



FINANCIAL STABILITY REPORT

2018



FINANCIAL STABILITY REPORT 2018

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Nethersole Place
Kingston
Jamaica

Telephone: (876) 922 0750–9
Fax: (876) 967 4265
Email: library@boj.org.jm
Website: <http://www.boj.org.jm/>
Twitter: [@CentralBankJA](https://twitter.com/CentralBankJA)
Facebook: [@CentralBankJA](https://www.facebook.com/CentralBankJA)
YouTube: [Bank of Jamaica](https://www.youtube.com/BankofJamaica)

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GLOSSARY

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ABBREVIATIONS AND ACRONYMS

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

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

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 2018 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 is at end-September 2018 except in some instances where data was available for end-2018.

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 inter alia banks, securities dealers and insurance companies. Financial markets include inter alia foreign exchange, money and capital markets. Financial market infrastructure refers to payment and securities settlement systems.

1.0 FINANCIAL STABILITY OVERVIEW

For the year ended September 2018, risks to financial system stability in Jamaica were low to medium. Sound domestic macroeconomic conditions and the continued fiscal consolidation have lowered risk to financial system stability. However, an analysis of funding relationships among financial institutions showed that financial stress may easily spread throughout the system.

These views were derived from Bank of Jamaica’s macroprudential framework of examining systemic risk along the following dimensions:

- excessive credit growth & leverage;
- excessive maturity mismatches & market illiquidity;
- direct and indirect exposure concentrations;
- excessive interconnectedness & systemic importance of institution; and
- overall resilience to financial shock.

Risks associated with the financial cycle were generally low during the review period. Rates of credit growth remained moderate against the background of continued accommodative monetary policy adjustments over the year. In addition, there was no significant trend expansion of leverage. Furthermore, the funding profile of deposit-taking institutions was stable, with deposits continuing to account for the bulk of funding liabilities.

The reduction of the Government of Jamaica’s (GOJ) footprint in the domestic debt market resulted in lower concentration risks. Consequently, the broadening of financial institutions’ exposures to other capital market assets will require close monitoring of asset prices by the Bank.

Regarding systemic risk exposures, foreign currency, liquidity and interest rate risks within the securities dealers’ (SDs’) sector as well as the systemic importance of a few large financial firms remained the largest risk exposures throughout the review period. In light of these risks, financial policies were implemented to limit the extent of the exposures. To curtail the risk exposures in the

SDs’ sector, the Financial Services Commission (FSC) identified appropriate prudential benchmarks for the sector to restrict excessive duration mismatch and liquidity risk on foreign currency balances. With regard to domestic systemically important financial institutions (SIFIs), the Bank intends to commence a risk-based consolidated supervision pilot for at least one domestic-systemically important entity.

Macro-financial environment

Jamaica recorded an improvement in macroeconomic conditions over the review period. Notably, there was an uptick in economic growth, an improvement in the external accounts and inflation remained low. Concurrently, the Bank maintained its accommodative monetary policy stance. Bank of Jamaica’s monetary policy actions, coupled with the Government’s continued fiscal consolidation, created an environment for the availability of additional capital for the private sector (see **Chapter 2**). As it relates to the global economy, macroeconomic growth accelerated over the review period while capital markets demonstrated heightened volatility compared to previous years.

Despite increased uncertainties in the outlook for global financial markets and against the background of improved domestic macroeconomic conditions, the domestic financial sector maintained rates of asset growth comparable to the previous review period. In addition, the main financial sub-sectors continued to demonstrate consistency in financial soundness measures of solvency, profitability and liquidity (see **Chapter 3**).

Financial system sectoral exposures

Notwithstanding the reduction in GOJ borrowing, government debt remained the largest single party exposure throughout the financial system, particularly for non-deposit taking financial institutions (NDTFIs). Nonetheless, exposure to public sector debt by SDs, insurance companies

(ICs) and pension funds decreased for the year ended–September 2018 (see **Chapter 4**).¹

The reduction in government debt created room for the deployment of financial capital to other types of assets. Despite this additional capacity, growth in private sector credit remained modest. Concurrently, corporate securities issued by non-financial firms via Exempt Distributions increased steadily and approximately equaled the outstanding stock of credit issued to the non-financial productive sector by DTIs.²

The changing financial landscape, partly associated with the reduction in government debt, was most evident in the growth in pooled funds and collective investment schemes. Meanwhile, financial institutions’ holdings of riskier assets such as equity investments, increased marginally over the review period (see **Chapter 4**).

Risk assessment of the financial system

Throughout the review period, the financial system was dominated by large interconnected banking groups. This was evident in large funding exposures as well as concentration of activity within the large value payment systems. In addition, network statistics showed increased interconnectivity and concentration over the review period.

Subsequent to the mapping of connected institutions, it was evident that both DTIs and SDs were “important” participants in the financial system network. Specifically, DTIs received significant funding from SDs and demonstrated significant asset and funding exposures to foreign institutions (see **Chapter 5** and **6**).

In terms of potential contagion, stress testing results that assessed the resilience of financial institutions to various financial shocks were largely similar to prior years’ reports. Generally, DTIs remained robust to the contemplated credit, liquidity and market related shocks largely due to strong levels of capitalization. However, SDs remained vulnerable to large but plausible

hypothetical interest rate and liquidity shocks (see **Chapter 5**).

Outlook

The risks to financial stability over the near to medium term are expected to be low. However, risks related to global economic growth remain. Global growth projections for the next eight quarters have been revised downwards.³ In addition, volatility in global capital markets and correlations with financial asset prices domestically may result in the spill-over of global financial shocks. Concurrently, planned increases in the permissible investment limits for NDTFIs may increase the exposures to global asset price volatility spill-over.

The financial authorities in Jamaica have made efforts to mitigate current and potential risk exposures. In particular, the FSC formulated appropriate prudential ratios to manage interest rate and liquidity risk exposures of the SDs’ sector. Furthermore, BOJ and the FSC have developed a framework for limiting counterparty exposures. This framework is expected to assist with the mitigation of the risks associated with the interconnected nature of Jamaica’s financial system and the potential for the propagation of financial shocks. At the same time, the Bank is enhancing its data collection and oversight of interconnectedness within the financial system.

In addition, BOJ and the FSC will proceed with a pilot for risk-based consolidated supervision for domestic-systemically important groups in 2019. It is also expected that work will advance on consolidated capital adequacy requirements for all DTIs and related financial holding companies.

Moreover, Bank of Jamaica is actively developing its macroprudential approach to complement prudential requirements for both DTIs and NDTFIs, for the management of systemic risk. In this regard, the Financial System Stability Committee (FSSC) continues to focus on regular reviews of Bank of Jamaica’s risk assessments and making recommendations to the Bank to assist in the

¹ Non-deposit-taking financial institutions include pension funds, collective investment schemes, securities dealers, life insurance companies and general insurance companies.

² Exempt Distributions refers to private securities issued subject to FSC Guidelines for Exempt Distributions.

³ See IMF World Economic Outlook Update January 2019.

execution of its financial system stability mandate.

Separately, a special resolution regime for financial institutions will be formalized in 2019. This regime will include mechanisms for resolution funding, improvement of recovery planning, resolution plans and resolvability assessments.

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 during 2018 as reflected by the developments in key macroeconomic and financial system indicators. For the review period, there was growth in both the global and domestic economy. Global expansion occurred in spite of volatility in international financial markets. Also, there were generally lower risks to domestic financial stability.

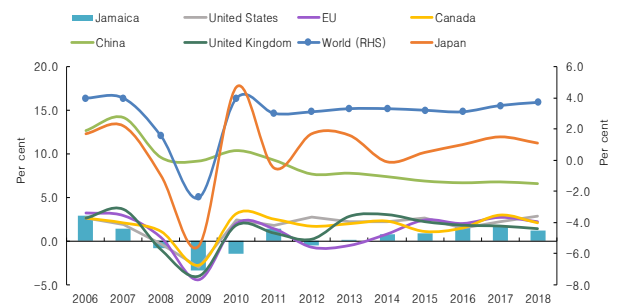
The BOJ's continued accommodative monetary policy stance as well as favourable liquidity conditions have not resulted in excessive credit growth. However, in the context of the growth in credit which occurred, there was an expansion of leverage in the financial system. Furthermore, there were lower currency risks in the domestic financial system, as reflected in a decline in financial dollarization. In addition, there was a reduction in the co-movement of domestic financial markets for 2018, largely due to declines in exposures from the bond and equity markets.

Within the financial system, there were also large exposures to commercial banks and SDs, reflecting a high degree of concentration and potential for contagion risks for 2018. Notwithstanding, financial institutions continued to be generally resilient to a range of hypothetical financial shocks.

2.2 Global developments

The global economy grew at an estimated 3.7 per cent for 2018 relative to growth of 3.5 per cent for 2017.¹ The faster growth reflected economic gains across several advanced and emerging economies (see **Figure 2.1**).² In particular, growth in the USA accelerated in the review year. However, the UK, EU, Canada and China experienced a slower pace of growth for 2018 relative to 2017. The global outturn occurred

Figure 2.1 GDP growth rates of selected countries



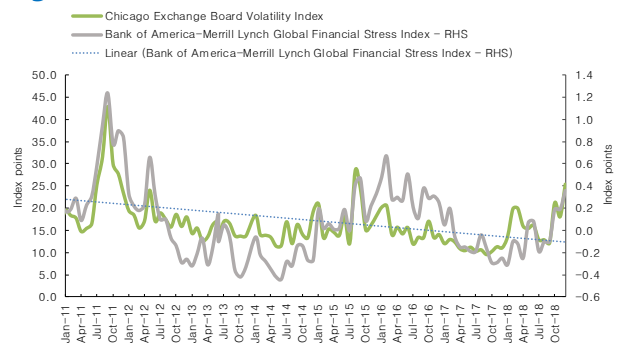
Source: IMF World Economic Outlook

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.

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.

¹ See IMF World Economic Outlook Update October 2018.

