FINANCIAL STABILITY REPORT 2019

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ISSN 0799 3617

Bank of Jamaica Financial Stability Report
prepared pursuant to subsection 34R of the Bank of Jamaica Act.

This publication available on the BOJ website at:
(http://boj.org.jm/publications/).

CONTENTS

ABBREVIATIONS AND ACRONYMS

ABM	Automated Banking Machine
ACH	Automated Clearing House
AFSI	Aggregate Financial Stability Index
BAML-GFSI	Bank of America Merrill Lynch Global Financial Stress Index
BINS	Benchmark Investment Notes
BIS	Bank for International Settlement
BN	Billion
BOJ	Bank of Jamaica
BPS	Basis Points
CAR	Capital Adequacy Ratio
CD	Certificate of Deposit
CIS	Collective Investment Schemes
CISS	Composite Indicator of Systemic Stress
CPI	Consumer Price Index
CRE	Credit Risk Exposure
CSD	Central Securities Depository
CY	Calendar Year
D-SIB	Domestic Systemically Important Bank
DTI	Deposit-taking Institution
DVBP	Dollar Value of a Basis Point
EMBI+	Emerging Market Bond Index
ERPS	Electronic Retail Payment Services
FSC	Financial Services Commission
FSR	Fiscal Stability Ratio
FSSC	Financial System Stability Committee
FX	Foreign Exchange
FUM	Funds Under Management
GDP	Gross Domestic Product
GI	General Insurance
GOJ	Government of Jamaica
GOJGB	Government of Jamaica Global Bonds
GWP	Gross Written Premium
HHI	Herfindahl-Hirschman Index
ICs	Insurance Companies
LI	Life Insurance
JDX	Jamaica Debt Exchange
JSE	Jamaica Stock Exchange
LSCRI	Large-Value System Concentration Risk Index
LCR	Liquidity Coverage Ratio
MaFI	Macro-Financial Index
MCCSR	Minimum Continuing Capital and Surplus Requirements
MCT	Minimum Capital Test
MiPI	Micro-Prudential Index
NDTFI	Non-Deposit-taking Financial Institution
NDX	National Debt Exchange
NIR	Net International Reserves

FSI	Financial Soundness Index
POS	Point-of-Sale
REER	Real Effective Exchange Rate
ROA	Return on Asset
ROE	Return of Equity
RTGS	Real-Time Gross Settlement System
RWA	Risk-Weighted Assets
SD	Securities Dealer
SIFI	Systemically Important Financial Institution
The Bank	Bank of Jamaica
VIX	Volatility Index
WTI	West Texas Intermediate
NOP	Net Open Position
NPL	Non-Performing Loan

FOREWORD

The maintenance of financial stability by the Bank of Jamaica (BOJ) primarily concerns the safeguard of conditions which ensure the proper and efficient functioning of the financial system and, consequently, the promotion of real economic activity. The financial system consists directly of three basic financial components: institutions, markets and infrastructure.[1] These components interact with each other as well as with other indirect participants in the system – such as households, nonfinancial corporations and the public sector – to allocate economic resources and redistribute financial risks.

Aside from the supervision of deposit-taking institutions (DTIs), BOJ is charged with the responsibility of ensuring that the overall financial system is robust to shocks and that participants are assured of its robustness. This entails making sure that financial institutions are sound. The maintenance of financial stability by the Bank also involves overseeing the efficient and smooth determination of asset prices, making certain that participants are able to honour promises to settle market transactions and preventing the emergence of systemic settlement risk arising from various financial imbalances that may develop within individual institutions or the system.

The Financial Stability Report 2019 provides an assessment of the main financial developments, trends and vulnerabilities influencing the stability of Jamaica's financial system during the year. The data utilized for the analyses are at end-September 2019 except in some instances where data were available for end-2019.

The Report covers:
i) an overall assessment of financial stability;
ii) macro-financial risks;
iii) financial system developments;
iv) financial system sectoral exposures;
v) risk assessment of the financial system; and
vi) payment system developments.

Comments and suggestions from readers are welcomed. Please email your feedback on this report to library@boj.org.jm.

[1] For the purpose of this report, financial institutions include banks, securities dealers and insurance companies. Financial markets include foreign exchange, money and capital markets. Financial market infrastructure refers to payment and securities settlement systems.

1.0 FINANCIAL STABILITY OVERVIEW

The Jamaican financial system remained stable for the review period. This outturn was underpinned by favourable domestic macroeconomic conditions, particularly low inflation, an improved labour market and a positive outlook on the future business environment.[1] These conditions facilitated continued expansion in the financial sector over the review year. Notably, deposit-taking institutions (DTIs) maintained sound asset quality and remained profitable. Additionally, non-deposit taking financial institutions (NDTFIs) continued to maintain adequate levels of capital (see **Chapter 3**). [2]

The outlook for the short to medium term includes a potential build-up of underlying risk associated with pressures on real and financial asset prices. Continued fiscal consolidation and accommodative monetary policy have facilitated strong levels of credit growth from the DTI sector. The ease in the lending environment is, however, slowly but steadily increasing the debt exposure of the household and corporate sectors, as underlying income growth has lagged. At the same time, a limited supply of investable assets in the market and search for yield across economic sectors are increasing systemic risks associated with common exposures across the financial system to similar asset classes (see **Chapter 4**).

Macro-financial environment

There were improvements in domestic macro-financial conditions over the review period. Specifically, financial uncertainties were generally lower compared to 2018. This was reflected in lower volatility in real and financial prices.[3] In addition, real economic activity in Jamaica continued to improve as reflected in positive GDP growth, a lower unemployment rate and strong performance of external accounts (see **Chapter 2)**.

Further, Bank of Jamaica (BOJ) maintained an accommodative monetary policy stance while the Government of Jamaica (GOJ) continued to reduce activity in the debt market. The actions of BOJ and the GOJ continued to support expansion in private sector credit (see **Chapter 5**).[4]

Despite improved macro-financial conditions in the domestic market, vulnerabilities due to developments in global markets persist. The global economy grew at a slower pace when compared to 2018 and contraction is expected in 2020 largely due to the impact of Covid-19. Since domestic financial conditions in the short to medium term depend on developments in international markets, a contraction in the global economy may likely dampen domestic financial conditions in the context of lower real sector demand and a fall-off in international capital flows (see **Chapter 2**).

1 Jamaica received credit rating upgrades from all three rating agencies during 2019.

2 Non-deposit-taking financial institutions include pension funds, collective investment schemes, securities dealers, life insurance companies and general insurance companies.

3 The volatility in bond yields and inflation volatility were lower in the review period. However, the foreign exchange market showed increased volatility.

4 The Bank reduced its policy rate 4 times by a total of 125 bps.

Financial system sectoral exposures

Exposures to GOJ debt, domestic real estate and equity are common across entities in the NDTFI sector. Within the context of reduced government debt, lower interest rates and a general search for yield, financial investment patterns reflected increases in equity and real estate investments. As a result, the combined exposure of pension funds and the insurance sector to the equity and real estate market is significant. Further, this exposure is magnified indirectly through positions in collective investment schemes.

DTIs credit to both businesses and households continued to expand. The exposure to household debt through personal loans remained the largest single asset exposure of DTIs. Nonetheless, credit quality of the DTI sector remained sound as reflected by low rates of non-performing loans (see **Chapter 4**).

Risk assessment of the financial system

The Jamaican financial system remained vulnerable to the spread of potential financial shock due to the degree of interconnectedness in the system. A significant amount of funding within the financial system occurs between entities within the same group. The size of these groups results in a high degree of concentration and risk of contagion within the system. Further, this interconnectivity and concentration among financial institutions increased relative to the previous reporting period.

Stress testing exercises of the financial network showed the potential for induced failures within conglomerate groups due to the extent of reciprocated intra-group funding relationships. These exercises also showed that members of financial groups are susceptible to a common financial shock and have the potential to create significant capital impairment to other entities in the group and the wider financial system (see Chapter 6).

DTIs and securities dealers are important sources of funding for the financial sector and are as well systemically important for the stability of the financial system. In further assessing the potential origination of financial distress and consequent contagion throughout the system, stress testing exercises showed that DTIs remained robust to the contemplated credit, liquidity and market- related shocks. However, securities dealers showed vulnerability to the interest rate and liquidity shocks administered, posing risks to their respective financial groups and to the broader financial system **(see Chapter 7).**

The strong growth in credit and corporate debt financing coupled with the general availability of investable funds was not reflected in real GDP growth. The continuation of which will create two separate vulnerabilities for systemic risk: that associated with inflated asset prices above fundamental value and that associated with debt profile of the household and corporate sector.

Outlook

The outlook for financial system stability is characterized by the benefits of asset diversification from deeper more efficient financial markets. Jamaica is undertaking various streams of initiatives to accomplish these goals. These include:

- BOJ's plan to implement a trading platform for foreign exchange sale among DTIs,

cambios and authorized dealers (ADs). The platform will allow users to view bid-ask prices within the market which will increase transparency and price efficiency. Efficiencies in the foreign exchange market will be further supported by the Bank's introduction of foreign exchange swap arrangements with Ads;

- A multi-agency project for formulating and supporting a platform to facilitate the trading of fixed income securities;
- The introduction by the Development Bank of Jamaica of an electronic platform to scale the use of reverse factoring of receivables as a source of financing;
- Amendments to the regulations governing the investment of pension funds that will widen the investment options available to the sector; and
- Developing regulations to facilitate Exchange-Traded Funds for the FY 2020/21 – 2021/22.

Developments in global markets could create uncertainties and risks for local financial stability. The global economy is projected to experience a contraction due to uncertainties in trade policy, geopolitical tensions as well as concerns posed by the outbreak of the COVID-19 virus. These developments are likely to have spillovers to the Jamaican economy through weaker aggregate demand.

Bank of Jamaica and the Financial Services Commission (FSC) continue to press ahead on key financial sector policies. Following a Financial Sector Stability Assessment Programme (FSAP) with the IMF, BOJ took the decision to revise the regulatory capital regime for licensees. This is in order to ensure that the capital requirements are fully risk based and consistent with international standards. Currently, work is being done by the Bank to determine new capital regulations for DTIs based on Basel II/III requirements, after which new capital adequacy regulation will be introduced.

Concurrently, BOJ is undertaking efforts to improve its group-wide supervision of financial entities. The Bank is enhancing its supervisory body of knowledge in an effort to effectively undertake risk-based supervision. It is, as well, collaborating with other supervisors across the region to develop a memorandum of understanding for regional information-sharing.

Moreover, as the BOJ continues to align its regulatory framework with international best practices to enhance Jamaica's regulatory landscape, the year-long phasing in of the LCR began in October 2019. There is an initial minimum requirement of 75.0 per cent that will be increased to 100.0 per cent in October 2020.

In addition, in carrying out its mandate of ensuring financial system stability, BOJ is developing a suite of potential macroprudential policy tools.

The FSC also plans to undertake a number of initiatives that are aimed at strengthening the regulatory and supervisory framework for Insurance Companies, Securities Dealers and Pension Funds. Subsequent to the amendment to the FSC Act, regulations and supervisory practices for group-wide supervision of NDTI financial groups will be developed for the financial years (FY) 2020/21 to 2021/22.

In addition, Regulations 28 and 29 for insurance companies will be revised to allow for greater

alignment with international core principles.[5] There will also be the strengthening of regulatory framework for Virtual Assets and Virtual Asset Service Providers, through additional amendments to the FSC Act and other relevant statutes. [6] For the pension funds sector, there should be the enhancement of Risk Management and Reporting Framework for Pension Fund Managers in FY 2020/21 – 2021/22.

Jamaica is also at an advanced drafting stage of its Special Resolution Regime as it relates to financial institutions and their connected parties.

Subsequent Events

It is anticipated that the outbreak of Covid-19 will have implications for the domestic financial markets, the financial system as well as the wider macro-economy. Any substantial volatility in the financial markets will lead to market illiquidity as reduced trading activity throughout the financial sector could lead to material declines in asset prices. Furthermore, deterioration in investor confidence could have a knock on effect in amplifying this potential volatility in financial markets.

Due to the macro financial linkages which exist within the Jamaican economy, there is the potential for weakened financial institutions' balance sheet and profitability performance, given the impending pandemic. Any significant fall-off in economic activity will fuel vulnerabilities in the financial system which could be manifested through reduced demand for credit, higher non-performing loans and lower deposit levels. Within this environment, financial institutions would also likely face higher revaluation losses and increased counterparty risks. During systemic events of this nature, financial institutions may need access to additional sources of liquidity.

Among the measures that would be implemented to address the potential Jamaica Dollar illiquidity for DTIs include offering longer term repos, reverse foreign currency swaps, reducing the domestic currency cash reserve requirement as well as removing the excess funds rate and the limit on the Standing Lending Facility. In addition, tools will be implemented to address possible Jamaica Dollar liquidity needs for securities dealers. These would include an Emergency Liquidity Facility as well as secondary market purchase of GOJ domestic currency securities. Furthermore, the Bank will continue to evaluate financial market conditions and take necessary steps to minimize disorder in the financial system.

5 These regulations cover the Minimum Capital Test (MCT), Minimum Continuing Capital and Solvency Requirements (MCCSR) and the Actuarial Regulations.

6 The term 'virtual asset' refers to any digital representation of value that can be digitally traded, transferred or used for payment.

2.0 MACRO–FINANCIAL RISKS

This chapter examines the financial risks associated with developments in macroeconomic factors.

2.1 Overview

There were broad-based improvements in the macro-financial environment for the year ended September 2019 as reflected by the developments in key macroeconomic and financial system indicators. Specifically, there was growth in both the global and domestic economy, as well as a decrease of volatility in international financial markets. As a result, risks to domestic financial stability remained benign. Measures such as the Aggregate Financial Stability Index (AFSI), the Macro Financial index (MaFI) and the Micro Prudential index (MiPi) were stable over the review period and remained below what obtained during the crisis periods.

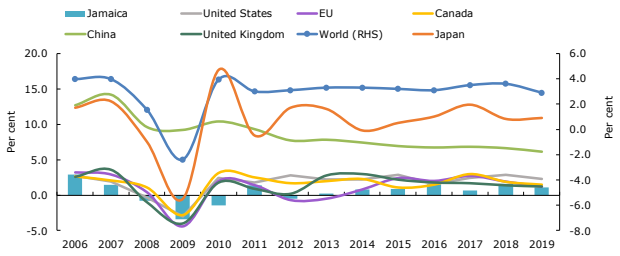
The BOJ's continued accommodative monetary policy as well as favourable liquidity conditions resulted in strong credit growth. In addition, coincident indicators of the financial cycle did not show any over-extension of leverage or excessive growth in maturity transformation undertaken by financial entities.

Notwithstanding these developments, there were increased systemic risks associated with common exposures. These stemmed from heightened co-movement in performance in domestic financial markets, largely due to increases in exposures from the bond and equity markets as well as returns in the foreign exchange market.

2.2 Global developments

Risks emanating from the global environment were generally unchanged for the review period. Notable characteristics of the global economy included decreased volatility in financial markets as well as reduced financial stress. However, the global economy grew at an estimated 2.9 per cent for 2019 relative to growth of 3.6 per cent for 2018.[1]

Figure 2.1 GDP growth rates of selected countries

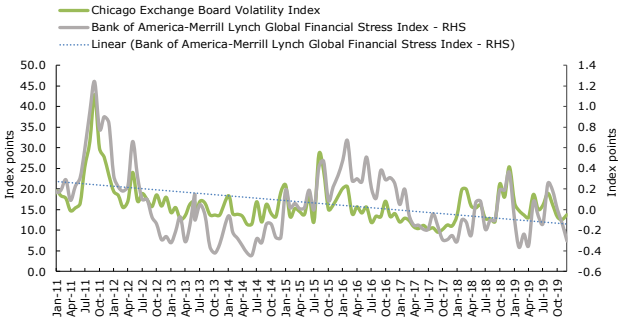


Source: IMF World Economic Outlook

Figure 2.2 West Texas Intermediate oil prices

Source: Bloomberg

Figure 2.3 International financial market indicators



Source: Bloomberg

Note: (i) The BAML-GFSI is a calculated, cross market measure of risk, hedging demand and investor flows in the global financial system. Values greater than 0 indicate more financial market stress than normal while values less than 0 indicate less financial stress than normal. (ii) The VIX reflects a market estimate of future volatility, based on the weighted average of the implied volatilities for a wide range of strikes. An increase in the VIX index indicates increased volatility.

[1] See IMF World Economic Outlook Update October 2019.

Figure 2.4 Selected domestic macroeconomic indicators

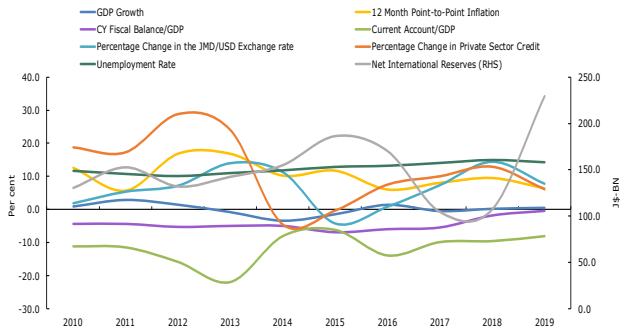
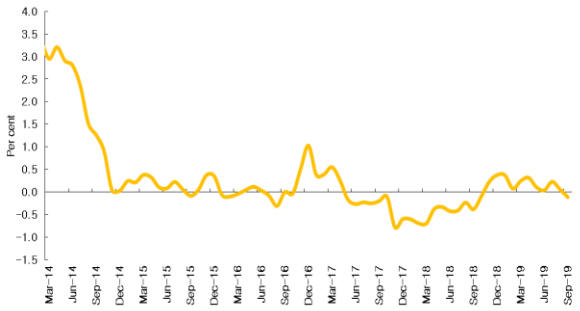
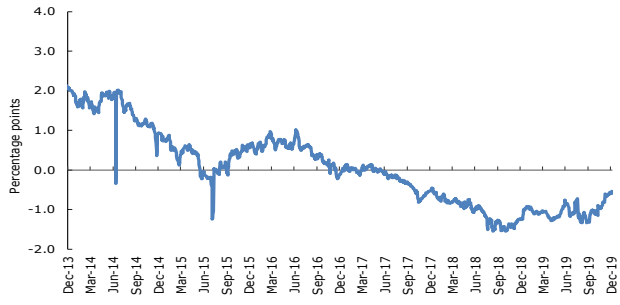


Figure 2.5 TRE spread



Note: The TRE spread measures the premium priced in the repo rate for default risk and is computed as the difference between the 30-day private money market repo rate and the 30-day T-bill rate.

Figure 2.6 Spread between GOJ global bonds and EMBI+



Source: Bloomberg

The slower economic growth reflected deceleration across several advanced and emerging economies (see **Figure 2.1**).[2] In particular, the USA, UK, EU, Canada and China experienced a slower pace of growth for 2019 relative to 2018. The global outturn occurred within the context of falling oil prices. Specifically, West Texas Intermediate (WTI) oil prices decreased by 11.9 per cent to an average of US$57.03 per barrel for 2019 (see **Figure 2.2**).

Volatility in the global financial market decreased for 2019, as measured by the Chicago Board Options Exchange Volatility Index (VIX) (see **Figure 2.3**). The Bank of America Merrill Lynch Global Financial Stress Index (BAML-GFSI) also indicated a reduction in financial stress during the review year. However, heightened financial market stress was evident in the March and June quarters, resulting from political and increasing global trade tensions.

2.3 Domestic environment

Macroeconomic conditions in Jamaica improved for the review period. There was real growth in GDP of 0.6 per cent for the year ended September 2019 notwithstanding slightly higher inflation. Additionally, there were improvements in the fiscal position, the net international reserves (NIR) and the unemployment rate (see **Figure 2.4**). In particular, the unemployment rate was 7.2 per cent as at October 2019, reflecting improved labour market conditions.

The annual point-to-point inflation was 3.4 per cent for September 2019 relative to 2.4 per cent for

[2] Growth in the USA largely reflected positive contributions from personal consumption expenditure, private inventory investment and government spending. The slowing in EU growth was reflective of, weaker external demand and domestic risks related to Brexit and high-debt EU members. China's outturn was attributed to weaker foreign trade positions and slower credit growth as well as higher tariffs. Canada's deceleration in growth was attributed to weaker consumer spending and tighter monetary policy in other countries. The UK's marginal decline reflected losses in services output and industrial production as well as continued uncertainty surrounding Brexit.

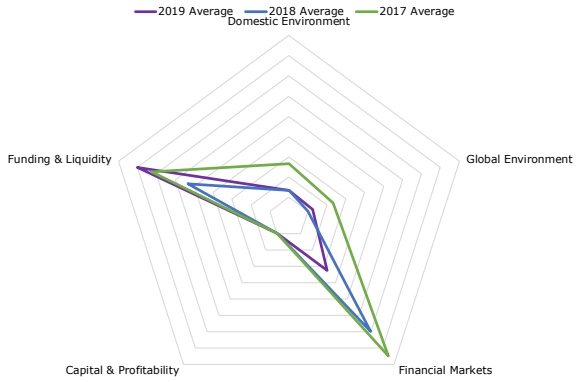
September 2018. Notably, for most of the review period, inflation fell below the Bank's medium-term target of 4.0 per cent to 6.0 per cent. Also, the Jamaica Dollar vis-à-vis the United States dollar depreciated by 3.8 per cent for 2019 relative to depreciation of 2.2 per cent for the prior year. This outturn was largely due to strong JMD liquidity and episodes of increased end-user demand for both portfolio and real sector purposes.

Overall liquidity conditions remained strong over the review period (see **Figure 2.5**). This was reflected in the widening of the average monthly TRE spread which was -0.1 per cent comparable to -0.4 per cent for 2018. In addition, the spread between GOJ Global Bonds (GOJGB) and the Emerging Market Bond Index (EMBI+) continued to narrow over the review period (see **Figure 2.6**). The observed improvements in Jamaica's economic and financial conditions contributed to increased investors' confidence in GOJGB and lower bond yields.

2.3.1 Cobweb measure of financial stability

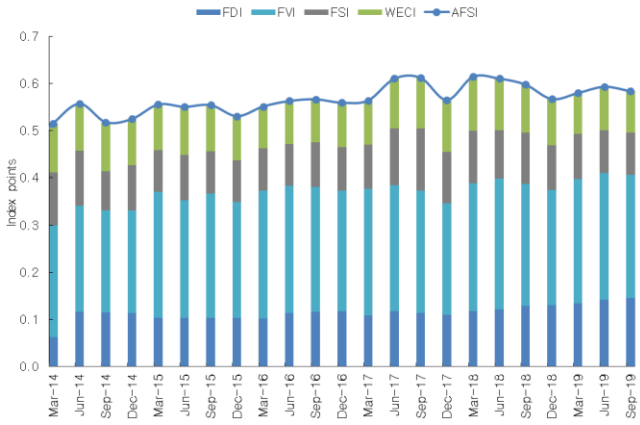
Risks to financial stability were generally lower in the 2019 review period. In particular, there was a reduction in risks in the Financial markets dimension of the cobweb measure of financial stability, the impact of which was partially offset by an increase in the risks in the Funding & Liquidity dimension (see **Figure 2.7**). All other dimensions showed unchanged risks. The reduction in risk exposure from the Financial markets dimension was largely due to strong domestic stock market performance, improvements in global equity returns and narrowing foreign exchange spreads.

Figure 2.7 Financial stability cobweb



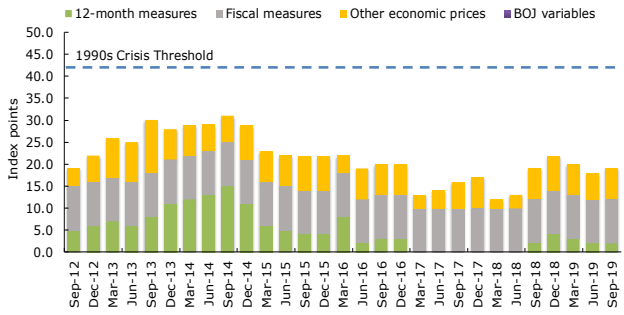
Note: The domestic macroeconomic environment, financial market conditions and the global environment indicators identify the systemic shocks that would trigger major difficulties for financial institutions. The capital & profitability and the funding & liquidity indicators reflect the capacity of financial institutions to absorb a shock to either side of their balance sheets. Movements away from the centre of the diagram represent an increase in the risk to financial stability. Movements towards the centre of the diagram represent a reduction in financial stability risks.

Figure 2.8 Aggregate financial stability index



Note: The AFSI aggregates microeconomic, macroeconomic and international factors to form a single measure of financial stability. A higher value indicates increased financial stability while a lower value indicates deterioration in financial sector stability. Of importance, microeconomic data captures information for DTIs. FDI - Financial Development Index, FVI - Financial Vulnerability Index, FSI - Financial Soundness Index, WECI - World Economic Climate Index

Figure 2.9 Macro-financial index



Note: The MaFI & MiPI are signal-based indices computed using scores for indicators based on the number of standard deviations of each indicator from its 'tranquil period' mean value. The tranquil period for both indices spans the period March 2002 to March 2003. The scores range from 0 to 5 with a score of 5 representing the most severe signal. The higher the aggregate score, the more severe the signal.

Figure 2.10 Micro-prudential index for DTIs

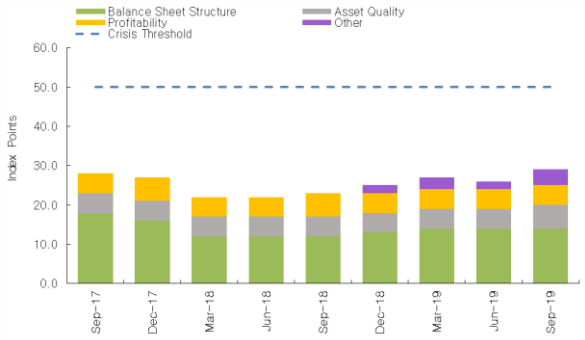
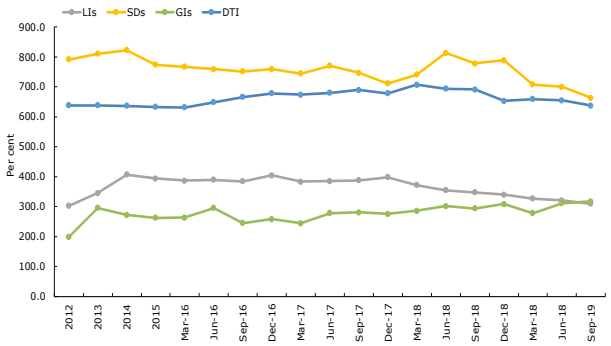


Figure 2.11 Leverage metric – DTIs, SDs and ICs



Note: Leverage is calculated as total financial assets to equity. DTI values prior to September 2016 are calculated as the average of the ratios of each DTI sub-sector. After September 2016, sector balances are first aggregated and a single ratio then computed. An increase in this indicator signals higher risks.

2.3.2 Macro-composite indicators of financial stability

The global and domestic macro-economic environment supported the stable performance of the macro-composite indicators of financial stability during the review period. Domestic financial conditions, as measured by the Aggregate Financial Stability Index (AFSI), which includes microeconomic, macroeconomic and international factors, showed relative stability for the year ended September 2019.[3] Specifically, the AFSI remained at a quarterly average of 0.6 (see Figure 2.8).

Although the AFSI was relatively unchanged, there was a weakening in the financial soundness and financial vulnerability sub-indices the impact of which was offset by an improvement in the financial development sub-index. The favourable outturn in the financial development sub-component was due to positive developments in the credit environment, increased stock market capitalization, narrowing of interest rate spreads and growth in overall financial system assets. Improvement in the financial development sub-index indicates a strengthening in the ability of banks to carry out their intermediation functions.

The Macro-Financial Index (MaFI), a composite indicator that captures macro-economic conditions, was also unchanged at 19.0 points at end-September 2019, relative to end-September 2018 (see Figure 2.9). Of note, the MaFI remained well below the 1996-1998 financial crisis threshold value of 44.0 points.

[3] See: Morris, V., Measuring and Forecasting Financial Stability: The Composition of an Aggregate Financial Stability Index for Jamaica, 2010. http://boj.org.jm/uploads/pdf/papers_pamphlets/papers_pamphlets_Measuring_and_Forecasting_Financial_Stability__The_Composition_of_an_Aggregate_Financial_Stability_Index_for_Jamaica.pdf

2.3.3 Micro-composite indicators of financial stability[4]

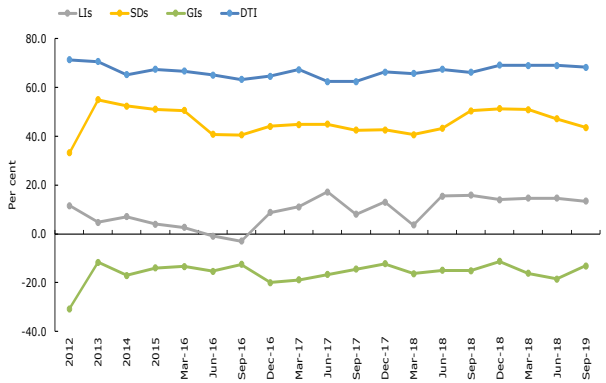
The Micro-prudential Index (MiPI), a composite indicator based on financial institutions' operations, increased to 30.0 points as at end-September 2019 from 23.0 points at end-September 2018. However, the MiPI remained far below the 1996-1998 financial crisis threshold value of 50.0 points (see Figure 2.10). Of note, the outturn in the MiPi was positively impacted by the performance of key domestic indicators such as continued declines in interest rates, improved level of employment as well as continued GDP growth. Against this background, there was improvement in the average quarterly signal for indicators from the profitability category. However, the impact of this performance was more than offset by deterioration in the balance sheet structure and asset quality categories as well as in the 'other' category.[5]

2.4 Measures of financial cycle

2.4.1 Financial sector leverage

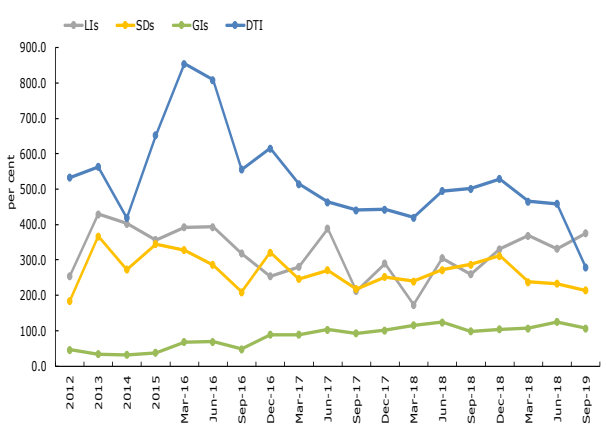
The leverage metrics for general insurance (GI) companies, DTIs and SDs increased for the year ended September 2019. This was attributable to larger growth in total financial assets and off-balance sheet exposures relative to the increase in equity (see Figure 2.11). Meanwhile, life insurance (LI) companies showed decreased leverage at end-September 2019, when compared to end-September 2018, due to a greater than proportional increase in equity relative to total financial assets.

Figure 2.12 Maturity transformation (long-term) – DTIs, SDs and ICs



Note: Maturity transformation is calculated as long-term assets less long-term liabilities and nonredeemable equity divided by total financial assets. An increase in this indicator signals higher risks.

Figure 2.13 Liquidity transformation – DTIs, SDs and ICs

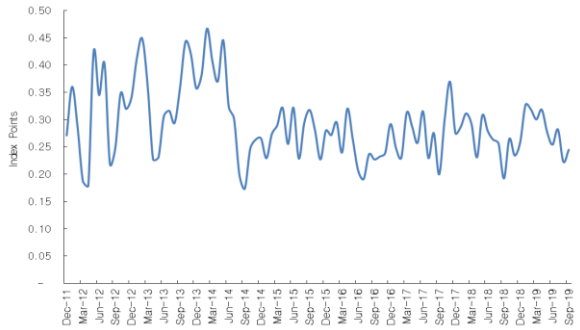


Note: Liquidity Transformation is calculated as short term liabilities [≤ 30 days] divided by liquid assets. Liquid assets include high quality liquid assets, such as cash and equivalents, short-term investments and government securities with a 0% risk-weight. An increase in this indicator signals higher risks.

[4] The MiPI is an early warning composite indicator. The current period value of various indicators is compared relative to tranquil period mean values. The number of standard deviations away from the mean is then used to assign risk scores of 1-5.

5 The "other" component is made up of FX liabilities/Assets, FX Deposits/FX Assets and 12-month growth in deposits.

Figure 2.14 Composite indicator of systemic stress



Note: The CISS measures the joint impact of activity in the money, equity, bond and foreign exchange markets. An increase in the CISS indicates a high degree of correlation between markets which aggravates systemic risk. When the correlation between markets is low the risk is reduced.

Figure 2.15 Quarterly distance-to-default for DTIs and non-deposit taking financial institutions

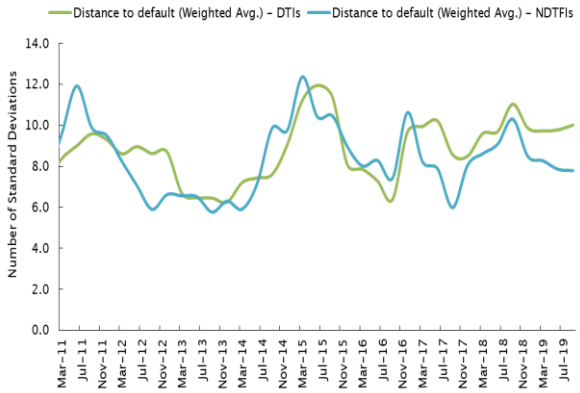
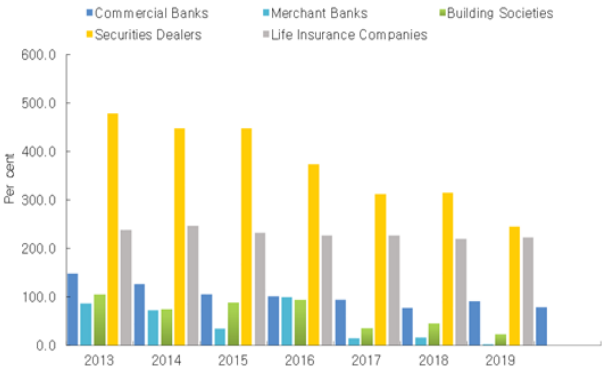


Figure 2.16 Ratio of holdings of total GOJ securities as a share of capital by DTIs, SDs and LI companies



2.4.2 Maturity and liquidity transformation

As it relates to maturity transformation, risks emanating from the mismatch of the maturity of long-term assets and liabilities marginally increased for the DTIs and General insurance sub-sectors but declined for the Life insurance and securities dealers sub-sectors (see Figure 2.12). The outturns for the DTI and GI sub-sectors mainly reflected growth in long-term assets relative to long-term liabilities. Meanwhile, the outturn for LI and SDs resulted from a larger than proportional increase in long-term liabilities relative to growth in long-term assets.

Liquidity transformation improved across SDs, GI and DTIs but deteriorated for LI. The performance of the LI sub-sector reflected larger than proportional declines in liquid assets relative to short-term liabilities. Meanwhile, the outturn for DTIs, GIs and SDs was mainly due to growth in liquid assets, which exceeded the pace of growth in short-term liabilities (see Figure 2.13).

2.5 Measures of direct and indirect exposure concentration

2.5.1 Exposure to financial markets

There was an increase in the co-movement of domestic financial markets for the review period as measured by the Composite Indicator of Systemic

Stress (CISS).[6] The CISS rose to 0.24 points as at end-September 2019 from 0.19 points as at end-September 2018 (see Figure 2.14). This was primarily reflected increased exposures from the bond and equity markets as well as greater exposure to returns in the foreign exchange market.

2.5.2 Exposure to financial markets

The distance-to-default for DTIs decreased to 10.0 standard deviations at end-September 2019 from 11.0 standard deviations at end-September 2018 (see Figure 2.15).[7] This deterioration was associated with large growth in market values of stocks in the September 2019 quarter, as well as higher than usual asset volatility. However, expected returns for DTIs' equities were relatively unchanged for the review period.

Similarly, the distance-to-default for the NDTFIs decreased over the review period, reflecting an increase in default risk across the sector. Of note, this default measure decreased to a quarterly average of 8.1 standard deviations from the default barrier for the year to September 2019 from 9.0 standard deviations at end-September 2018.[8]

The banking system's exposure to sovereign debt instruments, as measured by DTIs holdings of GOJ securities to capital, showed a general decline at end-September 2019, relative to end-September 2018 (see Figure 2.16).[9] Specifically, the ratio for commercial banks fell to 78.3 per cent from 91.1 per cent. The ratio for SDs also decreased sharply to 244.7 per cent from 313.9 per cent. Additionally, the ratios for the merchant bank and building societies decreased to 2.6 per cent and 21.5 per cent from 17.2 per cent and 44.3 per cent, respectively. Conversely, LI exposure to sovereign debt default risk increased for the review period in comparison to end-September 2018.

2.6 Macro-financial forecast

This analysis utilizes an accounting framework to assess the consistency between Jamaica's macroeconomic programme and the solvency of the commercial banking sector. Projections of the commercial banking sector's profit and loss account and balance sheet rely on forecasts for interest rates, as well as the fiscal, real and monetary sectors. These projected inputs feed into the commercial banks P&L, which generates a path for profitability. The share of profit that is pumped back into the capital base is determined by the historical payout ratio, which in turn determines capital build-up and capital adequacy.

It is important to note that provisions against credit risk are a key element in the projections of commercial banks' P&L accounts. The path of these

[6] See: Milwood, T., A Composite Indicator of Systemic Stress (CISS): The Case of Jamaica, Bank of Jamaica, 2014.
http://www.boj.org.jm/pdf/A_Composite_Indicator_of_Systemic_Stress_(CISS)_The_case_of_Jamaica_(2014).pdf

[7] The distance to default measure can only be computed for companies listed on the Jamaica Stock Exchange.

[8] The distance-to-default measures the distance (in standard deviation) of an institution's contingent assets to its default barrier (which is defined as the sum of short-term liabilities and one-half long-term liabilities).
See: Lewis, J., A Contingent Claims Approach to Measuring Insolvency Risk: An Empirical Assessment of the Impact of the Global Financial Crisis on Jamaica and its Financial Sector, 2012.
http://www.ccmf-uwi.org/files/publications/journal/2012_2_7/1_22.pdf

[9] GOJ securities include Government of Jamaica Treasury Bills, Local Registered Stock and all other domestic currency securities as well as foreign currency securities.

provisions relies heavily on the projected path of NPLs. Dynamic panel econometrics was used to analyze the sensitivity of bank-level NPLs to GDP. The model predicted continued low NPL ratios for the commercial banking sector which was consistent with the projected GDP growth.

The results of the projections for the commercial banks' medium-term profit & loss accounts for FY 2019/20 to FY 2021/2022 showed a gradual reduction in CAR despite a projected increase in net profits. The forecasted growth in net profits largely reflected projected increases in Net Commissions Received as well as interest income earned on Loans & Advances. Notwithstanding the projected reduction in the CAR, this ratio remained above the prudential limit of 10.0 per cent throughout the projection period.

Furthermore, five stress scenarios were applied to the three-year projection period. These stress scenarios included:

i. An inflation shock that was three times the projected inflation rate for FY 2019/20 to FY 2021/2022;
ii. A recession scenario which shows a quarterly decline of 2.0 per cent in GDP and contributes to a 10.0 per cent decline in both Loans & Advances and Deposits;
iii. A foreign exchange shock scenario, which involved a 20.0 per cent depreciation of the projected value of the Jamaica Dollar versus the United States dollar;
iv. An interest rate shock scenario, which was a reversal to the higher interest rates of FY 2011/12 to FY 2012/2013; and
v. An aggregate shock which was a combination of all the shocks outlined above, except the interest rate shock.

The commercial banking sector was resilient to these shocks, largely due to strong capital positions. Post-shock CAR values remained above 10.0 per cent in all instances.

Box 2.1 GDP Growth and Financial Vulnerabilities: A Growth at Risk Assessment for Jamaica

The growth at risk (GaR) methodology explores the extent to which future economic growth faces downside risks from financial vulnerabilities. Using a quantile regression approach, the framework links prevailing macro-financial conditions to the entire probability distribution of future GDP growth. Additionally, it provides an instrument for macro-financial surveillance purposes given its ability to identify key drivers of future GDP growth as well as quantify the likely impact of systemic risk. In the Jamaican context, results indicate that a tightening of both the domestic financial conditions and the economic performance of Jamaica's major trading partners are the main contributors of downside risks to growth.[1] Further, the easing of macro-vulnerabilities and leverage as well as improvements in global financial conditions were found to have a positive impact on Jamaica's growth outlook.

There has been increasing focus on financial stability following the impact of the US financial crisis in 2007-2008 that transitioned into a global economic crisis. Generally, financial crises can significantly affect the real economy and cause shocks to be amplified and transmitted across multiple channels. When financial vulnerabilities persist in any economy prior to a recession this may cause an increase in the severity and the duration of an impending recessionary period. The GaR framework can be utilized to identify and quantify linkages within the system as well as possess strong predictive capabilities.

Recent research on systemic risk have used financial conditions to forecast the probability distribution of future GDP growth at different horizons through quantile projections.[2] The quantile regression estimates potentially 'non-linear' relationships between the quantiles of future growth and its explanatory variables which reflect, but are not limited to, financial conditions and macro-financial vulnerabilities. The International Monetary Fund has done assessments using the GaR model in various countries. For example, in Panama the model found that accommodating financial conditions support economic growth in the near-term, but can contribute to the build-up of financial imbalances overtime, putting economic growth at risk.[3]

The GaR is a non-structural model that was designed to gauge the likelihood of negative macro-economic outcomes given existing macro-financial conditions. It is an Excel-based tool which incorporates the Python coding language that carries out estimations, optimizations, distribution fit, simulations and plots. The tool quantifies macro-financial risks to future GDP growth, uses financial and economic indicators to identify macro-financial linkages and gauges financial vulnerabilities. This tool is a flexible forecasting framework that can, inter alia, estimate the severity and the likelihood of a future recession. It also allows policymakers to link the entire distribution of future growth to the state of prevailing financial

[1] See Boothe, D. and Moulton, A., "GDP Growth and Financial Vulnerabilities: A Growth at Risk Assessment for Jamaica", Bank of Jamaica, 2019

[2] See Tay & Wallis (2000); Komunjer (2013); Corradi & Swanson (2006) and De Nicolo & Lucchetta (2017).

[3] See IMF (2018), Panama – Selected Issues, IMF Country Report No. 19/12.

conditions, which enhances macro-financial surveillance capabilities by:

- drawing attention to the entire growth distribution of future GDP
- assessing which financial and macro-financial variables are the key drivers of future GDP growth and
- quantifying the impact of systemic risk on future GDP growth.

The GaR framework is comprised of three steps; macro-financial variable selection, quantile regression analysis and fitting conditional growth distributions (see Figures 1 and 2). The conditional distribution of future GDP growth is derived by fitting a t-skew distribution to predicted values of the estimated conditional quantile regressions.[4]

Figure 1 Step 1: Macro-financial variable selection

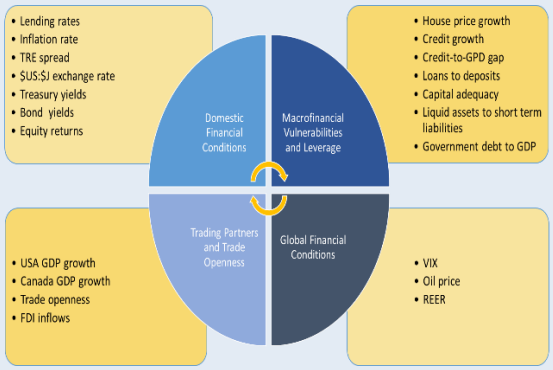


Figure 2 Step 2: Quantile regression

The quantile regression model is estimated:

$$y^q_{t+h} = \alpha^q + \sum_{i \in P} \beta^q_i X_{i,t} + \varepsilon^q_{t+h} \quad (1)$$

Expanded to:

$$y^q_{t+h} = \alpha^q + \beta^q_y y_t + \beta^q_f f_t + \beta^q_l l_t + \beta^q_r r_t + \beta^q_g g_t + \varepsilon^q_{t+h} \quad (2)$$

where:

y^q_{t+h} represents future real GDP growth rate, h quarters ahead for quantile q; y_t - current quarterly real GDP growth rate; f_t - domestic financial conditions; l_t - macrofinancial vulnerabilities and leverage, r_t - macroeconomic conditions of major trading partners and trade openness; g_t - global financial conditions; and ε^q_{t+h} - the residual term which is quantile dependent for each quantile regression.

Table 1 Variable descriptions and sources

Variables	Description
Average weighted lending rate	Average weighted lending rates for commercial banks
Inflation rate	Quarterly change in inflation rate
TRE spread	Difference between the 30-day private money market rate and the 30-day T-bill rate
Exchange rate	Quarterly change in the average weighted US:JMD exchange rate
Treasury yields	GOJ 180-day T-bill yield
Bond yields	Quarterly weighted average yield on all GOJ bonds
Stock market returns	Quarterly change in JSE Main index
Total credit growth	Quarterly change in total credit to GDP ratio
Credit to GDP gap	Total credit to GDP gap
Loans to deposits ratio	Loans to deposits ratio for commercial banks
Total government debt to GDP	Total government debt relative to GDP
Capital adequacy	Capital adequacy ratio for commercial banks
Liquid assets to short term liabilities	Liquid assets to short term liabilities for commercial banks
Residential real estate prices	Quarterly change in residential real estate price index for Kingston Metropolitan Area
USA - GDP growth	Quarterly GDP growth in the USA
Canada - GDP growth	Quarterly GDP growth in Canada
Trade Openness	The sum of imports and exports relative to GDP
FDI inflows	Quarterly FDI inflows
Oil prices	WTI oil prices
Global volatility index	Global volatility index
Real effective exchange rate	Quarterly real effective exchange rate

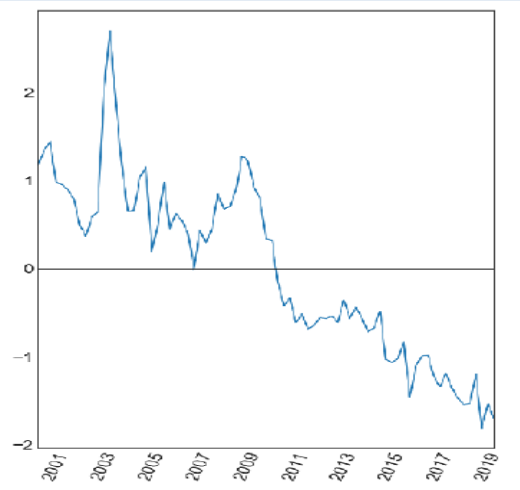
When the GaR tool was applied to the Jamaican economy the explanatory variables were divided into four partitions; domestic financial conditions, trading partners & trade openness, macro-vulnerabilities & leverage, and global financial conditions (see Table 1). Each of the created indices were able to capture the effects of the global financial crisis as well as some other periods of stress (see Figure 3). The most influential variables included bond yields, treasury yields and average weighted lending rate from the domestic financial conditions partition as well as capital adequacy, total credit, and loans to deposits ratio from the macro-vulnerabilities & leverage partition. As it relates to the trading partners & trade openness partition, FDI inflows and trade openness were most significant while the REER and oil prices were influential from the global financial conditions partition (see Figure 4). Overall, the GaR framework identified global financial conditions, domestic financial conditions and developments with major trading partners and trade openness as major risk

[4] see Adrian, Boyarchenko, and Giannone, (2019).

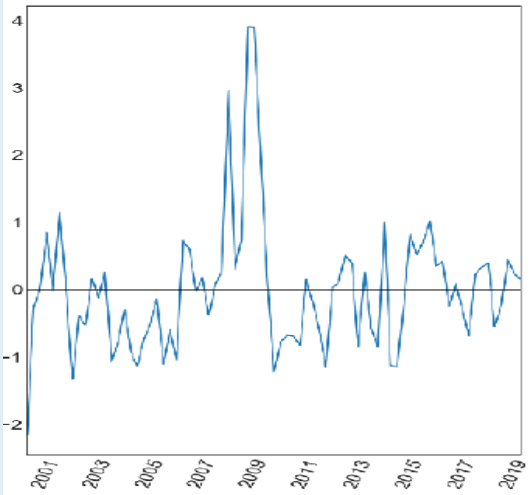
factors that can lead to tail outcomes in terms of GDP growth.

Figure 3 GaR Jamaica partitions

Domestic Financial Conditions



Trading Partners and Trade Openness



Global Financial Conditions

Macro-vulnerabilities and Leverage

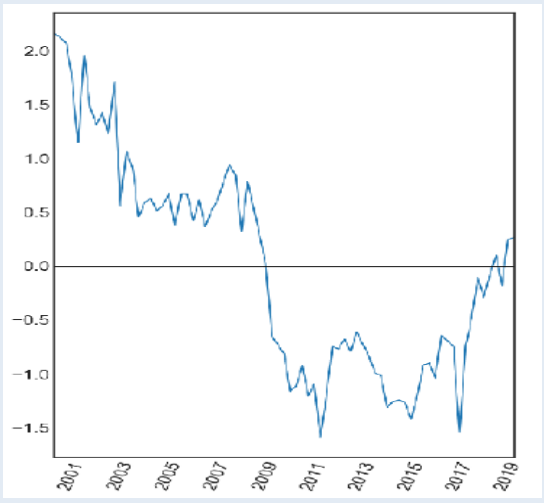
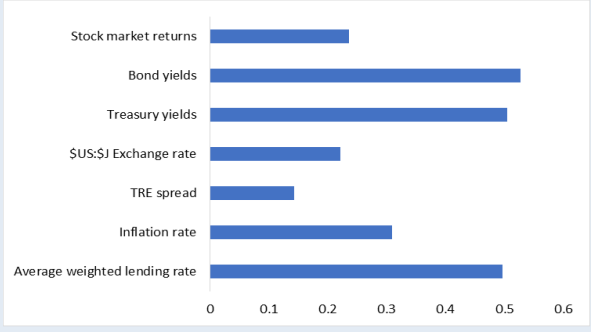
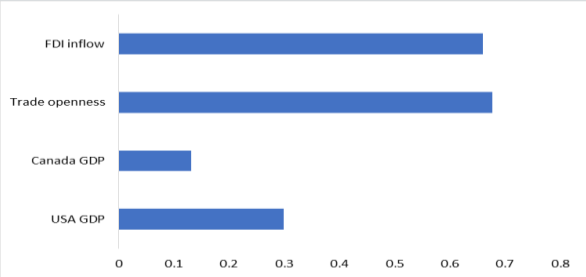


Figure 4 GaR Jamaica factor loadings

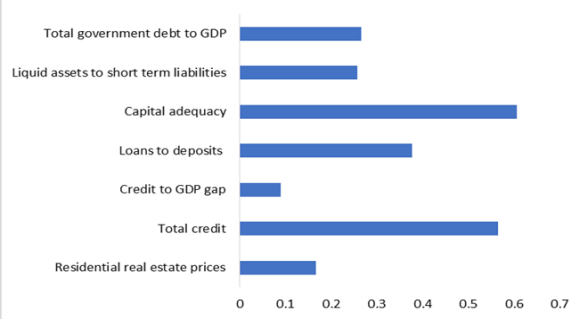
Domestic Financial Conditions



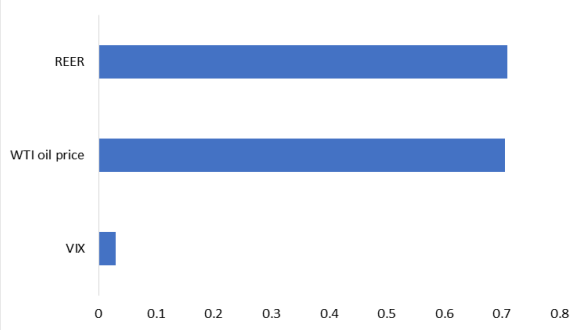
Trading Partners and Trade Openness



Macro-vulnerabilities and Leverage



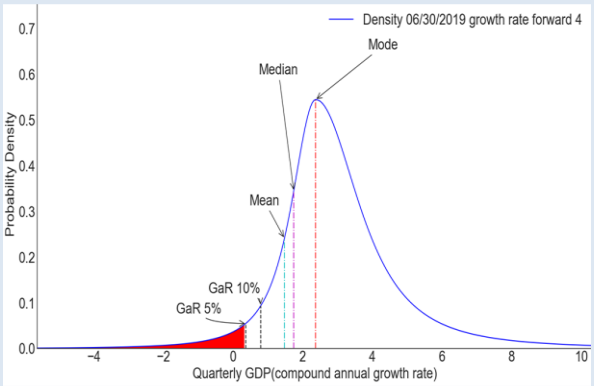
Global Financial Conditions



Results of the quantile regression suggested that the different dimensions of macro-financial variables had divergent effects on the growth forecast depending on the forecast horizon. Global financial conditions had a strong positive relationship with future growth, especially at the left tails of the growth distribution. Domestic financial conditions partition was negatively correlated with future growth, particularly at the lower tail for the one-year horizon. Notably, the accommodative monetary policy stance in Jamaica could explain this outturn, which is consistent with the literature, whereby loose financial conditions today could negatively affect growth through different channels. The trading partners and trade openness partition exhibited a strong negative correlation with future growth while macro-vulnerabilities and leverage was found to have a positive relationship with future growth, particularly at the right tail of the growth distribution in the medium-term and long-term.

When the conditional distribution was fitted, the GaR at 5% signaled GDP growth would fall below 0.37 per cent four quarters after June 2019 while the GaR at 10% saw GDP growth falling below 0.79 per cent for the same forecast period (Figure 5). These results coincided with the Sector Analysis Department of the Bank of Jamaica's point forecast for GDP growth at June 2020 which was 0.6 per cent.[5] The results also indicated that there was a 3.1 per cent probability of a recession.

Figure 5 Probability density of GDP growth four quarters ahead



[5] Forecast as at September 2019

Counterfactual scenario analysis was conducted using this framework to shock macro-financial conditions in order to assess how tail risks change and the likelihood of a recession (see **Table 2**). Based on the prevailing macro-financial conditions in Jamaica, a shock of a 1 standard deviation increase on bond yields was applied as well as on the domestic financial conditions partition. Following the shock on bond yields, the GaR at 5% showed that GDP growth would fall below -2.2 per cent four quarters ahead with a 22.3 per cent probability of a recession (see **Figure 6**). Meanwhile the shock on domestic conditions resulted in the GaR at 5% forecasting GDP growth to fall below -1.2 per cent four quarters ahead with a 12.3 per cent probability of a recession (see **Figure 7**).

The results of the GaR assessment on Jamaica highlighted the importance of global financial conditions, domestic financial conditions and trade as leading indicators of risks to future GDP growth. In addition the results suggested the importance of remaining vigilant and building resilience especially as it relates to the domestic financial conditions.

Overall, the GaR model identified moderate risks to growth, largely in keeping with the current state of the domestic economy. The framework can play a significant role in the decision-making process related to financial crisis preparedness and management. Specifically, the model allows for the timely detection of systemic build-up. Therefore, policymakers should be ready to apply the appropriate macro-prudential policy response should these threats escalate.

Table 2 Density quantification of selected shocks to GDP growth four quarters ahead

Source of risk	Relative likelihood compared with the no-shock scenario	Simulated shock (in standard deviations/ percentages)	No-shock and counterfactual probability of a recession
Weaker than expected growth in main trading partners	LOW	-1 std. dev. shock to USA GDP growth	3.1% | 14.5%
Sharp tightening of domestic financial conditions	MEDIUM	+2 std. dev. shock to domestic financial conditions	3.1% | 28.7%
Sharp tightening of global financial conditions	LOW	+2 std. dev. shock to global financial conditions	3.1% | 18.6%
Increase in oil prices	MEDIUM	5% increase in oil prices	3.1% | 37.1%
Increase in lending rates	LOW	10% increase in average weighted lending rate	3.1% | 15.2%
Increase in inflation rate	LOW	+1 std. dev. shock to inflation rate	3.1% | 10.8%
Depreciation in exchange rate	MEDIUM	+2 std. dev. shock to exchange rate	3.1% | 25.6%

Figure 6 Raw variable counterfactual scenario analysis of +1 standard deviation shock on bond yields[6]

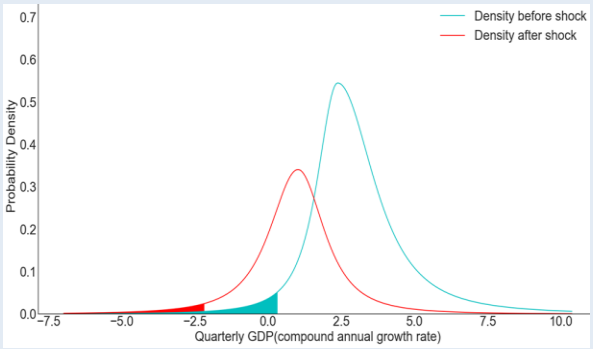
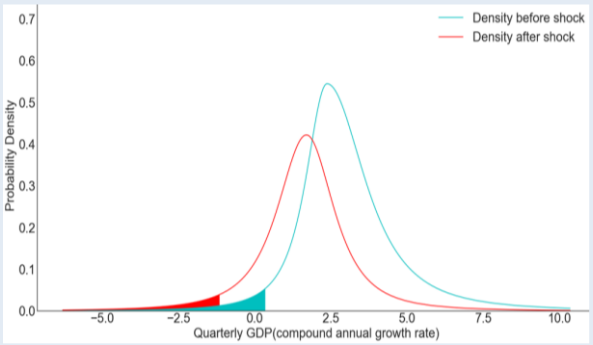


Figure 7 Partition counterfactual scenario analysis of +1 standard deviation shock on domestic financial conditions



[6] Raw variable refers to a variable that is part of a partition.

3.0 FINANCIAL SYSTEM DEVELOPMENTS

This chapter describes the major developments in sub-sectors within the financial system.

3.1 Overview

Jamaica's financial sector continued to expand over the review year. In particular, the DTI sector demonstrated continued positive performance in terms of profitability and asset quality. Additionally, financial soundness indicators signaled that DTIs continued to maintain adequate levels of capital and liquidity during the review period ended September 2019.

Within the NDTFI sector, the SDs' profitability at end-September 2019 increased over the corresponding period for 2018 as reflected by both return on assets (ROA) and return on equity (ROE). Similarly, there was an improvement in the capital adequacy ratio for the sector. As it relates to the overall insurance sub-sector, there was continued satisfactory levels of solvency. However, insurance penetration remained low.

3.2 The financial system

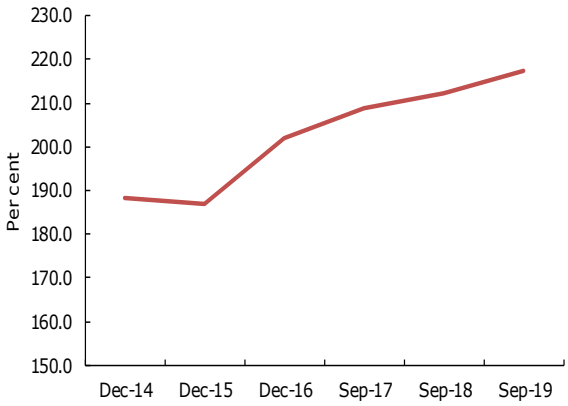
Jamaica's financial system deepened as total financial institutions' assets as a share of GDP increased relative to the previous review period (see Figure 3.1). The ratio increased to 218.1 per cent at end-September 2019 from 211.5 per cent at end-September 2018. This positive performance was primarily due to stronger growth in financial system assets relative to growth in GDP.

3.3 Deposit-taking institutions

3.3.1 Market share of deposit-taking institutions

Within the DTI sector, commercial banks remained the dominant sub-sector with the largest market share. The share of commercial bank asset to total DTI asset increased marginally to 91.2 per cent at end-September 2019 from 91.1 per cent at end-September 2018. The market share of building societies declined by 0.2 percentage point to 8.6 per cent while that of merchant banks increased by 0.1 percentage point to 0.2 per cent. Concurrently, commercial banks' assets as a percentage of overall financial system assets decreased by 2.1 percentage points to 33.9 per cent at end-September 2019 (see Figure 3.2).[1]

Figure 3.1 Jamaica's financial intermediation (assets of financial corporations as % of GDP)



[1] Credit unions were not included in the analysis for the review period.

Figure 3.2 Distribution of financial system assets[2]

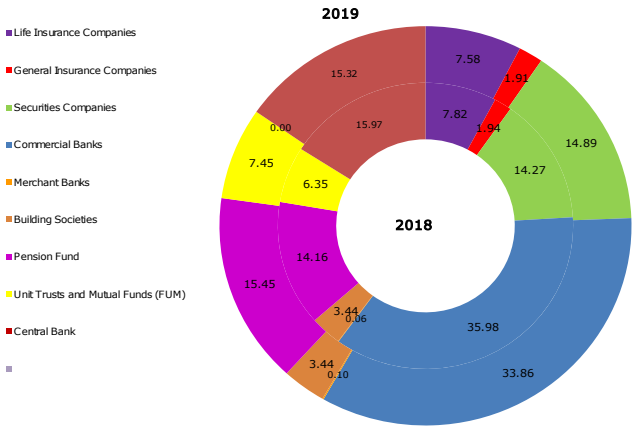


Figure 3.3 Distribution of major asset categories as a share of total DTIs' assets

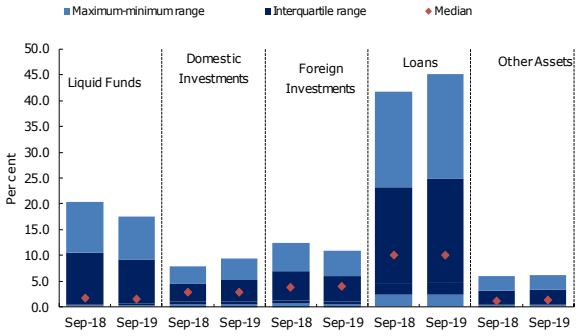
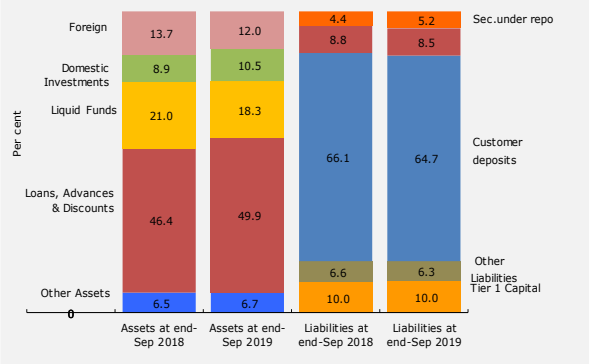
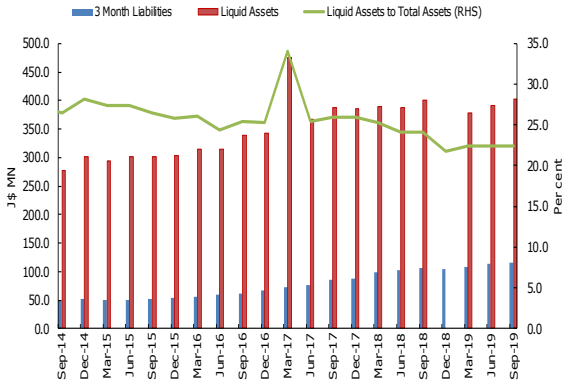


Figure 3.4 Major components of DTIs' aggregate balance sheet



[2] Assets are defined as total balance sheet assets.

Figure 3.5 Liquidity conditions in the DTI sector



3.3.2 Deposit-taking institutions' balance sheet position

DTIs' total assets grew by 8.2 per cent to $1,795.1 billion for the year ended September 2019. All DTI sub-sectors recorded growth in their asset base over the review period which primarily reflected expansion in *Loans, Advances & Discounts* (see Figures 3.3 and 3.4). Domestic currency loans increased by 18.0 per cent while foreign currency loans grew by 11.1 per cent. In addition, DTIs' total domestic currency investment holdings grew by 29.5 per cent to $404.3 billion. In contrast, DTIs' foreign currency investments declined by 11.8 per cent. Against this background, DTIs' net open position (NOP) to capital ratio decreased by 4.4 percentage points to 3.9 per cent at-end September 2019.

Loan loss provisions as a percentage of total loans fell to 2.8 per cent at end-September 2019 from 3.0 per cent at the end of the previous review period.[3]

[3] Loan loss provisions are net new allowances that DTIs make in the period against bad or impaired loans. This is done based on their judgement as to the likelihood of losses. Under the International Financial Reporting Standards, it is calculated as provisions of impairment plus prudential provisions as a percentage of total loans.

The reduction in loan loss provision was due to greater than proportional increases in total loans relative to DTIs' total provisioning.

Liquidity conditions continued to be buoyant within the DTI sector in spite of a decline in the liquid assets ratio (LAR). Specifically, the ratio of liquid assets to total assets decreased to 22.4 per cent at end-September 2019 from 24.2 per cent at end-September 2018.[4] The decrease in the ratio was due to stronger growth in DTIs' assets relative to the growth in liquid assets (see **Figure 3.5**).

Total deposits increased by 5.8 per cent to $1 159.3 billion and represented 76.4 per cent of total liabilities at end-September 2019 relative to 77.0 per cent at end-September 2018. Total loans as a share of total deposits, which is a measure of financial intermediation, increased by 7.0 percentage points to 77.4 per cent at end-September 2019.

The average CAR for DTIs increased to 23.6 per cent at end-September 2019 from 18.5 per cent at end-September 2018 (see **Figure 3.6**).[5] The quality of regulatory capital, as measured by the ratio of Tier 1 capital to total regulatory capital, decreased marginally by 0.4 percentage point to 91.8 per cent at end-September 2019. Concurrently, the ratio of non-distributable retained earnings to capital fell by 1.7 percentage points to 34.0 per cent at end-September 2019. Conversely, there was an increase in the Tier 1 capital to risk weighted assets to 15.2 per cent at end-September 2019 from 14.0 per cent at end-September 2018.

Figure 3.6 Distribution of capital adequacy ratio

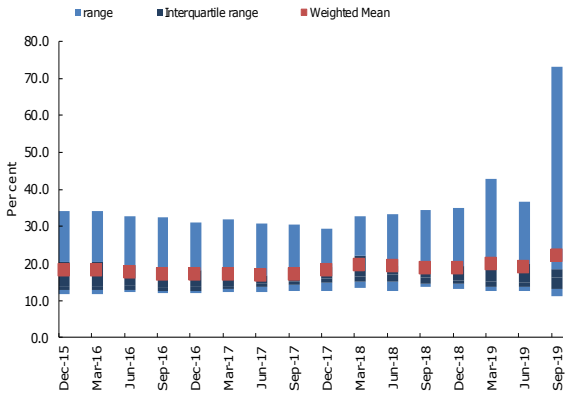
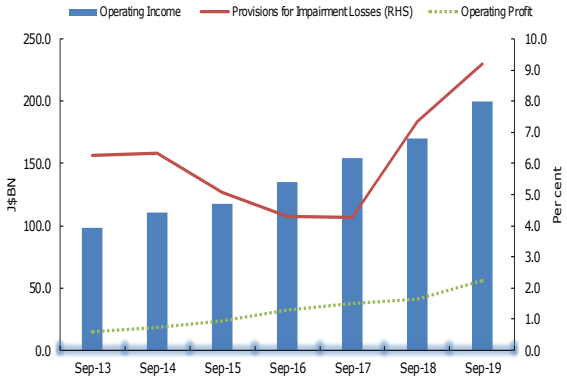


Figure 3.7 Operating profit and impairment losses for DTIs



[4] DTIs are required to hold cash reserves at Bank of Jamaica amounting to 7.0 per cent and 15.0 per cent for domestic and foreign assets, respectively. The liquid assets requirements are 21.0 per cent and 29.0 per cent for domestic and foreign assets, respectively.

[5] The aggregate CAR for DTIs is 14.9 per cent compared to the average distributed CAR of 23.6 per cent at end-September 2019.

Figure 3.8 Decomposition of DTIs' ROE

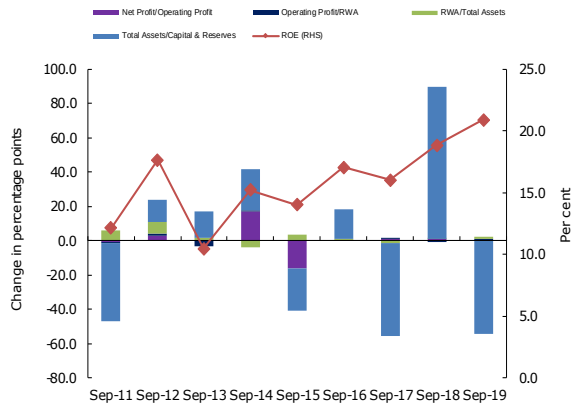


Figure 3.9 Distribution of DTIs' ROA

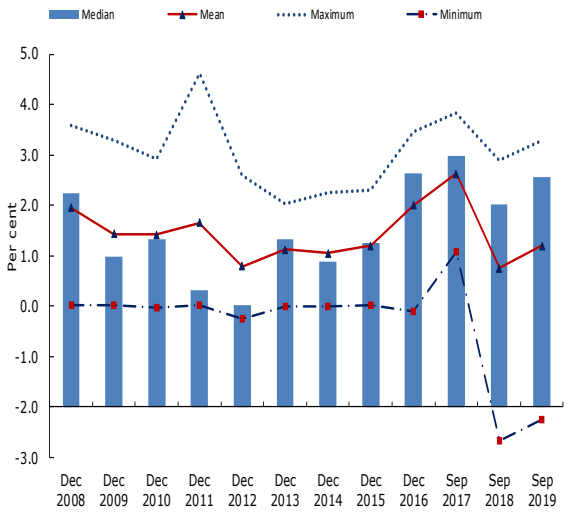
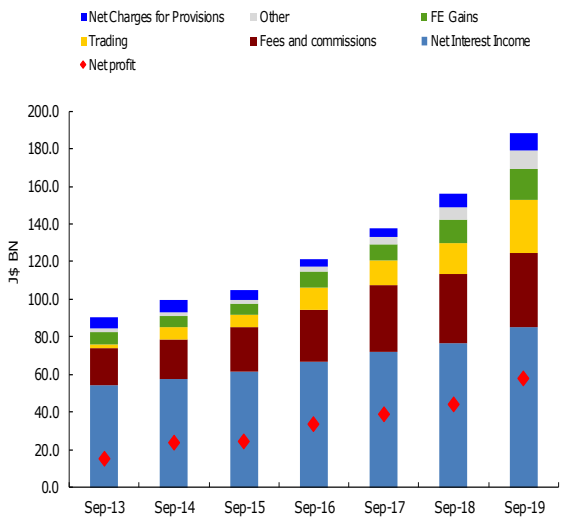


Figure 3.10 DTIs' sources of revenue, charges for provisions and net profit



3.3.3 Deposit-taking institutions' earnings and profitability

For the year ended September 2019, the DTI sector recorded net profits of $57.0 billion. Furthermore, DTIs' total operating income of $199.5 billion was 17.6 per cent higher than that of the corresponding period of 2018. Of note, operating profits increased by $4.4 billion to $55.8 billion, while provision for impairment loss increased by $1.8 billion to $9.2 billion for the review period. In addition, the sector's ROE increased by 2.0 percentage points to 20.9 per cent at end-September 2019, primarily reflecting higher operating margins (see **Figure 3.7**).

A decomposition of the ROE showed increases in the operating margin and the risk weighted assets density ratio. These results primarily reflected increases in DTIs' operating profit, total assets and risk-weighted assets (see **Figure 3.8**). DTIs' leverage ratio, as measured by Tier 1 capital as a percentage of total assets, decreased during the review period.

Notably, the median leverage ratio was unchanged at 9.6 per cent. Further, DTIs' ROA increased to 1.2 per cent as at end-September 2019 from 0.7 per cent at end-September 2018. In addition, the median ROA increased to 2.6 per cent at end-September 2018 from 2.0 per cent recorded for the previous year (see Figure 3.9). This outturn was primarily due to growth in the net income from trading as well as foreign exchange gains. There was an overall increase of 11.3 per cent in DTIs' net interest income for the year ended September 2019, largely reflecting the impact of the expansion in *Loans, Advances & Discounts* (see Figures 3.10). At the same time, interest expenses decreased by 3.6 per cent, primarily as a result of a reduction in expenses on time deposits. Net interest margin, as measured by the ratio of net interest income to average earning assets, marginally decreased to 7.1 per cent from 7.2 per cent at end- September 2018.

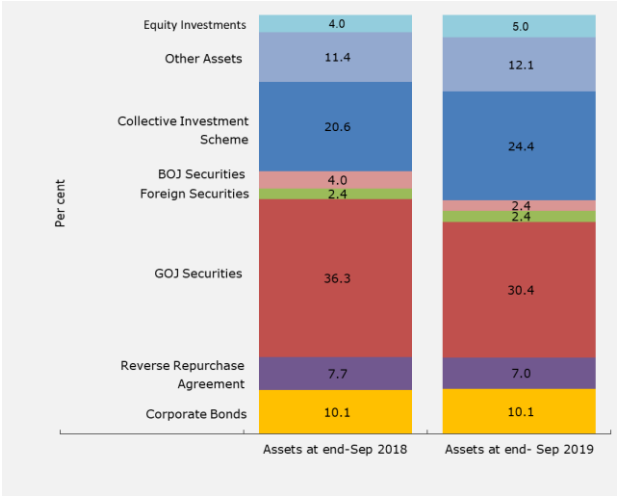
3.4 Non-deposit-taking financial institutions

3.4.1 Non-deposit-taking financial institutions' market share and balance sheet position

The asset base of the NDTFI sector increased by 12.7 per cent to $2 153.1 billion as at end-September 2019.[6] The expansion in the sector's total assets reflected increases in assets of all NDTFI sub-sectors. For the year ended September 2019, the assets of LI, GI and thirty core SDs grew by 3.1 per cent, 6.2 per cent and 10.8 per cent, respectively. The assets of collective investment schemes' (CIS) and pension funds increased by 22.8 per cent and 15.9 per cent, respectively.

At end-September 2019, the assets of SDs, pension funds and LI companies accounted for 30.9 per cent, 32.0 per cent and 15.7 per cent of NDTFIs' total assets, respectively. The LI, GI and SDs' sub-sectors recorded lower shares of NDTFI's total asset as at September 2019 relative to the previous period. Concurrently, CIS and pension funds recorded higher market shares. The expansion in the NDTFIs' asset base resulted in growth in its share of financial system total assets to 54.5 per cent at end-September 2019 from 53.5 per cent at the close of the previous review period.

Figure 3.11 Major components of SDs' FUM assets



[6] NDTFIs consist of Securities Companies, Pension Funds, CIS, LI and GI companies.

Figure 3.12 SDs' regulatory capital, capital adequacy and primary ratios

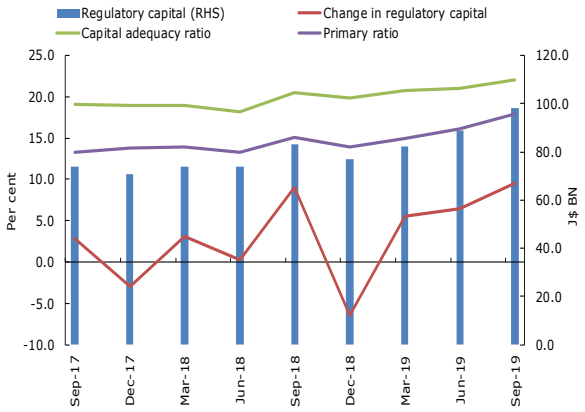


Figure 3.13 SDs' NOP to capital

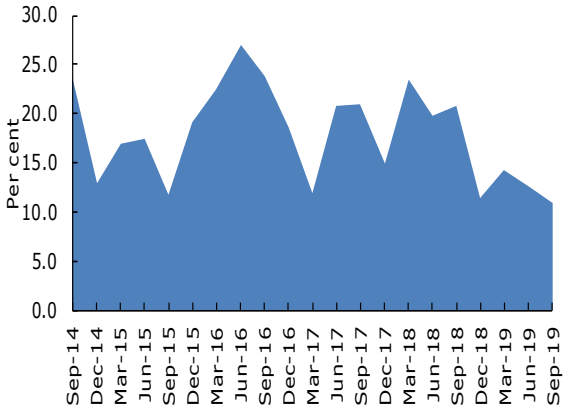


Figure 3.14 SDs' ROA and ROE

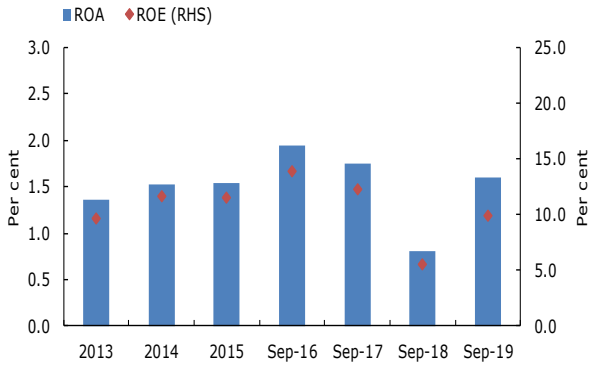


Figure 3.15 Distribution of assets of LI companies

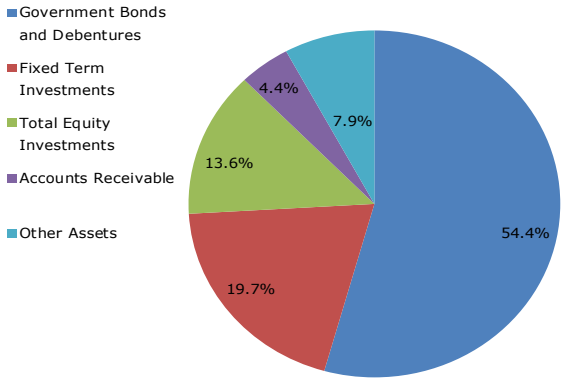
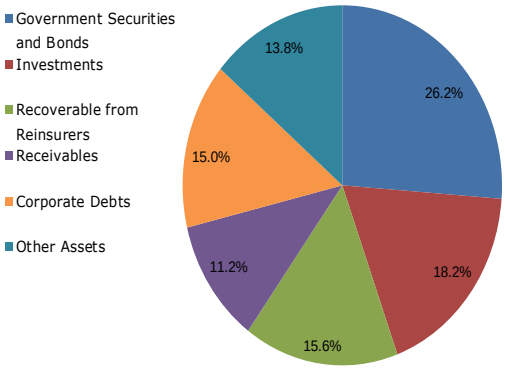


Figure 3.16 Distribution of assets of GI companies



3.4.2 Securities dealers

The asset base of SDs was $664.7 billion at end-September 2019 relative to $599.8 billion at end-September 2018. SDs' on and off-balance sheet funds under management (FUM) increased by 3.8 per cent to $1 314.6 billion at end-September 2019, which reflected an expansion in

CIS (see Figure 3.11).[7]

[7] CIS includes pooled funds and other assets, where other assets consist of derivatives, interest receivables, other receivables and other investments such as real estate.