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 a historical strong expansion for 2017, 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

Figure 2.4 Selected domestic macroeconomic indicators

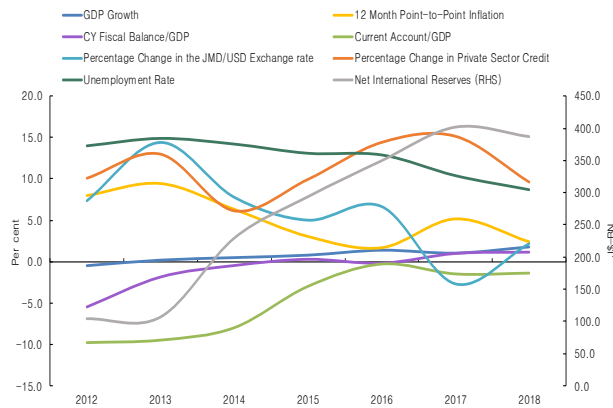
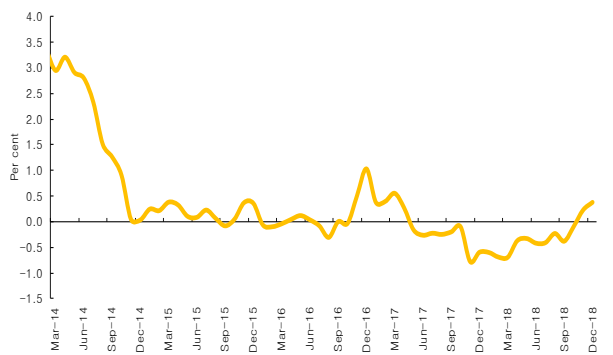


Figure 2.5 TRE spread



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

within the context of rising oil prices. Specifically, West Texas Intermediate (WTI) oil prices increased by 34.9 per cent to an average of US\$64.77 per barrel for 2018 (see **Figure 2.2**).

Volatility in the global financial market increased for 2018, 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 an increase in financial stress during the review year. Notably, sustained financial market volatility was observed throughout the year, highlighting major fluctuations in investors' confidence and perception of the financial market. However, heightened financial market stress was mainly evident in the June and December quarters, resulting from political and increasing global trade tensions.

2.3 Domestic environment

Macroeconomic conditions in Jamaica improved during 2018. Inflation remained low, growth in GDP accelerated, there was improvement in the fiscal position, the net international reserves (NIR) remained strong and unemployment fell (see **Figure 2.4**). In particular, the unemployment rate was 8.7 per cent for 2018, reflecting strong labour market conditions.³

The annual point-to-point change in inflation was 2.4 per cent for 2018 relative to 5.2 per cent for 2017. Notably, for most of 2018, 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 2.2 per cent for 2018 relative to an appreciation of 2.7 per cent 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 improved over the review period (see **Figure 2.5**). This was reflected in the persistent narrowing of the average monthly TRE spread which was -0.3 per cent comparable to -0.1 per cent for 2017. In addition, the spread between GOJ Global Bonds (GOJGB) and the

³ Unemployment rate as at end-October 2018.

Emerging Market Bond Index (EMBI+) continued to decline over the review period (see Figure 2.6). More specifically, 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

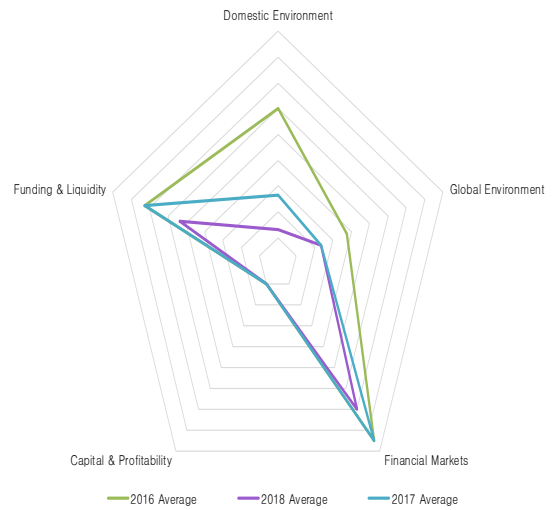
Risks to financial stability were generally lower in 2018, with the exception of the capital & profitability and global environment dimensions, both of which showed no change for the review period (see Figure 2.7). The reduction in risk exposure from the domestic environment largely reflected improvements in the unemployment rate and external debt to GDP. In addition, there was a reduction in risk in the financial market dimension. This was largely due to a strong domestic stock market performance and improvements in global equity returns. Also, improvements in the loan to deposit ratio and overall deposit growth resulted in the reduction in risk exposures for the liquidity and funding dimension.

2.3.2 Macro-composite indicators of financial stability

Macro-composite indicators of financial stability showed mixed results over the review period. Domestic financial conditions, as measured by the Aggregate Financial Stability Index (AFSI), were stable for the year ended September 2018 relative to the previous year.⁴ Specifically, the AFSI remained at a quarterly average of 0.6 (see Figure 2.8).

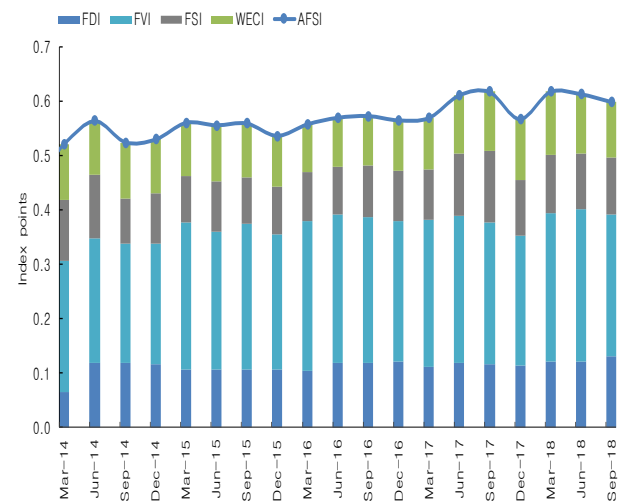
Notwithstanding the relatively unchanged AFSI, there were improvements in the financial development and financial vulnerability sub-indices. Specifically, the favourable outturn in the financial development sub-component was attributed to positive developments in the credit environment, increased stock market capitalization, smaller rate spreads and growth in the financial system’s overall assets. Additionally,

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.

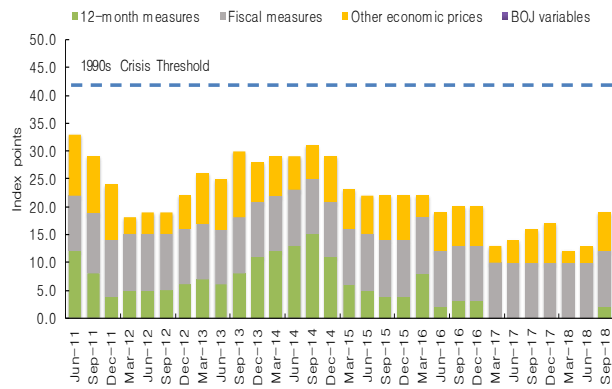
Figure 2.8 Aggregate financial stability index



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

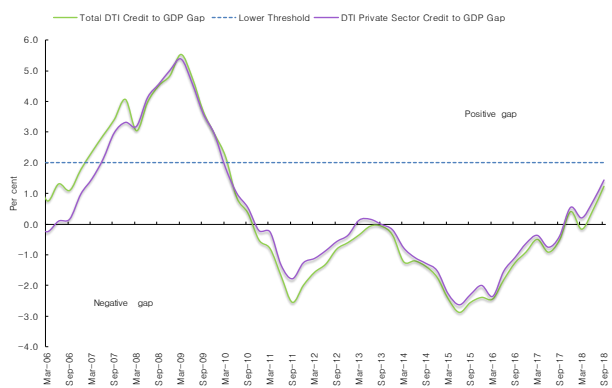
⁴ See: Morris, V., Measuring and Forecasting Financial Stability: The Composition of an Aggregate Financial Stability Index for Jamaica, 2010. http://boj.org.jm/uploads/pdf/papers_pamphlets/papers_pamphlets_Measuring_a

Figure 2.9 Macro-financial index



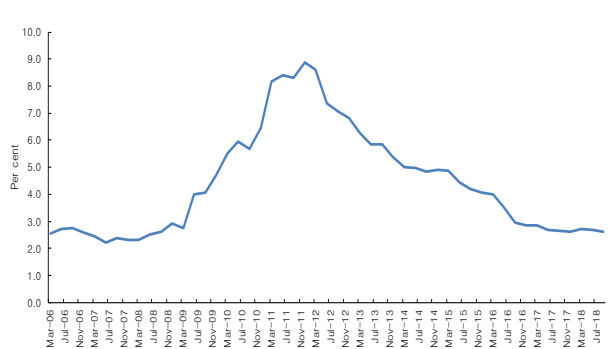
Note: The MaFI & MIPI are signal-based indices computed using scores for indicators based on the number of standard deviations of each indicator from its 'tranquil period' mean value. The tranquil period for both indices spans the period March 2002 to March 2003. The scores range from 0 to 5 with a score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

Figure 2.10 Credit-to-GDP Gap



Note: Credit-to-GDP gaps were estimated by applying the one-sided Hodrick Prescott (HP) filter to quarterly data spanning the period 2000 to 2015 for all DTIs.

Figure 2.11 Non-performing loans to total loans



improvements in inflation, the fiscal balance to GDP ratio and the REER contributed to stronger performance of the financial vulnerability sub-index. However, there was deterioration in the financial soundness and world economic conditions sub-indices reflecting a decline in total DTI capital to assets and an increase in global inflation, respectively.

The Macro-Financial Index (MaFI), a composite indicator that captures macro-economic conditions, deteriorated to 19.0 points at end-September 2018 relative to 16.0 points at end-September 2017 (see **Figure 2.9**).⁵ However, the MaFI remained well below the 1996-1998 financial crisis threshold value of 44.0 points. The outturn for the review period largely reflected deterioration in the signals from the 12-month growth in private sector credit and volatility in the exchange rate. Notwithstanding, there were improvements in inflation volatility over the review period.