Risk-weighted assets (RWA) of SDs rose by 12.9 per cent to $445.0 billion at end-September 2019 relative to end-September 2018. SDs' regulatory capital grew by 18.3 per cent to $98.4 billion for the year ended September 2019.[8] The growth in regulatory capital contributed to an increase of 1.6 percentage points to 22.8 per cent in the sub-sector's CAR (see **Figure 3.12**). Similarly, the sub-sector's primary ratio as measured by the ratio of regulatory capital to total assets, increased by 2.6 percentage points to 16.7 per cent at end-September 2019.

SDs' exposure to foreign exchange risk, as measured by the ratio of foreign currency NOP to capital, decreased by 9.9 percentage points ending September 2019 with 11.0 per cent (see **Figure 3.13**). In addition, consistent with the slow pace of growth in dollarization within the SDs sub-sector, for the review period, the ratio of foreign currency investments to total investments declined by 4.2 percentage points to 52.2 per cent.

For the year end September 2019 the SDs sector's ROA and ROE decreased to 2.5 per cent and 14.0 per cent, respectively, from 2.6 per cent and 18.1 per cent for the year ended September 2018 (see **Figure 3.14**). The decline in profitability indicators was primarily due to an increase of approximately 10.0 per cent in the sector's asset base and 39.0 per cent in equity, which both grew faster than profits respectively. In addition, total liabilities as a share of total assets, which is one measure of leverage, declined to 79.3 per cent as at end-September 2019 relative to 86.0 per cent at end of September 2018.

[8] For the remainder of the chapter, the analysis is based on a representative sample of twelve SDs that comprise 70.0 per cent of the sector.

3.4.3 Insurance companies

The insurance sector's asset base grew by 3.2 per cent to $424 billion at end-September 2019. Of note, LI companies accounted for 79.8 per cent of the sector's total assets. Within the LI sub-sector, the two largest companies accounted for 65.6 per cent of total assets at end-September 2019. With regard to GI, the three largest companies accounted for approximately 50.9 per cent of the sub-sector's asset base.

The asset base of GI and LI companies' asset base increased respectively by 4.7 per cent to $85.5 billion and 3.0 percent to $338.5 billion as at end September 2019. The growth in assets of LI companies was influenced by an increase of 3.7 per cent in investments in GOJ securities. For GI companies, the growth in the asset base reflected a 0.39 per cent increase in corporate debt.

Government securities accounted for 54.3 per cent and 26.2 per cent of LI and GI assets, respectively, at end-September 2019 relative to 58.0 per cent and 29.3 per cent at end- September 2018 (see **Figures 3.15** and **3.16**). The share of real estate, unquoted equities and debtors in total assets, which is a measure of asset quality, increased for LI and GI companies during the review period. Specifically, this ratio increased to 5.5 per cent and 29.9 per cent, respectively, from 4.3 per cent and 28.1 per cent at the of the previous review period.[9]

[9] Real estate, unquoted equities and debtors are asset classes within the insurance sector which have the largest probability of being impaired. This is largely due to the fact that real estate and unquoted equities are illiquid assets, while debtors exposes the sector to credit risk. The calculation of debtors for GI includes reinsurance recoverable

Levels of insurance penetration, as measured by the ratio of gross premium to GDP, continued to be low.[10] This ratio, which measures the importance of insurance activity relative to the size of the economy, increased marginally to 3.1 per cent for LI and decreased to 2.2 per cent for GI companies as at end of September 2019 relative to 3.0 per cent and 2.4 per cent at the end of the previous period (see **Figure 3.17**). Against this background, insurance density, measured as the ratio of total gross premiums to total population, remained at 0.002 per cent at end-September 2019. Insurance premiums increased by 4 billion to $120.0 billion for the year ended September 2019 relative to the previous period (see **Figure 3.18**). Concurrently, there was an increase of 8.9 per cent in claims incurred by the sector for the review period (see **Figure 3.19**).

Furthermore, the claims ratio, which is the ratio of claims incurred to earned premiums for insurance sector, decreased to 29.1 per cent at end-September 2019 from 30.2 per cent at end-September 2018.[11,12] The outturn in the ratio was influenced by a faster growth in claims relative to premiums earned and was also greater than the five year average of 28.8 per cent.

There was general improvement in the insurance sector's profitability during the review period which was largely due to an increase of 10.7 per cent in the total income earned for the year ended September 2019 (see **Figure 3.20**). The growth in total income was supported by increases in both gross written premium and total investment income earned. Furthermore, the sector's profit grew by 4.2 per cent to 33.6 billion as at end September 2019 relative to $32.3 billion at end-September 2018.

Figure 3.17 Insurance Penetration

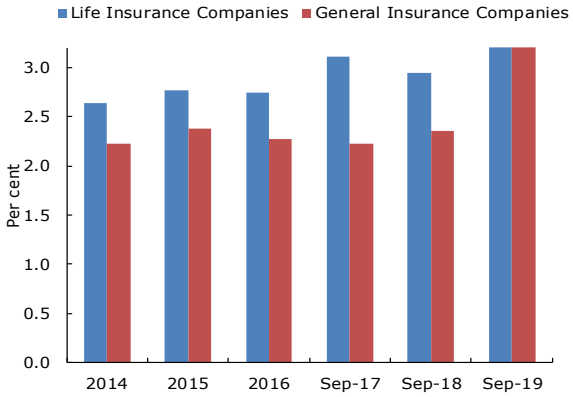
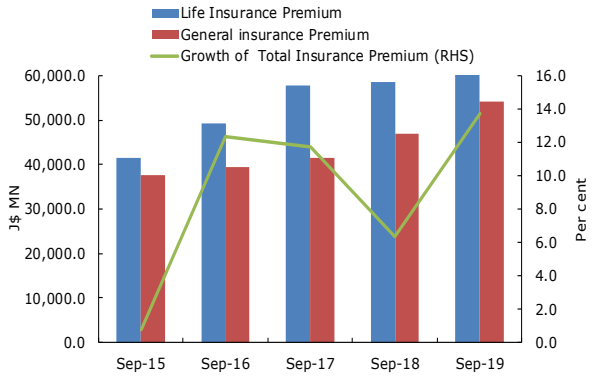


Figure 3.18 Premium income and growth of insurance sector



which account for more than 50.0 per cent of debtors, these recoverable are from companies with a A-credit rating

[10] Based on latest available data, Jamaica's insurance sector penetration exceeded the average of 3.1 per cent average for Latin America and Caribbean countries in 2016. However, the trend over the years has lagged behind the aggregate insurance penetration of 8.0 per cent in developed markets. See, Gonzalez, R., "Insurance penetration in Latin America and the Caribbean", The Actuary, 2018, http://www.theactuary.com/features/2018/07/insurance-penetration-in-latin-america-and-the-caribbean-/

[11] Earned premium is the pro-rated portion of the policy holder's prepaid premium that applies to the expired portion of the policy, which now belongs to the insurer.

[12] The breakdown of data required for the calculation of this ratio is not available for LI companies.

Figure 3.19 Earned premium, claims incurred and claims ratio of insurance sector

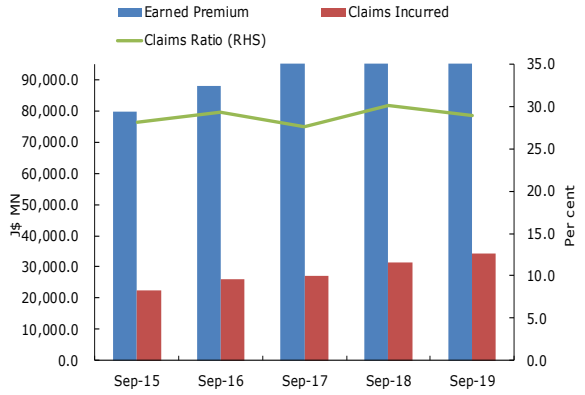


Figure 3.20 Total income (GWP + investment income) of the insurance sector

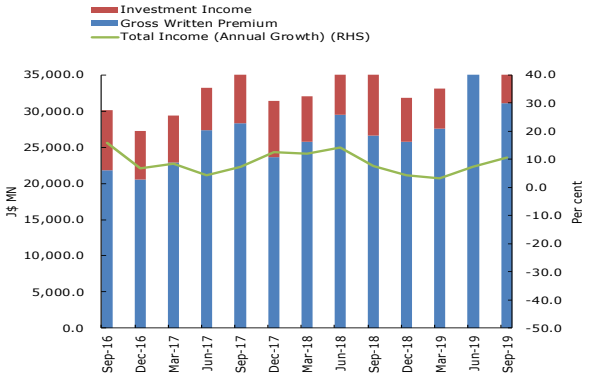


Figure 3.21 Growth in profit before tax for ICs

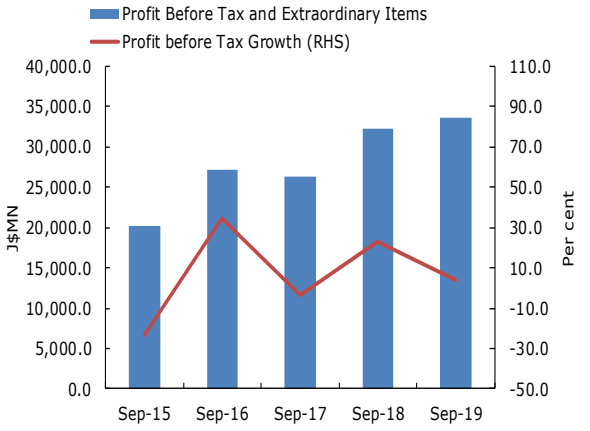
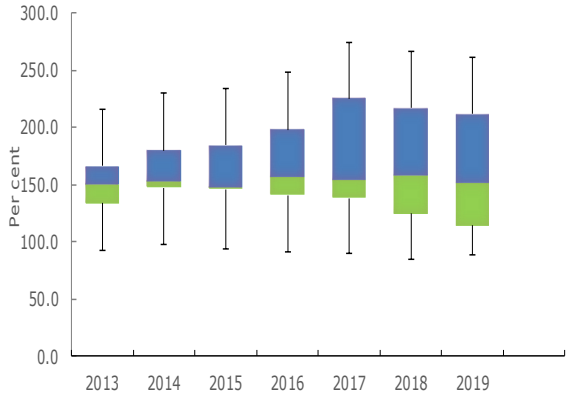


Figure 3.22 Distribution of the solvency ratio of ICs



The capital adequacy and solvency of insurance companies remained at adequate levels during the review year. Furthermore, there was an increase in the ratio of capital to total assets to 23.7 per cent at end-September 2019 from 23.3 per cent at end-September 2018 (see Figure 3.23).

All LI companies surpassed the Minimum Continuing Capital and Surplus Requirements (MCCSR) ratio prudential benchmark of 150.0 per cent.[13] In particular, the MCCSR was 239.0 per cent. Similarly, all GI companies exceeded the Minimum Capital Test (MCT) prudential benchmark of 250.0 per cent.[14] The MCT ratio for the GI sub-sector was 310.2 per cent at end-September 2019.

Of note, the reinsurance retention ratio, as measured as net premium written to gross direct

[13] The Minimum Continuing Capital and Surplus Requirements (MCCSR) uses the actuarial liabilities and asset mix to measure an insurer's capital adequacy to meet its obligations to policyholders. Except for annual filing of the MCCSR, the figures are preliminary.

[14] The MCT Prescribed Capital Required ("PCR") assesses the riskiness of assets and policy liabilities and compares capital available to capital required. It was initially set at 200.0 per cent in 2011 and was increased to 225.0 per cent in the first quarter of 2012 and increased to 250.0 per cent in 2013. Except for annual filing of the MCT, the figures are preliminary.

premium written, for LI companies decreased to 98.1 per cent at end-September 2019 relative to 98.3 per cent at end-September 2018. On the other hand, the GI companies' reinsurance retention ratio decreased to 34.2 per cent at end-September 2019 from 43.7 per cent at the end of the previous review period (see Figures 3.24 and 3.25).[15]

Figure 3.23 Capitalization of the insurance sector

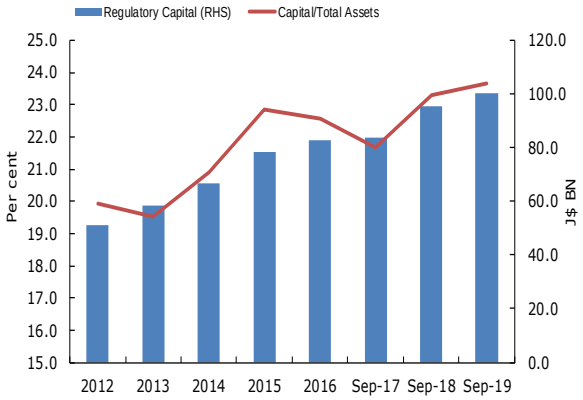


Figure 3.24 Retention ratio of LIs

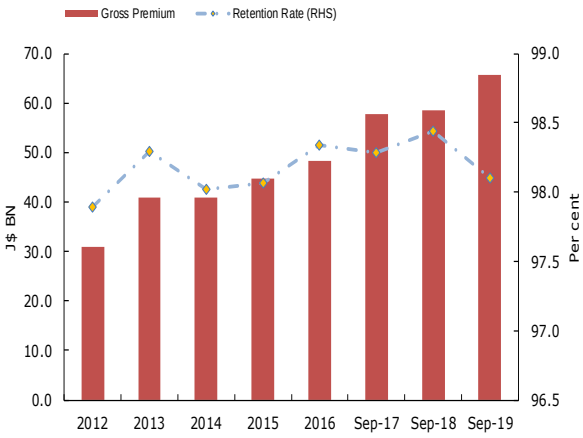
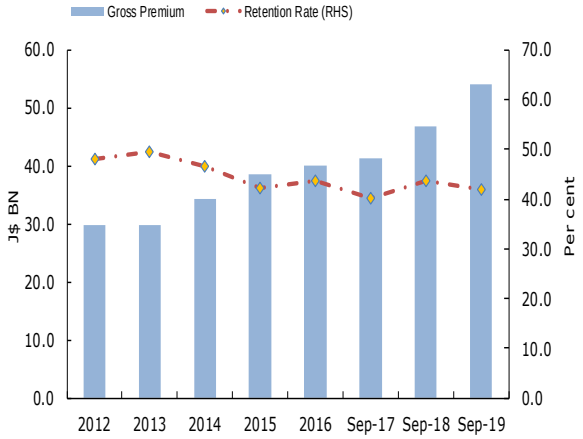


Figure 3.25 Retention ratio of GIs



[15] Reinsurance retention ratio measures the amount of risk being absorbed by an insurer rather than passing it on to a reinsurer. Measured as the ratio of net premiums written to gross premiums, the ratio captures the net amount of risk which the reinsurer keeps for his own account. The lower the ratio, the more the company is able to avoid financial distress following a large claim.

Box 3.1 Key changes to Pensions (Superannuation Funds and Retirement Schemes) (Investment) Regulations

In keeping with the Government of Jamaica's (GOJ) initiative to progressively reform the country's private pension industry, the Financial Services Commission (FSC) recently amended the Pensions (Superannuation Funds and Retirement Schemes) (Investment) Regulations (Investment Regulations) . The amended regulations will take into account evolving international standards and widen the investment options available to pension plans in order to promote greater diversification and better access to finance.

The Investment Regulations imposes quantitative and qualitative limits based on the investment instruments (asset classes), jurisdictions, nature of transactions and concentration levels. Trustees and investment managers are required to invest and manage pension plan assets prudently as per the provisions of the Investment Regulations. These regulations also set minimum standards for a written Statement of Investment Policies and Principles ("SIPP") for pension plans. Therefore, the Investment Regulations is regarded as a critical component of the overall regulatory framework within which pension plans operate and will serve to prevent excessive exposure to investment risk.

The overarching objective of expanding the quantitative investment limits is to create a balance between providing retirement income and seeking the highest return on investments for pension plans. The amendments explicitly address investments in unsecured debt, private equity, leases and other assets and take into account the fiduciary duties to be performed by trustees.

The Pensions (Superannuation Funds and Retirement Schemes) (Investment) (Amendment) Regulations, 2019 (IAR) was approved unanimously by the House of Representatives on July 23, 2019 and by the Senate on August 2, 2019. The table below outlines the major changes effected by the IAR.

1. Summary of the Changes:

1.1 Investment Limits:

Investment Regulations	Existing Provisions	Changes per the IAR
16(1)	This provision imposes a general concentration limit of 5% on investments with an entity.	Increase the concentration limit from 5% to 10%
26	This provision restricts the percentage of voting shares owned in a company to a maximum of 30%	Private companies established for the sole purpose of holding real estate assets of pension plans will be exempted from the 30% cap on acquisition of voting shares
33(1)	**This provision allows investments in "leases and other investments" up to a limit of 5% of the fair value of the pension plan assets.**	An investment limit was established for secured/collaterized leases up to 10% of the fair value of the pension plan assets. Additionally a separate limit of 5% has been established for "other investments"

1.2 New Provisions:

Investment Regulations	New Provisions	Requirements
23	Unsecured debt (bonds) investments	A quantitative aggregate limit of 5% of the fair value of the pension plan assets
24, 25, 27	Private Equity (venture capital) Investments	A limit of 5% has been introduced with a prohibition on private foreign companies
10	Risk Management	New provisions have been introduced to address the risk management of pension plans as well best practices standards.

2. Commentary:

2.1 Increasing the concentration limit provides pension plans the ability to hold more assets within a single entity and/or group.

2.2 The introduction of private equity and venture capital investments in the private pension sector helps to broaden the scope of investments available to pension plans seeking higher returns. Additionally, provisions for accessing unsecured debt can also allow pension plans to continue participating in the bond market; thus increasing overall market participants.

2.3 In terms of the percentage cap, leases were separated from other investments. As a result, pension plans will now be able to engage in more secured leases as part of expanding their portfolios.

2.4 Provides alternate structural options for the ownership of real estate which is expected to facilitate more operational and cost efficient transactions.

3. Expectations:

It is anticipated that pension plans will revise their investment strategies in order to take advantage of the investment opportunities that come with the newly effected IAR. It is also expected that there will be more activity within the industry as pension funds seek to invest in the assets available in the market, particularly with the GOJ's reduced participation in the capital market. The pension funds landscape is already adjusting to the lower interest rate environment. Additionally, there are fewer long term GOJ issues to match the liability profile of members. The trends in the pension portfolio asset allocations since 2015 are shown in Figures 1 to 3.

Figure 1 Composition of pension portfolio assets - Direct Investments

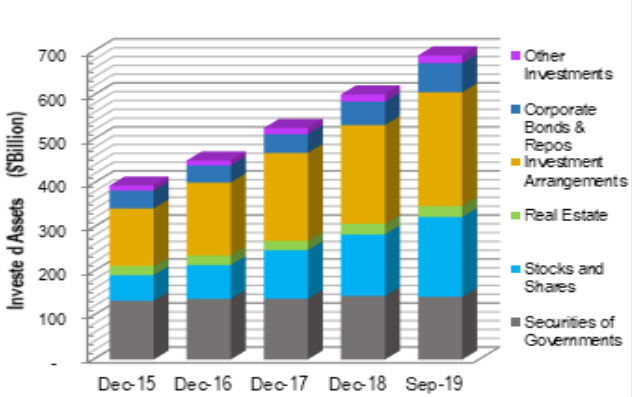


Figure 2 Composition of pension portfolio assets - Direct & Indirect Investments

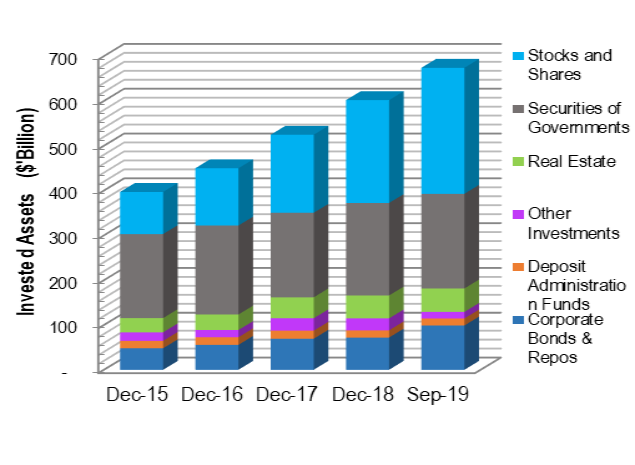
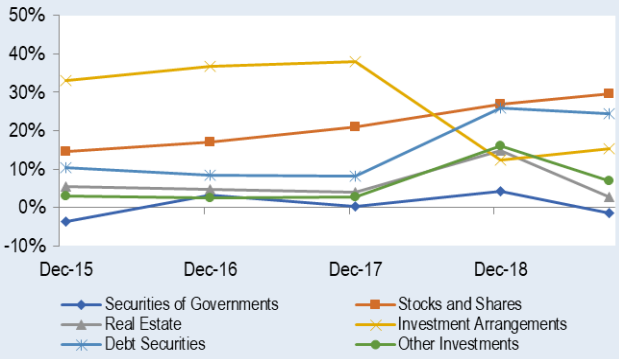


Figure 3 Growth rate in pension portfolio assets



4. Financial Risk Implications

4.1 Increased Market Risk

As the search for higher yielding assets continues, trustees of pension plans are likely to continue including more non-interest bearing assets within the pension portfolio. Equity assets are generally more volatile than fixed income securities and an understanding of the dynamics of equity investments is necessary for these trustees. A bearish market could have a significant impact on the assets of pension plans and related pension benefits including salary replacement ratios, particularly Defined Contribution plans, for which the members assume all of the investment risks.

4.2 Increased Credit Risk

The inclusion of venture capital or private equity (this includes both equity and fixed income securities) and the likely replacement of GOJ securities with corporate bonds, could result in an increase in the credit risk exposure among pension plans. Trustees who are willing to take on the risk of investing in debt instruments issued by private entities or structures, must understand the heightened probability of loss as the counterparty has a higher risk of failure and may not have an established track record of quality performance. The introduction of IFRS 9 has implications for the provision for credit losses, which may adversely affect the valuation of bonds, mortgages, loans and receivables existing in pension portfolios.

4.3 Increased Operational & Strategic Risks

The adverse effects of relaxing investment limits for pension plans include increased exposure to new alternative investments for which there may be asymmetric information, which could hinder prudent decision making. There are concerns regarding the narrowing of the knowledge gap among pension plan trustees as well as the need for better prudential practices. The FSC has issued risk management guidelines to state the minimum requirements for a risk management framework. The IAR has also included more comprehensive requirements for SIPPS to improve the level of prudence in investment management.

There is now a greater need for education and training among trustees as well as more expert technical support for investment managers and other agents of pension plans. These efforts would be required to achieve and/or maintain good governance and compliance with the new legislation. The FSC is committed to dedicating resources towards the education and guidance of trustees. Additionally, trustees will be required to be more diligent and critical of the services provided by their respective investment managers, to ensure that the utmost due diligence is provided to guide their strategic decisions. The FSC also anticipates improvements in many internal pension plans policies, which are more in line with the new criteria of the legislation

5. Impact of the IAR on the Jamaican private pension industry:

5.1 Pension Industry Growth and Strengthening of National Pension Coverage

The pension industry faces increased longevity risk as life expectancy of Jamaicans rose to 76.2 years in 2018 from 74.3 years in 2017, which exceeds the

global average of 71.5 years.[1] This has resulted in increased prices for annuities and thus lower pension payments from pension assets for retirees. This will also increase the funding costs for defined benefit plans to ensure benefit payments and for solvency to be maintained.

The recent legislative changes will allow pension plans to access a broader pool of assets to maximize returns as well as to preserve capital and provide sufficient pension benefits.

5.2 Deepening of Capital Markets and Economic Expansion

As at September 30, 2019, the private pension sector in Jamaica was valued at $690 billion. With the current reforms, pension plans that are large institutional investors can be utilized to provide greater financing options to private firms as well as increased participation in the financial sector's unsecured debt market. This can lead to further financial deepening of the economy as more capital can be provided to households and Small and Medium-sized Enterprises outside of the traditional banking sector. This could ultimately increase job creation and lead to further national development through infrastructure projects, business innovation and expansion. The cycle closes where greater job creation leads to greater participation in the pension industry through the onboarding of new members and related contributions. Private pension assets as a fraction of GDP, currently stands at 31.2 per cent of GDP. Relaxation of the investment limits may boost industry growth that could fuel GDP expansion.

[1] For year 2018: The World Health Organization - https://www.who.int/.

4.0 FINANCIAL SYSTEM SECTORAL EXPOSURE

This chapter examines the vulnerabilities of the financial system due to potential developments in the household, corporate and public sectors

4.1 Overview

Influenced by the accommodative monetary stance of the BOJ as well as continued fiscal consolidation, real annual household and corporate sector credit expanded during the period. However, risks posed to the financial system by the household, corporate and public sectors remained relatively low to moderate over the year ended September 2019. Also, with the exception of the corporate sector, real annual growth rates for credit remained below pre-global crisis levels. Although there were increases in the debt to asset ratios for both DTIs and NDTFIs, loan quality measures showed general improvement.

Regarding sovereign risk, the DTI sector and the life insurance sub-sector recorded increases in exposure to the public sector, while there was a decline in exposure for SDs and general insurance companies for the year ended September 2019. The increase for DTIs and life insurance companies was primarily driven by expansion in the holdings of GOJ debt, largely attributable to new issuances of Benchmark Investment Notes (BMIs) and Treasury bills during the review period.

4.2 Household debt and deposit-taking institutions' exposure

Against the background of a relatively stable macroeconomic environment, supported by the Bank's accommodative monetary policy stance, household sector debt held by DTIs continued to expand during the review period. Notwithstanding, this growth remained below the pre-global financial crisis level of 13.7 per cent.[1,2] In real terms, household sector debt grew by 11.2 per cent

Figure 4.1 Real growth in household debt and its sub-components for DTIs

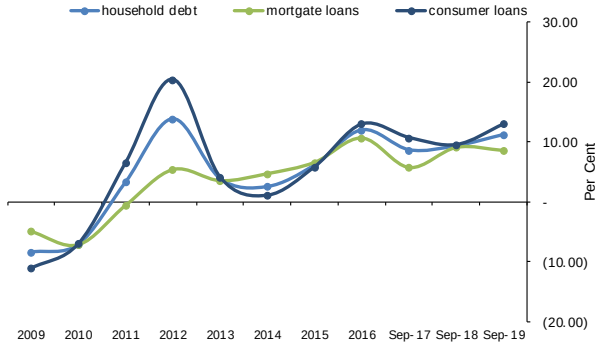
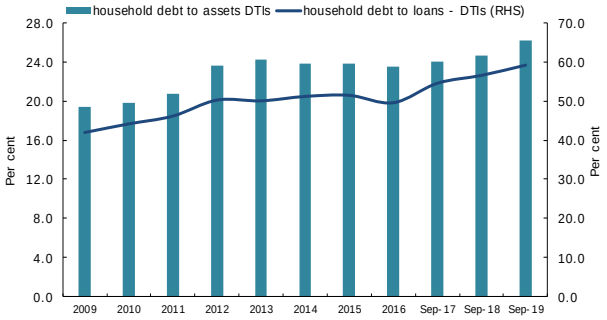


Figure 4.2 Household debt as a share of DTIs' loans & assets



[1] Household debt incurred with DTIs is proxied by the sum of residential mortgage loans and consumer loans (which includes credit card receivables).

[2] Pre-Global Financial Crisis refers to the period of 2003-2007

Figure 4.3 DTIs' household sector loan quality & loan loss provisioning to household sector NPLs

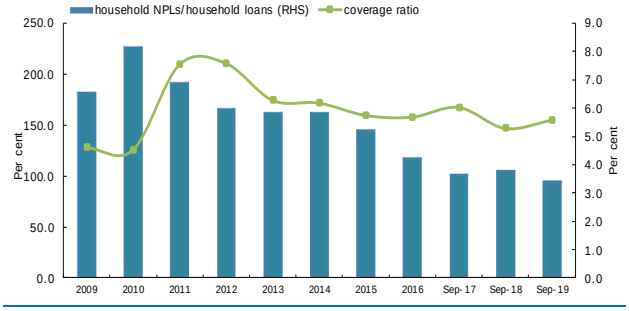


Table 4.1 Selected interest rates

Sectoral Interest Rates (per cent)	2015	2016	Sep-2017	Sep-2018	Sep-2019	Change*
Building societies						
Real Mortgage Loans Rate*	5.6	7.1	3.9	3.9	4.4	**0.5**
Mortgage Loans Rate	9.5	9.0	8.7	8.4	7.9	**-0.5**
Average Weighted Loan Rate	9.5	9.0	8.8	8.5	8.0	**-0.5**
Commercial banks						
Real Mortgage Loans Rate*	5.7	7.6	3.9	4.0	4.3	**0.3**
Mortgage Loans Rate	9.6	9.4	8.7	8.5	7.8	**-0.7**
Installment Credit Rate	15.2	13.8	12.6	11.6	11.1	**-0.6**
Personal Credit Rate	26.2	25.5	24.0	23.1	21.5	**-1.5**
Commercial Credit Rate	12.9	12.3	12.3	11.5	10.9	**-0.6**
Average Weighted Loan Rate	16.9	16.2	14.6	14.0	12.9	**-1.1**
Merchant bank						
Personal Credit Rate	14.7	10.7	12.8	11.6	9.7	**-1.8**
Commercial Credit Rate	11.6	11.7	10.5	10.3	9.0	**-1.3**
AverageWeighted Loan Rate	11.7	11.6	10.6	10.5	9.1	**-1.4**

* Change in percentage points from Sep 2018 - Sep 2019

* Annual Average Inflation rate used to compute the real mortgage rate.

Figure 4.4 Household debt servicing capacity

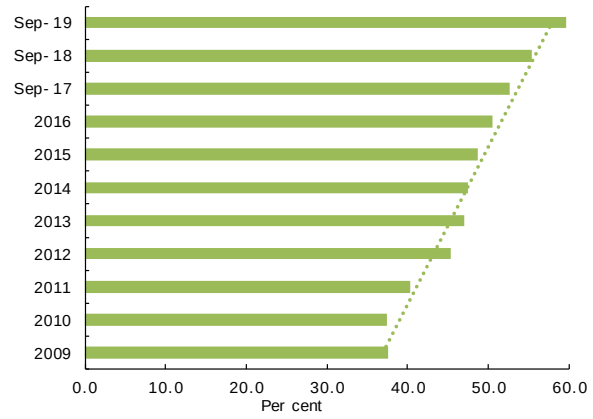
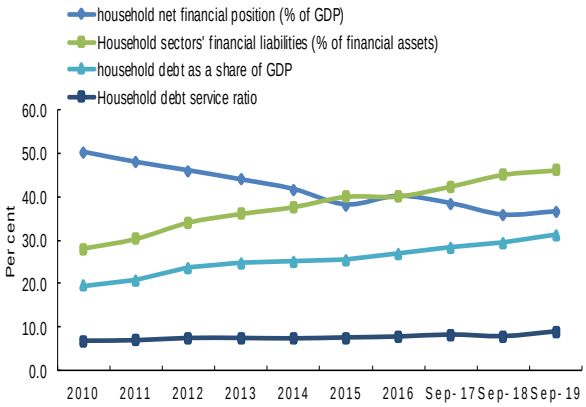


Figure 4.5 Household debt servicing capacity



for the year ended September 2019 relative to growth of 9.3 per cent for the corresponding period of 2018 (see Figure 4.1). This growth was largely reflected an increase of 12.9 per cent in consumer loans, compared to an expansion of 9.5 per cent for the prior review period. Growth in household sector debt was also supported by an increase of 8.5 per cent in mortgage loans, albeit marginally lower than the 9.5 per cent recorded for the same period last year.

DTIs' exposure to the household sector continued to increase in 2019. In particular, for the review period, household sector debt accounted for approximately 59.3 per cent of DTIs' credit portfolio, representing an increase of 2.6 percentage points over the prior review period. Additionally, household sector debt as a proportion of total assets also trended upward to 26.3 per cent as at end-September 2019 from 24.7 per cent at end-September 2018 (see Figure 4.2).

Despite DTIs' increased exposure to households, the sector's loan quality ratio improved for the review period. Specifically, household NPLs as a share of total household loans was 3.4 per cent at end-September 2019 relative to 3.8 per cent at end-September 2018. This outturn reflected a faster pace of increase in household loans relative to household

NPLs. In addition, DTIs continued to maintain adequate coverage of NPLs as evidenced in the coverage ratio exceeding 100.0 per cent for the review period (see **Figure 4.3**)[3]. Notwithstanding this outturn, a trend reversal in property prices as well as economic growth could result in rising household sector NPLs.

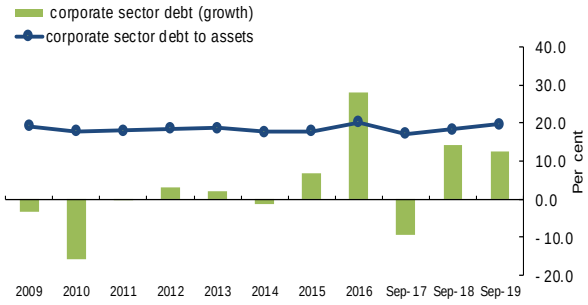
4.2.1 Household sector indebtedness

Over the past decade, household debt to disposable income rose, reflecting increased indebtedness. This phenomenon was largely influenced by declining and low interest rates coupled with increased access to household credit (see **Table 4.1**). For the year ended September 2019, the ratio of household debt to disposable income deteriorated by 4.4 percentage points to 59.7 per cent at end-September 2019 relative to end-September 2018 (see **Figure 4.4**).[4,5,6] This outcome was due to a faster pace of growth in household debt of 12.7 per cent relative to growth in disposable income of 4.4 per cent for the review period. Additionally, other household sector debt sustainability measures such as household debt to GDP and the household debt servicing ratio, showed marginal deterioration for the review period (see **Figure 4.5**).[7] Nonetheless, these indicators have remained relatively stable overtime and below historical averages.

4.3 Deposit-taking institutions' exposure to corporate sector debt

Similar to the household sector, DTIs' exposure to the corporate sector increased marginally to 19.8 per cent from 18.4 per cent for the year ended September 2018.[8] This outturn was due to growth in corporate sector debt which outpaced the growth in DTIs' assets base. Notably, real growth in corporate sector debt was 12.5 per cent for the year ended September 2019, in comparison to growth of 14.2 per cent for the year ended September 2018 (see **Figure 4.6**).[9] This expansion in corporate sector debt can be partially attributed to offers of lower interest rates on corporate loans by DTIs.

Figure 4.6 Real growth in corporate debt held by DTIs & corporate debt as a share of DTIs' assets



[3] The coverage ratio is measured as the ratio of loan loss provisions plus prudential provisioning to non-performing household loans.

[4] Total household debt is proxied by the sum of residential mortgage loans, consumer loans (which includes credit card receivables) and National Housing Trust loans.

[5] BOJ's projection for disposable income is computed as gross personal income less statutory deductions. Gross personal income is proxied as the sum of compensation to employees domestically and from the rest of the world as well as current transfers from rest of the world (which primarily includes remittances). Operating surplus of the household sector is excluded from personal income due to data availability.

[6] The current level of household debt to income is low relative to advanced economies such as the United States and hasn't significantly deviated from its historical average of XX over the past decade.

[7] The DSR for households is computed as follows:
$DSR_{j,t} = \frac{i_{j,t}}{(1-(1+i_{j,t})^{-s_{j,t}})} * \frac{D_{j,t}}{Y_{j,t}}$ where $D_{j,t}$ denotes the total stock of household debt, $Y_{j,t}$ denotes aggregate household income available for debt service payments, $i_{j,t}$ denotes average interest rate on the existing stock of debt and $s_{j,t}$ the average remaining maturity across the stock of debt.

[8] Exposure to corporate sector measured by corporate sector debt to DTIs' assets

[9] Corporate sector debt includes loans for commercial purposes and notes & debenture holdings of DTIs.

Figure 4.7 Growth in DTIs' lending to corporate sectors

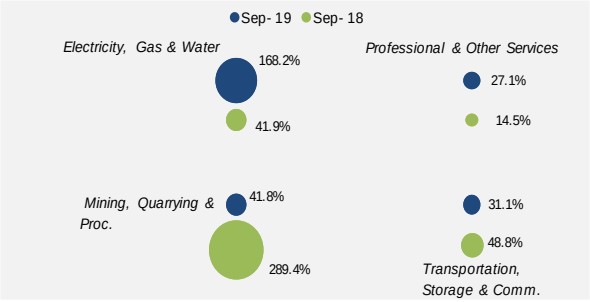


Figure 4.8 Ratio of corporate sector NPLs to corporate sector loans for Top 5 sectors-DTIs

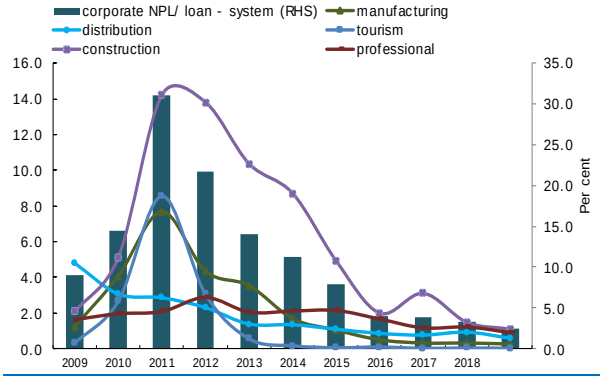


Figure 4.9 Corporate sector debt to corporate operating surplus

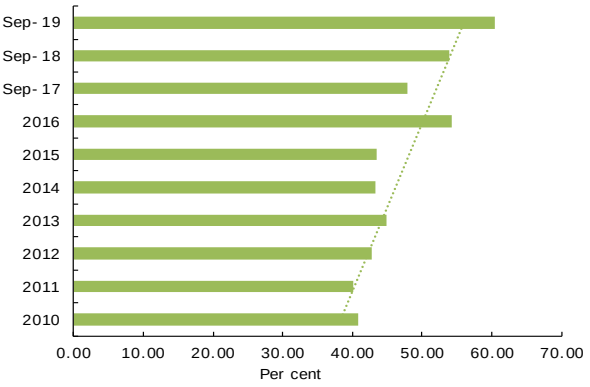


Figure 4.10 Other corporate sector indebtedness indicators

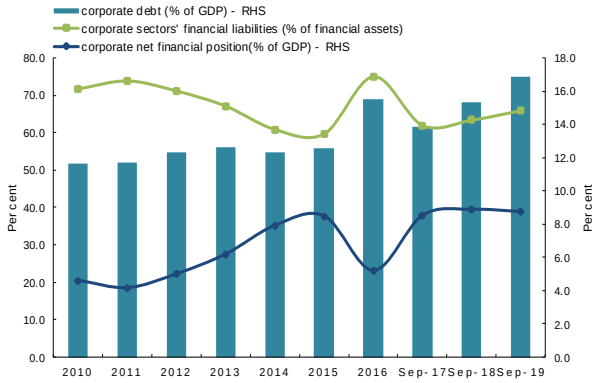
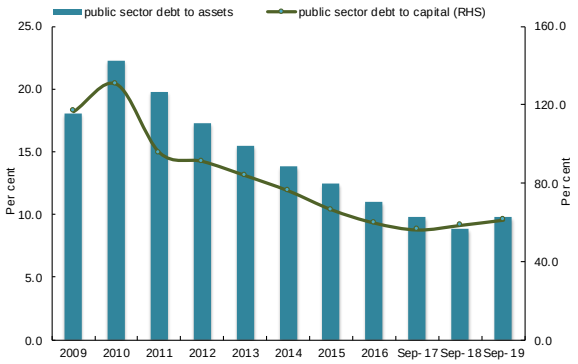


Figure 4.11 Public sector loans and securities to assets & capital - DTIs



Expansion in DTIs' lending to the corporate sector was reflected in all economic sectors with the exception of *Entertainment* and *Tourism*. Notably, *Mining*, *Electricity, Professional* and *Transportation* were the major recipients with increases ranging between 31.1 per cent and 168.2 per cent for the review period (see Figure 4.7)

4.3.1 Corporate sector loan quality

The loan quality of the corporate sector within DTIs continued to improve for the year ended September 2019. Specifically, the ratio of corporate sector NPLs to total corporate sector loans declined to 1.1 per cent

at end-September 2019 from 1.5 per cent at end-September 2018 (see Figure 4.8). The improvement in the asset quality ratio was reflected across all economic sectors with the exception of *Agriculture, Entertainment* and *Mining*.

4.3.2 Corporate sector indebtedness

The debt servicing capacity of the corporate sector continued to deteriorate in the current review period (see Figure 4.9).[10] Corporate sector net financial position as a share of GDP was 8.7 per cent as at end-September 2019, albeit slightly lower than the 8.9 per cent at end-September 2018. This result was indicative of rapid expansion in debt which exceeded growth in output. Additionally, corporate sector financial liabilities as a share of corporate sector assets increased to 65.9 per cent at end-September 2019 from 63.4 per cent the prior review period.[11] This outcome indicates increased risks posed to DTIs by the corporate sector (see Figure 4.10).

4.4. Deposit-taking institutions' exposure to the Public Sector

DTIs' exposure to public sector debt increased for the review period, a reversal of the trend observed since 2010. Specifically, the ratio of public sector loans and securities to DTIs' assets was 9.8 per cent at end-September 2019, relative to 8.9 per cent at end-September 2018 (see Figure 4.11). The reversal from the downward trend observed since 2010 could be attributed to an increase in holdings of public sector securities driven by the issuance of several new BMIs and Treasury bills by the GOJ over the review period.

4.4.1 Public sector performance & indebtedness

Within a context of continued fiscal discipline by the GOJ, public sector debt as a share of GDP fell below 100.0 per cent for the first time since 2000. The ratio declined to 94.3 per cent for the year ended September 2019 from 100.7 per cent at end-September 2018. Specifically, the public sector debt stock fell by $15.6 billion and coincided with moderate growth in domestic GDP (see Figure 4.12). For the review period, the domestic and external debt stock decreased by 0.7 per cent and 5.2 per cent, respectively (see Figure 4.13). The decrease in the external debt stock was mainly driven by payments to multi-lateral and bi-lateral lending agencies totaling approximately US$298.4 million. In addition, US$235.0 million was paid for the buy-back of PetroCaribe Development Fund holdings of GOJ bonds. Furthermore, the reduction in the domestic debt stock for the year ended September 2019 reflected amortization of two benchmark investment notes which amounted to approximately $58.5 billion.

[10] Capacity measured as the share of corporate sector debt to corporate sector operating surplus

[11] The financial assets of corporates include: deposits and retail repos. Corporate financial liabilities on the other hand include: loans for commercial purposes as well as notes & debenture holdings of DTIs. Notably, corporate financial assets does not capture large shares and other classes of corporate assets

Figure 4.12 Debt to GDP ratios

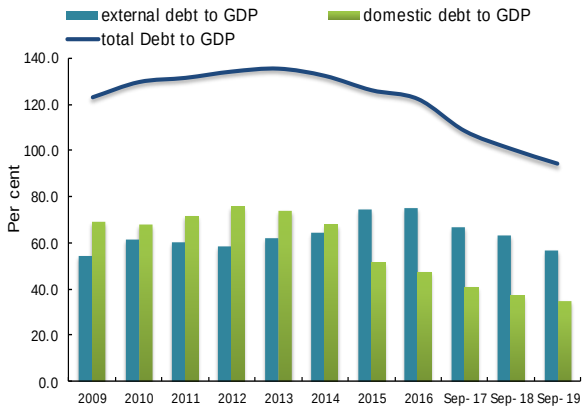


Figure 4.13 Growth in public sector debt stock

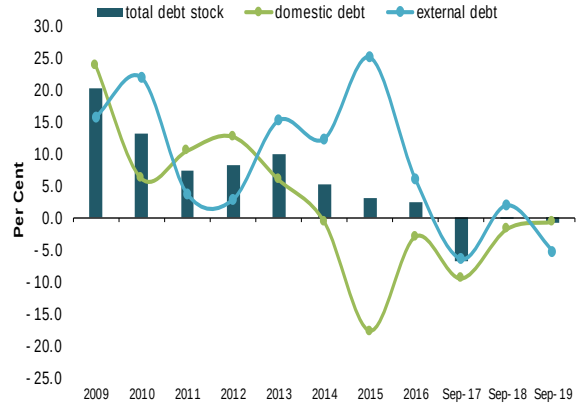


Figure 4.14 Debt sustainability indicators

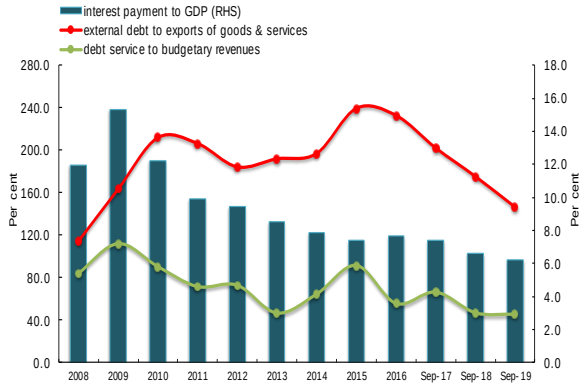


Figure 4.15 Public Sector domestic debt by maturity

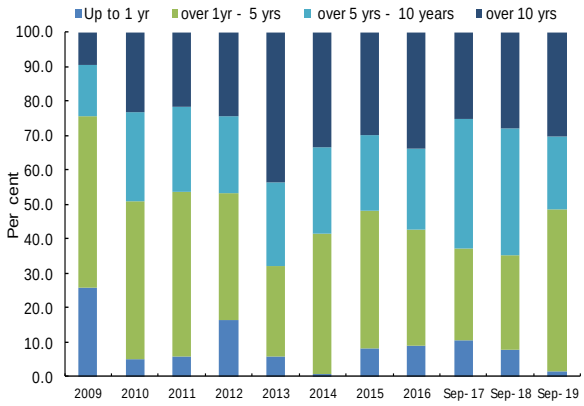
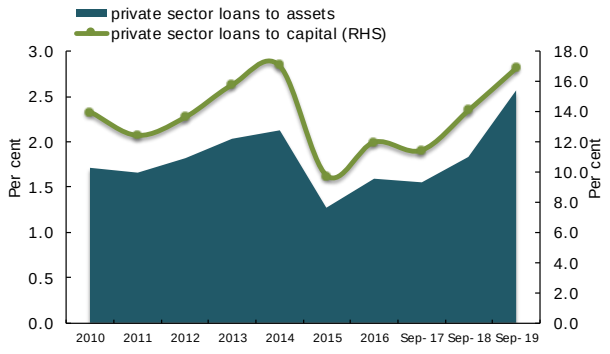


Table 4.2 Share of public sector domestic debt by instrument type (%)

	Fixed rate	Variable rate	Non Interest Bearing Debt
2009	48.9	51.1	0.0
2010	59.3	40.7	0.0
2011	56.5	43.4	0.1
2012	56.0	43.9	0.1
2013	67.9	32.0	0.1
2014	67.7	32.2	0.1
2015	60.8	39.2	0.1
2016	59.6	40.4	0.1
Sep- 17	55.3	44.7	0.0
Sep- 18	61.7	38.3	0.0
Sep- 19	63.0	37.0	0.0

Figure 4.16 Private sector loans to assets & capital for the 12 core securities dealers



The stability of government finances as measured by the fiscal stability ratio (FSR), improved marginally to 0.95 at end-September 2019 from 0.96 at end-September 2018.[12] The other public debt sustainability indicators also showed improvements for the year ended September 2019. Particularly, debt servicing to budgetary revenues, interest payment to GDP and external debt to exports of goods and services declined by 1.3, 0.3 and 28.7 percentage points, respectively, within the review period (see Figure 4.14).

The maturity profile of domestic public debt for the review period showed a decline in refinancing risk. In particular, the proportion of debt due to mature up to 1 year declined to 1.4 per cent from 7.8 per cent the previous review period. However, financing risk in the medium-term increased, as reflected in a rise in the portion of domestic debt due to mature in 1 to 5 years to 47.2 per cent from 27.4 per cent at end-September 2018 (see Figure 4.15). Additionally, domestic fixed rate instruments continued to account for the largest share of the total debt stock. The share of domestic fixed rate instruments as a share of the total debt stock increased to 63.0 per cent at end September 2019 from a ratio of 61.7 per cent at end-September 2018 (see Table 4.2).

4.5. Non-deposit-taking financial institutions' sector exposure

4.5.1 Securities dealers' exposure to private sector debt

The exposure of the SDs to private sector debt remained below 3.0 per cent of SDs' total asset base for the review period.[13,14] However, private sector debt as a ratio of SDs' total assets increased to 2.6 per cent at end-September 2019 from 1.8 per cent at end-September 2018 (see Figure 4.16). Similarly, the ratio of SDs holdings of private sector debt to capital increased to 16.9 per cent at end-September 2019 from 14.1 per cent at end-September 2018. This reflected a greater than proportional increase in private sector credit relative to the growth in total assets and capital.

SDs' loan quality ratio, as measured by private sector NPLs to private sector loans, was 4.5 per cent at end-September 2019, reflecting deterioration relative to the 1.1 per cent for the previous review period (see Figure 4.17). Of concern, the ratio at end-September 2019 was above the average of 3.9 per cent over the past five years. The deterioration largely reflected the operations of one institution. Concurrently, the coverage ratio of SDs worsened to 62.8 per cent at end- September 2019 from 291.2 per cent at end-September 2018. This deterioration was attributable to a six-fold increase in NPLs which outpaced the expansion in loan loss provisions across the sector.

[12] The FSR is computed as the ratio of the overall fiscal balance as a per cent of total revenue less 1 (one). The closer the FSR is to zero indicates more stable government finances.

[13] Private sector loans include loans to corporate sector entities and personal (household) loans.

[14] SDs include dealers whose business model is predominantly securities dealing activities and include the top 5 largest SDs.

Figure 4.17 Private sector NPLs to total private sector loans & coverage ratio for securities dealers

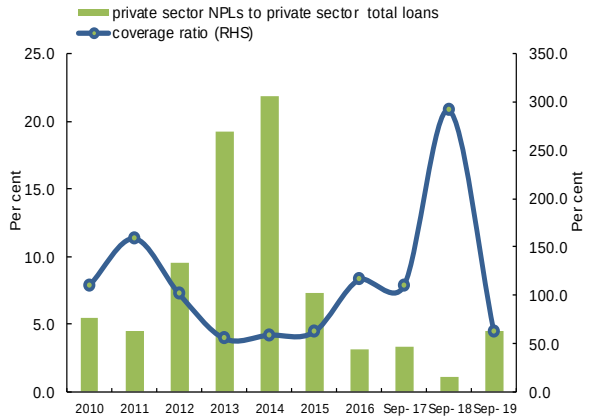


Figure 4.18 Public sector debt holdings to assets & capital for securities dealers

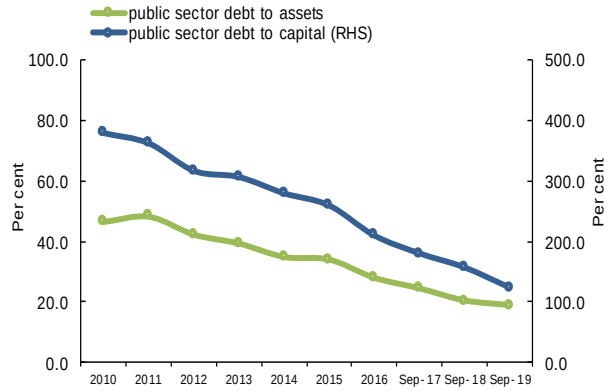


Figure 4.19 Public sector debt holdings to assets for insurance companies

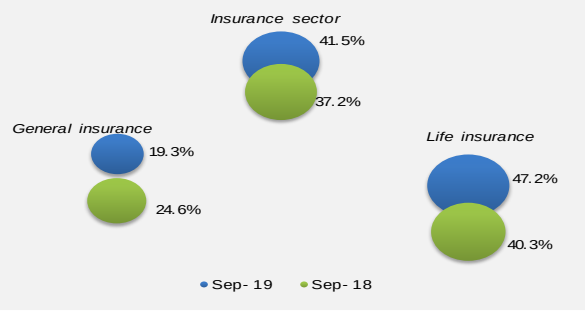


Figure 4.20 Public sector debt holdings to capital for the insurance sector

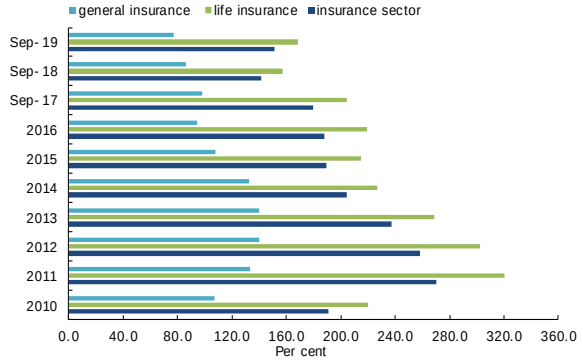


Figure 4.21 Investment in other assets for the DTIs, SDs & insurance

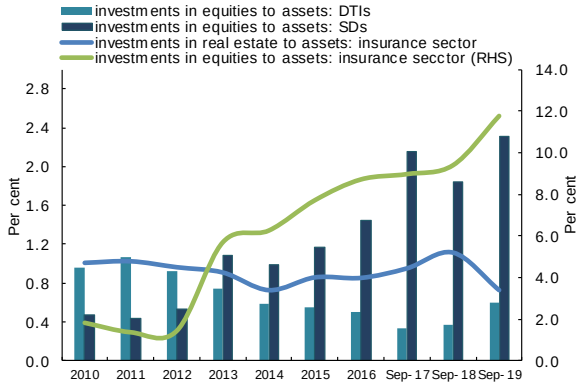


Table 4.3 Investment classes as a per cent of total assets pensions industry

	2014	2015	2016	Sep-17	Sep-18	Sep-19
Investments in Governments Securities to Assets (%)[1/]	40.5	33.6	30.4	26.1	25.0	20.6
Investments in Equities to Assets (%)	9.3	14.6	17.0	20.3	23.8	26.3
Investments in Real Estate to Assets (%)	5.8	5.4	4.8	4.0	3.8	3.6
Investment Arrangements to Assets (%)[2/]	29.5	32.8	36.6	38.0	36.9	37.4
Other Investments to Assets (%)	14.1	13.2	11.1	11.5	10.7	12.2
Total Asset values (J$BN)	341.4	396.9	453.1	513.3	595.1	690.0

Notes

[1/] Government securities includes Government of Jamaica securities and other sovereign securities from the US, UK

[2/] An investment arrangement describes investments in deposit administration contracts and pooled funds.

4.5.2 Public sector debt & securities dealers' exposure

SDs' exposure to public sector debt continued to trend downward for the review period, consistent with the overall decline in the national debt. In particular, the ratio of SDs' holding of public sector debt to SDs' assets declined to 18.9 per cent at end-September 2019 from 20.5 per cent at the end of the previous review period. Correspondingly, SDs' public sector debt holdings to capital fell to 124.1 per cent at end-September 2019 from 157.4 per cent at end-September 2018 (see Figure 4.18).

4.5.3 Insurance sector exposure to public sector debt

Similar to DTIs, the insurance sector's exposure to public sector debt increased for the review period.[15] Specifically, the ratio of public sector debt holdings to insurance assets rose by 4.3 percentage points to 41.5 per cent at end-September 2019 relative to the previous review period (see Figure 4.19). This outturn reflected an increase by the life insurance sub-sector as the ratio for the general insurance sub-sector declined relative to the previous reporting period. Public sector debt holdings for the insurance sector as a proportion of capital increased to 151.4 per cent at end-September 2019 from 141.6 per cent at end-September 2018 (see Figure 4.20).

4.6 Non-DTFIs exposure to real estate and equity

NDTFIs' exposure to equities and real estate remained relatively low during the review period. Specifically, the ratio of equity investments to assets for SDs was 2.3 per cent as at end-September 2019 relative to 1.8 per cent as at end-September 2018. Similarly, the insurance sector recorded an increase of 2.3 percentage points to 11.7 per cent in this ratio for the year ended September 2019. On the other hand, investment in real estate for the insurance sector marginally declined to 0.7 per cent of total assets from 1.1 per cent for the year ended September 2018. Of note, DTIs' investment in equities has consistently been below 1.0 per cent of DTIs' assets base (see Figure 4.21).

4.7 Pension industry exposure to government's securities, equities & real estate[16]

Investment arrangements continued to account for the largest share of the pension industry's assets. For the review period, the share increased marginally by 0.5 percentage point to 37.4 per cent. Of note, exposure to equity investments was 26.3 per cent of pension fund assets accounting for the second largest share of pension fund asset base (see Table 4.3).[17,18] This could be reflective of a portfolio shift away from investment in GOJ securities, which occurred within the context of reduce presence of GOJ in the domestic bond market as well as the continued favourable performance of the Jamaica

[15] Public sector debt is defined as public sector domestic securities which include Bank of Jamaica Securities, Treasury Bills as well as other domestic Jamaican Government Securities.

[16] The data for the industry represents data for the pension fund as at end-September 2019.

[17] Pension industry refers to private pension plans within the regulatory oversight of the Financial Services Commission.

[18] Exposure is computed as a per cent of total assets.

stock market. The pension fund industry's exposure to real estate and domestic & foreign government securities declined by 0.2 and 4.4 percentage points to 3.6 per cent and 20.6 per cent, respectively, for the year ended September 2019.

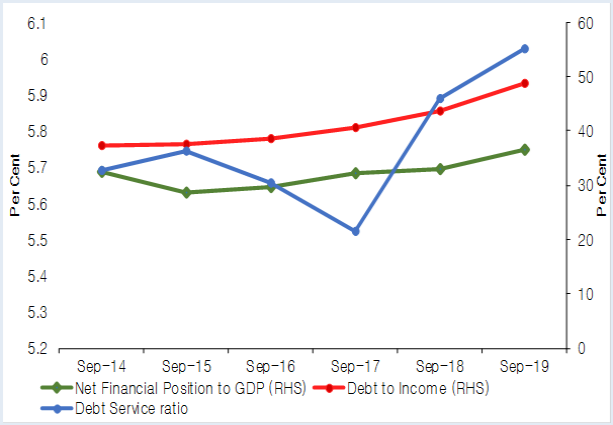
Box 4.1 Debt Sensitivity Analysis for the Household Sector

The household sector represents DTIs' largest credit exposure, accounting for approximately 59.3 per cent of their loan portfolio at end-September 2019. Given the significance of this credit exposure, any disruption to households' ability to service loans may have significant ramifications for the financial sector. Furthermore, household debt is not generally associated with an increase in income in the long run. Therefore, rapid expansion of household credit can create conditions that precipitate a financial crisis. Accordingly, this analysis examines the trends in household sector indebtedness and the short-run risks related to possible fallouts in key macroeconomic variables on the resilience of the financial system.

Introduction

The three measures of household financial vulnerability that were utilized in this assessment were the debt to income measure, households' net financial position (HNFP) as a share of GDP and the household debt service ratio (DSR).[1,2,3] Over the past five years, there has been a general deterioration in the abovementioned financial vulnerability measures. In particular, debt to income rose steadily to 48.7 per cent at end-September 2019 from 37.2 per cent at end-September 2014. In comparison, HNFP to GDP increased to 36.5 per cent from 28.8 per cent at end-September 2015. This increase was largely due to an expansion in household financial assets, which largely reflected large increases in deposits and the value of pension funds' assets. Regarding the DSR, the ratio fell to 5.5 per cent at end-September 2017 from 5.7 per cent at end-September 2015, implying reduced vulnerability due to declining interest rates. However, since 2017, there has been a trend increase in the DSR reflecting an expansion in the household debt within the lower interest rate environment (see Figure 1).

Figure 1 Debt to income, HNFP to GDP and the DSR



Methodology

The following model was estimated using the ARDL estimation technique to determine the factors influencing household financial vulnerability:

$$FV_t = \alpha_1 + \beta_1 Debt_t + \beta_2 Int_t + \beta_3 Rem_t + \beta_4 X + \varepsilon$$

where FV represented the financial vulnerability indicators; Debt referred to the sum of household debt to DTIs and residential mortgages held by

[1] Debt to Income is defined as the ratio of Household Debt to the sum of Personal Disposable Income and Net Remittance Inflow.

[2] Households' net financial position (HNFP) is defined as the difference between aggregated values of household financial assets and household financial liabilities. Household Financial Assets comprises Asset value of Pension Funds, Deposits in DTIs, Retail Repos, Life assurance and annuity contracts and Policyholders' funds on deposit. Household Financial Liabilities comprises overall debt outstanding from consumer and mortgage loans for DTIs and the residential mortgage loans outstanding for NHT.

[3] For the definition of DSR, see Chapter 4, Section 4.2.1, footnote 6, page 32

NHT; Int refers to the weighted average lending rate for DTIs; Rem refers to the net inflow of remittances; X refers to the other control variables including GDP.

The results from the model showed that interest rate, net remittance inflows and the stock of household debt were the most significant contributor to household sector vulnerability.[4] Debt sustainability measures were shocked based on historical sharp movements in interest rates, net remittance inflows and household sector debt stock. Additionally, an array of shocks were used ranging from low to high in order to gauge the sensitivity of the household sector to changing risk factors (see Table 1). Furthermore, threshold values were established for each vulnerability measure based on a 3 standard deviation fallout in its current level. Using this methodology, the threshold for the DSR was 8.6 per cent; for HNFP to GDP, the threshold was 24.1 per cent; and for Debt to Income, the threshold was 64.8 per cent.

Table 1 Stress scenarios

	Interest rate	Remittances	Household Debt
Reference point	+500 bps	-11.4%	+17.7%
Low	+300 bps	-10%	+10%
Medium	+400 bps	-12%	+15%
High	+600 bps	-15%	+20%

Findings

The stress tests were carried out individually at first (see Table 2). The results indicated that the DSR is most sensitive to shocks to the liability side of a household's balance sheet. This was evidenced from the large impact on the DSR from shocks to the interest rate and debt level. In particular, a high interest rate shock of 600 bps would cause the DSR to breach its 3 standard deviation threshold of 8.6 per cent. Comparatively, a shock to the income level, through a fall in remittances, had a more subdued impact on the DSR. Regarding HNFP to GDP, the results showed that the household sector remained resilient to the range of shocks applied to household debt. The debt to income was most sensitive to shocks to household sector debt level, but remained resilient to each of the individual shocks.

Table 2 Individual stress test results

	Original	Threshold	Low Int	High Int	Low Rem	High Rem	Low Debt	High Debt
DSR	6.03	8.61	7.45	**8.88**	6.09	6.18	6.63	7.23
HNFP/ GDP	36.51	24.05	36.51	36.51	36.51	36.51	33.38	30.25
Debt to Income	47.47	64.84	47.47	47.47	47.96	48.67	52.22	56.97

In addition, three aggregated scenarios were examined where interest rate, net remittances inflow and household debt were simultaneously shocked (see Table 3). Specifically, a medium level shock of an increase 400 bps in interest rate, 12.0 per cent decline in remittances and 15.0 per cent increase in household sector debt would result in a

[4] See Tijani, A., "Determinants of Household Sector Vulnerability in Jamaica: An Application of an ARDL Model and Stress Testing Scenarios"

breach of the threshold value of the DSR. Of note, the other measures remained resilient to the aggregated shocks.

Table 3 Aggregated stress test results

	Original	Threshold	Low	Med	High
DSR	6.03	8.61	8.28	**9.27**	**10.92**
HNFP/ GDP	36.51	24.05	33.38	31.82	30.25
Debt to Income	47.47	64.84	52.76	55.50	58.40

Conclusion

The DSR was more responsive to changes in the macroeconomic conditions than the HNFP to GDP and debt to income. As such, the DSR is a better measure of household risks to the financial system. This was largely due to its sensitivity to changes in interest rates. The debt to income and HNFP indicators reflected an expansion of household credit facilitated by the fall in interest rates over the same time. A reversal in the trend of falling interest rates could lead to a substantial number of households being unable to service their debt which poses a significant credit risk to the financial system. This sensitivity of household fragility to positive interest rate shocks confirms the need for continued focus by policymakers on macroeconomic stability.

5.0 SPECIAL ASSESSMENT ON CREDIT GROWTH AND ASSET PRICES

This chapter examines DTIs' exposure to credit risk and asset prices

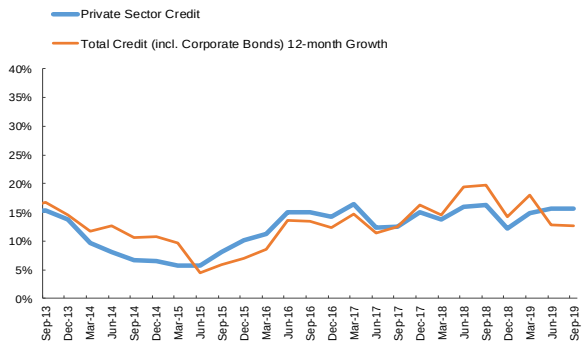
5.1 Overview

Consistent with the Bank of Jamaica's accommodative policy, credit growth was strong for the year ended September 2019. There was a notable increase in the credit-to-GDP gap to 2.8 per cent. However, credit metrics show that financial institutions do not show any over-leveraging. Personal loans remained the dominant driver of private sector credit over the review period. Nonetheless, asset quality for the DTI sector improved as indicated by a reduction in non-performing loans within the personal loans category. Meanwhile, DTIs' remained resilient to hypothetical shocks to NPLs by sector, where NPLs were projected using GDP forecast for the March 2020 quarter. Real estate assets comprise the majority of the asset portfolio of Jamaican households, with growth in mortgage loans remaining strong for the review period. As such, real estate cycles have a very influential impact on Jamaica's aggregate financial and business cycles. Qualitative information gathered from real estate stakeholders indicate that property markets will rely on continued favourable macroeconomic conditions.

5.2 Growth in Credit

Total credit grew by 12.7 per cent for the year ended September 2019, relative to growth of 19.8 per cent for the year end-September 2018.[1] This expansion resulted in $112.6 billion of additional financing in the system over the review period. Within total credit, private sector credit grew by 15.6 per cent or $108.3 billion over the year ended-September 2019 (see Figure 1).

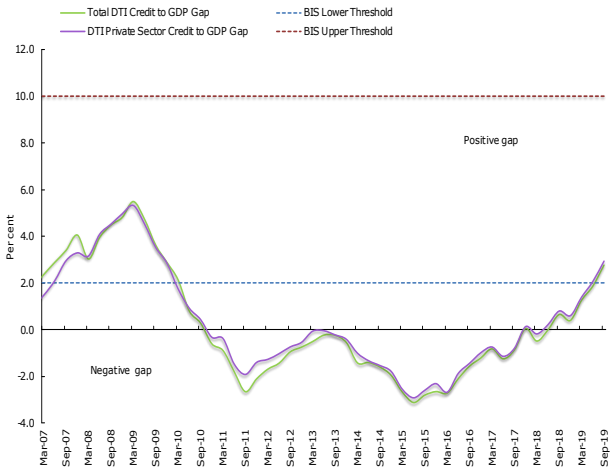
Figure 1 Growth in private sector credit



The credit-to-GDP gap indicator increased by 1.6 percentage points to 2.8 per cent over the review period. However, the credit metrics show that the financial institutions were not over-leveraging. This is in the context where the outturn was higher than the Bank of International Settlement's lower threshold of 2.0 per cent but well below the upper threshold of 10.0 per cent (see Figure 2).

[1] Total credit includes credit to the private sector, corporate bond issues, public sector credit minus lending to financial institutions and overseas residents. Private Sector Credit is comprised of DTIs' loans and advances to the private sector excluding credit to overseas residents and other financial institutions. Total DTI credit used to calculate the credit-to-GDP gap, is comprised of private sector credit plus corporate securities held by DTIs plus public sector credit. The credit-to-GDP gap indicators measure the deviation of credit-to-GDP variables relative to long-term trends to signal excessive credit risk accumulation.

Figure 2 Credit to GDP gap



5.3 Concentration in Private Sector Lending

The concentration in private sector lending which is measured using the Herfindahl-Hirschman Index (HHI), decreased by 0.5 per cent to 3 026.2 at end-September 2019 (see **Figure 3**).[2] DTI loans continued to be concentrated within the domestic *Household* sector (personal loans).[3] Notwithstanding, the share of loans to the household sector decreased by 0.2 percentage points to 52.7 per cent at end-September 2019. DTIs' other significant exposures in the lending market were to *Distribution* (8.2 per cent), *Overseas* residents (7.2 per cent), *Professional Services* (6.1 per cent) and *Tourism* (5.4 per cent) (see **Figure 4** and **Table 1**).

A Lorenz curve analysis showed that lending to the private sector was concentrated within three of the eleven DTIs. Moreover, these three DTIs continued to account for over 60.0 per cent of loans extended to the three sectors that had the highest loan concentration (*Household, Distribution* and *Tourism*). During the review period, the share of private sector loan for these three DTIs' declined by 1.7 percentage points to 64.1 per cent of overall private sector credit, largely reflecting decreased lending to the tourism sector. Most DTIs increased the share of credit extended to households during the review year ended September 2019 (see **Figure 5**).[4]

Figure 3 Concentration of DTIs' loan portfolio to private sector

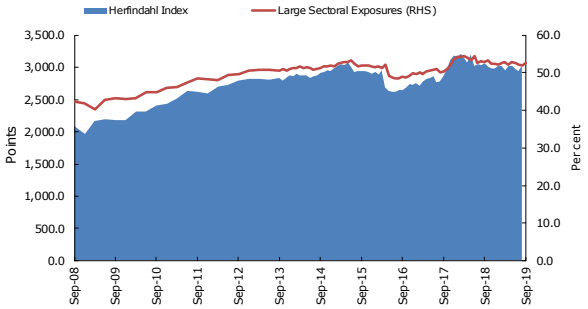


Figure 4 Share of Private Sector Credit by top three DTIs

[2] The Herfindahl-Hirschman Index (HHI) is calculated by squaring the loan share of each sub-sector within the private sector loan market and then summing the resulting numbers. The HHI index can range from close to zero to 10 000.

[3] "*Household*" is used to represent the "*Personal Loans*" line item which include mortgages to households.

[4] Lorenz curve analysis subsequent to end-2010 is significant given the impact of the global financial crisis and the Jamaica Debt Exchange (JDX) on DTIs' loan portfolio.

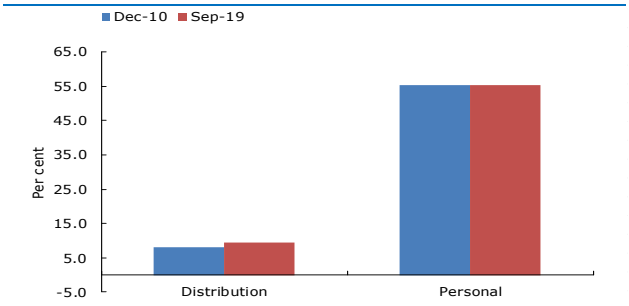
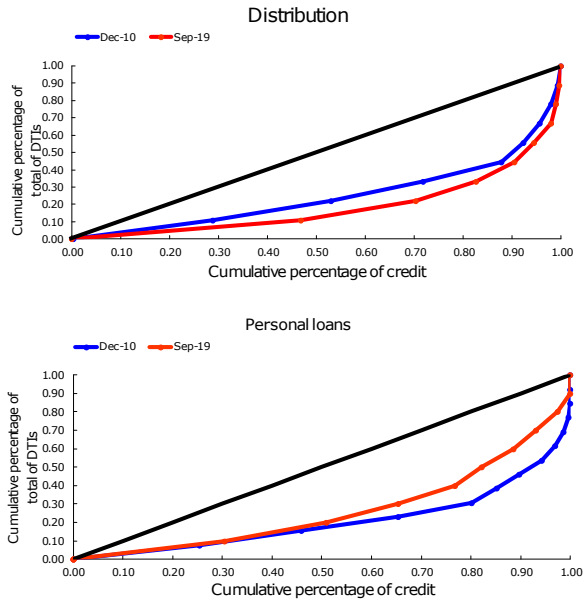


Table 1 Concentration of DTIs loan portfolio[5]

Per cent	2015	2016	Sep-17	Sep-18	Sep-19
AGRICULTURE & FISHING					
CONSTRUCTION & LAND DEV.					
DISTRIBUTION					
ELECTRICITY					
ENTERTAINMENT					
FINANCIAL INSTITUTIONS					
MANUFACTURING					
MINING, QUARRYING & PROC.					
PERSONAL NON BUS. LOANS TO IN					
PROFESSIONAL & OTHER SERVICE					
OVERSEAS RESIDENTS					
TOURISM					
TRANSPORT , STORAGE & COMM.					
PUBLIC SECTOR					

Figure 5 Lorenz curve Distribution of credit for DTIs



5.4 Asset Quality in DTIs

Asset quality for DTIs, as measured by non-performing loans (NPLs) as a share of total loans, declined by 0.3 percentage point to 2.3 per cent at end-September 2019. Of note, the dollar value of NPL increased to 2.2 per cent for the current review period in contrast to the decline of 6.8 per cent for the previous review year (see **Figure 6**). The NPL coverage ratio increased to 122.3 per cent at end-September 2019 from 113.9 per cent at end-September 2018 (see **Figures 7**).[6]

Figure 6 NPLs in the DTI sector

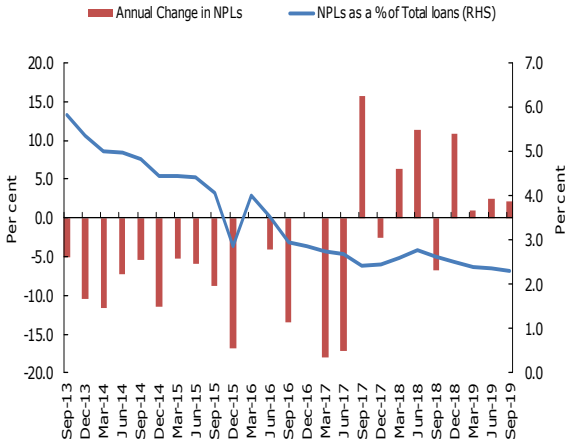
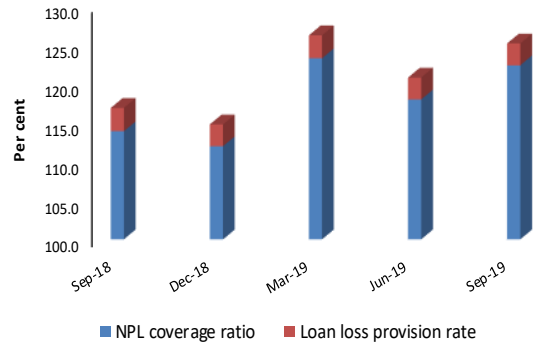


Figure 7 Loan loss provisioning rate and NPL coverage for DTIs

[5] With respect to Table 1, darker areas indicate more concentration.

[6] NPL coverage ratio measures a bank's ability to absorb potential losses from its non-performing loans. It is calculated as provisions for impairment under the International Financial Reporting Standards (IFRS) plus prudential provisions for expected losses based on regulatory criteria as a ratio to NPLs.



5.5 Sectoral Distribution of Credit

DTIs' credit to all loan categories increased for the review period, with the exception of *Tourism* and the *Public Sector*. Of note, *Overseas Residents* (76.3 per cent), *Mining* (41.8 per cent), and *Electricity* (36.8 per cent) recorded the strongest increases. However, average credit growth to all economic sectors decelerated to 21 per cent for the review period from 100.2 per cent for the year ended September 2018 (see Table 2).

Table 2 Growth in DTIs' loans by sector

End-September 2019		End-September 2018	
Overseas	76.3	Public Sector	788.5
Mining	41.8	Mining	289.4
Electricity	36.9	Transportation	48.8
Transportation	31.1	Agriculture	43.5
Professional	26.5	Eletricity	42.0
Distribution	22.7	Manufacturing	22.6
Construction	20.1	Construction	19.3
Entertainment	18.1	Personal	15.6
Personal	15.2	Professional	15.5
Manufacturing	11.2	Tourism	11.6
Agriculture	9.0	Overseas	7.5
Tourism	-14.3	Distribution	0.3
Public Sector	-21.0	Entertainment	-2.3

Personal loans continued to account for the largest share of DTIs' credit (52.0 per cent) with annual growth of 15.2 per cent for the year ended September 2019. Excluding *Personal loans*, DTIs' loan portfolio was largely concentrated in *Overseas Residents*, *Distribution*, and *Professional Services*. These sectors accounted for 9.2 per cent, 8.3 per cent and 6.1 per cent, respectively, of DTIs' loan portfolio at end-September 2019 (see Table 3).