2.4 Measures of financial cycle

2.4.1 Credit-to-GDP gap and financial sector leverage

DTIs' total credit increased by 14.8 per cent for the year ended September 2018, relative to 11.6 per cent for the previous year. Meanwhile, private sector credit increased by 16.2 per cent relative to 12.5 per cent for end-September 2017.⁶ This growth in credit occurred against the background of favourable domestic credit conditions, primarily influenced by BOJ's continued easing of monetary policy. The stronger credit growth was not deemed excessive as credit-to-GDP gap of 1.2 per cent remained well below the BIS lower threshold of 2.0 per cent (see **Figure 2.10**). Additionally, loan quality remained relatively unchanged as reflected in a stable non-performing loans to total loans ratio in 2018 relative to 2017 (see **Figure 2.11**).

The leverage metrics for general insurance (GI) companies, DTIs and SDs increased for the year

⁶ Total DTI credit is comprised of private sector credit plus corporate securities held by DTIs plus public sector credit. Private sector credit is comprised of DTIs' loans and advances to the private sector excluding credit to overseas residents and other financial institutions.

ended September 2018. This was attributable to larger growth in total financial assets and off-balance sheet exposures relative to the increase in equity (see **Figure 2.12**). Meanwhile, life insurance (LI) companies showed decreased leverage at end-September 2018 when compared to end-September 2017 due to a greater than proportional increase in equity relative to total financial assets.

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 across all subsectors except for the GI subsector (see **Figure 2.13**). The outturn for the DTIs, SDs and LI sub-sectors mainly reflected growth in long-term assets relative to long-term liabilities. Meanwhile, the improvement in the outturn for GI sub-sector resulted from a larger than proportional increase in long-term liabilities relative to growth in long-term assets.

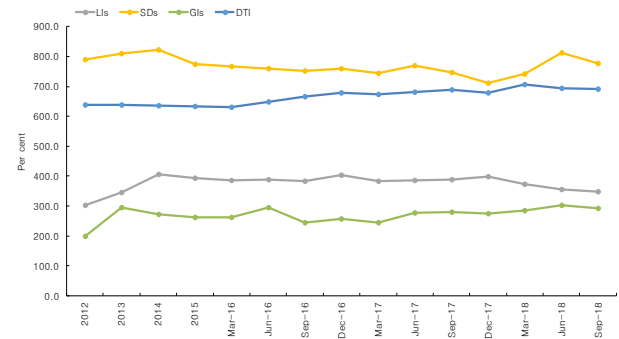
Regarding liquidity transformation, the extent of coverage of short-term liabilities with liquid assets decreased at end-September 2018 relative to end-September 2017 (see **Figure 2.14**). This outturn mainly reflected larger growth in short-term liabilities relative to liquid assets.

2.4.3 Micro-composite indicators of financial stability⁷

The Micro-prudential Index (MiPI), a composite indicator based on financial institutions' operations improved to 23.0 points as at end-September 2018 relative to 28.0 points at end-September 2017. The MiPI also remained far below the 1996-1998 financial crisis threshold value of 50.0 points (see **Figure 2.15**). This outturn reflected improvements in indicators mainly in the balance sheet structure, specifically deposits and repos to assets and loans to financial institutions as a share of total loans. However, the impact of these indicators was

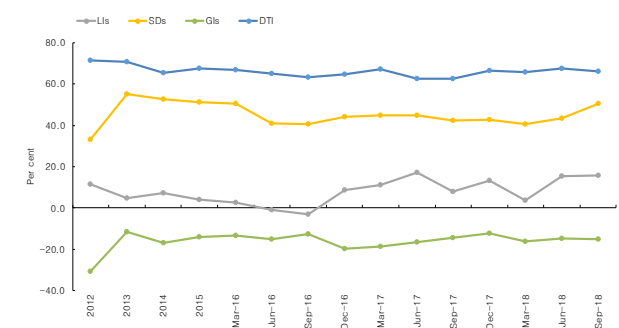
⁷ The MiPI is an early warning composite indicator. The current period value of various indicators are compared relative to tranquil period mean values. The number

Figure 2.12 Leverage metric – DTIs, SDs and ICs



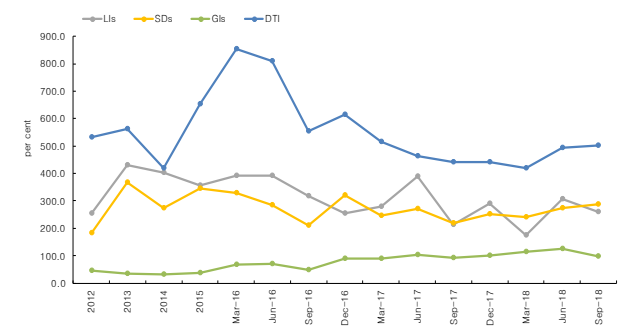
Note: Leverage is calculated as total financial assets to equity. DTI values prior to September 2016 are calculated as the average of the ratios of each DTI sub-sector. After September 2016, sector balances are first aggregated and a single ratio then computed. An increase in this indicator signals higher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

Figure 2.13 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. An increase in this indicator signals higher risks.

Figure 2.14 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.

of standard deviations away from the mean is then used to assign risk scores of 1-5.

Figure 2.15 Micro-prudential index for DTIs

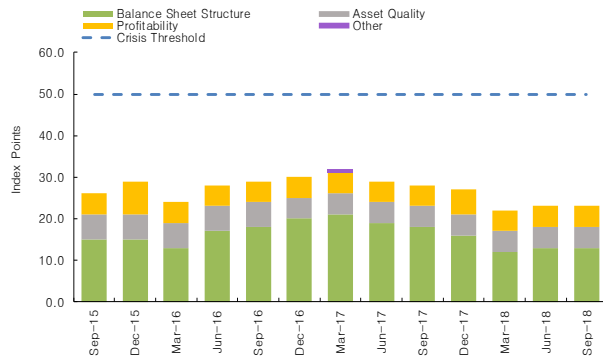
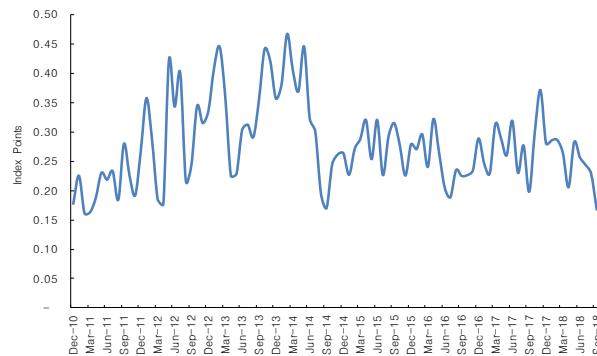
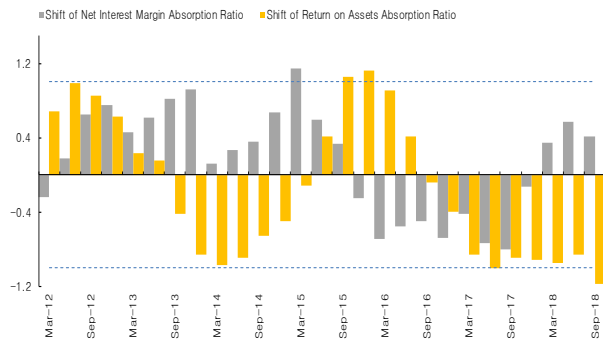


Figure 2.16 Composite indicator of systemic stress



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 2.17 Shift in absorption ratio



Note: The absorption ratio (AR) measures the fraction of the covariance in returns explained by the largest direction of covariance over the past 18 quarters. Increases in AR reflects stronger system-wide co-movement of commercial bank returns. The shift in the AR is calculated as the difference between the 4 quarter average AR and the 12 quarter average AR as a share of the 12 quarter standard deviation of the AR. A shift in the AR approaching a magnitude of 1 is used as a benchmark for identifying periods of increased fragility.

partially offset by a deterioration in the signal from the liquid assets to total assets ratio.

2.5 Measures of direct and indirect exposure concentration

2.5.1 Exposure to financial markets

There was a decline in the co-movement of domestic financial markets for 2018, as measured by the Composite Indicator of Systemic Stress (CISS).⁸ The CISS fell to 0.17 points as at end-September 2018 relative to 0.20 points as at end-September 2017 (see **Figure 2.16**). This was primarily influenced by the reduction in exposures from the bond and equity markets, which neutralized the increased exposure to returns in the foreign exchange market.

Notwithstanding, there was a rise in the joint movement of commercial banks' interest rate related performance in 2018 relative to 2017 based on calculated absorption ratios. This reflected increases in quarterly co-dependence across institutions' net interest margin. However, overall bank performance as measured by return on assets showed lower co-movement in bank performance at end-September 2018 compared to end-September 2017 (see **Figure 2.17**).

2.5.2 Exposure to financial markets

The distance-to-default for DTIs increased to 11.0 standard deviations at end-September 2018 relative to 8.6 standard deviations at end-September 2017 (see **Figure 2.18**). This improvement was associated with large growth in market values of stocks in the September 2018 quarter, as well as low asset volatility. However, equities for DTIs experienced lower expected returns for the review period. Similarly, the distance-to-default for the NDTFIs increased over the review period, reflecting a decrease in default risk across the sector. Of note, this default measure increased to a quarterly average of 9.0 standard deviations from the default barrier for the

⁸ 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](http://www.boj.org.jm/pdf/A_Composite_Indicator_of_Systemic_Stress_(CISS)_The_case_of_Jamaica_(2014).pdf)

year to September 2018 relative to 8.6 standard deviations at end-September 2017.⁹

There was a general increase in the banking system’s exposure to sovereign debt instruments as at end-September 2018, measured by DTIs holdings of GOJ securities to capital (see **Figure 2.19**).¹⁰ Specifically, the ratios for commercial banks and SDs increased to 91.1 per cent and 313.9 per cent from 76.8 per cent and 312.1 per cent, respectively. Additionally, the ratios for merchant bank and building societies increased to 17.2 per cent and 44.3 per cent from 15.1 per cent and 34.2 per cent, respectively. Conversely, LI exposure to sovereign debt default risk decreased for the review period in comparison to end-September 2017.