Table 3 Market share of DTIs' loans by sectors

End-September 2019		End-September 2018	
Personal	52.0	Personal	53.40
Overseas	9.2	Distrubution	8.00
Distrubution	8.3	Tourism	7.44
Professional	6.1	Overseas	6.17
Tourism	5.4	Professional	5.70
Construction	4.7	Construction	4.61
Eletricity	4.2	Manufacturing	3.64
Manufacturing	3.4	Eletricity	3.64
Transportation	3.4	Public Sector	2.86
Public Sector	1.9	Transport	2.02
Agriculture	1.5	Agriculture	1.68
Mining	0.6	Mining	0.50
Entertainment	0.3	Entertainment	0.33

All DTIs, except one bank had a significant concentration in personal loans ranging between 16.4 per cent and 98.3 per cent. With the exception of two institutions, DTIs had concentration exposure to the distribution sector in excess of 7.0 per cent. Exposures to *Overseas Residents* were concentrated in four institutions with an average of 5.6 per cent. Loan concentration in *Professional services* was more broad-based across the DTIs, representing an average of 8.7 per cent of total loans (see Table 4).

Table 4 DTI loan concentration at end-September 2019

	Total	All COMMERCIAL BANKS	CB1	CB2	CB3	CB4	CB5	CB6	CB7	CB8	All BUILDING SOCIETIES	BS1	BS2	MERCHANT BANK	MB1	Average
Agriculture	1.55	1.70	0.37	21.03	2.49	2.32	0.44	0.18	2.85	1.31	0.02	0.00	0.03	4.64	4.64	3.24
Mining	0.60	0.65	0.16	0.00	0.06	0.03	0.00	0.03	1.52	0.23	0.00	0.00	0.00	5.41	5.41	0.68
Manufacturing	3.42	3.75	6.09	17.44	1.81	5.41	5.76	3.87	2.59	5.07	0.00	0.00	0.00	16.02	16.02	5.82
Construction	4.68	5.09	3.52	0.00	8.54	2.16	10.94	4.34	4.54	8.01	0.69	0.00	1.00	7.45	7.45	4.59
Transport	2.24	2.48	6.28	0.00	5.44	4.34	1.51	0.10	0.80	1.73	0.00	0.00	0.00	0.00	0.00	1.84
Electricity	4.21	4.65	1.83	31.12	23.26	8.99	2.90	0.05	3.18	6.91	0.00	0.00	0.00	0.91	0.91	7.20
Distribution	8.30	9.14	10.17	27.50	8.53	8.88	7.42	0.60	11.42	12.26	0.00	0.00	0.00	16.46	16.46	9.39
Tourism	5.39	5.95	1.69	0.00	7.15	6.40	5.95	0.20	10.51	6.66	0.09	0.00	0.13	0.00	0.00	3.52
Entertainment	0.33	0.37	0.63	0.00	0.06	0.03	0.16	0.04	0.39	0.59	0.00	0.00	0.00	0.00	0.00	0.17
Professional	6.12	6.67	5.56	2.91	4.37	17.34	5.56	2.56	6.08	18.12	0.34	0.00	0.49	32.77	32.77	8.70
Personal	52.04	48.67	56.68	0.00	30.37	43.94	50.83	70.66	46.42	34.08	85.38	98.83	79.35	16.35	16.35	47.96
Overseas	9.20	8.78	1.03	0.00	1.27	0.15	8.53	17.36	9.02	4.36	13.48	1.17	19.00	0.00	0.00	5.63
Public Sector	1.91	2.11	5.99	0.00	6.63	0.00	0.00	0.01	0.70	0.66	0.00	0.00	0.00	0.00	0.00	1.27

Table 5 DTI NPL concentration at end-September 2019

5.5.1 Sectoral Distribution of Non-performing Loans

All DTIs, except for two, had non-performing personal loans to total loans ranging between 0.8 per cent and 8.3 per cent. Of note, personal loans accounted for the highest percentage of non-performing loans in DTIs, followed by Distribution with an average NPL of 0.13 per cent. Notably, NPL ratios ranged between zero per cent and 0.5 per cent (see **Table 5**).

	Total	All COMMERCIAL BANKS	CB1	CB2	CB3	CB4	CB5	CB6	CB7	CB8	All BUILDING SOCIETIES	BS1	BS2	MERCHANT BANK	MB1	Average
Agriculture	0.06	0.06	0.01	0.00	0.01	0.32	0.12	0.00	0.06	0.25	0.02	0.00	0.03	0.00	0.00	0.07
Mining	0.02	0.03	0.02	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Manufacturing	0.02	0.02	0.02	0.00	0.00	0.34	0.00	0.00	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.04
Construction	0.14	0.15	0.02	0.00	0.00	0.59	0.00	0.00	0.17	0.71	0.09	0.00	0.13	0.00	0.00	0.15
Transport	0.04	0.05	0.01	0.00	0.01	0.12	0.00	0.00	0.05	0.23	0.00	0.00	0.00	0.00	0.00	0.04
Electricity	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Distribution	0.13	0.15	0.14	0.00	0.03	0.63	0.00	0.00	0.13	0.52	0.00	0.00	0.00	0.00	0.00	0.13
Tourism	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Entertainment	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Professional	0.14	0.15	0.07	0.00	0.09	0.80	0.01	0.10	0.12	0.50	0.04	0.00	0.06	0.00	0.00	0.16
Personal	2.15	2.12	1.02	0.00	0.81	1.77	0.99	2.33	1.98	8.25	2.49	1.76	2.82	0.00	0.00	1.98
Overseas	0.21	0.17	0.00	0.00	0.17	0.00	0.17	1.17	0.02	0.07	0.58	0.13	0.78	0.00	0.00	0.23
Public Sector	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Non-performing personal loans grew by 50.2 per cent for the review period relative to 9.4 per cent for the year ended September 2018. There was also notable growth of non-performing loans in the mining and Overseas resident categories. Of note, the increase in NPLs for the remaining sectors was relatively low and well below (see **Table 6**).[7]

Table 6 NPL Growth and loan quality

NPL to total loans				NPL Growth			
End-September 2019		End-September 2018		End-September 2019		End-September 2018	
Personal	2.2	Personal	1.7	Mining	7259.5	Eletricity	1138.4
Overseas	0.2	Overseas	0.3	Agriculture	94.8	Overseas	142.3
Construction	0.1	Distribution	0.2	Personal	50.2	Tourism	54.7
Professional	0.1	Construction	0.2	Transportation	41.1	Professional	13.3
Distribution	0.1	Professional	0.2	Construction	13.1	Public sector	0.0
Agriculture	0.1	Agriculture	0.0	Entertainment	11.2	Distribution	-0.7
Transport	0.0	Transport	0.0	Professional	10.6	Manufacturing	-2.4
Mining	0.0	Manufacturing	0.0	Manufacturing	6.0	Personal	-9.4
Manufacturing	0.0	Entertainment	0.0	Electricity	3.3	Mining	-17.6
Entertainment	0.0	Tourism	0.0	Distribution	-3.1	Agriculture	-39.4
Tourism	0.0	Eletricity	0.0	Tourism	-19.3	Entertainment	-46.4
Eletricity	0.0	Mining	0.0	Overseas	-29.1	Construction	-51.7
Public Sector	0.0	Public Sector	0.0	Public Sector	-100.0	Transport	-52.9

5.6 Sectoral Stress Tests

[7] The mining sector experienced high NPL growth due to the transition of Past due loans to non-performing of one institution.

DTIs' remained resilient to hypothetical shocks to NPLs by sector, where NPLs were projected using GDP forecast for the March 2020 quarter.

Scenario:

Hypothetical shocks to GDP by economic sector for the March 2020 quarter. These hypothetical shocks were applied to the NPL portfolio of each DTI (see Table 7).

Assumptions:

1. Growth by economic sector, based on GDP forecast for the March 2020 quarter, applied to the sectoral loan portfolio of each DTI. It was also assumed that there is a pro-cyclical relationship between sectoral GDP growth and DTIs' NPLs by economic sector. Therefore, higher loans and GDP growth would lead to increases in the dollar value of NPLs;
2. It was assumed that there is a loss in interest income due to increases NPLs. The average weighted lending rate for each DTI was utilized. This conservative assumption underpins the absence of stringent risk practices by DTIs;
3. A 100 per cent provisioning was applied to new NPLs;
4. The impact on DTIs' buffer capital was also considered. The shock is first applied to the buffer capital before it hits the regulatory capital. The buffer capital is comprised of retained earnings, unappropriated profits and revaluations reserves. If the buffer capital is fully depleted the impact on the capital adequacy ratio is evaluated.
5. Examines the aggregate impact on the capital adequacy ratio; and
6. Lending to the mining sector was assumed to grow by forecasted GDP and loans to overseas residents had a forecasted growth of 1.0 per cent.

Table 7 March 2020 forecasted shocks to NPLs

Economic Sectors	Shocks
Agriculture	2.93
Mining	-28.09
Manufacturing	2.76
Construction	1.00
Transport	1.00
Electricity	1.00
Distribution	1.00
Tourism	2.50
Entertainment**	1.00
Professional**	1.02
Personal*	0.52
Loans to overseas residents**	1.00
Loans to Public Sector	0.30
Total GDP	0.5

*Since this sector has a negative growth rate there is a negative relationship between GDP growth and NPL to this sector

With the exception of two DTIs, all institutions would realize an increase in their NPL ratio subsequent to the shocks examined (see Table 7). However, all ratios remained below 10.0 per cent following the shock. Credit risk stress tests demonstrated that all DTIs remain adequately capitalized to withstand the contemplated shocks. There were only marginal declines in buffer capital, with the exception of one commercial bank. Of note, two DTIs did not have non-performing loans prior to the shock (see Table 8).

Figure 7 Impact of GDP on DTIs' NPL ratios

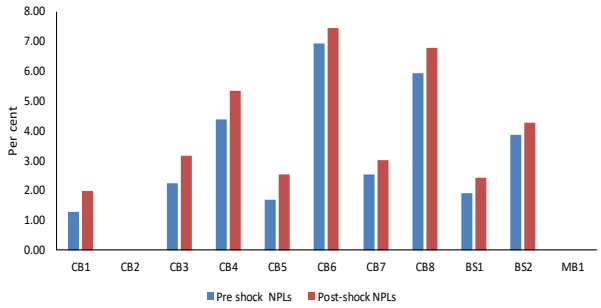


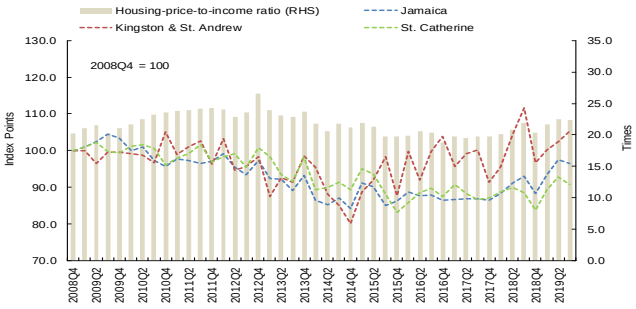
Table 8 Impact of GDP on DTIs capital positions.

	CB1	CB2	CB3	CB4	CB5	CB6	CB7	CB8	BS1	BS2	MB1
Loss in Interest Income	38,262,129	357,267	12,855,712	8,298,179	6,957,336	11,794,950	60,057,157	27,235,321	2,763,120	4,938,857	-
Increase in Provisions	1,275,404,293	35,726,747	642,705,576	276,605,979	349,866,786	523,658,802	1,501,428,936	680,883,035	131,739,963	241,201,323	-
Impact on capital	(1,313,666,422)	(36,084,014)	(655,641,287)	(284,904,158)	(356,824,122)	(535,453,752)	(1,561,486,093)	(708,118,356)	(134,497,083)	(246,200,220)	-
Impact on buffer capital (post-shock)	(968,083,422)	2,267,655,986	988,494,713	320,792,842	605,092,878	1,440,837,498	24,523,965,917	1,903,301,644	5,970,787,917	357,225,780	-
Private sector-NPLs to Total loans (pre-shock)	1.3	0.0	2.2	4.4	1.7	6.9	2.5	6.0	1.9	3.9	0.0
Private sector-NPLs to Total loans (post-shock)	1.7	0.0	3.1	5.1	2.2	7.3	2.9	6.5	2.4	4.3	0.0
Pre shock CAR	16.2	17.4	12.8	13.2	13.7	15.2	12.8	13.6	37.4	19.7	87.8
Post-shock CAR	16.2	17.4	12.8	13.2	13.7	15.2	12.8	13.6	37.4	19.7	87.8

5.7 Mortgage Loans

Growth in mortgage loans remained strong for the review year with real estate assets comprising dominating the asset portfolio of Jamaican households. For the September 2019 quarter, the outturn of the CPI deflated residential Real estate price indices (RREPI), as measured by BOJ four quarter rolling window Hedonic RREPI model, showed mixed results relative to the previous quarter. The indices for the all Jamaica and St. Catherine declined by 1.2 per cent, and 2.1 per cent, respectively, while the index for Kingston & St. Andrew increased by 2.8 per cent. This outturn coincided with an annual increase of 0.5 percentage point in the housing-price-to-income ratio, which showed a faster pace of growth in average house prices relative to income (see Figure 8).

Figure 8 Adjusted residential Real Estate



For the year ended September 2019, mortgage loans accounted for 36.6 per cent of household credit from DTIs. Furthermore, there was a nominal increase of 8.5 per cent in DTIs' mortgage loans to households, which was marginally lower than the 9.5 per cent recorded for the previous review period. Overall mortgage loans increased by 5.8 per cent in real terms during the review period, compared to growth of 6.1 per cent for the year ended September 2018. In addition, when loans from the National Housing Trust are accounted for, mortgage loans represent 53.9 per cent of overall household debt. In the context where real estate cycles have a very influential impact on Jamaica's aggregate financial and business cycles these figures are important to policy makers.

5.7.1 Qualitative Information on Real Estate Market

Qualitative information gathered from real estate stakeholders indicate that property markets will rely on continued favourable macroeconomic

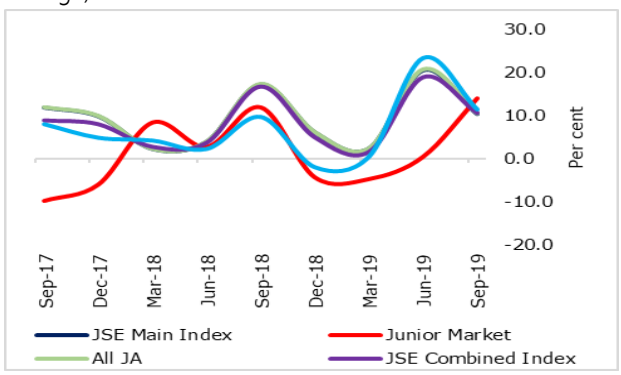
conditions. Survey respondents noted that demand for properties was higher than normal during 2019, which resulted in higher real estate prices relative to previous years. Activity in the real estate market was dominated by residential purchases by the household sector. Furthermore, there were reductions in investment in real estate assets by pension funds and the insurance sector. Specifically, pension funds investment in real estate fell by 0.2 percentage point to 3.6 per cent of total assets. For the insurance sector, investment in real estate fell to 0.7 per cent of total assets from 1.1 per cent at end-September 2018.

As it relates to the source of funds for real estate purchases, most buyers received mortgage loans from commercial banks. It was noted that most first-time buyers purchased homes for the purposes of personal occupancy, while some home purchases are for short-term and long-term rental income. Pension funds were mainly interested in purchasing commercial properties given the preference for long-term leases (15 to 20 years) and the view that residential properties were more difficult to manage. In addition, demand and prices for commercial properties are expected to increase due to pension funds' continued search for yields given the Government of Jamaica's reduced presence in the domestic debt market.

5.8 Jamaica Stock Exchange

There were fluctuations in the JSE index during the review period. Nonetheless, the index grew by 44.0 per cent relative to growth of 36.4 per cent for the year ended September 2018.

Figure 9 Quarterly Growth of the JSE Indices (Per cent Change)



Box 5.1 Financial Deepening

An interagency group led by the BOJ and comprising the Financial Services Commission (FSC), Development Bank of Jamaica (DBJ) and Jamaica Stock Exchange (JSE) was established by the Minister of Finance and the Public Service (MOFPS) in November 2018. This group was tasked with advancing Jamaica's Financial Deepening Agenda. That is, to spearhead a set of reforms and initiatives aimed at expanding the range of domestic assets that are intermediated and also to develop an ecosystem for deeper financial markets. In addition, the reforms will facilitate the creation of high quality liquidity assets which support prudent liquidity management by financial institutions.

Highlights and Near-Term Agenda

A multi-pronged, multi-agency approach was taken to advance the financial deepening agenda. The key elements of immediate focus include:

(i) Accelerating access to finance;

(ii) Increasing transparency and price discovery;

(iii) Standardizing asset quality and

(iv) Accelerating the creation of investible domestic assets.

(i) Accelerating access to finance

Various efforts are underway, both within the government and the private sector, to increase access to finance for small and medium sized enterprises (SMEs). The focus of the financial deepening agenda in 2019 was to support the building out of a financial environment that facilitates reverse factoring. This will allow SMEs the opportunity to receive earlier payment and better financing terms. The development of reverse factoring is aimed at providing an alternative to traditional collateral based financing for SMEs.

The DBJ is developing an electronic platform to scale the use of reverse factoring in Jamaica. In September 2019, DBJ selected the reverse factoring electronic platform provider. Once DBJ signs the contract with the platform provider, the pilot phase will commence. The first live transaction on the electronic platform is anticipated for the second quarterof 2020.

In addition, the financial deepening efforts have involved collaboration with the PSOJ Access to Finance Panel (PAFP) to enhance the credit assessment infrastructure for SMEs.[1] Preliminary discussions were held on utilizing a credit agency's SME credit scoring model and rating tool. Improved credit assessment of SMEs will enhance access to finance for SMEs by bridging the information gap, among other things.

[1] This panel was launched in June 2019, with the objective of assisting SMEs in accessing credit. Specifically, they will seek to take into consideration accounts receivables as collateral, increased access to the DBJ's credit enhancement facility, the creation of a dedicated SME section on most financial institutions' websites, more friendly SME credit adjudication processes and the inclusion of more SMEs in credit bureaus' databases.

(ii) Increasing market transparency and priced discovery

The financial deepening agenda will focus on strengthening the trading microstructures to foster increased transparency and efficient price discovery. Against this background, a new JSE NASDAQ trading platform was commissioned on 02 December 2019. This new trading platform has multi-asset class trading capabilities and supports the trading of equities, fixed income (both government and corporate bonds), futures, forwards and derivatives.

The FSC and the JSE also implemented initiatives aimed at providing an easier environment for the issuing of corporate debt securities. Accordingly, in September 2019, the FSC modified guidelines to make it easier for listed companies to issue corporate debt securities. In addition, draft amendments to the Securities Regulations are being prepared to adjust the fee structure between the FSC and the JSE which will allow for more competitive pricing with respect to the trading of debt.

In December 2019, technical assistance (TA) was provided by the International Monetary Fund (IMF) to strengthen the Primary Dealers' system which will result in a more transparent and meaningful yield curve. The TA recommended that primary dealers should provide post daily transactions, such as price, to allow for a more transparent yield curve. Implementation and follow up of the proposed reforms from the TA will be pursued.

For 2020 and beyond, the financial deepening efforts will focus on facilitating the trading of GOJ securities on the new JSE platform and exploring other measures to enhance transparency and efficient price discovery. Also, in January 2020, preliminary discussions were held with the FSC, JSE and the JSDA regarding a proposal for the establishment of a private market for the trading of private placements on the new JSE NASDAQ platform. This private market will allow for greater efficiency and transparency relative to the current over the counter operation. Further work on this initiative will be conducted in 2020.

(iii) Standardizing asset quality

The financial deepening agenda promotes reforms focused on expanding the independent ratings of corporates in order to facilitate price discovery. In this regard, the BOJ and the FSC collaborated in 2019 to advance specific financial regulatory reforms. For example, the August 2019 amendments to the Pensions Investments Regulations allows Pension Funds to invest in an expanded pool of highly rated instruments. Similarly, the phased implementation of the Liquidity Coverage Ratio (LCR) which began in October 2019, requires corporate debt to be highly rated for it to qualify as a high-quality liquid asset.

BOJ has begun work under Basel III regarding the implementation of proposed reforms to the capital adequacy framework. The proposed reforms will allow for the application of external ratings as an input for the risk-weighting framework. Subsequently, these risk weights will determine DTIs' minimum regulatory capital adequacy requirements for credit risk. In addition, it is expected that a revised capital framework for securities dealers

will be developed by the FSC to address risks that may evolve and to ensure that market deepening is supported in a prudent manner.

Efforts by the BOJ, FSC and the MOFPS are underway to establish an independent national ratings scale infrastructure to support the evolving regulatory framework and to promote the bringing to market of high-quality assets. In this regard, the MOFPS has signalled its plans to have the Government of Jamaica rated on a national scale by Caribbean Information & Credit Rating Services Limited, an important feature of the national rating scale framework.

(iv) Accelerating the creation of domestic investible assets

The DBJ continued to lead the GOJ's privatization programme and, in 2019, bolstered its efforts to facilitate the acceleration of government domestic assets going to market. The listing of Wigton Wind Farm on the JSE is an example. In addition, the GOJ intends to list the Jamaica Public Service Company and Jamaica Mortgage Bank in 2020.

Going forward, the financial deepening team will continue to explore prospects for securitizing income streams of selected public agencies to fund respective capital investment projects.

6.0 SPECIAL ASSESSMENT OF THE INTERBANK FUNDING NETWORK

This chapter examines the results of network analysis conducted on interbank gross funding exposures

6.1 Overview

Contagion and spillover risks continued to be high within the Jamaican financial system. The commercial banking sector continued to be the most significant contributor to gross funding in the financial system. Securities dealers also played a significant role in the funding of the domestic financial system. There was a slight increase in gross funding exposures for the Jamaican financial system as at September 2019 relative to September 2018. This assessment was supported by systemic risk scores which indicated an increase in risk over the review period. Five financial institutions are both critical and key contributors to the interbank risk composition.[1] In this regard, the interbank network continued to reflect fragility and vulnerability.

The domestic financial system also continued to exhibit strong funding relationships with foreign entities. More specifically, Jamaica is significantly exposed to the United States, Cayman Islands and United Kingdom. In addition, there was substantial exposure to The Bahamas and Barbados highlighting the role of regional conglomerate structures. Financial group analysis also emphasised the critical role that holding companies play in the domestic financial system. The number of systemically important banking groups was unchanged at end-September 2019 relative to end-September 2018. Notably, deposit-taking institutions continued to be resilient to hypothetical credit and funding shocks.[2] The inclusion of securities dealers to the stress test resulted in increased risk within the interbank funding network.

6.2 Contagion and Spillover Risks

For the review year, contagion and spillover risks remained high within the Jamaican financial system. Network analysis metrics indicated a highly interconnected system as a result of a large proportion of reciprocated links and significant density (see **Figure 6.1**).[3] Reciprocated links comprised 52.3 per cent at the end of the review period, albeit a decrease relative to September 2018 (see **Table 6.1**). However, the high level of density signalled that financial institutions heavily rely on each other for funding and reciprocated links continue to indicate the willingness to lend and borrow from each other. This represented significant counterparty and interconnectivity risk.

[1] Criticality measure incorporates the ratings of institutions with their centrality and is used to highlight institutions that are critical as it relates to failure of the system,

[2] The IMF's Excel-based Bank Network Analysis toolkit was used to conduct stress scenarios on the DTIs and SDs. See: Espinosa-Vega, M., and Solé, J. (2010), "Cross-Border Financial Surveillance: A Network Perspective", IMF Working Paper, WP/10/105.

[3] Node size depicts the eigenvector centrality of the institution. The basis of eigenvector centrality is not all nodes are equivalent as some are more relevant than others, and, therefore relationships with important nodes count more.

Figure 6.1 Network of gross credit exposures between DTIs and SDs at end-September 2019[4]

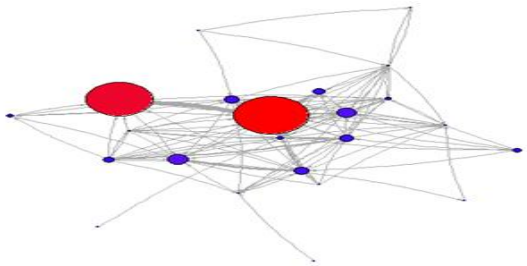


Figure 6.2 Network of gross credit exposures within the financial system at end-September 2019

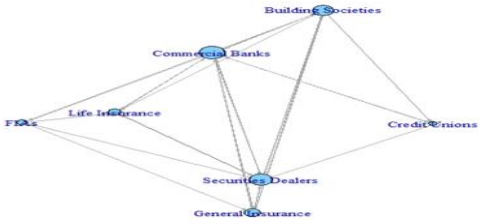


Table 6.1 Descriptive statistics of the financial institutions "funding to" exposures network

J$'000	Sep-18	Sep-19
Total System Funding To Exposure	321,139,607.00	368,129,314.00
Total System Funding To Exposure (% Total System Assets)	14.5	15.2
Total Funding of Highest Lender	45,177,804.00	50,350,559.00
Total Funding of Highest Lender (% Lender Assets)	11.3	12.0
Maximum Single Transaction	15,528,380.08	13,978,608.38
Network Mean	581,775.00	666,901.00
Reciprocity (%)	60.6	52.3
Density (%)	25.7	27.0

6.3 Gross Funding in the Financial System

The commercial banking sector continued to be the most significant contributor to gross funding in the financial system over the review year. Furthermore, the commercial bank sector recorded funding relationships with all other sectors in the financial system (see Figure 6.2). Securities dealers and building societies were also significant funding agents. The network analysis indicated that five commercial banks and four securities dealers had a crucial funding role within the financial system.

Securities dealers also provided significant funding of the domestic financial system. Of note, these institutions continued to be a significant source of funding for DTIs (see Table 6.2). On aggregate, securities dealers provide funding amounting to approximately 10.6 per cent of its total assets to other domestic financial entities. Notably, DTIs also showed significant asset exposures to foreign financial institutions.

Table 6.2 Average system exposure of deposit taking institutions and securities dealers

%	SDs	Insurance	DTIs	Domestic	Foreign
Average DTI's 'Funding From' to DTI's Assets	5.7	2.2	0.6	14.9	4.4
Average DTI's 'Funding To' to DTI's Assets	2.7	0.1	2.7	6.3	8.4

%	SDs	Insurance	DTIs	Domestic
Average SD's 'Funding From' to SD's Assets	2.3	1.3	4.0	9.3
Average SD's 'Funding To' to SD's Assets	2.2	0.3	7.9	10.6

There was a slight increase in gross funding exposures for the Jamaican financial system as at September 2019 relative to September 2018.

[4] The two largest nodes represent a securities dealer and a commercial bank and both belong to the same financial holding company.

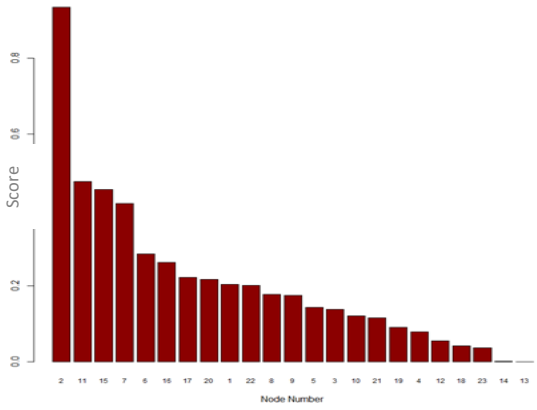
Total gross funding exposures of DTIs and securities dealers increased by 14.6 per cent to $368.1 billion at end-September 2019 and was 15.2 per cent of their combined assets (see **Table 6.1**). The largest creditor contributed $50.4 billion which was 12.0 per cent of its assets, with significant funding to its group affiliated securities dealer. The maximum single transaction for September 2019 was $14.0 billion with the network mean increasing to $0.7 billion per funding transaction for the review period.

6.3 Systemic Risks

Systemic risk scores indicated an increase in risk for the review period. At end-September 2019 the overall risk score was 4.9 in comparison to 4.7 at end-September 2018.[5]

Within the financial system, five financial institutions continued to be both critical and key contributors to the interbank risk composition. Specifically, three commercial banks and two securities dealers were found to be critical to the financial system. Accordingly, there would be a strong potential for system failure if the operations of these institutions were disrupted. Of note, two pairs of critical institutions belonged to two separate financial holding companies. Furthermore, three of these critical financial institutions contributed significantly to the risk score (see **Figure 6.3**). In addition, the top five risk contributors included two SIFIs as well as one institution with strong correspondent banking relationships.

Figure 6.3 Network risk score decomposition at-end September 2019



Note: Node number here refers to each institution's contribution to the systemic risk score

6.4 Fragility and Vulnerability

The interbank network continued to reflect fragility and vulnerability with two articulation points identified in the network.[6] The two articulation points found in the domestic network at end-September 2019 signalled vulnerabilities in the interbank system. Removal of these two financial institutions would result in a weakening of the financial system's funding flow as this would hinder access to funding for some institutions. The network was also found to be substantially fragile, i.e. high concentration risk, with a fragility score of 14.8.[7]

[5] See: M. Cihak (2014), "Stress Tester: A Toolkit for Bank-by-Bank Analysis with Accounting Data", A Guide to IMF Stress Testing: Methods and Models. This score is a network metric used to depict overall system risk. It is computed using an adjacency matrix which is used to quantify the influence of each node and a rating for each institution. The ratings are used as a proxy for credit quality and computed using the Cihak Model.

[6] Articulation points represent vulnerabilities in a network and when they are removed it results in at least two connected sub-networks.

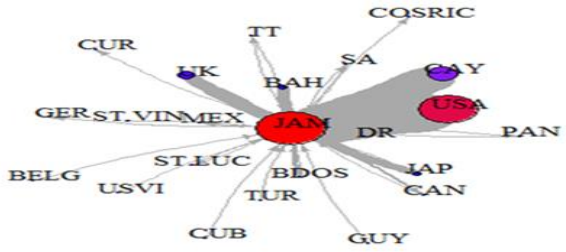
[7] Fragility refers to how quickly the failure of any one institution would trigger failures across the domestic interbank network. A network with a fragility score greater than 2 is considered to be fragile.

6.4.1 Funding Relationships with Foreign Entities

The domestic financial system continued to exhibit strong funding relationships with foreign entities. For the year ended September 2019, foreign entities contributed a total of $274.4 billion in funding relationships with domestic DTIs and securities dealers and displayed significant relationships with group affiliates. In this regard, foreign exposure was substantial enough to allow vulnerabilities to international financial shocks to persist. The strong funding relationships were also reflective of the role of correspondent banking as well as group transactions.

More specifically, Jamaica is significantly exposed to the United States, Cayman Islands and United Kingdom. For the year to September 2019, the domestic financial system received most of its funding from the Cayman Islands which amounted to $56.1 billion, while providing most of its funding to the United States totalling $90.2 billion (see Figure 6.4). The financial system also recorded notable relationships with Japan and Canada.

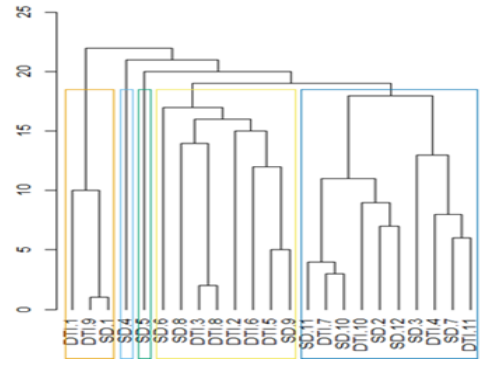
Figure 6.4 Network of the financial system's exposures with foreign countries at end-September 2019



6.5 Regional Conglomerates

For the review year, there was also substantial exposure to The Bahamas and Barbados through regional conglomerate structures. Network analysis identified five clusters, wherein each cluster was made up of entities of the same conglomerate. The dendrogram was used to illustrate this as it links the financial institutions based on their similarities in structure which highlighted the uniformity of business models within conglomerates (see Figure 6.5).

Figure 6.5 Dendrogram as at end-September 2019



6.6 Financial Groups

Financial group analysis also emphasised the critical role that holding companies play in the domestic financial system. Reciprocity of the group network was 44.4 per cent which indicated that groups were willing and able to engage with other financial groups as it relates to funding transactions (see Figure 6.6). In a healthy financial system this is ideal as it allows the system to function at its full potential. However, if one financial group comes under stress this may jeopardise the operations of the groups that they engage with and may result in spillovers and contagion across groups. The group network was also found to be significantly

fragile with a score of 13.7, well above the threshold of 2. Notably, cluster analysis showed that there were not enough similarities between groups to form clusters relative to the outcome observed when this analysis was conducted on the network of individual holding companies. Total system funding exposures were also notably less after intra-group transactions and foreign transactions were removed, declining by 85.3 per cent to $53.9 billion at end-September 2019 and representing 2.2 per cent of total assets (see **Table 6.3**). The largest creditor changed subsequent to the removal of intra-group and foreign transactions and contributed $17.2 billion or 8.3 per cent of its assets for the review period.

Figure 6.6 Network of gross credit exposures among financial holding companies, DTIs and SDs at end-September 2019

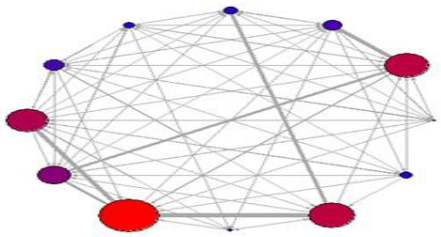


Table 6.3 Descriptive statistics of the financial institutions funding exposures network excluding group affiliates and foreign entities

J$'000	Sep-18	Sep-19
Total System Funding To Exposure	53,551,280.65	53,947,308.68
Total System Funding To Exposure (% Total System Assets)	2.4	2.2
Total Funding of Highest Lender	11,739,449.00	17,197,696.24
Total Funding of Highest Lender (% Lender Assets)	10.3	8.3
Maximum Single Transaction	4,311,452.00	6,092,669.98
Network Mean	101,231.15	101,979.79
Reciprocity (%)	54.2	42.6
Density (%)	21.1	21.3

6.7 Systemically Important Banking Groups

At end-September 2019 there were three systemically important banking groups, unchanged relative to end-September 2018.[8] Furthermore, total SIFI group assets as a share of total financial system assets was 63.4 per cent at end-September 2019 relative to 65.0 per cent at end-September 2018. The outturn for the review year highlighted the continued high degree of concentration and contagion risks within the financial system and the need to continuously as well as the need to effectively monitor the developments related to these groups.

6.8 Stress Tests

Deposit-taking institutions were resilient to hypothetical credit and funding shocks.[9,10] Stress tests results found no induced failures as a result of interbank funding relations among DTIs. However, a few entities experienced some level of capital impairment. These entities were found to be either vulnerable to another entity or posing a risk of failure to another entity. Notably, the SIFIs of the domestic system

[8] The score for banking group i for period j is computed as follows:

$$SCORE_{ij} = \frac{A_{ij}}{\sum_i^n A_{ij}} + \left(\frac{(LFC_{ij} + DFC_{ij})}{(\sum_i^n LFC_{ij} + \sum_i^n DFC_{ij})}\right) + \left(\frac{(LH_{ij} + LNFC_{ij} + LGG_{ij} + LCS_{ij})}{(\sum_i^n LH_{ij} + \sum_i^n LNFC_{ij} + \sum_i^n LG_{ij} + \sum_i^n LCS_{ij})}\right) + \left(\frac{(TS_{ij} + IS_{ij})}{(\sum_i^n TS_{ij} + \sum_i^n IS_{ij})}\right)$$

where, A = total resident assets, LFC = loans to financial corporations, DFC = deposits from financial corporations, LH = loans to households, LNFC = loans to non-financial corporations, LGG = loans to the general government, LCS = loans to community service and non-profit organizations, TS = trading securities and IS = investment securities. See: Lewis, K., Senior, A, & Smith Yee, R., Do Jamaican Domestic Systemically Important Financial Institutions have a Deposit Rate Advantage?, 2014. http://www.boj.org.jm/pdf/Do_Jamaican_Domestic_Systemically_Important_Financial_Institutions_have_a_Deposit_Rate_Advantage_(2014).pdf

[9] The credit shock scenario applied entails a failing institution defaulting on all its funding exposures (i.e. 100% of its debts will not be repaid)

[10] The funding scenario applied entails a shortfall in funding by 35% of the exposure.

induced no failures in response to the hypothetical shocks.

The inclusion of securities dealers to the stress test resulted in increased risk within the interbank funding network. There were two failures when the hypothetical shocks were applied: one failure was as a result of a conglomerate relationship between a securities dealer and building society, while the other was as a result of funding relationships between two domestic securities dealers (see Figure 6.7 and 6.8). The SIFIs did not induce any failures when hypothetical shocks were applied, although some institutions suffered minor impairments to their capital.

Figure 6.7 Number of induced failures after credit and funding shocks on DTIs and SDs

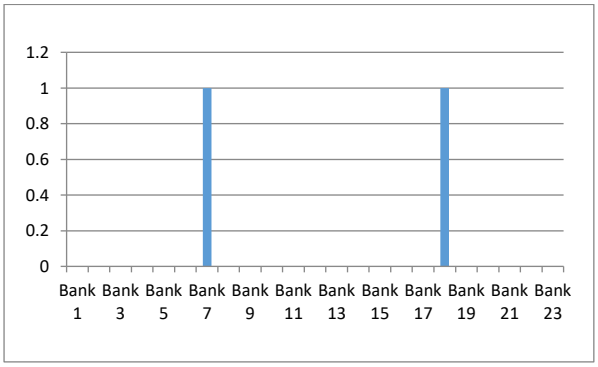
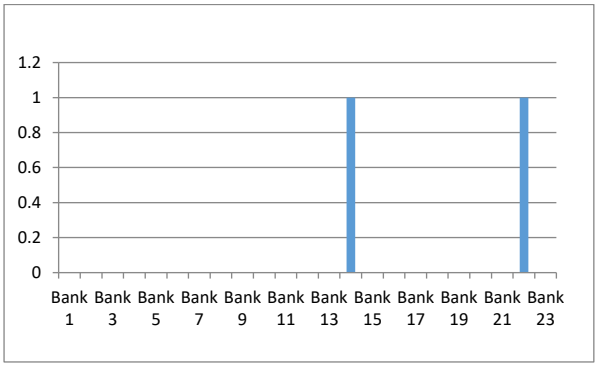


Figure 6.8 Vulnerability level after credit and funding shocks on DTIs and SDs were applied



7.0 RISK ASSESSMENT OF THE FINANCIAL SECTOR

This chapter discusses the resilience of the financial sector to hypothetical macroeconomic and financial shocks.