2.6 Measures of interconnectedness & systemic importance

2.6.1 Misaligned incentives

Financial dollarization continued to decline for the year ended September 2018 due to two-way movement in the domestic exchange rate as well as the increase in DTIs’ foreign currency reserve requirements (see **Figure 2.20**). Specifically, DTIs’ foreign currency deposits to total deposits declined to an average of 42.4 per cent for the year ended September 2018 compared to an average of 44.7 per cent for the prior year. Similarly, the ratio of foreign currency investments holdings to total investments declined by 4.3 percentage points for SDs to 54.1 per cent during the review period. Given the improved levels of financial dollarization for DTIs and SDs, the financial sector was marginally less exposed to, inter alia, currency mismatch risk and credit risk from foreign currency lending to un-hedged borrowers.

Figure 2.18 Quarterly distance-to-default for DTIs and non-deposit taking financial institutions

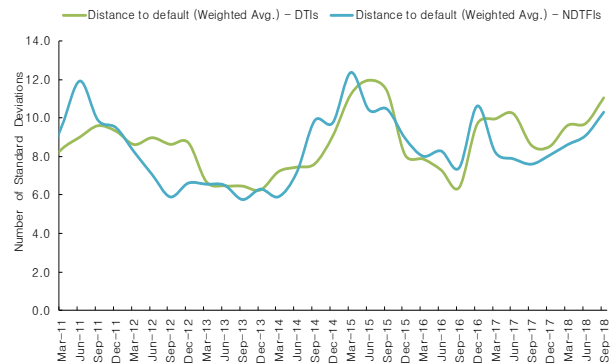


Figure 2.19 Ratio of holdings of total GOJ securities by DTIs, SDs and LI companies to capital

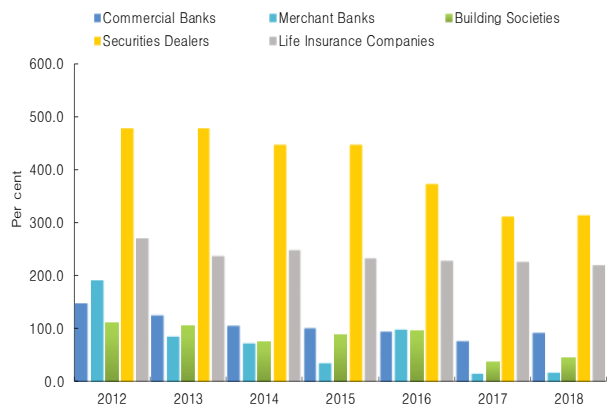
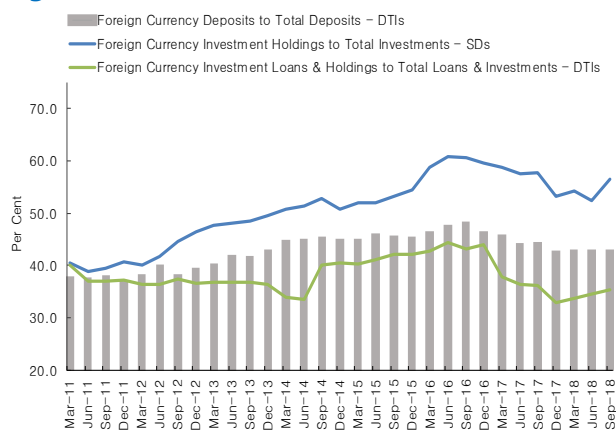


Figure 2.20 Dollarization trends



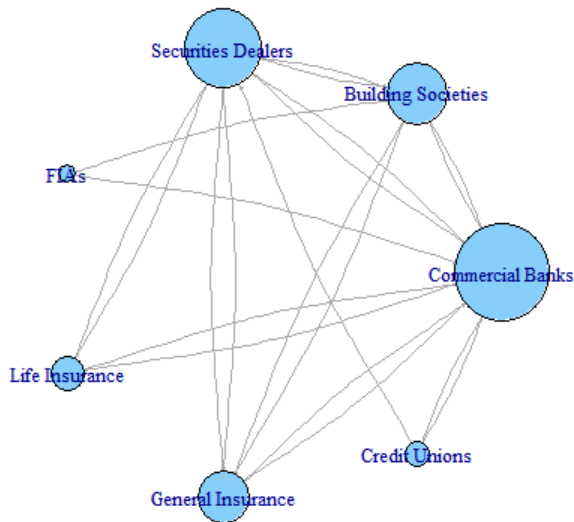
⁹ The distance-to-default measures the distance (in standard deviation) of an institution’s contingent assets to its default barrier (which is defined as the sum of short-term liabilities and one-half long-term liabilities).

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-owi.org/files/publications/journal/2012_2-7/1_22.pdf

¹⁰ GOJ securities include Government of Jamaica Treasury Bills, local registered stock and all other domestic currency securities as well as foreign currency securities.

Figure 2.21 Network of gross credit exposures within the financial system at end-September 2018

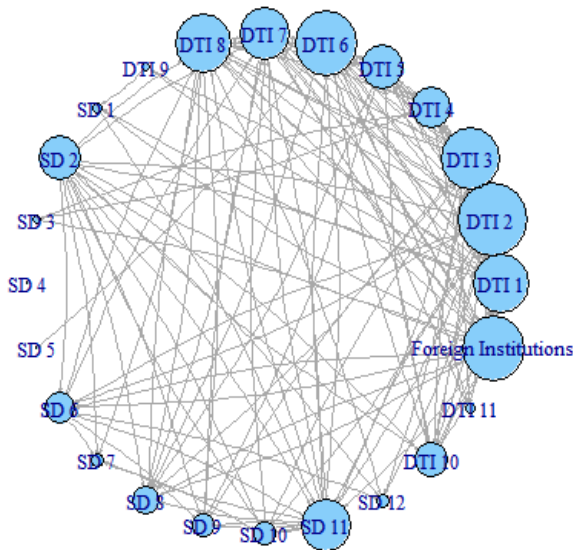


2.6.2 Interconnectedness within the interbank market

Regarding interconnectedness, within the interbank market there were large exposures to commercial banks and SDs. The commercial bank sub-sector recorded funding relationships with all other sub-sectors in the financial system. Network analysis measures indicated a large proportion of reciprocated links and a significantly dense financial system (see **Figure 2.21**).¹¹

Network analysis conducted on individual DTIs and SDs emphasized the large degree of interconnectedness in the system at end-September 2018 (see **Figure 2.22**). Reciprocated links within this network was 60.6 per cent at the end of the review period, which highlighted financial institutions' heavy reliance on each other for funding. The network statistics also reflected significant relationships between domestic financial institutions and foreign institutions. Additionally, the assessment indicated that five commercial banks and six SDs play critical funding roles within the financial system.

Figure 2.22 Network of gross credit exposures between DTIs and SDs at end-September 2018



2.6.3 Systemic importance

The number of systemically important banking groups was unchanged at three at end-September 2018 relative to end-September 2017.¹² Nonetheless, total SIFI group assets as a share of total financial system assets increased to 65.0 per cent at end-September 2018 from 64.6 per cent at end-September 2017. The outturn continued to highlight growth in the degree of concentration within the financial system and the potential for contagion risks. Furthermore, there is the need to continuously and effectively monitor the developments related to these groups.

¹¹ A reciprocated link describes a relationship in which two nodes both borrow from and lend to each other, a corresponding funding relationship.

¹² The score for banking group *i* for period *j* is computed as follows:

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

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](http://www.boj.org.jm/pdf/Do_Jamaican_Domestic_Systemically_Important_Financial_Institutions_have_a_Deposit_Rate_Advantage_(2014).pdf)

Box 2.1 The Effect of Capital Flows on Key Financial Stability Measures in Jamaica

Capital flows refer to the cross-border movement of money and financial assets. The Jamaican economy benefits from significant capital inflows. Any sudden decline or stop of these flows could create risks to financial system stability and has the potential to destabilize the economy. The study thus sought to investigate the relationship between capital inflows and Jamaica’s financial stability.¹ This was assessed by examining the impact an inflow surge may have on financial stability.

Capital inflows contribute to an economy’s development by increasing the availability of funds for new projects, infrastructure development and productivity improvements, which can stimulate economic growth and job creation. Historically, excessive and unmanaged capital inflows, sudden stops and/or reversals have served as catalysts of financial crises. Excessive inflows can disrupt monetary policy, and destabilize money and financial markets. The potential for capital inflow surges, and by extension, sudden stops and capital reversals, are especially an issue in small open economies due to their relatively underdeveloped financial systems. In Jamaica, historical trends show that there is a relationship between capital inflows and economic performance.

This relationship was demonstrated by sharp declines in capital inflows to Jamaica during the Global Financial Crisis (GFC). Furthermore, there was an increase of capital inflows to Jamaica post-GFC which can be attributed to the Federal Reserve’s low interest rate. Also, note that it was during this same time frame that Jamaica began to record positive GDP growth (see Figures 1–3).

In order to assess the dynamic relationship between private capital inflows and financial stability a structural vector autoregressive (SVAR) model was estimated (see Equation 1).²

Figure 1 Jamaica’s gross private capital inflows and GDP growth

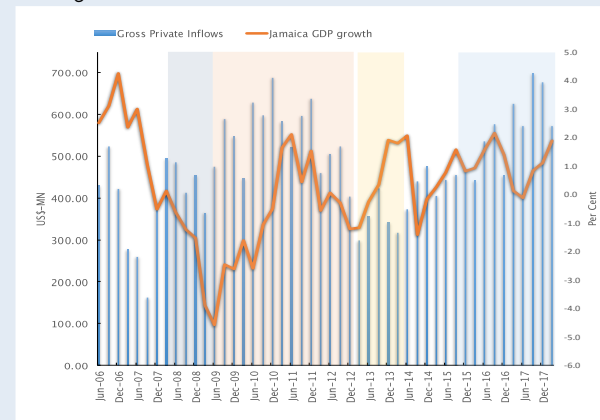


Figure 2 Federal Reserve’s interest rate

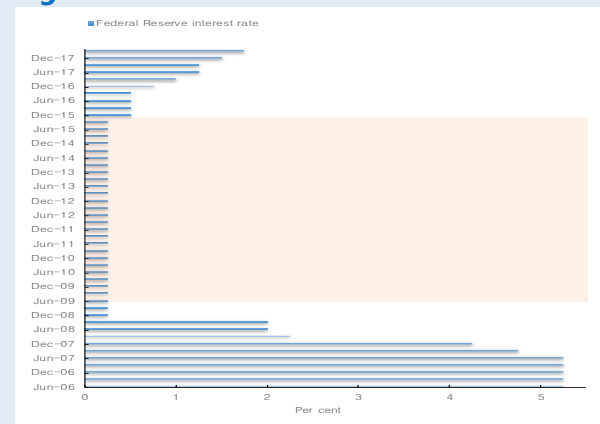
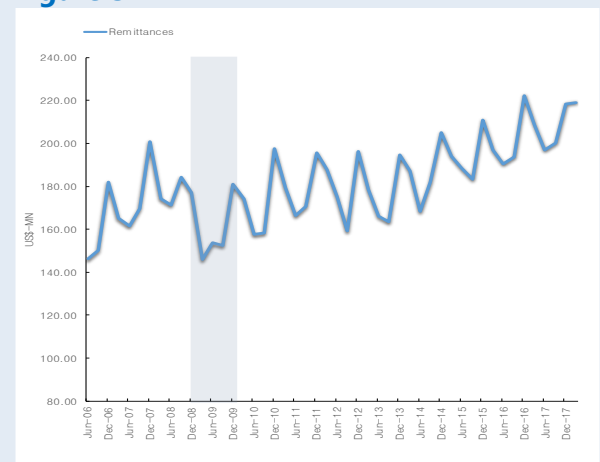


Figure 3 Remittances



¹ See Cork, J., “The Effect of Capital Flows on Key Financial Stability Measures in Jamaica”, Bank of Jamaica, 2018

² F_t is the financial stability measure, $C_{i,t}$ is the capital inflow measure and $X_{i,t}$ represent domestic and global measures

The model captured the responsiveness of financial stability indicators to sudden changes in private capital flows (see **Table 1**).

$$F_t = \beta_0 + \beta_1 CI_t + \alpha' X_{i,t} + \varepsilon_{i,t} \quad (1)$$

The results of the assessment showed financial stability measures had a significant response to a surge in gross private capital inflows. Of note, the findings show a strong positive relationship between private capital inflows and credit. This relationship emphasized the potential likelihood of a credit boom–bust cycle.

Likewise, the results also showed that increases in DTIs’ leverage can be attributed to surges in gross private inflow. However, the CAR for the DTI sector responded negatively to surges in gross private inflow surges. Moreover, credit–to–GDP gap had a lagged positive response to a shock from gross private capital inflow. These results support economic intuition, as it is expected that surges in capital inflows would lead to increased availability and accessibility of financial assets in the system, which would impact both leverage and CARs. This would also translate to DTIs’ increased ability and willingness to issue credit, which would be reflected in an increase in the credit–to–GDP gap.

Note that NPLs had a positive response to an overall surge in gross private capital inflows but responded negatively to a specific surge in remittance inflows. An increase in NPLs in response to a surge in gross private capital inflows could be due to increased lending to risky borrowers. Conversely, a fall in NPLs in response to a surge in remittance inflows may signal borrowers being better able to repay loans as result of the increase in assets in the financial system.

Given these findings, the monitoring and forecasting of capital inflows to Jamaica is important and confirms the need for the development of appropriate macro–prudential policy tools to mitigate the risks associated with capital inflows. These tools should be aimed at

addressing the procyclicality of the financial system and movements in capital flows. Of note, the effectiveness of these macro–prudential policies will depend on whether capital inflows primarily pass through the regulated financial sector.

Table 1 SVAR Model Variables

Financial Stability Measure (F _t)	Capital Inflow Variable (CI _t)	Domestic Variable (X _{i,t})	Global Variable (X _{i,t})
CAR	Gross private capital inflow	Private sector credit growth	VIX
NPL	Net private capital inflow	Exchange rate	Fed interest rate
Credit–to–GDP gap	Remittances	GDP growth	US GDP growth
		Interest rate	
		Current account deficit	
		House price to income	

3.0 FINANCIAL SYSTEM DEVELOPMENTS

This chapter examines the performance of sub-sectors within the financial system.

3.1 Overview

Jamaica's financial sector continued to expand over the review year while maintaining healthy stability indicators. The DTI sector continued to perform favourably in terms of profitability and asset quality. Furthermore, financial soundness indicators signaled that DTIs continued to maintain adequate levels of capital and liquidity during the review period.

Within the NDTFI sector, there were improvements in SDs' profitability indicators, particularly return on assets (ROA) and return on equity (ROE). In addition, there was an improvement in the capital adequacy ratio for the sector. As it relates to the insurance sub-sector, there was continued satisfactory levels of solvency and capital adequacy. The profitability metrics for the sub-sector showed improvements, however, insurance penetration remained at low levels.

3.2 The financial system

Jamaica's financial system deepened, as measured by total financial institutions' assets as a share of GDP (see **Figure 3.1**). The ratio increased to 213.1 per cent at end-September 2018 relative to 210.6 per cent at end-September 2017. 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 market share, in terms of asset base, increasing to 91.1 per cent at end-September 2018 from 90.9 per cent at end-September 2017. The market share of building societies declined by 0.3 percentage point to 8.7 per cent while that of merchant banks remained at 0.1 per cent. Concurrently, commercial bank assets as a percentage of overall financial system assets increased by 0.9

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

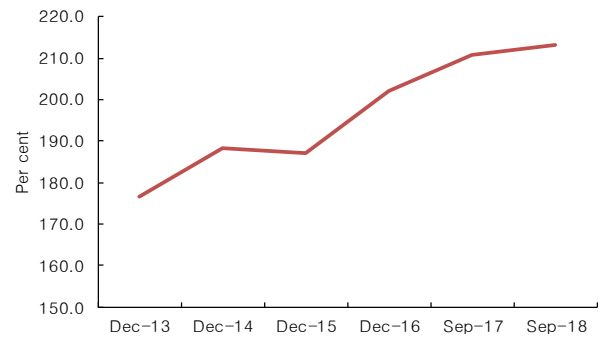


Figure 3.2 Distribution of financial system assets¹

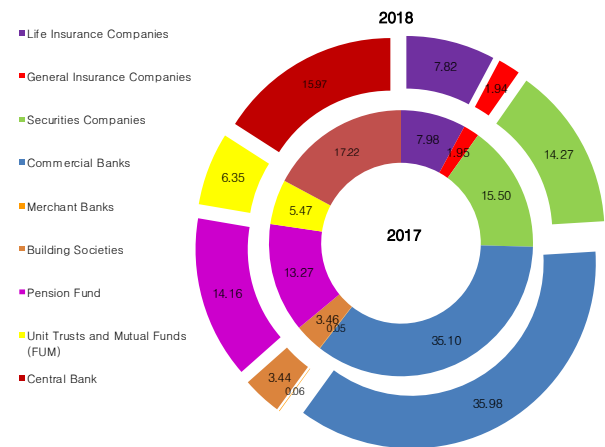
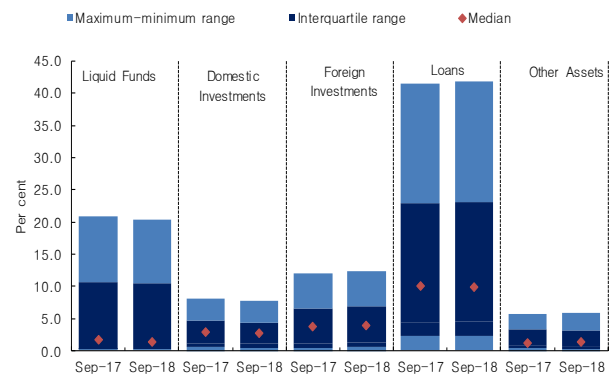


Figure 3.3 Distribution of major asset categories as a share of total DTIs' assets



¹ Assets are defined as total balance sheet assets.

Figure 3.4 Major components of DTIs' aggregate balance sheet

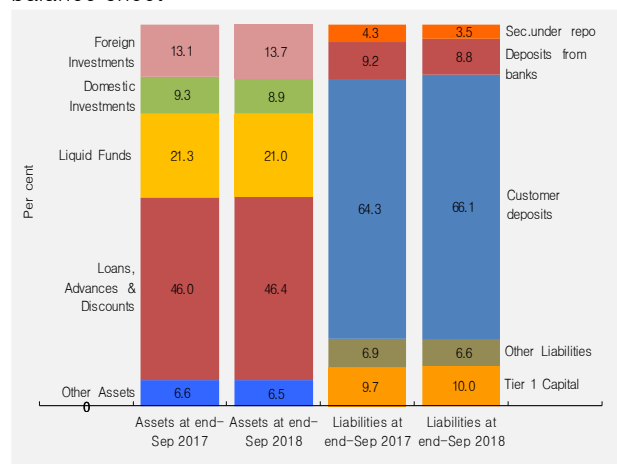


Figure 3.5 Concentration of DTIs' loan portfolio to private sector

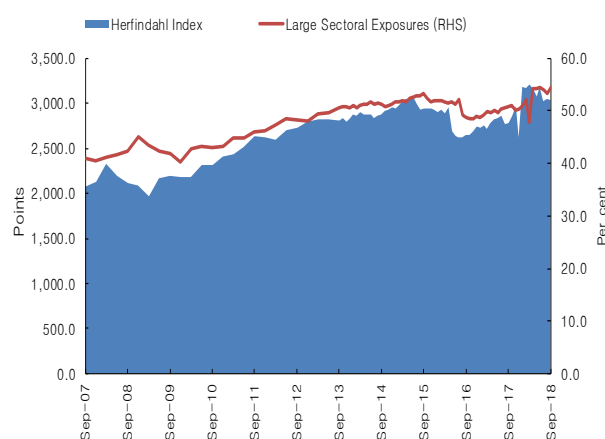
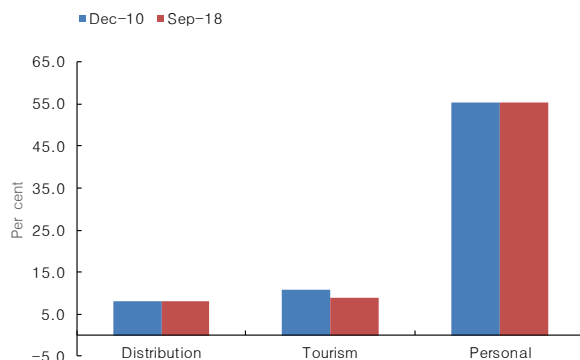


Figure 3.6 Share of Private Sector Credit by top three DTIs



percentage point to 35.7 per cent at end-September 2018 (see **Figure 3.2**).²

3.3.2 Deposit-taking institutions' balance sheet position

DTIs' total assets grew by 11.1 per cent for the year ended September 2018 to \$1 658.8 billion. Notably, all DTI sub-sectors recorded growth in their asset base over the review period, primarily reflecting expansion in *Loans, Advances & Discounts* (see **Figures 3.3** and **3.4**). In particular, there was an increase of 15.0 per cent in domestic loans and an expansion of 3.3 per cent in foreign currency loans. Concurrently, the holdings of investments grew by 41.2 per cent to \$374.9 billion, reflecting growth of 32.4 per cent in foreign investments. Despite the growth in foreign currency investments, DTIs' net open position (NOP) to capital ratio decreased by 4.4 percentage points to 3.9 per cent at end-September 2018.