7.1 Overview

DTIs' stress test results showed that institutions generally remained resilient to hypothetical shocks to key financial risk exposures. In particular, the average exposure to interest rate and credit risks fell, while exposures to liquidity risk increased for the year ended September 2019. Moreover, foreign exchange risks were relatively unchanged for the review period.

Additionally, NDTFI remained robust to the contemplated range of foreign exchange and liquidity shocks during the review period. However, at end-September 2019, the SDs' sector continued to demonstrate susceptibility to interest rate risks due to fair value losses and maturity mismatches. Furthermore, the SDs sector showed reduced resilience to aggregated hypothetical shocks.

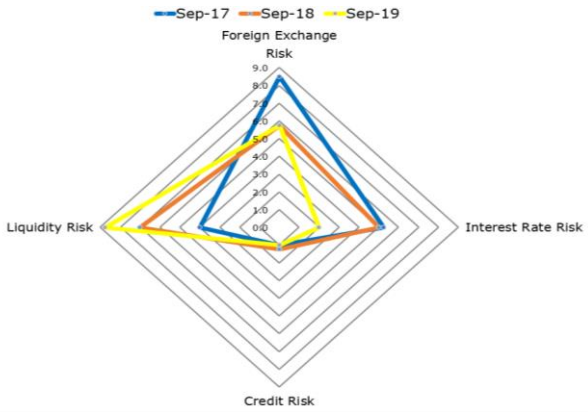
Regarding the insurance sector, there was improved resilience to interest rate risks as at end-September 2019 relative to end-September 2018. Of note, the most significant risk exposure for the life-insurance sub-sector was FX appreciation.

7.2 Risk exposure for deposit taking institutions

The financial risk exposure "cobweb", which measures annual average exposures, showed improvements in exposure to credit risk as measured by non-performing loans as a share of total loans. Similar to the previous review period, there was a marginal increase in DTIs' exposure to liquidity risks (see Figure 7.1).[1]

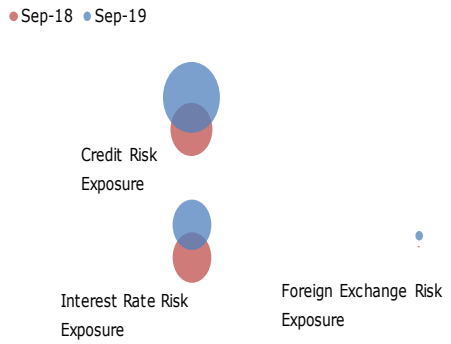
[1] Liquidity risk exposure was impacted by the maturity of GOJ benchmark notes in June 2019.

Figure 7.1 Risk exposures of DTIs



Note: Movements away from the centre of the diagram represent an increase in DTIs' risk exposures. Movements towards the centre of the diagram represent a reduction in DTIs' risk exposures. Risk exposure indicators are: (i) Foreign exchange risks – Net open position/Capital; Loans to Non-FX earners/Total FX loans (ii) Interest rate risks - Cumulative maturity gap of up to 30 days/Assets; Cumulative maturity gap of up to 90 days/Assets; Cumulative maturity gap of up to 365 days/Assets; DVBP/Capital (iii) Credit Risks – NPL/Total loans (iv) Liquidity risks – Liquid assets/Total assets; Liquid assets/Short-term liabilities

Figure 7.2 Relative exposures of DTIs based on scenarios examined in aggregate stress test analysis



Note: The larger the bubble, the greater the exposure to risk factors. The aggregate stress test assesses the simultaneous impact of increases in interest rates, currency depreciation and credit quality deterioration as well as deposit outflows on institutions' CARs. The size of each node is scaled in proportion to the total value of exposure arising from scenarios involving credit risk (100.0 per cent of past due performing loans (0-3 months) becoming non-performing), foreign exchange risk (10.0 per cent depreciation in the JMD/USD exchange rate) and interest rate risk (1100 bps/100 bps & 100 bps/10 bps increase in interest rates on domestic/foreign rate sensitive assets and liabilities, respectively).

Figure 7.3 Trends in the liquid asset ratio and excess reserves in liquid assets

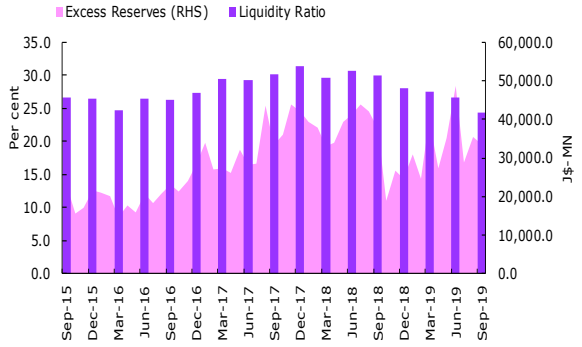


Figure 7.4 The ratio of assets maturing within 3 –months to liabilities maturing within 3 - months for DTIs

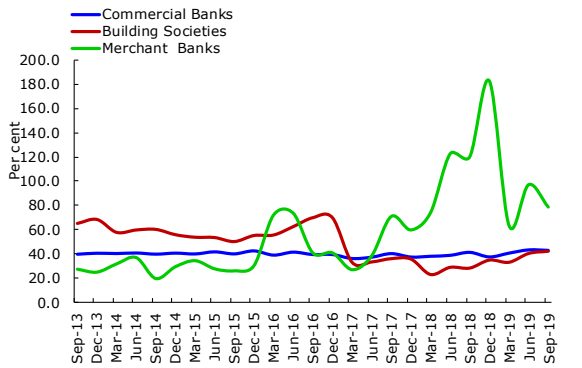
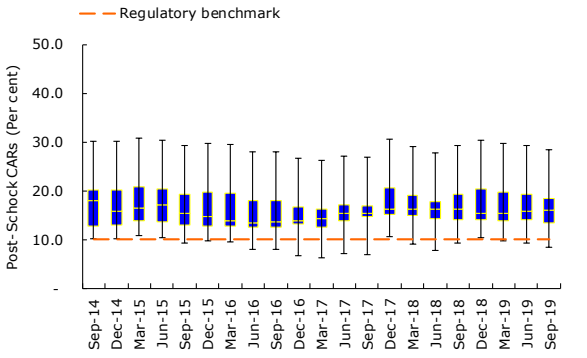


Figure 7.5 Distribution of liquidity funding risk stress test results for DTIs (10.0 per cent decline in average deposits)



Of note, DTIs' continued to reflect lower average exposure to key financial risks during the review period. This performance was primarily evidenced in reductions in credit and interest rate risks for the review period. However, there was a greater exposure to liquidity risk largely due to the maturity of GOJ securities in the June 2019 quarter. Notwithstanding, DTIs remained resilient to hypothetical interest rate, liquidity, foreign exchange and credit shocks as at end September 2019 (see Figure 7.2).

7.3 Liquidity funding risk for deposit taking institutions

DTIs remained liquid for the year ended-September 2019. In particular, the liquidity ratio of the sector was 24.5 per cent at end-September 2019, albeit a decline of 5.6 percentage points relative to end-September 2018. Consequently, the dollar value of DTIs' excess liquid asset holdings fell below the level recorded at the end of the previous review period (see Figure 7.3).

Concurrently, there was improvement in the ratio of short-term assets to short-term liabilities for the building societies and commercial bank sub-sectors (see Figure 7.4). However, the ratio for the merchant bank sub-sector fell by 41.4 percentage points to 78.8 per cent. Regarding commercial banks, the ratio increased by 1.6 percentage points to 42.8 per cent at end-September 2019. Also, the loan-to-deposit ratio for the DTI sector increased marginally by 7.0 percentage points to 77.4 per cent at end-September 2019. Notably, this ratio remained below 100.0 per cent, indicative of continued viability in meeting short-term liquidity needs.

As it relates to funding sources, deposits as a proportion of total funding decreased marginally to 64.7 per cent at end-September 2019 from 66.1 per

cent at end-September 2018. Conversely, 'repos' as a share of total funding increased to 5.2 per cent from 4.4 per cent in the previous reporting year. At the same time, 'other funding' liabilities as a share of total funding was 6.3 per cent at end-September 2019 relative to 6.6 per cent at end-September 2018.

Funding risk stress tests results, showed that all DTIs were adequately capitalized to absorb losses associated with hypothetical declines in deposits during the first three quarters of 2019. For instance, following a hypothetical decline of 10.0 per cent in average deposits, the post-shock CARs for all DTIs were above the regulatory minimum of 10.0 per cent.[2] As such, there was an increase in the interquartile range of post-shock CARs for the system during the review period ended September 2019. Moreover, as at end-September 2019, it would take a hypothetical withdrawal of 61.0 per cent of deposits to breach the statutory benchmark of 10 per cent compared to 60.2 at end–September 2018 (see Figures 7.5 & 7.6).

Figure 7.6 Liquidity funding risk stress test results for DTIs[3]

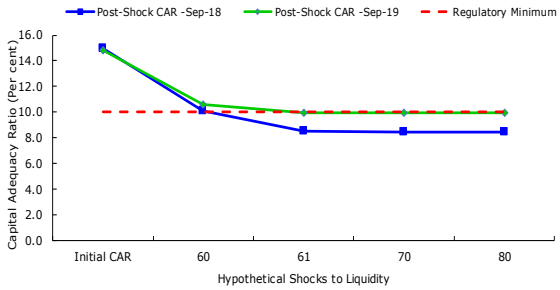


Figure 7.7 DTIs' domestic currency and foreign currency investment holdings as a ratio to total investments

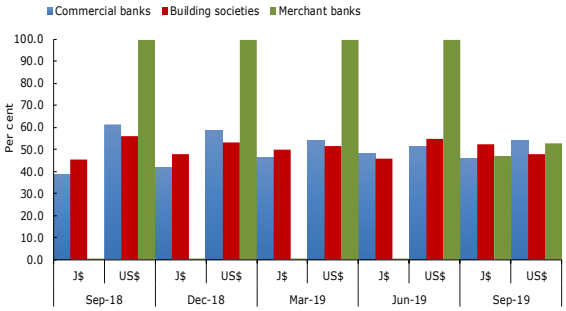
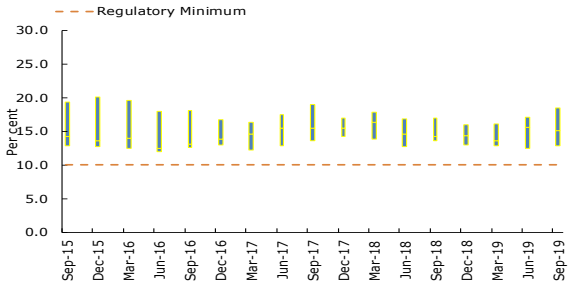


Figure 7.8 Interquartile range for post-shock CARs due to interest rate risk stress tests of DTIs (impact on CAR of 1100 bps/ 100 bps & 275 bps/ 15 bps shock to interest rates)[4]



[2] The scenarios assume that DTI assets are sold with the following 'hair cuts' (per cent loss in value): items in course of collection (10.0 per cent), non-liquid investments (25.0 per cent), accounts receivables (25.0 per cent), loans & advances (25.0 per cent), fixed assets (50.0 per cent) and other assets (50.0 per cent). Further funding needs are then written off against the capital buffers and statutory capital.

[3] Liquidity stress test results show DTIs post shock CARs following declines in deposits.

[4] A shock of 1100 bps and 100 bps was applied to the domestic securities portfolio and the domestic deposits & loan portfolio, respectively. A shock of 275 bps and 15 bps was applied to the foreign securities portfolio and the foreign deposits & loan portfolio, respectively.

Figure 7.9 Quarterly ratio of DTI NOP to tiered capital

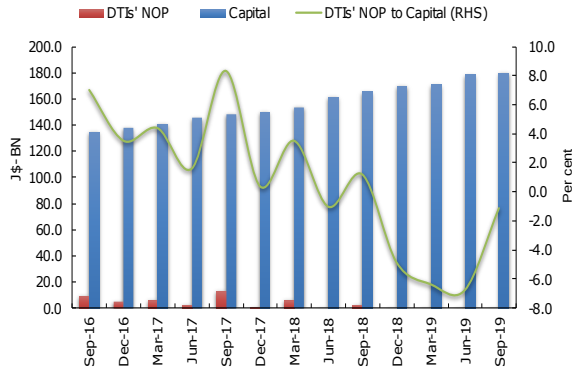


Figure 7.10 Analysis of foreign currency loans to non-foreign currency earners for DTIs

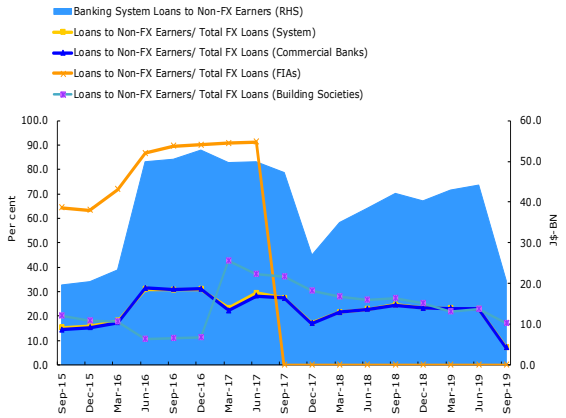
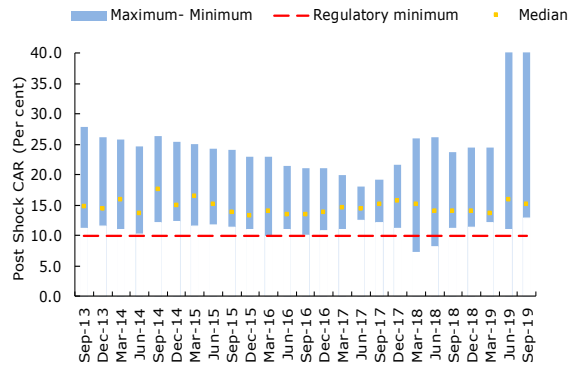


Figure 7.11 Distribution of foreign exchange risk stress test results for DTIs (impact on CAR of 30.0 per cent depreciation)



7.4 Market risk of deposit taking institutions

There was a decrease in the Jamaica Dollar value of foreign currency securities held by DTIs during the review period. This decline mainly reflected a decrease in holdings of foreign currency investments as DTIs adjusted portfolios within the context of the two way movement in the foreign exchange (see Figure 7.7). Against this backdrop, foreign currency securities as a share of the total investments fell to 53.5 per cent at end-September 2019 from 60.9 per cent at end-September 2018. In addition, total foreign investments decreased to 54.1 per cent and 47.9 per cent at end-September 2019 for the commercial banks and building societies, respectively, from 61.5 per cent and 56.0 per cent at end-September 2018.

7.5 Interest rate risk for deposit taking institutions

At end-September 2019, DTIs' remained resilient to hypothetical interest rate shocks with the sector's CAR remaining above the 10.0 per cent prudential minimum. Notwithstanding, at end-September 2019, the CAR of one DTI fell below the prudential benchmark in response to the aforementioned interest rate shocks (see Figure 7.8).

7.6 Foreign exchange risk for deposit taking institutions

The DTI sub-sector recorded a short NOP of $2.0 billion at end-September 2019, relative to a long position of $1.9 billion at end-September 2018 (see Figure 7.9).[5] The NOP to capital ratio for the DTI sector was a short position of 1.1 per cent at end-

[5] Long position in foreign currency assets include all currencies converted to US dollars.

September 2019 relative to a long position of 1.2 per cent at end-September 2018. Moreover, loans to non-foreign exchange earners as a proportion of total foreign currency loans **declined to a quarterly average of 7.4 per cent** for the review period from an average of 24.6 per cent for the corresponding period in 2018 (see **Figure 7.10**).[6]

DTIs remained generally resilient to hypothetical depreciations of the Jamaica Dollar vis-à-vis the U.S. dollar at end-September 2019. Also, subsequent to a hypothetical 30.0 per cent depreciation, the average median post-shock CAR across all DTIs increased for the review period, relative to end-September 2018. DTIs also remained resilient to all the hypothetical appreciation shocks (see **Figure 7.11**).[7]

7.7 Credit risk of deposit taking institutions

DTIs' loan quality, as measured by the ratio of NPLs to total loans, declined to 2.3 per cent at end-September 2019 in comparison to 2.6 per cent at end-September 2018. This improvement was largely due to favourable macro-economic conditions as well as the increased role of credit bureaus in the credit underwriting practices. Commercial banks' NPL ratio was largely unchanged at 2.2 per cent at end-September 2019. The loan quality ratio for the building societies sub-sector improved to 3.2 per cent from 3.5 per cent in the previous review period.

Figure 7.12 NPL coverage ratios for DTIs and write-off rates for NPLs for commercial banks

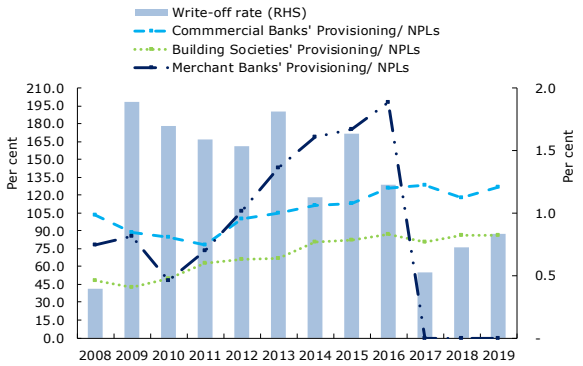


Figure 7.13 Credit risk stress test results for DTIs (Scenario: Impact on CAR of a 30% increase in NPLs)[8]

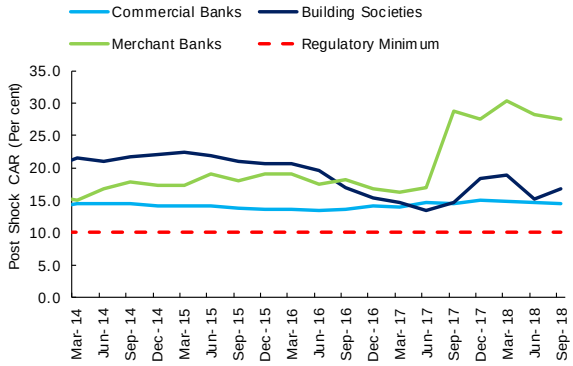
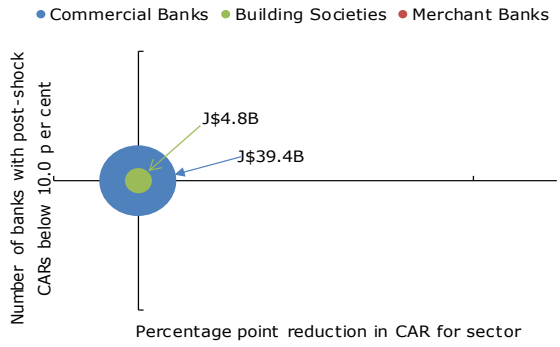


Figure 7.14 Credit risk exposure for DTIs at end-September 2018 (scenario: 100.0 per cent write-off of past due loans less than 3 month) [9]



[6] Foreign exchange stress test assessments include an increase in NPLs and the associated 100.0 per cent provisioning for foreign currency loans to non-FX earners.

[7] Shocks are applied first to the exchange rate between the Jamaica Dollar and the US dollar. The corresponding exchange rates of the Jamaica Dollar vis-à-vis the Euro, the Canadian dollar, and the Pound Sterling are then incorporated based on historical correlations with the selling rate for the US dollar between the January and May 2003 foreign exchange crisis period.

[8] The post shock CAR increased as the merchant bank sector has zero nonperforming loans, as such the initial CAR is equal to the post shock CAR.

[9] No institution's CAR fell below the prudential minimum.

Figure 7.15 Reverse stress testing the credit risk exposure of DTIs

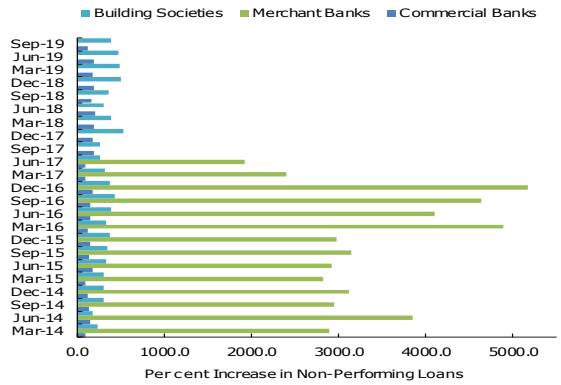


Figure 7.16 Impact on DTIs' CAR from an increase in NPLs

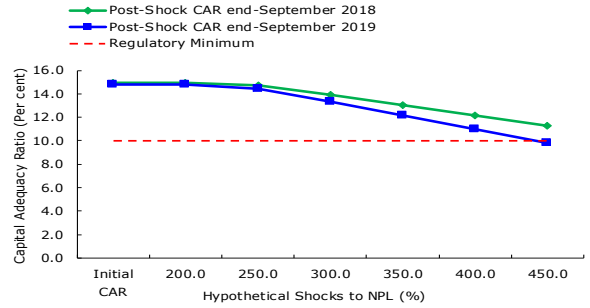
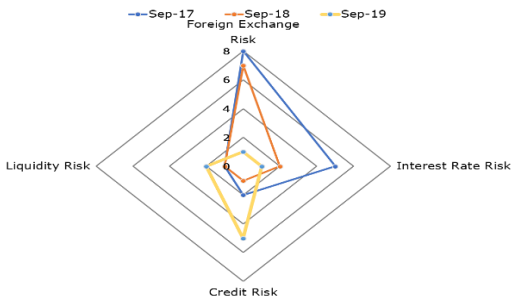


Figure 7.17 Evolution of risk exposure indicators for the 12 largest SDs



Note: Risk exposure indicators: (i) Credit Risk - NPLs/Loans (ii) Interest Rate Risk - Cumulative maturity gap < 30 days, < 90 days, < 360 days/Assets, DVBP/Capital (iii) Foreign Exchange Risk - NOP/Capital (iv) Counterparty Risk - Gross exposures to DTIs/Capital (v) Liquidity Risk – Liquid assets/total assets, liquid assets to short-

The NPL coverage ratio for the commercial banking sub-sector as measured by total provisioning as a share of total NPLs increased to 126.5 per cent at end-September 2019 from 118.1 per cent at end-September 2018 (see **Figure 7.12**).[10] Notably, the outturn in the NPL coverage ratio was influenced by an increase in write-offs for the sector. Specifically, commercial banks' loan write-offs as a share of total loans, increased to 0.8 per cent at end-September 2019 from 0.7 per cent at end September 2018. For the building societies sub-sector, the NPL coverage ratio rose to 94.1 per cent at end-September 2019 from the 86.4 per cent recorded at the close of the previous review period. This outturn reflected a greater than proportional increase in provisions relative to NPLs.

As at-end September 2019 the maximum ratio of NPLs to capital within the DTI sector increased to 43.1 per cent from 21.4 per cent at end-September 2018. Also, there was continued narrowing of the inter-quartile range of NPLs to capital for the DTIs sector which reflected lower exposure to credit risk for four institutions. The ratios were within an inter-quartile range of 9.4 per cent to 16.3 per cent at end-September 2019 relative to the range of 7.1 per cent to 18.5 per cent at end-September 2018.

Stress test results at end-September 2019 showed that each DTI sub-sector was adequately capitalized to absorb hypothetical shocks of a 30.0 per cent increase in NPLs. Notably, there were improvements to the results of the hypothetical increases in NPLs. This was largely due to improved loan quality and stronger capitalisation for the review period. In

[10] The merchant banking sector had no NPLs as at September 2019. As such, there was no impact on the sub-sector's CAR subsequent to a hypothetical increase in NPLs.

response to the hypothetical scenarios, post-shock CARs for the commercial bank sub-sector were relatively unchanged. (see Figure 7.13).

At end-September 2019, DTIs' exposure to credit risk increased following a shock involving a hypothetical write-off of 100 per cent of past due loans (< 3 months) becoming non-performing. Notably, the credit risk exposures of commercial banks and building societies increased to $39.4 billion and $4.8 billion, respectively, at end-September 2019 from $20.8 billion and $3.4 billion recorded at end-September 2018 (see Figure 7.14).

Reverse stress testing exercises showed that the DTI sector remained generally robust when hypothetical shocks ranging between 200.0 per cent and 450.0 per cent were applied to NPLs at end-September 2019. However, it would take a hypothetical increase of 431.0 per cent in NPLs at end-September 2019 for the CAR of the DTI sector to breach the prudential minimum, relative to an increase of 505.0 per cent at end- September 2018 (see Figures 7.15 and 7.16).[11,12]

Figure 7.18 Impact of scenario based aggregate stress tests on SDs' CARs

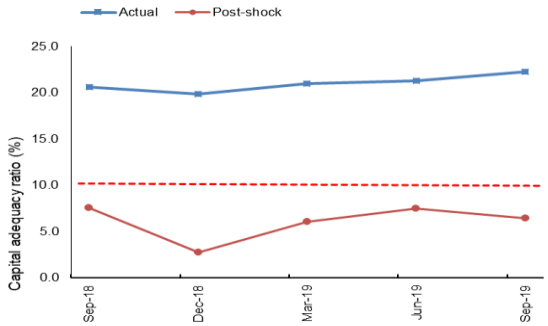


Figure 7.19 Liquidity funding risk stress test results for SDs (Scenarios: 10.0 per cent to 50.0 per cent decline in Retail Repo-liabilities)

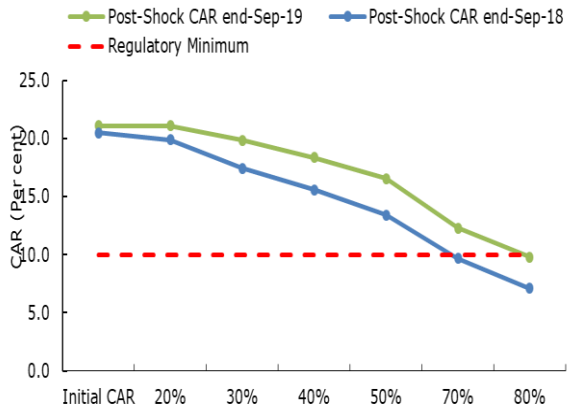


Figure 7.20 The ratio of assets maturing within 3–months to liabilities maturing within 3-months for SDs

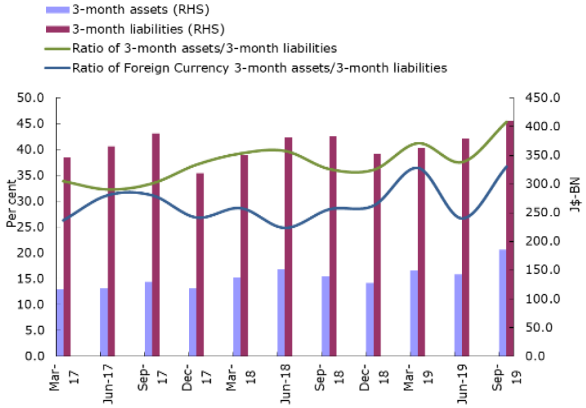


Figure 7.21 Cumulative gap to asset positions – SDs

[11] Reverse stress testing involves identifying the increase in NPLs required to bring the weakest institution's CAR below the 10.0 per cent minimum benchmark.

[12] The merchant banking sub-sector had zero NPLs and as a result no reverse stress testing was applied.

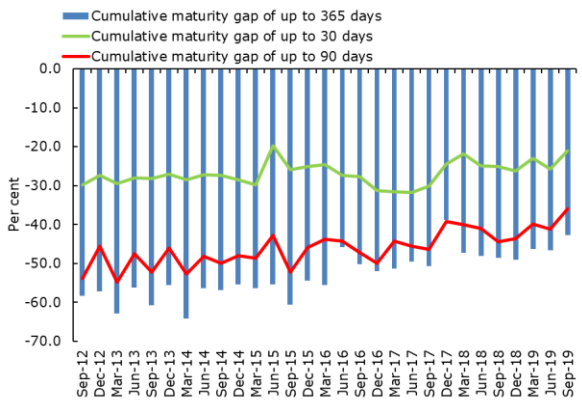


Figure 7.22 Interest rate stress test results - SDs[13]

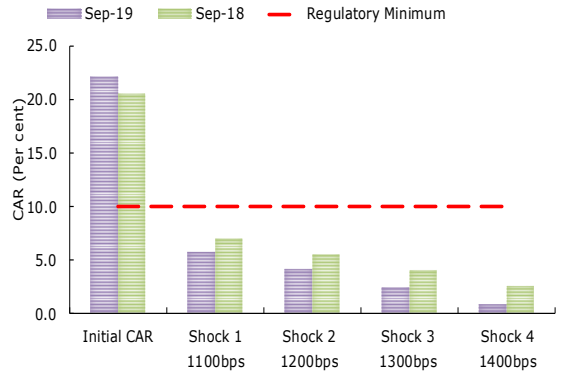
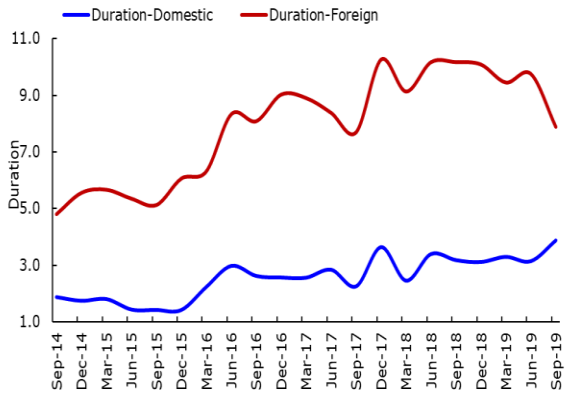


Figure 7.23 Evolution of duration for domestic and foreign securities for top 12 largest securities dealers



[13] The scenarios examined include: Increases of 1100 bps/100 bps & 275 bps/15 bps, 1200 bps/200 bps & 300 bps/30 bps, 1300 bps/300 bps & 325 bps/50 and 1400 bps/400 bps & 350 bps/70 bps in interest rates on domestic/foreign rate sensitive assets and liabilities.

7.8 Risk exposure for securities dealers

The results the SDs' sub-sector were mixed in response to all assessed average quarterly risk exposures for the year-ended September 2019 relative to end-September 2018 (see Figure 7.17).[14] In particular, the SDs' exposure to foreign exchange risks improved due to decrease in the NOP to capital ratio. Conversely, there was deterioration in the credit risk dimension due to an increase in the NPLs to total loans ratio.[15] There was also heightened liquidity risk exposure due to a decrease in SDs' average quarterly liquid assets position. With regard to the interest rate risk exposure, this was lower due predominantly to improvements in SDs' short-term maturity position, in particular, the cumulative maturity gap position to asset ratio for periods up to 30-days and 90-days.

The results of the aggregate stress test at end-September 2019 showed deterioration in resilience relative to the performance at end- September 2018.[16] This deterioration was largely reflective of continued vulnerability to interest rate risk (see Figure 7.18).

[14] The analysis is based on a representative sample of twelve SDs.

[15] DVBP is the loss in net interest income generated from 100 bps shocks to the system's foreign and domestic securities portfolio and reported as a percentage of the system's capital base.

[16] Aggregate stress test assumptions include: i/ 1100 bps and 100 bps increases in domestic interest rates on investment assets & liabilities and other assets & liabilities, respectively. ii/ 100 bps and 10 bps increases in foreign currency interest rates on investment assets & liabilities and other assets & liabilities, respectively. iii/ 10.0 per cent depreciation in the JMD/USD exchange rate. iv/ 100.0 per cent of past due performing loans (0 - 3 months) becoming non-performing. v/ 10.0 per cent reduction in deposits or repurchase liabilities.

7.9 Liquidity funding risk of securities dealers

Stress test results, based on data at end-September 2019, showed that SDs continued to be resilient to hypothetical reductions in repo liabilities.[17] Stress tests results imply that it would take a decline of 79.0 per cent in retail repo liabilities for the sector's CAR falling below 10.0 per cent, which favourably compares to the result at end-September 2018 (see Figure 7.19).[18] This resilience occurred within a context of further declines in the sector's holdings of repo liabilities during the review period, due to the continued phasing down of the retail repo business model. As such, retail repos as a share of total liabilities fell to 16.0 per cent at end-September 2019 from 16.9 per cent at end-September 2018.

There was also deterioration in key liquidity indicators for the SD sector for the year ended September 2019. Specifically, the ratio of liquid assets to total assets decreased to a quarterly average of 16.9 per cent for the review period compared to a quarterly average of 17.9 per cent for the corresponding period of 2018.[19] There was also a narrowing of the cumulative 30-day and 90-day maturity gaps between interest sensitive assets and liabilities (see Figure 7.21).

Figure 7.24 Investment holdings as a ratio to total investments – top 12 SDs

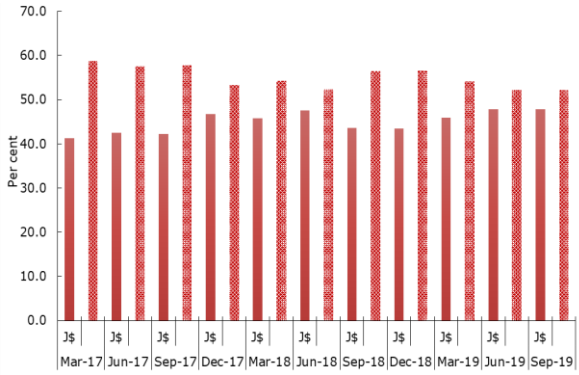


Figure 7.25 Duration gap vs. percentage point change in CAR after a 1100bps/100bps interest rate shock at end-September 2019[20]

[17] The definition of retail repos in the liquidity funding risk assessment is a proxy as it is a much broader measure than actual retail repos. This broader definition is based on the type of client, that is, individual or non-financial clients, and not on the treatment of the securities.

[18] The scenarios assume that SDs' assets are sold with the following 'hair cuts' (per cent loss in value): non-liquid investments (25.0 per cent), accounts receivables (25.0 per cent), loans & advances (25.0 per cent), fixed assets (50.0 per cent) and other assets (50.0 per cent). Further funding needs are then written off against the capital buffers and statutory capital.

[19] Liquid Assets for securities dealers comprise: i) Liquid funds ii) BOJ securities iii) GOJ T-Bills iv) Eligible locally registered GOJ stocks v) Other eligible GOJ securities and vi) Eligible liquid assets from other counter-parties.

[20] Graph includes the SDs that are most severely impacted

Figure 7.26 Foreign exchange risk stress test results - SDs (Scenarios: Impact on CAR of 10.0 per cent to 50.0 per cent depreciation)

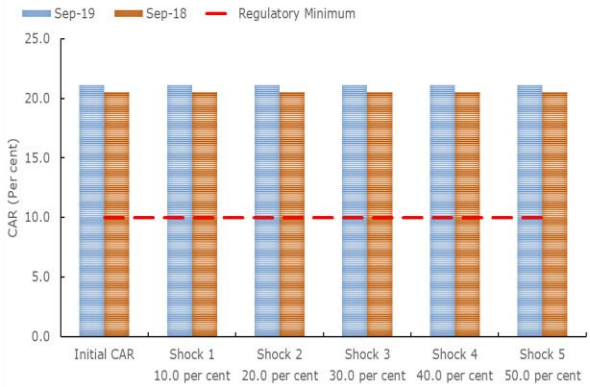
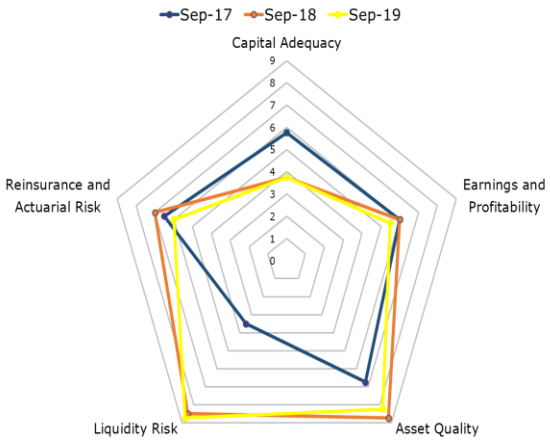
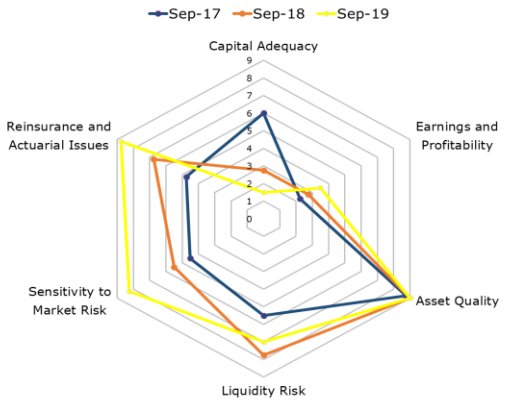


Figure 7.27 Evolution of Risk Exposures - GI



Note: Core FSI indicators: (i) Capital Adequacy – MCT, Capital/Assets, Capital/Technical Reserves (ii) Earnings & Profitability - ROE, Operating expenses/Net premium, Investment income/Investment Assets (iii) Asset Quality – Receivables to gross premiums, Equities/Total Assets, real estate + accts receivables to TA (iv) Liquidity – Liquid assets/Total Assets (v) Sensitivity to market risks – Duration of assets and liabilities (domestic bonds), Duration of assets and liabilities (global bonds) (vi) Reinsurance & Actuarial Issues – net premium to gross premium, net tech. reserves to net claims

Figure 7.28 Evolution of Risk Exposures – LI



Note: Core FSI indicators: (i) Capital Adequacy – MCCSR, Capital/Assets, Capital/Technical Reserves (ii) Earnings & Profitability - ROE, Operating expenses/Net premium, Investment income/Investment Assets (iii) Asset Quality – Receivables to gross premiums, Equities/Total Assets, real estate + accts receivables to TA (iv) Liquidity – Liquid assets/Total Assets (v) Sensitivity to market risks – Duration of assets and liabilities (domestic bonds), Duration of assets and liabilities (global bonds) (vi) Reinsurance & Actuarial Issues – net premium to gross premium, net tech. reserves to net claims

Furthermore, the ratio of short-term assets (less than three months) to short-term liabilities increased to a quarterly average of 40.1 per cent from 38.1 per cent for the year-ended September 2018 and exceeded the five-year average of 33.9 per cent. In contrast, the foreign currency short-term assets to short-term liabilities ratio improved to a quarterly average of 32.2 per cent for the year-ended September 2019 from a quarterly average of 27.2 per cent for the previous review period (see Figure 7.20).

7.10 Interest rate risk of securities dealers

The securities dealers sector showed increased vulnerability to interest rate shocks involving increases of 1100 bps/100 bps & 275 bps/15 bps on domestic rate sensitive assets and liabilities and foreign rate sensitive assets and liabilities respectively. In response to these shocks, the sector's CAR declined to 5.7 per cent at end-

September 2019 from 6.9 per cent at end-September 2018 (see Figure 5.22). The weaker performance of the SDs as at end-September 2019 was mainly attributable to higher fair value losses as a result of increases in domestic investment durations (see Figure 5.23 & 5.24). Furthermore, SDs remained susceptible to interest rate risk due to the significant gap between the duration on the asset and liability portfolio at end-September 2019 (see Figure 5.25).