The Herfindahl-Hirschman Index (HHI), used to measure concentration in private sector lending, increased by 9.0 per cent to 3 051.4 at end-September 2018 (see **Figure 3.5**).³ Furthermore, DTI loans continued to be concentrated within the domestic *Household* sector.⁴ Specifically, household sector loans as a proportion of total loans increased by 2.6 percentage points to 52.9 per cent at end-September 2018. DTIs' other significant exposures in the lending market were to *Distribution* (7.9 per cent), *Tourism* (7.4 per cent), *Overseas* residents (6.1 per cent) and *Professional Services* (5.6 per cent) (see **Figure 3.6** and **Table 3.1**).

In addition, a Lorenz curve analysis showed that lending to the private sector was concentrated within three of the eleven DTIs. Moreover, these three DTIs accounted for over 60.0 per cent of loans extended to the three sectors that had the highest loan concentration (*Household*,

² Credit unions were not included in the analysis for the review period.

³ 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.

⁴ "*Household*" is used to represent the "*Personal Loans*" line item which include mortgages to households.

Distribution and Tourism). At end-September 2018, the share of private sector loans for these three DTIs was 65.8 per cent of overall private sector credit relative to 64.6 per cent at end-September 2017. This uptick at end-September 2018 was largely influenced by increased lending to the household and tourism sectors of 14.4 per cent and 10.2 per cent, respectively. Of note, most institutions increased the share of credit extended to households at end-September 2018 relative to end-December 2010 (See **Figure 3.7**).⁵

Asset quality for DTIs, as measured by non-performing loans (NPLs) as a share of total loans, was relatively unchanged at 2.6 per cent at end-September 2018 in comparison to end-September 2017. This development occurred against the background of an increase of 10.8 per cent in the dollar amount of NPLs relative to a decline of 2.7 per cent for the previous review year (see **Figure 3.8**). Of importance, the personal loans sector had the most significant dollar value increase in NPLs while the entertainment sector accounted for the highest NPL ratio (see **Figure 3.9**).

The NPL coverage ratio declined to 113.9 per cent at end-September 2018 from 121.6 per cent at end-September 2017.⁶ In addition, the median NPL coverage ratio decreased slightly to 88.4 per cent from 88.7 per cent at end-September 2017 (see **Figures 3.10 and 3.11**).

Loan loss provisions as a percentage of total loans fell to 3.0 per cent at end-September 2018 from 3.3 per cent at the end of the previous review period.⁷ The reduction in loan loss provision was due to greater than

⁵ 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.

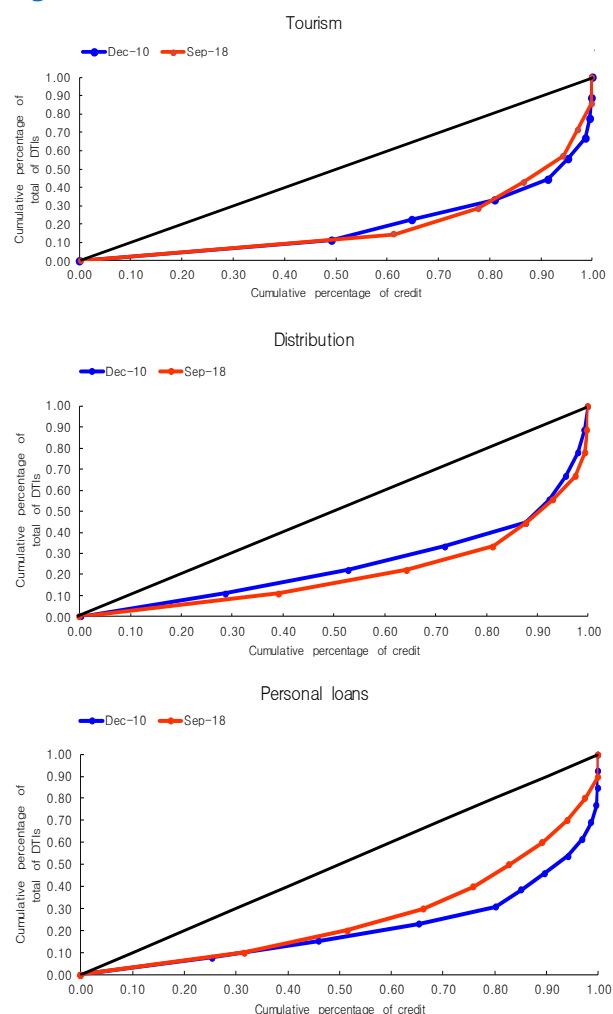
⁶ NPL coverage ratio measures a bank's ability to absorb potential losses from its non-performing loans. It is calculated as provisions for impairment under the International Financial Reporting Standards (IFRS) plus prudential provisions for expected losses based on regulatory criteria as a ratio to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

⁷ 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

Table 3.1 Concentration of DTIs loan portfolio⁸

Per cent	2014	2015	2016	Sep-17	Sep-18
AGRICULTURE & FISHING					
CONSTRUCTION & LAND DEV.					
DISTRIBUTION					
ELECTRICITY					
ENTERTAINMENT					
FINANCIAL INSTITUTIONS					
MANUFACTURING					
MINING, QUARRYING & PROC.					
PERSONAL NON BUS. LOANS TO IND					
PROFESSIONAL & OTHER SERVICES					
OVERSEAS RESIDENTS					
TOURISM					
TRANSPORT, STORAGE & COMM.					
PUBLIC SECTOR					

Figure 3.7 Lorenz curve Distribution of credit for DTIs



provisions of impairment plus prudential provisions as a percentage of total loans.

⁸ With respect to Table 3.1, darker areas indicate more concentration.

Figure 3.8 NPLs in the DTI sector

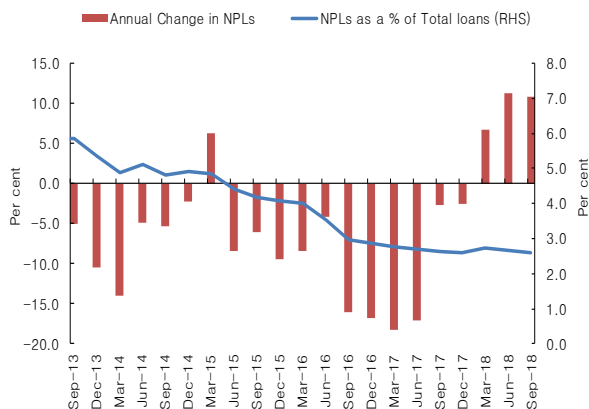


Figure 3.9 Sectoral asset quality of DTIs

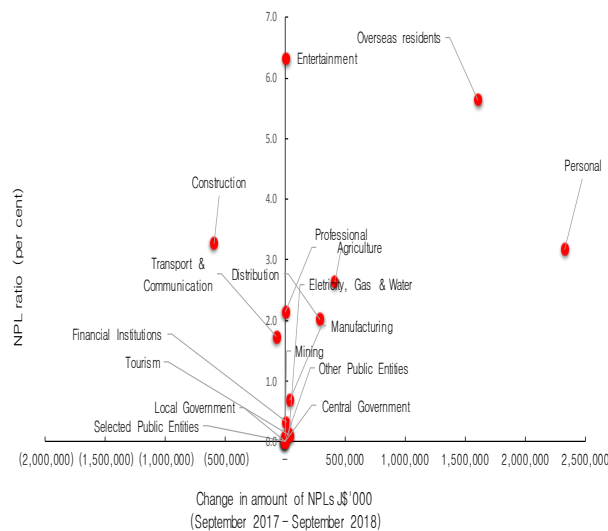
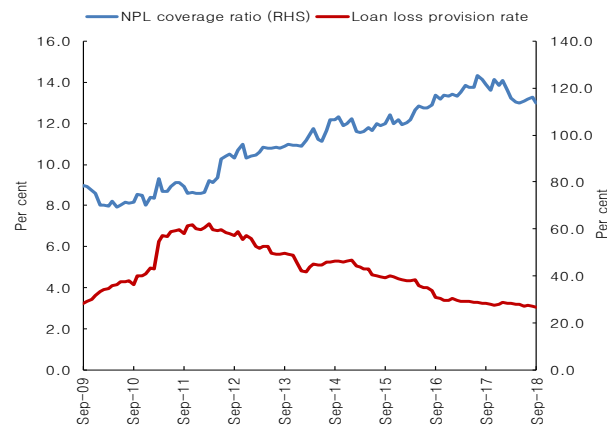


Figure 3.10 Loan loss provisioning rate and NPL coverage for DTIs



proportional increases in total loans relative to DTIs' total provisioning (see **Figure 3.10**).

Liquidity conditions continued to be buoyant within the DTI sector. The ratio of liquid assets to total assets decreased marginally to 24.2 per cent at end-September 2018 from 25.9 per cent at end-September 2017.⁹ The decrease in the ratio was due mainly to DTIs' growth in the total asset base relative to liquid assets (see **Figure 3.12**).