7.11 Foreign exchange risk of securities dealers

At end-September 2019, the SDs' sector remained resilient to hypothetical exchange rate shocks influenced by a decrease in the NOP.[21] Specifically, these institutions were resilient to hypothetical depreciations and appreciations of 10.0 to 50.0 per cent in the exchange rate (see Figure 7.26). Of note, following a hypothetical appreciation of 50.0 per cent in the exchange rate, the CAR for the SD sector declined by 4.1 percentage points to 17.0 per cent. This was in comparison to a decline of 4.4 percentage points to a post-shock CAR of 16.1 per cent at end-September 2018 following a similar shock. The sector's CAR remained above the 10.0 per cent benchmark due to the strong level of capital.

7.12 Evolution of risk indicators – life and general insurance companies

At end-September 2019, the cobweb map of risk exposures for GI companies showed an overall improvement. There were declines in the exposures to the asset quality and reinsurance & actuarial risk dimensions relative to end- September 2018 (see Figure 5.27). The improvement in asset quality mainly reflected the impact of decreases in the receivables to gross premiums ratios, specifically in the first and second quarters of 2019. For the reinsurance & actuarial risk dimension, the improvement largely reflected the impact of strengthening in the net premium to gross premium ratio. Notably, the earnings & profitability, capital adequacy and liquidity dimensions were relatively unchanged for the review period.

Figure 7.29 Foreign exchange rate risk stress test results for the LI sector (Scenario: Impact on MCCSR of 10.0 per cent to 50.0 per cent appreciation)

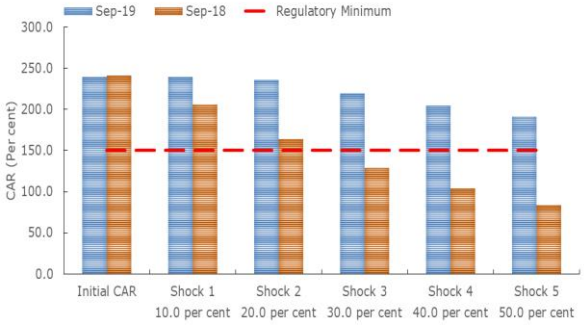
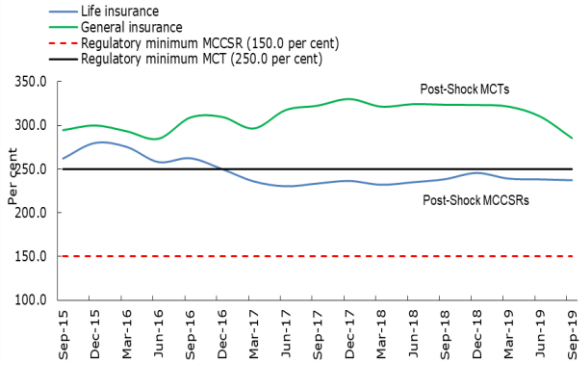


Figure 7.30 Liquidity funding rate risk stress test results for the insurance sector (Scenario: Impact on CAR of 10.0 per cent decline in liquid liabilities)



[21] The NOP to capital ratio for the SDs decreased to 11.0 per cent at end-September 2019 from 20.9 per cent at end- September 2018.

Figure 7.31 Interest rate risk stress tests for the LI sector[22]

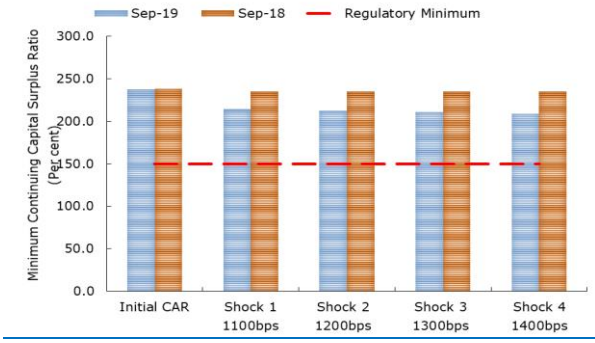


Figure 7.32 Impact of Scenario based aggregate stress tests on LI sector's MCCSR

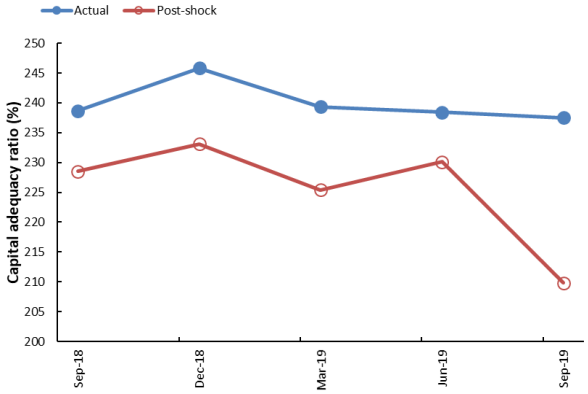
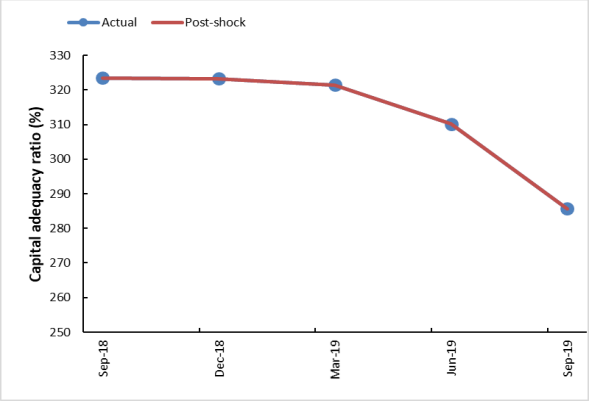


Figure 7.33 Impact of Scenario based aggregate stress tests on GI sector's MCT



[22] The scenarios examined include: Increases of 1100 bps/100 bps & 275 bps/15 bps, 1200 bps/200 bps & 300 bps/30 bps, 1300 bps/300 bps & 325 bps/50 bps and 1400 bps/400 bps & 350 bps/70 bps in interest rates on domestic/foreign rate sensitive assets and liabilities

As it relates to the LI sub-sector, there was deterioration across the reinsurance & actuarial issues, sensitivity to market risk as well as earnings & profitability dimensions for the review period (see Figure 7.28). However, there were strong improvements in the capital adequacy and liquidity risk dimensions, driven by increases in liquid assets to total assets, the MCCSR, capital to assets and capital to technical reserves.

7.13 Foreign exchange risk of insurance companies

The LI sub-sector was more resilient to hypothetical appreciations of the exchange rate at end-September 2019 as most institutions reduced their significant net long positions. The LI sub-sector's MCCSR was above the prudential benchmark following the most severe hypothetical shock. At end-September 2018, the post-shock MCCSR was 84.1 per cent (see Figure 5.29).

7.14 Market and interest rate risk of insurance companies

LI and GI companies showed increased resilience to hypothetical interest rate shocks at end-September 2019 relative to end-September 2018. The performance of each sub-sector reflected strong levels of capitalization. There was also lower net interest income losses for the LI sub-sector (see Figure 7.30). The capital ratios of each sub-sector remained above their respective prudential minimums at end-September 2019 in response to the hypothetical shocks.

Following the most severe shock, which involved increases of 1400 bps/400 bps & 350 bps/70 bps in interest rates, the capital ratios for both sub-sectors

were unchanged relate to the results at end-September 2018. In response to these hypothetical interest rate shocks, the post-shock capital ratios of all insurance companies, except one LI company, remained above the statutory benchmarks (see Figure 7.31).

7.15 Liquidity funding risk of insurance companies

The LI and GI sub-sectors showed continued robustness to hypothetical shocks involving declines in liquid liabilities. This performance partly reflected the impact of further increases in liquid asset holdings, relative to liabilities, during the review period. In response to a hypothetical shock involving a 10.0 per cent loss of liquid liabilities, the MCCSRs of LI companies remained above the prudential benchmark at 240.3 per cent at- September 2019 relative to 235.7 per cent for the year-ended September 2018 (see Figure 7.30).

Additionally, the post-shock MCT for the GI sub-sector was well above the prudential benchmark despite a decline year-over-year. The quarterly average post-shock MCT for GI companies was 310.2 per cent relative to a quarterly average of 324.8 per cent for the previous review period. The decline for the sub-sector was due to a decrease in the capital position.

Aggregate stress test results for the life and GI companies showed post-shock capital ratios which remained above the prescribed statutory benchmarks (see Figures 7.32 & 7.33). Of note, the LI sub-sector was largely impacted by a hypothetical shock involving a loss of 10.0 per cent in liquid liabilities.

Box 7.1 Banking Fraud

Bank of Jamaica recently conducted an assessment of banking fraud, which is a significant aspect of money laundering risk exposures in the financial system. This study was largely informed by data on fraudulent activities which was submitted to the Bank by licensees, pursuant to section 132(1)(b) of the Banking Services Act (BSA). In addition, a follow-up survey was conducted to obtain qualitative and quantitative data on banking fraud from deposit-taking institutions for the period January 2018 to April 2019. The survey also included information on measures employed by banks to tackle internal and external fraud threats.

The Caribbean Financial Action Task Force's (CFATF) Mutual Evaluation Report on Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) which was published in January 2017, highlighted the lack of a comprehensive National Risk Assessment (NRA) Programme in Jamaica and the need for strengthening the management of money laundering/terrorism financing (ML/TF) risk exposures. The report also highlighted the absence of sectoral AML/CFT studies, conducted by the relevant authorities that would assist stakeholders in key sectors of the economy to: (i) develop an understanding of the specific inherent risks of conducting business in a particular sector and (ii) inform institution-specific risk identification, control, and mitigation strategies.

A thematic study on the threat and vulnerability of bank fraud risk in the financial system was deemed necessary, both within the context of CFATF's Mutual Evaluation Report and the International Monetary Fund's recent Financial Sector Assessment Programme (FSAP) review of Jamaica's financial system.

Fraud in the financial system

Fraud incidents by sub-sector: Commercial banks accounted for 95.4 per cent of reported fraud incidents or an average of 330 monthly incidents over the period January 2018 to April 2019.[1] Building societies reported an average of 28 monthly incidents of fraud over the same period while credit unions reported an average of 8 monthly incidents.

Fraud losses by occurrence: Card fraud is the most frequently occurring fraud as well as the fraud with the lowest average loss. The average loss per event of card fraud ranged from $93,674 to $163,339 for both debit and credit card fraud for 2018 and 2019. Other fraud incidents such as, (loan, wire transfers, and cheque), internet and internal fraud occurred less frequently, but had a higher average loss per fraud incident.

Credit and debit card fraud require proactive understanding of emerging fraud techniques, technological and operational innovations in order to mitigate losses. Implementation of effective and persuasive deterrents against (potential) perpetrators are necessary. Other types of fraud for example via cheques, loans, wire transfers and internal fraud occur infrequently but can be deleterious and require strong internal controls, separation of functions, effective governance

[1] As at December 2018, the number of commercial bank branches in the Jamaican financial system was 134. There were a corresponding 746 ATMs within the commercial bank network covering all 14 parishes.

arrangements and training of staff to help mitigate risks to the business.

Fraud losses by sub-sector: Banking fraud losses for the period January 2018 to April 2019 were $680.7 million. Commercial banks accounted for 98.7 per cent of overall losses for the review period. Building societies recorded losses of $7.3 million or 1.1 per cent, while credit unions reported losses of $1.9 million or 0.3 per cent. Of note, monthly losses from bank fraud declined by 88.6 per cent between January 2018 and April 2019.

Fraud losses and incidents by fraud type: Losses from credit and debit card fraud accounted for 91.0 per cent of all fraud losses between January 2018 and April 2019, resulting from the frequent use of these transactional channels. Commercial banks reported that the challenges included deep insert skimming, tampering with ABM and POS terminals, theft and retrofitting of POS machines as well as interception of credit cards sent through the mail. DTI's exposure to fraud via these channels was due primarily to efforts to: (i) reduce the capital and operational costs associated with a branch-based business model and (ii) efforts to maximize income generation from non-face to face based activity.

Assessment of money laundering risk exposures

Card fraud accounted for 98.0 per cent of all incidents of fraud for the review period. The most common types of credit card fraud reported were card not present, 'other' and counterfeit.[2] Debit card and credit card fraud were the most significant sources of ML risk amongst reporting institutions. Licensees' susceptibility to ML threats due to internet banking were within medium-low range. However, the system's susceptibility to ML vulnerability and threat from wire transfers, loans, cheques and internal (occupational) activities is expected to remain benign over the near- to medium-term.

The ML risk matrix provides evidence that there needs to be prioritization of ML risk management regarding debit and credit card usage in the short-term (see Figure 1). These measures should include upgrades of technology driven anti-fraud solutions, targeted training of staff, and improved education as it relates to safe habits in the usage of debit and credit cards by customers. However, as banks implement measures to deter fraud related to card products, fraudsters' efforts could migrate to other channels such as internet banking or other more sophisticated schemes. In this regard, reporting institutions should also closely monitor ML threats that could emanate from internet banking as a result of fraud displacement.

Impact of fraud on the deposit-taking sector

Reporting institutions' fraud losses as a share of regulatory capital was 0.07 per cent of annualized fraud losses. This outturn signalled that the capital base of the sector remained intact and able to absorb fraud related losses.

Further, monthly fraud losses as a share of revenues was 0.3 per cent at end-April 2019, relative to a high of 6.0 per cent at end-July 2018. In addition, total fraud losses were 3.2 per cent of

[2] The 'other' category may include skimming, account takeover, never received, and fraudulent application, amongst others.

total revenues for 2018 and 0.9 per cent for the calendar year to April 2019.

Demographics of banking fraud

The main highlights regarding the demographics of banking fraud in the financial system are that women and millennials are the most frequent victims of fraud. Specifically, it can be inferred that the most at-risk sub-group to banking fraud are women between the ages of 18 and 34.[3] Further, banking fraud is most prevalent in major towns and cities.

Control and prevention mechanisms

DTIs generally employ traditional risk management approaches in the control and prevention of banking fraud. Reporting channels across institutions typically involve the establishment of specialty fraud units which perform, audit, oversight, and compliance functions within banks. Fraud risk assessments are generally done annually, rather than on a risk-adjusted basis, depending on the extent, scope, and severity of the fraud exposure.

However, there needs to be closer alignment of anti-fraud and anti-money laundering functions in monitoring, identifying, and minimizing inter-related fraud and money laundering risks. This alignment can be accomplished by open channels of communication between various functions as well as timely cause and effect analyses.

Financial institutions face significant challenges as fraudsters continue to develop more advanced fraudulent techniques. As such, ongoing investment in technology is key to countering fraud attempts. Fraud awareness sensitization and training, both internally and externally, are important preventative measures being undertaken in enhancing public education. Preventative measures also include staff training on fraud detection and prevention, improvements in platforms that offer additional security as well as increased monitoring of transactions.

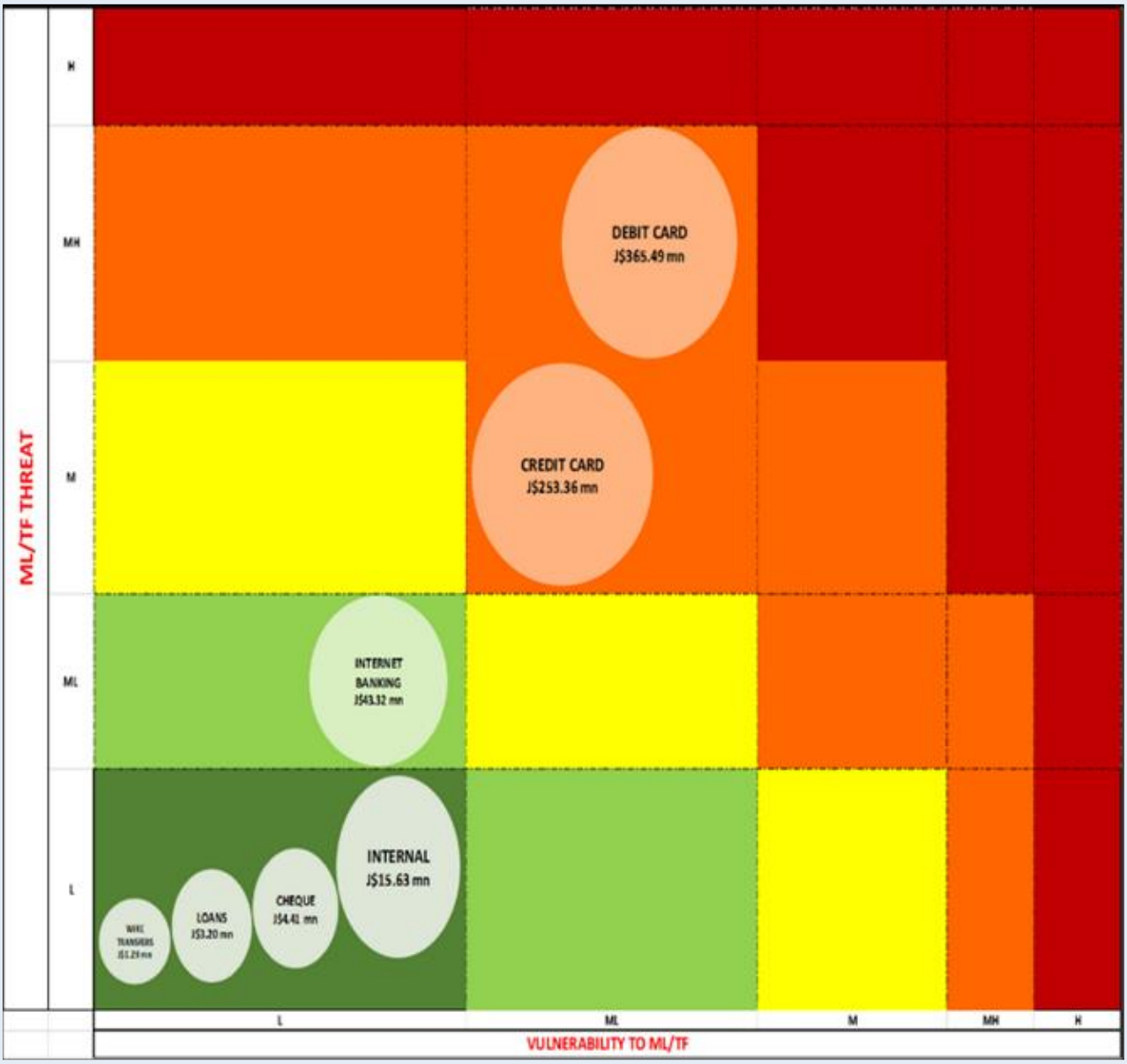
Next Steps

The thematic assessment on banking fraud was disseminated to the industry as part of the support to licensees in cultivating a deeper understanding of the specific inherent risks of conducting business in the sector. The assessment is also aimed at informing on how banking fraud risks and consequently money laundering risks are identified, controlled, and mitigated. In this regard, reporting institutions were allowed time to conduct self-assessments and thereafter indicate measures they had instituted in response to the findings from the thematic assessment.

Bank of Jamaica intends to conduct periodic follow-up assessments of banking fraud and other aspects of money laundering risk exposures.

[3] This may reflect the fact that women conducted more financial transactions relative to men over the review period.

Figure 1 Money laundering risk matrix (as at April 2019)



8.0 PAYMENT SYSTEM DEVELOPMENTS

This chapter provides information on activities and developments within the payment system.

8.1 Overview

Activities in the JamClear®-Real-Time Gross Settlement (RTGS) system showed mixed results for 2019. Specifically, overall transaction volumes grew by 14.8 per cent while overall transaction values declined 50.8 per cent and amounted to 9.5 times GDP relative to 20.5 times GDP for 2018. This decline largely reflected a reduction in JamClear® - Central Securities Depository (CSD) transfers which was impacted by the Bank's policy decision to eliminate the Overnight Deposit facility for DTIs.

The usage of electronic retail payment continued to increase in 2019, however, cash remained the most preferred means of payment for retail consumers. Concurrently, the number of cheque transactions continued to decline.

In relation to the JamClear® -(CSD) system, there were declines in both the volume and values of securities traded during 2019.

Susceptibility to concentration risk in the payment system persisted throughout 2019. This vulnerability reflected concentration of liquidity in the RTGS transfer system as the majority of payment activity was undertaken by two active participants.

8.2 Key developments in payment systems

8.2.1 JamClear®-Real-Time Gross Settlement (RTGS) System [1,2]

Market activity in the JamClear®-RTGS system showed mixed performance for 2019 relative to 2018. In particular, overall transaction values declined sharply to $20.3 trillion for 2019 from $41.3 trillion for 2018, indicating a system turnover of 9.5 times GDP for 2019 relative to 20.5 times GDP for previous year (see Figure 8.1).[3]

Additionally, average monthly transaction value decreased by 50.8 per cent to $1.7 trillion for 2019. The average monthly turnover for the RTGS of 2.4 times GDP relative to 5.2 times GDP for 2018. [4,5] This decline was largely due to a reduction in CSD securities settlement due to the Bank's policy decision to eliminate the Overnight Deposit facility for DTIs. Of note, is that payment related to securities transactions from JamClear®-CSD accounted for approximately 63.8 per cent of the total transaction value of the RTGS system.

On the other hand, overall monthly JamClear®-RTGS volumes for the period grew by 14.8 per cent to 1 014 891 transactions for 2019 (see Figure 8.2). Customer credit transfers (single and multiple) accounted for approximately 93.0 per cent of the total transaction volumes relative to a share of 91.6 per cent for 2018.

[1] JamClear®-RTGS statistics include both JMD and USD denominated transactions.

[2] The JamClear®-RTGS system consists of 24 full members: eight commercial banks, two clearing house, one building society, one merchant bank, eight primary dealers (broker dealers), the Jamaica Central Securities Depository (Trustee), Jamaica Central Securities Depository (Equities), Accountant General Department (AGD) and Bank of Jamaica (BOJ).

[3] Turnover is a ratio of the total transaction value as percentage of GDP.

[4] The monthly GDP was derived based on the interpolation of quarterly nominal GDP using the quadratic match sum method.

[5] JamClear®-RTGS overall value does not include general ledger and billing transactions.

Figure 8.1 JamClear®-RTGS systems monthly turnover

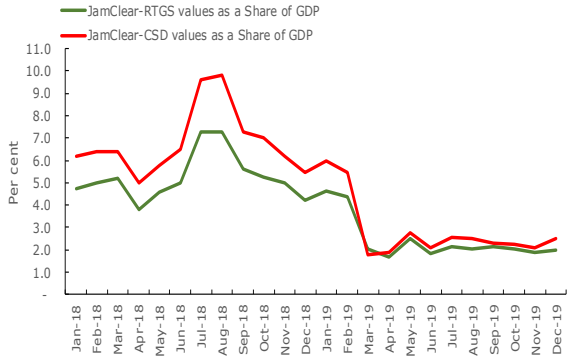


Figure 8.2 JamClear®-RTGS monthly transaction values and volumes

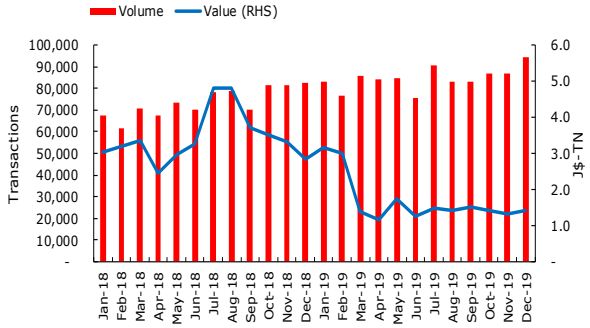


Figure 8.3 JamClear®-CSD monthly transaction values and volumes

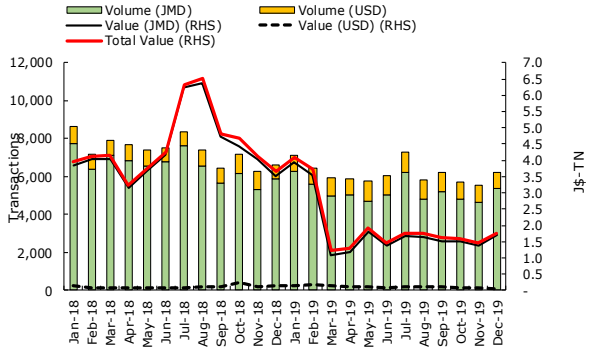


Figure 8.4 Inter-bank and intra-bank cheque volumes and values per 1000 persons

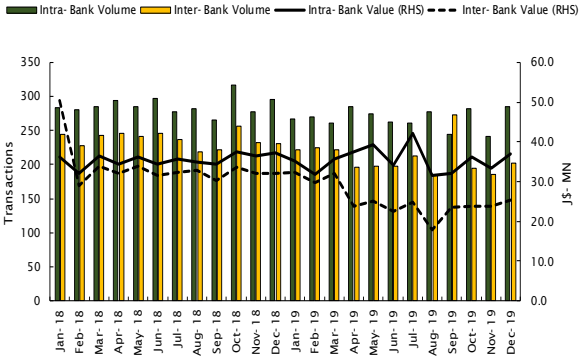


Figure 8.5 E-payment volumes and values per 1000 persons

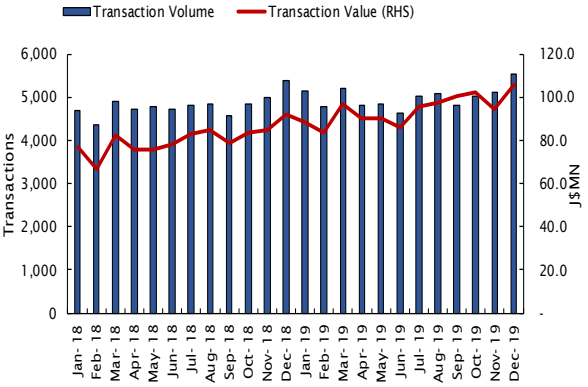
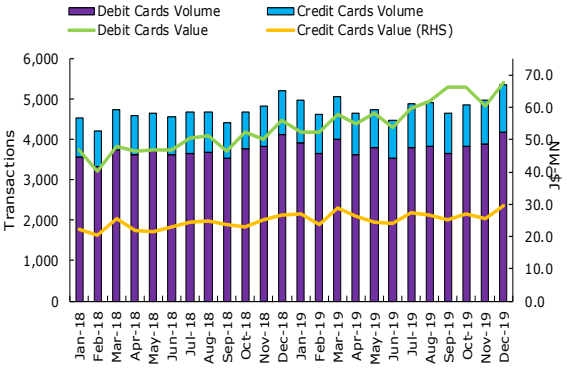


Figure 8.6 Debit & credit card volumes and values per 1000 persons



8.2.2 JamClear® - Central Securities Depository[6]

For 2019, there was a slowdown in activities within the JamClear®-CSD system as there were declines in both the value and volume of securities traded (see Figure 8.3). The overall transactional value declined by 57.2 per cent to $22.3 trillion which represented a system turnover of 6.1 times GDP. This performance was also reflected in a decrease in the average monthly value of JamClear®-CSD transactions to $1.9 trillion for 2019, an average monthly turnover of 1.6 times monthly GDP relative to 6.8 for 2018. (see Figure 8.1). Similarly, overall volume fell by 20.3 per cent to 62 639 transactions for 2019. (see Figure 8.3).

8.2.3 Retail Payment Systems

Development in commercial bank sector

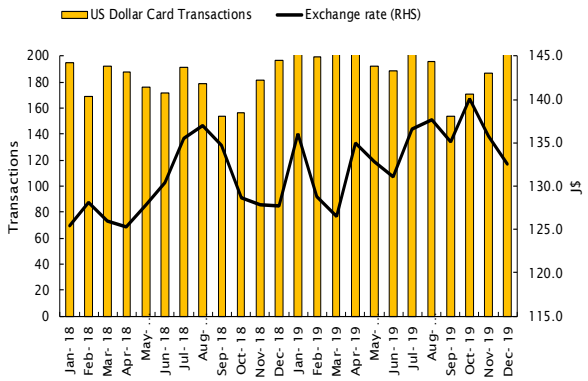
Automated Clearing House (ACH)[7]

The total volume of cheques processed by the ACH declined by 4.9 per cent to 5.8 million for 2019 relative to 2018. This performance was consistent with the Bank's efforts to minimize net settlement risks which emanated from the ACH activities.[8] Notwithstanding, the value of these cheques processed increased marginally by 1.4 per cent to $805.0 billion for the review period. The average monthly value of cheques processed also increased to $139 197 per transaction from $134 303 per transaction for 2018 (see Figure Appendix).

MultiLink Network

There was continued strong usage of electronic retail payments in 2019 as reflected in an increase in activity within the MultiLink card network. Of note, the total value of MultiLink transactions increased by 14.5 per cent to $233.9 billion for the review period. Likewise, overall MultiLink transaction volumes reflected an increase to 33.5 million from 30.1 million transactions for 2018. The increase in activity within the MultiLink network resulted from growth in both point-of-sale (POS) and automated bank machine (ABM) transactions. Notably, the number of POS transactions increased by 3.4 per cent and amounted to $18.2 billion. Also, the number of ABM transactions increased to $15.3 billion representing growth of 10.1 per cent (see Appendix).

Figure 8.7 US dollar card transaction per 1000 persons and exchange rate



[6] JamClear®- consists of 40 participants, 8 com. banks, 1 merchant bank, 8 primary dealers, 20 secondary dealers, 2 issuers BOJ and GOJ and JCSD (Trustee) including both JMD and USD denominated transactions.

[7] The Automated Clearing House (ACH) is owned by commercial banks, clearing transactions against their account and those transactions made on behalf of other payment services providers with indirect access to the ACH.

[8] Commercial banks face a charge of J$5 000.0 per transaction greater than and equal to the targeted ACH threshold of J$1.0 million.

Figure 8.8 POS transactions to ABM withdrawals

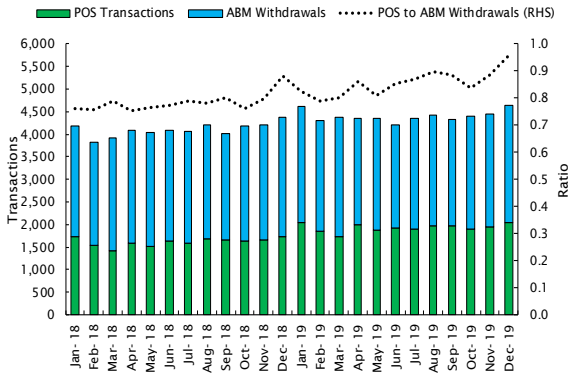


Figure 8.9 Large-value system concentration risk index

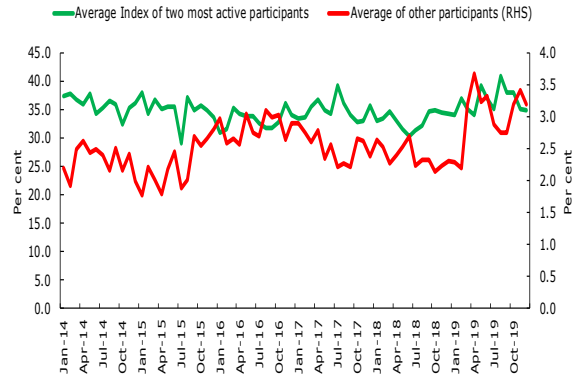


Figure 8.10 Herfindahl index of JamClear-RTGS payment activity

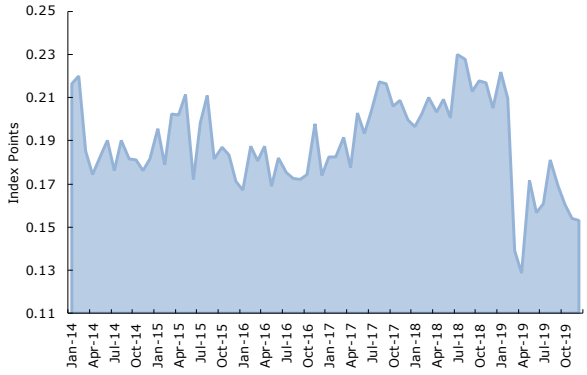


Figure 8.11 BOJ intraday repo facility monthly transaction value

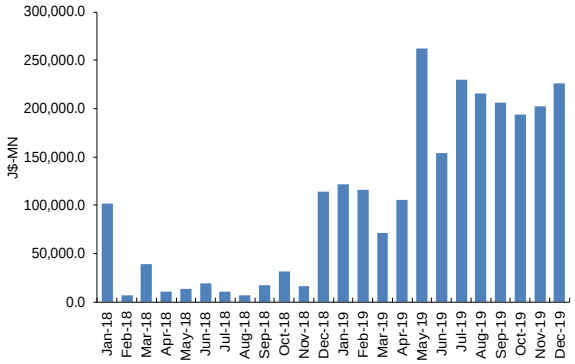
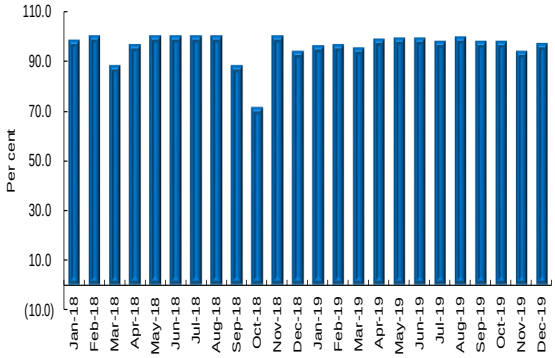


Figure 8.12 Share of BOJ intraday repos (values) demanded by the top four subscribers during 2018 & 2019



8.2.4 Key trends & developments in retail payments[9]

Retail payments activity continued to expand for 2019, which reflected improvements in unemployment and economic activity.[10] Of note, the average monthly transactional value increased to $155.2 million per 1000 persons for 2019 from $149.3 million per 1000 persons for the previous year. At the same time, average monthly transaction volumes increased to 5 474 transactions per 1000 persons for

[9] All retail payments figures except cash data are per 1000 persons of working age (age 15 and older).

[10] Retail payments include cheque payments, debit and credit card payments and other electronic forms of payment.

2019 relative to 5 323 transactions per 1000 persons for the previous year. Notably, debit cards continued to be the most utilized retail payment instrument accounting for 69.7 per cent of the total number of retail payment transactions. The value of cheques as a percentage of the total value of retail payment transactions declined to 39.3 per cent for 2019 from 46.3 per cent for 2018. This decline reflected the continued migration from paper-based means of payments to electronic forms and imposed charges for breaches of targeted ACH thresholds. (see Figure 8.1). (see Appendix).

Paper-based Instruments

Cash

Notwithstanding, the increase usage of electronic payment, cash continued to be the most preferred form of payment for retail consumers. Currency in circulation rose by 15.3 per cent to $148.7 billion, albeit slower than the growth of 20.9 per cent for 2018. In addition, the average monthly level of currency in circulation as a share of GDP, increased to 5.9 per cent from 4.5 per cent for 2018. Average currency in circulation as a share of M1 also increased to 48.0 per cent for 2019 from 46.2 per cent for 2018

Cheques[11]

Average monthly cheque transaction values declined to $61.0 million per 1000 persons from $69.1 million per 1000 persons for 2018. A further disaggregation of cheque transactions for 2019 showed that the average monthly intra-bank cheque transactions value was unchaged at $35.5 million per 1000 persons, while the value of inter-bank transactions declined by 24.0 per cent to $25.4 million per 1 000 persons. At the same time, average monthly cheque transaction volumes declined by 9.0 per cent to 477 transactions per 1000 persons. This reduction reflected declines in both intra-bank and inter-bank average cheque volumes by 6.6 per cent and 11.8 per cent to 268 and 209 transactions per 1000 persons, respectively (see Figure 8.4).

Electronic payment instruments[12]

There was further growth in value and usage of electronic payment instruments offered by commercial banks during 2019. The total number of electronic transactions increased by 4.2 per cent to 59 997 transactions per 1000 persons (see Figure 8.5). Similarly, the value of electronic payments increased to $1.1 billion per 1000 persons reflecting growth of 17.6 per cent. This performance was consistent with the authorities' effort to build consumers' confidence in electronic means of payments as well as to promote financial inclusion.

Card payments

For 2019, growth in the number and value of debit cards processed by commercial banks continued to outpace that of credit cards processed during 2019. Of note, credit card transaction values increased by 11.7 per cent to $315.0 million per 1000 persons. Further, credit card volumes increased by 7.2 per cent

[11] These transactions capture both interbank and intrabank cheque transactions.

[12] Electronic payments include debit card, credit card and other electronic payments.

to 12 442 transactions per 1000 persons. Debit card transaction values also grew by 22.5 per cent to $711.8 million per 1000 persons for the review year. Concurrently, debit card volumes reflected a minimal increase of 3.4 per cent to 45 781 transactions per 1000 persons (see Figure 8.6). The growth in card payment activities mirrored an increase of 12.6 per cent to 3.9 million in the average number of cards in circulation for 2019. Within this context, average monthly card penetration increased to 1.9 cards per person for 2019 from 1.7 for 2018 (see Appendix).[13]

There was a reduction in the average monthly number of US dollar card transactions in 2019, especially during the latter half of the year. Specifically, the average monthly number of US dollar card transactions grew by 11.2 per cent to 199 transactions per 1000 persons (see Figure 8.7).

Electronic payment channels offered by commercial banks

The number of active ABM and POS terminals operated by commercial banks continued to increase in 2019. Specifically, ABM active terminals increased by 6.0 per cent to 755, while the number of active POS terminals grew by 17.5 per cent to 40 030 (see Appendix).

For 2019 the average monthly number of ABM withdrawals decreased by 0.5 per cent to 2 474 transactions per 1 000 persons. At the same time, the average monthly POS transactions volume grew by 8.5 per cent to 2 117 transactions per 1 000 persons.

Moreover, the ratio of POS transactions to ABM withdrawals increased by 0.1 percentage point to 0.9 POS transaction for every ABM withdrawal in 2019. The trend increase in the ratio reflected a slight improvement in customers' preference for using POS method for transactions above a certain size. (see Figure 8.8).

8.3 Assessing financial sector exposure to financial market infrastructures

8.3.1 Concentration risk

Large-value system concentration risk Index (LSCRI)[14]

Concentration risk, as measured by the large-value payment system concentration index, remained relatively high for the review year.[15] Notably, the two most active participants continued to dominate the share of payment activity, with both accounting for an average monthly share of 36.5 per cent during 2019, an increase of 10.1 per cent relative to 2018. The monthly average share of activity for other participants within the system increased to 3.0 per cent at end 2019 from 2.4 per cent at end 2018 (see Figure 8.9).

[13] Cards penetration is total credit and debit cards (JMD, USD and dual currency) to the working population (14 years and older).