Deposits continued to be a stable source of funding for DTIs. Total deposits increased by 14.9 per cent to \$1 095.6 billion and represented 77.0 per cent of total liabilities at end-September 2018 relative to 76.5 per cent at end-September 2017. Total loans as a share of deposits, which is a measure of financial intermediation, was relatively unchanged at 70.4 per cent at end-September 2018 (see **Figures 3.13** and **3.14**).

The average CAR for DTIs increased to 18.5 per cent at end-September 2017 from 18.1 per cent at end-September 2017 (see **Figure 3.15**). The quality of regulatory capital, as measured by the ratio of Tier 1 capital to total regulatory capital, decreased to 92.2 per cent at end-September 2018 from 99.0 per cent at end-September 2017. Consistently, the ratio of non-distributable retained earnings to capital fell by 1.7 percentage points to 36.0 per cent at end-September 2018. Similarly, there was a reduction in the Tier 1 capital to risk weighted assets ratio to 13.8 per cent from 14.6 per cent at end-September 2017.

3.3.3 Deposit-taking institutions' earnings and profitability

For the year ended September 2018, the DTI sector recorded net profits of \$43.0 billion. Furthermore, DTIs total operating income of \$169.9 billion was 10.2 per cent higher than the corresponding year ended September 2017. Of

⁹ DTIs are required to hold cash reserves at Bank of Jamaica amounting to 12.0 per cent and 15.0 per cent for domestic and foreign assets, respectively. The liquid assets requirements are 26.0 per cent and 29.0 per cent for domestic and foreign assets, respectively.

note, operating profits increased to \$41.3 billion from \$37.8 billion for the previous review year. The outturn for the review year occurred alongside an increase in DTIs' provisions for impairment losses to \$7.4 billion from \$4.3 billion for the year ended September 2017. Furthermore, the sector's ROE increased by 2.3 percentage points to 18.3 per cent at end-September 2018, primarily reflecting higher operating income (see **Figure 3.16**).¹⁰

A decomposition of the ROE showed increases in the operating margin, equity multiplier and the risk weighted assets density ratio. These results primarily reflected increases in DTIs' operating profit, total assets and risk-weighted assets, respectively, at end-September 2018 (see **Figure 3.17**).¹¹ In addition, 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 decreased to 9.6 per cent from 10.1 per cent at end-September 2017 (see **Figure 3.18**).

DTIs' ROA declined to 0.7 per cent as at end-September 2018 from 2.6 per cent at end-September 2017. In addition, the median ROA decreased to 2.0 per cent at end-September 2018 from 3.0 per cent recorded for the previous year (see **Figure 3.19**). This outturn was primarily due to a reduction in the net income before taxes for the merchant banking sub-sector. Nonetheless, there was an overall increase of 6.6 per cent in DTIs' net interest income for the year ended September 2018, largely reflecting the impact of the expansion in *Loans, Advances & Discounts* (see **Figures 3.20 to 3.22**). At the same time, interest expenses decreased by 3.3 per cent, primarily as a result of a reduction in borrowing expenses. Moreover, net interest margin, as measured by the ratio of net interest income to average earning assets, decreased to 7.2 per cent from 7.7 per cent at end-September 2017 (see **Figure 3.21**).

¹⁰ Operating profit excludes non-interest income and expenses.
¹¹ Operating margin is equal to operating profit as a percentage of gross income. Equity multiplier is equal to total assets as a proportion of capital & reserves. The risk weighted assets density ratio is calculated as risk weighted assets as a percentage of total assets.

Figure 3.11 Distribution of NPL coverage ratio in the domestic DTI sector

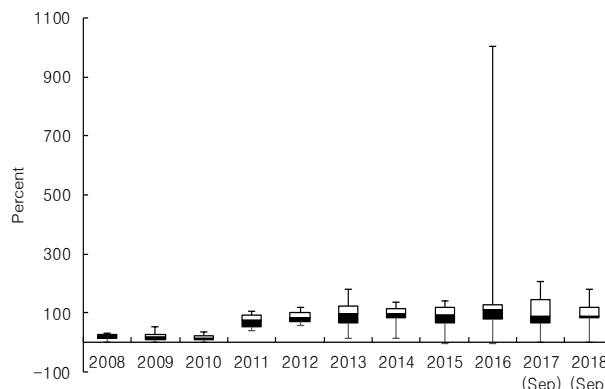


Figure 3.12 Liquidity conditions in the DTI sector

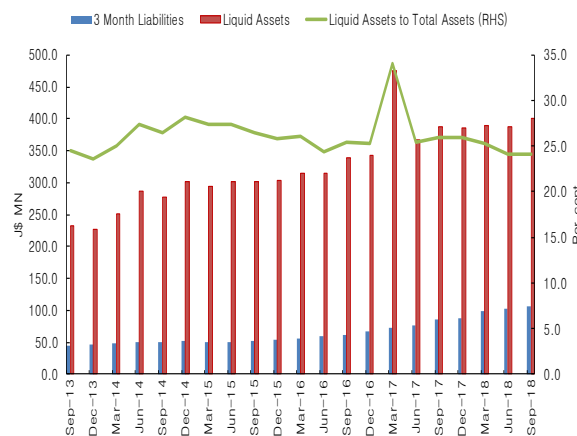


Figure 3.13 Distribution of DTIs' funding sources as a share of total liabilities

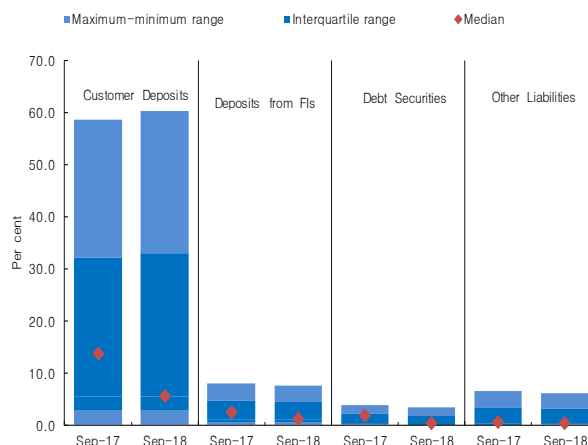


Figure 3.14 Trend in loans and deposits of the DTI sector

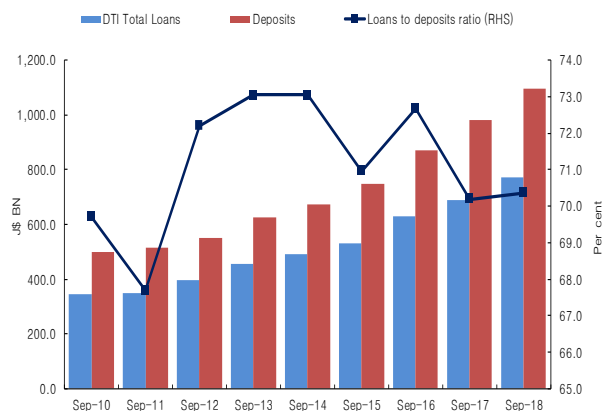


Figure 3.15 Distribution of capital adequacy ratio

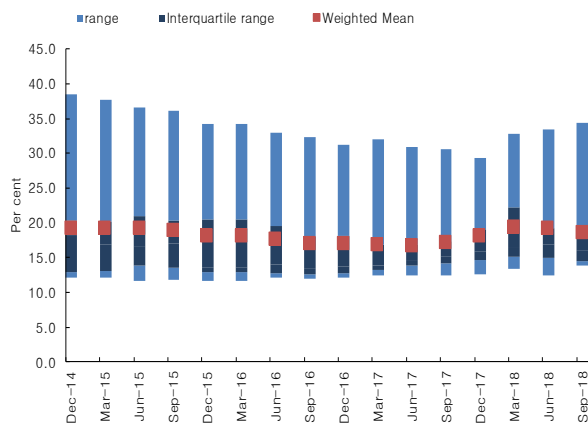
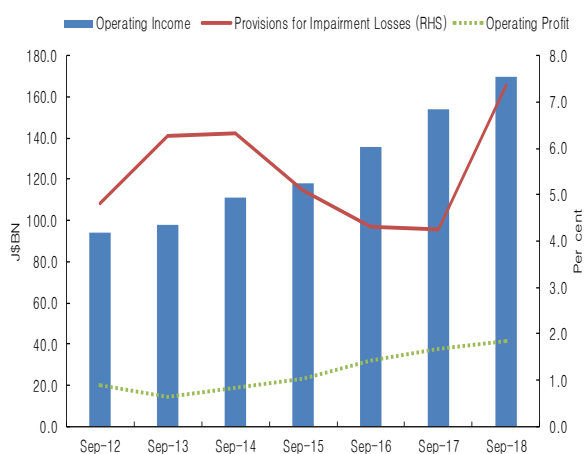


Figure 3.16 Operating profit and impairment losses for DTIs



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 9.5 per cent to \$1 909.0 billion as at end-September 2018.¹² The expansion in the sector's total assets was influenced by increases in assets of all NDTFI sub-sectors. For the year ended September 2018, the assets of the thirty-two core SDs, LI and GI companies grew by 0.1 per cent, 6.5 per cent and 6.1 per cent, respectively. Furthermore, collective investment schemes' (CIS) and pension funds' assets increased by 23.9 per cent and 15.9 per cent, respectively.

At end-September 2018, the assets of SDs, pension funds and LI companies accounted for 31.4 per cent, 31.2 per cent and 17.2 per cent of NDTFIs' total assets, respectively. The LI and SDs' sub-sectors recorded lower market shares relative to end-September 2017, while CIS and pension funds recorded higher market shares. Despite increases in the NDTFIs' asset base, its share of financial system total assets remained at 54.0 per cent at end-September 2018 relative to the previous review period (see **Figure 3.2**).

3.4.2 Securities dealers

The asset base of SDs was \$599.8 billion at end-September 2018 relative to \$599.5 billion at end-September 2017.¹³ SDs' on and off-balance sheet funds under management (FUM) increased by 6.1 per cent to \$1 155.5 billion at end-September 2018, reflecting an expansion in CIS (see **Figure 3.23**).¹⁴

Risk-weighted assets (RWA) of SDs rose by 5.9 per cent to \$405.2 billion at end-September

¹² Real growth of NDTFI's asset base was 5.0 per cent as at September 2018

¹³ 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.