[14] This measure is computed based on payments made and received by each bank as a share of overall payments for the system.

[15] The LSCRI records the share of payment activity between:

a) the two most active participants in relation to all other participants and;

b) all other participants in relation to the two most active participants.

The calculation excludes the activities of the Accountant General Department, BOJ and Clearing Houses who are also participants in the RTGS system.

Herfindahl Index of JamClear®-RTGS liquidity concentration

The level of liquidity concentration as measured by the Herfindahl index averaged 0.2[16], which was inline in line with the annual five-year average. This result signalled persistence in the level of liquidity concentration in the system (see Figure 8.10). High levels of concentration as indicated by both the HHI and LSCRI measures potential systemic risk within the Jamaican payment system. This underscores the importance of monitoring systemically important financial institutions especially within the JamClear®-RTGS.

8.3.2 Liquidity risk

Usage of BOJ's intraday liquidity facility[17]

There was a significant increase in the usage of BOJ's intraday liquidity facility during 2019 relative to the previous year. (see Figure 8.11). The increased usage of this facility largely coincided with commercial banks' participation in BOJ short term instruments especially during the second half of the year. Of note, the average monthly and overall value of BOJ's intraday liquidity facility usage increased to $175.5 billion and $2.1 trillion respectively for 2019. These results were in comparison to respective values of $32.2 billion and $386.3 billion for 2018. Similarly, the number of intra-day liquidity transactions increased by 110.8 per cent to 1 579 from 749 transactions for 2018.

The percentage of funds demanded for the BOJ intra-day repo facility by the top four institutions remained consistently above 90.0 per cent for most of the review period, indicating concentration of liquidity risks in the payment system (see Figure 8.12).

[16] Values 0.2 and above indicates that the system is concentrated, while values below suggest that the system is competitive

[17] The BOJ's intraday liquidity facility provides funds to system participants to minimize their liquidity exposure brought about by timing mismatches between incoming and outgoing payment activities.

Box 8.1 JamClear® Systems Modernization

National Payment Systems (NPS) play a critical role in supporting the financial system as it enables the transfer of value between businesses, consumers and financial institutions. The Bank of Jamaica is responsible for the smooth functioning of the NPS. This is accomplished through the performance of the various roles of the Bank as catalyst, participant, service provider and payment system overseer.

The payments, clearing and settlement systems, particularly JamClear®, established by the Bank has made significant contribution to financial stability and economic growth of Jamaica through the provision of a safe, reliable and efficient payments system infrastructure since 2009.

Introduction

JamClear® is a multicurrency payments, clearing and settlement system that is comprised of the following:

- JamClear®-RTGS – a real time gross settlement system for electronic payment transfers between participants on their own behalf and on the behalf of the beneficiaries of participants in the domestic market; and
- JamClear®-CSD – the electronic registry for the Government and the Bank of Jamaica fixed income domestic debt issues that facilitates the issuing and recording of bond activity in the primary and secondary markets.

The systems operate in real-time and are fully integrated to ensure a high level of payments efficiency with the settlement of securities occurring on a delivery versus payment (DvP) basis.

Rationale for JamClear® modernization

Since 2009, rapid evolving technology and growing stakeholder demands have influenced the need for modernization of the existing JamClear® Systems and supporting infrastructure. The modernized JamClear® Systems provides a more flexible system, with capabilities to support cost effective cross border payments, enhance monetary policy tools, improve reporting options and enhance payment features. These features increase safety, integrity, interoperability and transparency in the payments landscape.

New functionalities and features

JamClear®-RTGS

Selected new features of the JamClear®-RTGS System include:

1. Enhanced reporting options and dashboard features to facilitate real-time monitoring; and
2. Tiered participation where the GOJ Treasury (Accountant General) can manage multiple own accounts and generate their payments.

JamClear®-CSD

During 2019, activities towards the implementation of further upgrades to JamClear® CSD (Phase-2) primarily focused on the completion of new functionalities aimed at automating some policy operations. These operations include, inter-alia, the B-FXITT and liquidity providing auctions and access to the overnight Standing Liquidity Facility (SLF) for DTIs. Additionally, a yield curve module using the secondary market data in the system is at an advanced stage. This feature will result in the system being able to generate daily market valuation of the existing securities dematerialized in the depository. The automation of this activity will contribute to improved efficiencies in the processes for the Bank's liquidity operations. These features that were scheduled for implementation during the December quarter 2019 will be deployed during the March quarter 2020.

The upgrades to the JamClear Systems will also see the implementation of a foreign exchange (FX) trading platform (JamClear® FX-TP), an extension of the existing payment and settlement systems infrastructure. The business requirements for this new platform for inter-dealer FX trades were finalized with the developers during the June 2019

quarter and will be deployed over two phases. Phase-1 is scheduled to go-live by the end of the March 2020 quarter. It is anticipated that the implementation of this new system will contribute to greater transparency of FX transaction volumes and rates between intermediaries as they occur. In addition, it is expected that the system will facilitate the straight through settlement of these trades on accounts held by dealer participants in the RTGS. The implementation of Phase-2 of this platform is scheduled for March 2021.

Implications for Monetary Policy and Financial Stability

Monetary policy is primarily concerned with the flow of money and credit in the economy. The payments, clearing and securities settlements systems, JamClear® facilitates:

- the flow of money and credit; and
- the Bank's use of open market operations as an indirect monetary policy tool to influence short-term interest rates, monetary base, money supply and exchange rates to achieve it's policy objective of maintaining price stability.

The operational resilience of these systems affects the financial sector's liquidity position, the Bank's ability to implement and transmit monetary policy and its mandate of price stability. In addition, in maintaining financial stability, the Bank exercises oversight of the JamClear® Systems.

Payment System Oversight Responsibilities

Compliance with international standards, principles and improvements in system functionality enables the JamClear® Systems to be versatile and flexible and supports the smooth functioning of the financial markets. The Principles for Financial Market Infrastructures (PFMIs) promulgated by the Bank for International Settlements and International Organization of Securities Commissions are the international standards to assess financial market infrastructures, i.e. payment systems, central securities depositories, securities settlement systems, central counterparties and trade repositories.[1]

On 31 December 2019, the Bank adopted the PFMI, as an additional tool for overseeing the JamClear® Systems. The PFMI will enable the Bank to better safeguard the JamClear® Systems from systemic risks and foster transparency and financial stability.

[1] Currently there are no trade repositories in Jamaica.

Box 8.2 The Regulation of Virtual Assets In Jamaica: Key Issues and Current Responses

In a June 2019 Bulletin, the Financial Action Task Force (FATF) stated that "countries should ensure that Virtual Asset Service Providers (VASP) are subject to adequate regulation and supervision or monitoring for AML/CFT and are effectively implementing the relevant FATF Recommendations, to mitigate money laundering and terrorist financing risks emerging from virtual assets (VA)". [1] *Further, Recommendation 15 of the FATF Recommendations outlines the requirement for the AML/CFT regulation of virtual assets (VA) and VASPs.* [2]

1. Overview

1.1 A VA is defined as a digital representation of value that can be digitally traded or transferred and can be used for payment or investment purposes.[3] A VASP is any natural or legal person which, as a business, conducts any of the following activities for or on behalf of another person:[4]

i. Exchange between VAs and fiat currencies[5]
ii. Exchange between one or more forms of VAs
iii. Transfer of VAs
iv. Safekeeping and/or administration of VAs or instruments enabling control over VAs and
v. Participation and provision of financial services related to an issuer's offer and/or sale of a VA.

1.2 VASPs include VA exchanges and transfer services; VA wallet providers that host wallets or maintain custody or control over another person's VA's wallet(s) or private keys and providers of financial services relating to issuance, offer, or sale of a VA. [6]

1.3 In its Guidance on VA and VASPs, FATF indicates that VASPs should be supervised or monitored by a competent authority which should conduct risk-based supervision or monitoring.[7,8] Supervisors should be given adequate powers to ensure compliance by VASPs, with the requirements to combat Money Laundering/Terrorism Financing (ML/TF). These powers include the authority to conduct inspections, compel the production of information, and to impose sanctions.

1.4 In accordance with FATF Recommendation 15, VASPs should be required to be licensed or registered, at a minimum, within the

[1] Bulletin-Revisions to the FATF Recommendation-June 2019
[2] Anti-Money Laundering and Counter-Financing of Terrorism
[3] As per FATF definition
[4] As per FATF definition
[5] Fiat currency is legal tender which has a value that is backed by the government that issued it.
[6] A private key is used to decrypt a received message using cryptography. Cryptography is a solution to make data secure during communication by using encryption and decryption. Encryption is used to transform the original message into an unreadable message by the use of an algorithm and a key. Decryption is used by the receiver to transform the encrypted message back to the original message also by the use of an algorithm and a private key.
[7] Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers (2019)
[8] The Guidance indicates that the Authority should not be a self-regulatory body.

jurisdiction where they are created.[9] Where the VASP is a natural person, they should be registered or licensed in the jurisdiction where their place of business is located. Competent authorities are required to take legal and/or regulatory measures to prevent criminals or their associates from holding, or being the beneficial owner of, a significant or controlling interest, or holding a management function in a VASP. Countries are also required to identify natural or legal persons that carry out VASP activities without the requisite licence or registration, and apply appropriate sanctions.

1.5 It is acknowledged that new technology, products and related services can spur financial innovation and efficiency and improve financial inclusion. However, they also provide additional channels for criminals and terrorists to launder their proceeds or finance their illicit activities. The VA ecosystem has evolved with systems including anonymity-enhanced crypto-currencies, mixers and tumblers, decentralized platforms and exchanges, and other products and services that enable or allow for reduced transparency and increased obfuscation of financial flows. The emergence of activities such as Initial Coin Offerings (ICOs) that present ML/TF risks, including fraud and market manipulation risks, compound the need for regulation. Further, new illicit financing typologies continue to emerge, including the increasing use of virtual-to-virtual layering schemes that attempt to further obscure transactions in a comparatively easy, cheap and secure manner.

1.6 Countries are therefore required to focus on the financial conduct or activity surrounding the VA or its underlying technology and the manner in which it poses ML/TF risks, and apply measures accordingly. Countries are to address ML/TF risks associated with VA activities, whether these activities intersect with the regulated fiat currency financial system or consist only of virtual-to-virtual interactions.

1.7 VASPs are to be subject to the relevant FATF measures based on the types of activities in which VASPs engage. For the purposes of applying the FATF Recommendations, countries should consider VAs as "property", "proceeds", "funds", "funds or assets" or other "corresponding value". These measures include customer due diligence provisions, recordkeeping, transaction monitoring, identification and reporting of suspicious transactions, source of funds and wealth information and risk assessments on customers and products.

2. Current Local Climate

2.1 In May 2019, International Organization of Securities Commissions (IOSCO) released a Consultation Report on "Issues, Risks and Regulatory Considerations to Crypto-Asset Trading Platforms (CTP)".[10] This report was

[9] References to creating a legal person include incorporation of companies or any other mechanism that is used in the relevant jurisdiction to do so.

[10] Issues, Risks and Regulatory Considerations Relating to Crypto-Asset Trading Platforms (IOSCO: May 2019)

aimed at assisting IOSCO members in evaluating the issues and risks relating to CTPs. The Final Report describes issues and risks identified to date that are associated with the trading of crypto-assets on CTPs. In relation to the issues and risks identified, it describes key considerations and provides related toolkits that are useful for each key consideration. These key considerations and toolkits are intended to assist regulatory authorities who may be evaluating CTPs within the context of their regulatory frameworks.

2.2 The report also highlights the range of possible regulatory approaches to the regulation of CTPs including; (a) application of an existing framework (b) tailoring of an existing framework, and (c) introduction of a new regulatory framework. In Jamaica's case, the ultimate objective is the introduction of a new regulatory framework, however, currently the Financial Services Commission (FSC) is employing a mix of approaches as described at (a) and (b) above. The regulation of the Jamaica Stock Exchange (JSE) and its trading activities is a case in point.

2.3 The JSE in collaboration with Blockstation (a Canadian company recently launched a Digital Assets Trading Platform (DATP), and teamed to create this digital asset platform. [11] In the case of the DATP, many of the considerations highlighted in IOSCO (2019) were already provided for in the existing framework and additional considerations and safeguards were considered, where not explicitly addressed. In particular, the FSC has issued an Advisory published on its website regarding the regulation of the DATP.[12]

2.4 It will require all issuers and Securities Dealers (SDs) bringing the assets to investors to register their securities to be traded on the DATP with the FSC. These requirements are outlined in section 3 of the Advisory. If the Registration statement and accompanying prospectus document meet the requirements of the FSC, a non-objection letter will be issued (please refer to section 3.1 of the Advisory).

2.5 SDs who intend to trade digital assets or digital currencies on behalf of its clients are required to receive approval from the FSC prior to engage in this activity (please refer to section 3.3 of the Advisory). SD's applications will be assessed based on its prudential compliance, operational performance, risk management policy, enhanced client onboarding process and submission of specific documents as outlined in sections 3.3 and 4 of the Advisory.

2.6 SDs will also be subjected to periodic reporting requirements once registration is done by the FSC. Additionally, the SDs are required to

(https://www.iosco.org/library/pubdocs/pdf/IOSCOPD649.pdf) – hereafter "IOSCO (May 2019)"

[11] The term "digital assets" is used interchangeably with "virtual assets" in this Paper.

[12] In this regard, please note the link below:

http://www.fscjamaica.org/downloads.php?doc=ZG9jdW1lbnRzL3NlY3Rpb25zLzE5MTIxNTc1NzdfYWR2aS0xMC0tLWZzYy1hcHBsaWNhdGlvbi1yZXF1aXJlbWVudHMtZGlnaXRhbC1hc3NldHMtZGVjLTIwMTkucGRm

provide FSC with a due diligence framework that complies with section 4.2 of the Advisory. The SD's compliance with its due diligence framework will be assessed by the FSC under its examination powers under the Securities Act. This may be done during a routine, targeted or desk based review.

2.7 Market makers[13] for the DATP are also required to be registered by the FSC prior to commencing trading activities as well as satisfy the JSE's registration requirements. Upon receipt of the application and documents as requested by the JSE and section 3.4 of the Advisory, the FSC will conduct fit and proper assessment of owners, directors and senior officers of the Market maker.

2.8 In the review of the DATP, some key issues were considered in addressing the risks related to CTPs. These considerations were outlined in the IOSCO Paper and are addressed as shown in Table 1.

2.9 Over the near to medium-term, the regulatory regime for VASPs will be strengthened by the FSC., Efforts to strengthen the regulatory regime will include strong inter-agency involvement and stakeholder consultations, including with the Ministry of Finance and the Public Service, the Bank of Jamaica, the Financial Investigations Division and market participants. In the interim, the FSC is not considering approving VA trading (and by extension VASPs) except where virtual asset trading takes place across a recognized exchange that is subject to its regulatory jurisdiction, and according to rules approved by the FSC which should be consistent with FATF and IOSCO principles.

Table 1 Key to address the risks related to CTPs

Risks to CTPs	JSE DATP
Access and on-boarding	Access to the platform is granted to SDs. Only licensed SDs may utilize the DATP. SDs facilitating trading in VAs must be approved to do so by the FSC. SDs are required to have on-boarding procedures that are compliant with AML requirements.
Safekeeping of participants' assets	Assets are safeguarded using cold storage which is not connected to the internet and is at less risk for data breaches.[14]
Transparency of CTP operations (extent to which information of how CTPs operate is available to participants)	The operations of the DATP are subject to rules administered by the JSE and the FSC and are readily available to participants.
Market integrity (processes to detect and/or prevent market abuse	The DATP has rules around the prevention and detection of market abuse. The FSC also has facilities in place for the investigation of such abuse once suspected.
Price discovery mechanisms	Price discovery is facilitated through the JSE's trading platform which is widely used and has readily available information is. Participants have access to real time trading information and post trade data.
Technology (resiliency, reliability, integrity and security)	The JSE is required to have risk management policies and procedures relating to the DATP. These procedures are reviewed by the FSC.
Clearing and settlement	Clearing and settlement is done through the Jamaica Central Securities Depository.

[13] A market maker is typically a large bank or institution that helps to ensure the liquidity of a market by offering to both buy and sell securities.

[14] Cold storage refers to storing digital assets offline and facilitating spending without the private keys controlling them ever being online. This form of storage resists theft by hackers and malware.

APPENDIX

Table A.1 Quarterly Financial Soundness Indicators for DTIs

Indicator (%)	Categories	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19
Core Indicators								
Regulatory capital to risk-weighted assets	Capital adequacy	15.3	15.2	14.9	14.6	14.4	14.6	14.8
Tier 1 capital to risk-weighted assets	Capital adequacy	15.0	14.3	13.8	13.3	13.3	13.4	13.6
Non-performing loans (net) to capital	Capital adequacy	-2.0	-1.8	-1.7	-1.4	-2.7	-1.7	1.6
Non-performing loans to total loans	Assets quality	2.7	2.7	2.6	2.5	2.4	2.4	3.1
Return on assets	Earnings & Profitability	0.7	0.8	0.7	1.0	0.6	0.6	1.2
Return on equity	Earnings & Profitability	5.2	5.7	5.0	6.7	3.7	4.2	8.0
Interest margin to income	Earnings & Profitability	45.3	45.3	42.4	38.9	46.0	47.6	39.8
Non-interest expenses to income	Earnings & Profitability	22.7	21.9	23.3	19.8	23.1	23.4	20.1
Liquid assets to total assets	Liquidity	25.3	24.2	24.2	21.8	22.4	22.4	22.4
Duration on assets -Domestic Bonds	Sensitivity to Market Risk	1.2	1.4	1.5	1.2	0.8	1.1	1.2
Duration on assets- Global Bonds	Sensitivity to Market Risk	3.3	3.3	3.2	2.9	2.7	2.2	2.4
NOP to capital	Sensitivity to Market Risk	5.2	1.7	3.9	-7.4	0.0	0.0	0.0
Encouraged Indicators								
Capital to assets	Capital adequacy	14.0	14.1	14.2	15.1	14.9	15.0	15.3
Trading income to total income	Earnings & Profitability	14.6	17.9	21.7	28.5	14.2	15.1	31.7
Personnel expenses to non-interest expenses	Earnings & Profitability	36.4	37.6	35.5	32.9	33.8	35.9	35.6
Spread between lending & deposits rates [1/]	Earnings & Profitability	12.3	12.2	12.2	11.7	11.6	11.4	11.3
Deposits to total (non-interbank) loans	Liquidity	144.3	142.0	142.4	134.7	133.0	132.3	129.5
Foreign-currency-denominated loans to total loans	Foreign Exchange risk	22.0	23.0	23.4	21.8	22.1	22.3	22.3
Foreign-currency-denominated liabilities to total liabilities	Foreign Exchange risk	40.1	39.3	39.3	37.2	36.8	37.6	37.2
Household debt to GDP	Household sector leverage	21.6	25.2	22.6	26.1	21.3	18.3	23.2

Notes:

[1/] Weighted by assets size

Table A.2 Quarterly Financial Soundness Indicators for SDs and ICs

Indicator (%)	Categories	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19
A. Securities Dealers [1/]								
Regulatory capital to risk-weighted assets	Capital adequacy	19.0	18.1	20.5	19.8	20.8	21.1	22.1
Tier 1 capital to risk-weighted assets	Capital adequacy	15.9	14.9	14.2	15.3	16.6	15.6	14.2
Non-performing loans (net) to capital	Capital adequacy	0.1	-0.2	-0.3	-0.4	0.0	0.2	0.3
Non-performing loans to total loans	Assets quality	3.2	0.7	1.1	0.6	3.5	4.4	4.5
Return on assets	Earnings & Profitability	0.7	0.6	0.9	0.5	0.4	1.2	0.6
Return on equity	Earnings & Profitability	5.2	4.4	6.8	3.9	3.2	8.5	4.3
Interest margin to income	Earnings & Profitability	20.1	24.9	20.2	22.7	21.2	16.0	21.6
Non-interest expenses to income	Earnings & Profitability	35.9	35.5	31.6	45.7	43.2	29.0	37.2
Liquid assets to total assets	Liquidity	18.7	20.7	16.3	14.6	17.5	18.0	17.3
Duration on assets -Domestic Bonds	Sensitivity to Market Risk	2.5	3.4	3.2	3.2	3.2	3.2	3.2
Duration on assets- Global Bonds	Sensitivity to Market Risk	9.1	10.2	10.2	10.2	10.2	10.2	10.2
NOP to capital	Sensitivity to Market Risk	23.4	19.8	20.9	11.4	14.3	12.6	11.0
B. General Insurance								
Net premium to Capital	Capital adequacy	22.8	22.5	21.8	24.6	23.1	25.6	25.2
Capital to Assets	Capital adequacy	30.0	28.2	28.7	29.3	28.8	26.5	25.3
(Real estate + unquoted equities + debtors) to total assets [2/]	Assets quality	28.5	32.6	28.1	28.2	27.2	31.5	29.9
Receivables to gross premiums	Assets quality	174.9	166.8	185.4	190.4	168.8	137.6	187.7
Equities to total assets	Assets quality	3.1	2.8	3.8	3.6	3.7	3.9	4.3
Net technical reserves to net claims paid in last 3 years	Reinsurance & acturial issues	401.4	417.9	391.1	418.6	430.8	444.9	418.9
Risk retention ratio (net premium to gross premium)	Reinsurance & acturial issues	46.4	35.0	45.2	53.7	45.6	32.0	43.5
Gross premium to number of employees J$(000)	Management Soundness	9.4	12.7	9.6	9.1	10.0	16.2	10.6
Assets per employee J$(000)	Management Soundness	64.0	70.5	69.3	67.7	68.8	76.3	72.5
Net Claims to net premium (loss ratio)	Earnings & Profitability	61.6	58.8	61.6	52.9	64.7	66.6	53.8
Total expenses to net premium (expense ratio)	Earnings & Profitability	92.6	90.8	99.6	81.4	93.1	94.4	91.8
Combined ratio (loss + expense ratio)	Earnings & Profitability	154.2	149.6	161.3	134.4	157.8	161.0	145.6
Investment Income to net premium	Earnings & Profitability	13.5	14.8	12.6	14.6	10.9	16.8	14.7
Return on Equity	Earnings & Profitability	3.7	5.9	3.8	4.3	2.0	4.3	6.4
Liquid assets to total liabilities	Liquidity	71.8	70.1	67.6	70.0	71.4	61.8	66.5
C. Life Insurance								
Capital to technical reserves	Capital adequacy	88.4	95.6	95.4	100.5	107.6	106.9	108.6
(Real estate + unquoted equities + debtors) to total assets	Assets quality	3.9	4.1	4.3	4.4	4.7	5.1	5.5
Receivables to gross premiums	Assets quality	68.2	74.4	75.5	76.6	80.3	87.6	81.1
Equities to total assets	Assets quality	3.2	3.1	3.5	3.7	3.7	4.4	5.1
Net technical reserves to net premium paid in last 3 years	Reinsurance & actuarial issues	723.3	705.1	707.1	666.5	641.7	648.3	650.0
Risk retention ratio (net premium to gross premium)	Reinsurance & actuarial issues	98.3	97.9	98.2	97.9	98.6	97.6	98.3
Gross premium to number of employees J$(000)	Management Soundness	7.6	7.5	8.0	7.8	8.2	8.5	9.6
Assets per employee J$(000)	Management Soundness	163.8	166.6	170.3	167.2	170.0	173.1	175.1
Expenses to net premium (expense ratio)	Earnings & Profitability	47.4	45.8	44.6	57.6	46.6	44.8	41.5
Investment Income to investment assets	Earnings & Profitability	2.0	2.0	3.4	1.8	1.7	2.9	3.3
Return on Equity	Earnings & Profitability	6.5	8.8	10.3	8.0	5.6	8.2	8.7
Liquid assets to total liabilities	Liquidity	28.9	25.1	20.9	24.2	24.5	30.7	27.1
Duration on assets -Domestic Bonds	Sensitivity to market risk	1.6	2.3	2.2	2.7	2.5	1.9	3.2
Duration on assets- Global Bonds	Sensitivity to market risk	7.0	7.8	6.1	9.4	7.0	10.2	9.6

Notes:

[1/] Includes the twelve securities dealers that makes up 70.0 per cent of the market

[2/] Data revised to include "Recoverable from Reinsurers" as debtors

Table A.3 Annual Sectoral Indicators of Financial Development

Sub-sector	Indicator	Dec-14	Dec-15	Dec-16	Sep-17	Sep-18	Sep-19
Banking	Total number of DTIs	11	11	11	11	11	11
	Number of branches and outlets	165	165	165	165	157	157
	Number of branches/ thousands population	0.06	0.06	0.06	0.06	0.06	0.06
	Bank deposits/ GDP (%)	44.3	47.1	50.4	52.7	55.1	55.1
	Bank assets/ total financial assets (%) [1/]	35.7	36.8	37.1	37.3	38.1	37.8
	Bank assets/ GDP (%)	69.3	71.8	77.9	80.4	83.4	85.3
Insurance	Number of insurance companies [2/]	15	16	17	16	17	19
	Gross premiums/ GDP (%)	4.9	4.8	5.1	5.3	5.3	6.3
	Gross life premiums/ GDP (%)	2.6	2.5	2.8	3.1	2.9	3.1
	Gross non-life premiums/ GDP (%)	2.2	2.3	2.3	2.2	2.4	3.2
	Insurance assets/ GDP (%)	20.7	21.2	21.1	20.8	20.6	20.1
	Insurance assets/ total financial assets (%)	11.0	10.7	10.5	10.1	9.6	9.4
Pensions	Types of pension plans						
	Total number of defined benefit plan	110	107	106	99	98	93
	Total number of defined contribution plan	319	308	304	300	295	288
	Pension fund assets/ total financial assets (%)	11.4	11.5	12.0	12.8	13.7	14.5
	Pension fund assets/ GDP (%)	22.1	22.4	25.2	27.6	29.9	32.8
Mortgage	Mortgage assets/ total financial assets (%) [3/]	7.9	8.4	8.4	6.4	7.7	9.1
	Mortgage assets/ GDP (%)	15.4	16.4	17.6	13.7	16.9	20.6
Securities Dealers	Total number of securities dealers	30	29	32	32	31	30
	Securities dealer's/ total financial assets (%)	18.2	16.6	15.8	15.0	13.8	14.0
	Securities dealer's assets/ GDP (%)	35.3	32.5	33.3	32.3	30.2	31.6
Credit Union	Total number of credit unions	37	37	37	29	26	29
	Credit union's assets/ total financial assets (%)	2.7	2.7	2.4	2.6	2.5	2.6
	Credit union's assets/ GDP (%)	5.3	5.3	5.1	5.6	5.6	5.8
Foreign exchange markets	Adequacy of foreign exchange (reserves in months of imports)	5.0	5.9	5.8	6.3	5.8	7.7
	Foreign exchange reserves as ratio to short-term external debt (%)	279.8	527.2	277.3	658.9	594.5	683.9
Collective investment scheme	Local unit trust and mutual funds (J$BN) [4/]	111.0	136.4	181.2	211.5	266.9	332.8
	Number of local unit trust and mutual funds	11	12	13	14	18	19
	Local unit trust and mutual funds/ total financial assets (%)	3.7	4.3	5.0	5.3	6.1	7.0
	Overseas mutual funds (value of units held by Jamaicans) US$MN	177.0	200.9	223.0	258.6	275.5	293.1
	Overseas mutual funds/ total financial assets(%)	0.7	0.7	0.8	0.8	0.9	0.8
Sub-sector	Indicator	Dec-14	Dec-15	Dec-16	Dec-17	Dec-18	Dec-19
Capital markets	Number of listed securities (equities) [5/]	54	64	68	66	73	63
	Number of new issues (equities) [6/]	7	1	7	8	15	7
	Number of new issues (bonds) [7/]	0	0	6	8	3	2
	Value of new issues (bonds) J$BN	0	0.0	41.8	55.8	15.0	5.0
	Market capitalization/ GDP (%)	19.0	36.9	39.7	55.9	69.6	91.3
	Value traded/ market capitalization (%)	5.4	2.8	3.5	3.4	4.7	4.3

Notes:

[1/] Financial system assets include assets for banks, insurance companies, credit unions, securities dealers, pension funds, unit trust FUM and mutual funds.

[2/] There are seven life insurers and twelve general insurers. Of the twelve general insurers and seven life insurers one of each is not operational.

[3/] Includes data for building societies, commercial banks & National Housing Trust

[4/] Unit trust portfolios are composed mainly of fixed income securities,equities and real estate investments

[5/] Includes Junior market listings

[6/] Includes preference shares

[7/] Government of Jamaica bonds

Figure A.1 Automated Clearing House monthly transaction values and volumes

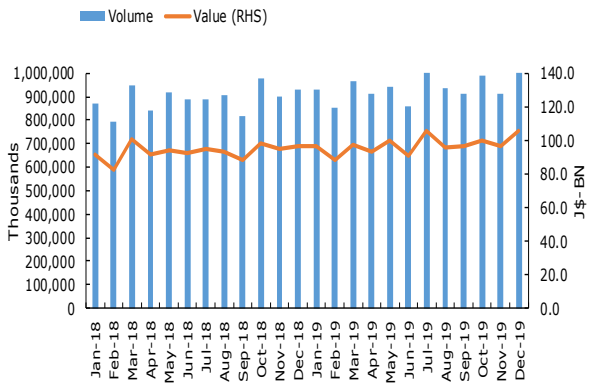


Figure A.2 MultiLink monthly transaction values and volumes

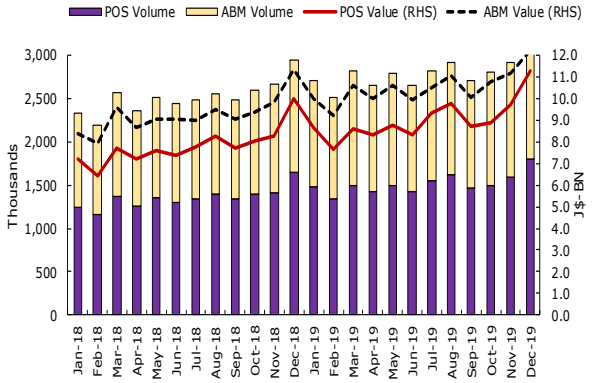


Table A.4 Proportion (%) of average monthly retail payment transactions

	2018		2019	
	Volume	Value	Volume	Value
Cheques	46.3	9.8	39.3	8.7
Card Payments				
Debit	32.5	69.3	38.2	69.7
Credit	15.8	18.2	16.9	18.9
Other Electronic Payments	5.5	2.7	5.6	2.7

Figure A.3 Monthly credit and debit cards in circulation

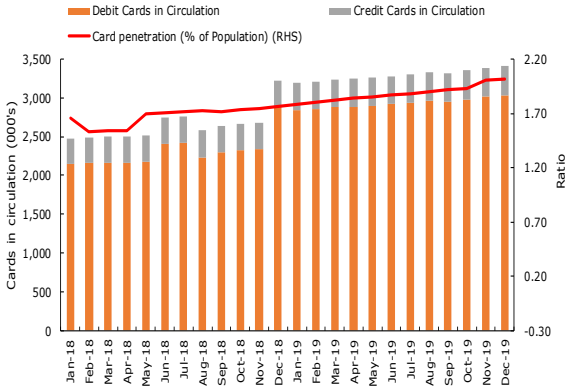
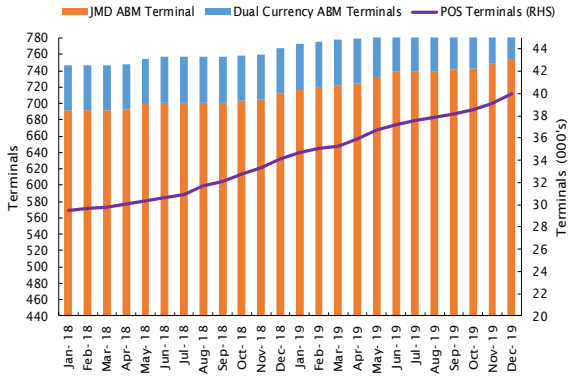


Figure A.4 Number of active POS and ABM Terminals

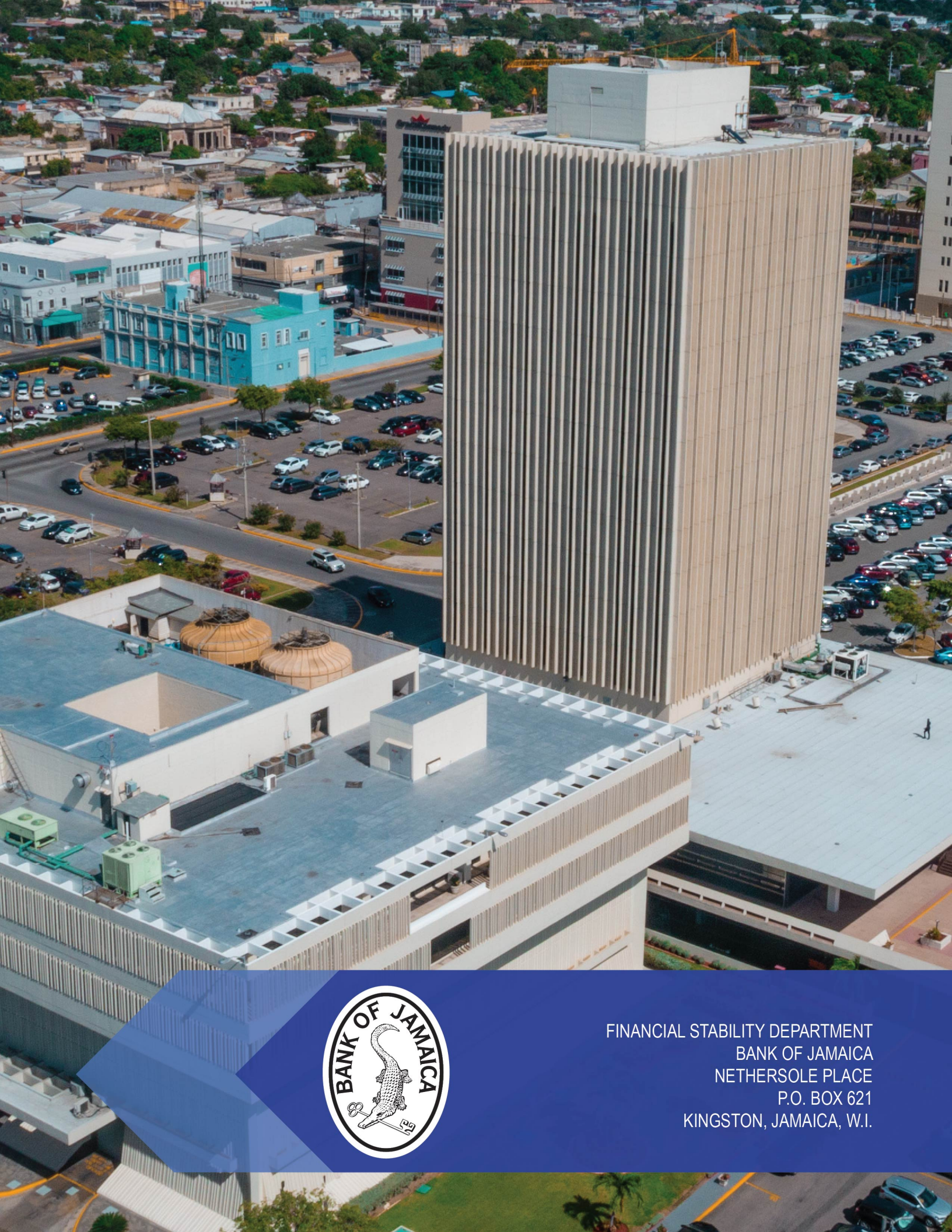


GLOSSARY

Automated Clearing House	A facility that computes the payment obligations of participants, vis-à-vis each other based on payment messages transferred over an electronic system.
Bid-ask Spread	The difference between the highest price that a buyer is willing to pay for an asset and the lowest price that a seller is willing to accept to sell it.
Central Securities Depository	An institution which provides the service of holding securities and facilitating the processing of securities transactions in a book entry (electronic) form.
Concentration Risk	The risk associated with the possibility that any single exposure produces losses large enough to adversely affect an institution's ability to carry out its core operations.
Consumer Confidence Index	An indicator of consumers' sentiments regarding their current situation and expectations of the future.
Counter-party Risk	The risk to each party of a contract that the counterparty will not live up to its contractual obligations. Counterparty risk is a risk to both parties and should be considered when evaluating a contract.
Credit Risk	The risk that a counterparty will be unable to settle payment of all obligations when due or in the future.
Disposable Income	The remaining income after taxes has been paid which is available for spending and saving.
Dollarization	The official or unofficial use of another country's currency as legal tender for conducting transactions.

Financial Intermediation	The process of channeling funds between lenders and borrowers. Financial institutions, by transforming short-term deposits or savings into long-term lending or investments engage in the process of financial intermediation.
Fiscal Deficit	The excess of government expenditure over revenue for a given period of time.
Foreign Exchange Risk	The risk of potential losses which arise from adverse movements in the exchange rate incurred by an institution holding foreign currency-denominated instruments.
Funds Under Management/ Managed Funds	The management of various forms of client investments by a financial institution.
Hedging	Strategy designed to reduce investment risk or financial risk. For example, taking positions that offset each other in case of market price movements.
Interest Margin	The dollar amount of interest earned on assets (interest income) minus the dollar amount of interest paid on liabilities (interest expense), expressed as a per cent of total assets.
Interest Rate Risk	The risk associated with potential losses incurred on various financial instruments due to interest rate movements.
Intraday Liquidity	Credit extended to a payment system participant that is to be repaid within the same day.
Large Value Transfer System	A payment system designated for the transfer of large value and time-critical funds.
Liquidity Risk	The risk that a counterparty will be unable to settle payment of all obligations when due.
Net Open Position	The difference between long positions and short positions in various financial instruments.

Non-Performing Loans	Loans whose payments of interest and principal are past due by 90 days or more.
Off-Balance Sheet Items	Contingent assets and debts that are not recorded on the balance sheet of a company. They are usually noteworthy as these items could significantly affect profitability if realized.
Payment System	A payment system consist of the mechanisms - including payment instruments, institutions, procedures and technologies - used to communicate information from payer to payee to settle payment obligations.
Real-Time Gross Settlement System	A gross settlement system in which payment transfers are settled continuously on a transaction-by-transaction basis at the time they are received (that is, in real-time).
Repurchase Agreement (Repo)	A contract between a seller and a buyer whereby the seller agrees to repurchase securities sold at an agreed price and at a stated time. Repos are used as a vehicle for money market investments as well as a monetary policy instrument of BOJ.
Retail Payment System	An interbank payment system designated for small value payments including cheques, direct debits, credit transfers, ABM and POS transactions.
Stress Test	A quantitative test to determine the loss exposure of an institution using assumptions of abnormal but plausible shocks to market conditions.
Systemic Risk	The risk of insolvency of a participant or a group of participants in a system due to spillover effects from the failure of another participant to honour its payment obligations in a timely fashion.



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