¹⁴ CIS includes pooled funds and other assets, where other assets consist of derivatives, interest receivables, other receivables and other investments such as real estate.

2017 relative to end-September 2017. SDs' regulatory capital grew by 11.9 per cent to \$83.2 billion for the year ended September 2018. The growth in regulatory capital contributed to an increase of 1.4 percentage points to 20.5 per cent in the sub-sector's CAR (see **Figure 3.24**). Similarly, the sub-sector's primary ratio, measured by the ratio of regulatory capital to total assets, increased by 1.8 percentage points to 15.1 per cent at end-September 2018.

SDs' exposure to foreign exchange risk, as measured by the ratio of foreign currency NOP to capital, remained at 20.9 per cent as at end-September 2018 (see **Figure 3.25**). 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 1.4 per cent to 56.4 per cent.

Profitability indicators showed improvements for the SDs sector. In particular, the sector's ROA and ROE increased by 0.8 percentage point and 5.9 percentage points, respectively, to 2.6 per cent and 18.4 per cent for the year ended September 2018 (see **Figure 3.26**). This improvement in profitability was primarily due to an increase of 33.6 per cent in the sector's income before taxes. Of note, total liabilities as a share of total assets, which is one measure of leverage, remained at 86.0 per cent as at end-September 2018.

3.4.3 Insurance companies

The insurance sector's asset base was \$410.4 billion at end-September 2018 relative to \$385.5 billion at end-September 2017, reflecting asset growth of 6.4 per cent. Of note, LI companies accounted for 80.1 per cent of the sector's total assets. Within the LI sub-sector, the two largest companies accounted for 64.6 per cent of total assets at end-September 2018. With regard to GI, the three largest companies accounted for approximately 52.5 per cent of the sub-sector's asset base.

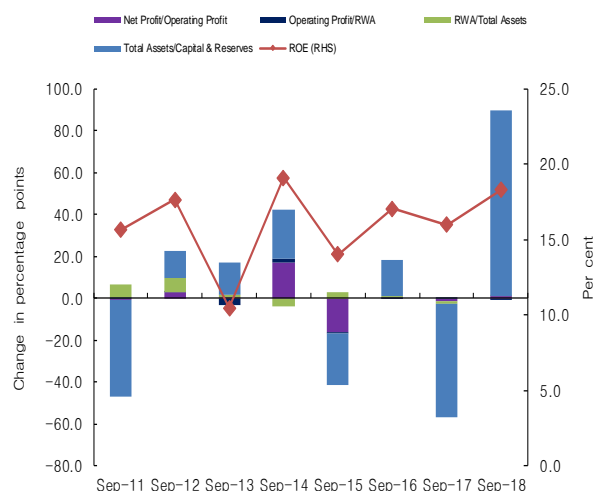


Figure 3.18 Distribution of DTIs' leverage

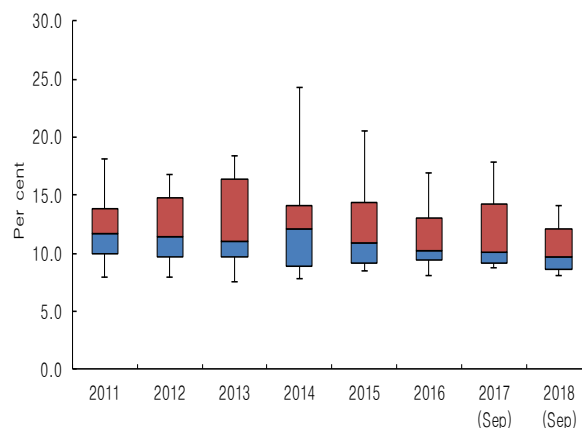


Figure 3.19 Distribution of DTIs' ROA

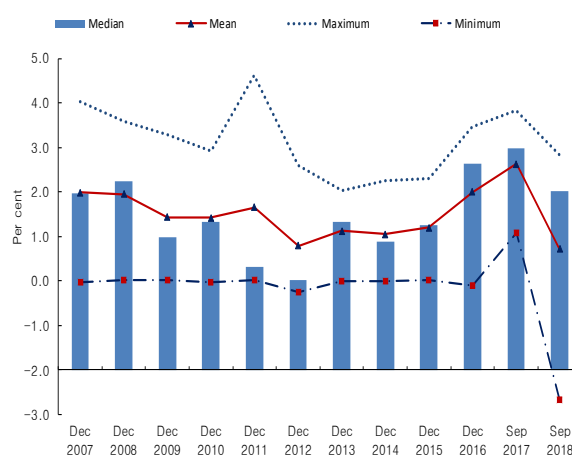


Figure 3.17 Decomposition of DTIs' ROE

Figure 3.20 DTIs' sources of revenue, charges for provisions and net profit

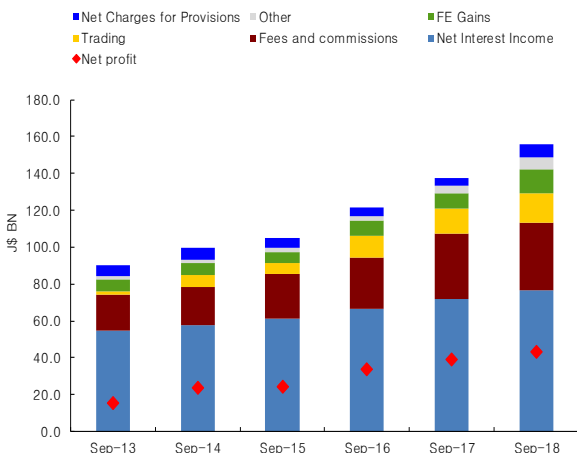


Figure 3.21 DTIs' interest margin for retail operations

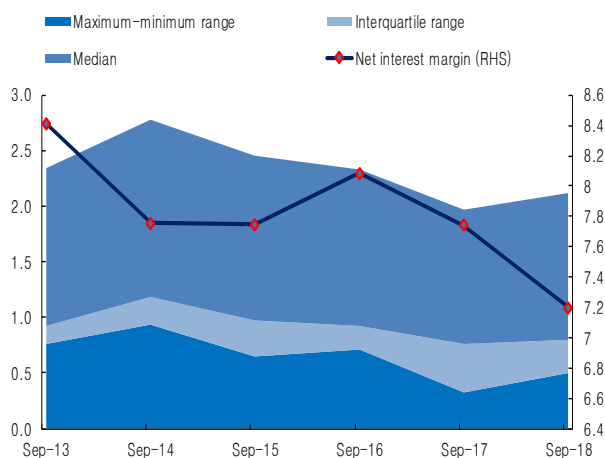
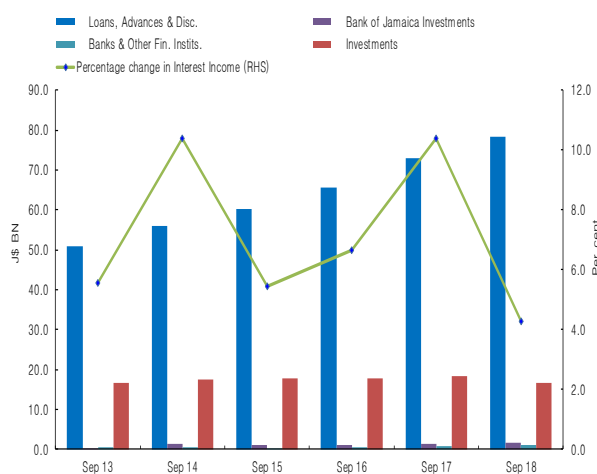


Figure 3.22 DTIs' sources of interest income



GI and LI companies' asset bases totaled \$328.7 billion and \$81.7 billion, respectively, at end-September 2018, compared to \$308.6 billion and \$76.9 billion at end-September 2017. The growth in assets of LI companies was influenced by an increase of 6.7 per cent in investments in GOJ securities. For GI companies, the increase in the asset base reflected expansions of 17.3 per cent and 26.6 per cent in recoverables from reinsurers and corporate debt, respectively (see **Figure 3.27**).

Government securities accounted for 58.2 per cent and 28.4 per cent of LI and GI assets, respectively, at end-September 2018 relative to 58.0 per cent and 30.0 per cent at end-September 2017 (see **Figures 3.28** and **3.29**). The share of real estate, unquoted equities and debtors in total assets, declined for LI and GI companies during the review period. Specifically, this ratio increased to 4.3 per cent and 28.5 per cent, respectively, from 4.1 per cent and 26.8 per cent at the close of the previous review period.¹⁵

Levels of insurance penetration, as measured by the ratio of premium to GDP, continued to be low.¹⁶ This ratio, which measures the importance of insurance activity relative to the size of the economy, declined marginally to 3.0 per cent for LI companies from 3.1 per cent at end-September 2017 (see **Figure 3.30**). However, insurance penetration for GI companies improved slightly to 2.4 per cent as at end-September 2018 from 2.2 per cent at the end of the previous review period. Against this

¹⁵ 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 which account for more than 50.0 per cent of debtors, these recoverables are from companies with a A-credit rating

¹⁶ 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/>

background, insurance density, measured as the ratio of total gross premiums to total population, increased marginally to 0.002 per cent at end-September 2018 from 0.001 per cent at end-September 2017.

Insurance premiums amounted to \$105.5 billion for the year ended September 2018 relative to \$99.2 billion for the year ended September 2017 (see **Figure 3.31**). Concurrently, there was an increase of 16.0 per cent in claims incurred by the sector for the review period (see **Figure 3.32**). Furthermore, the claims ratio, which is the ratio of claims incurred to earned premiums for insurance sector, increased to 30.2 per cent at end-September 2018 from 27.6 per cent at end-September 2017.^{17,18} The outturn, which was influenced by a faster growth in claims relative to premiums earned, was also greater than the five year average of 28.3 per cent.

There was general improvement in the insurance sector's profitability during the review period. This improvement was largely due to an increase of 7.6 per cent in the total income earned for the year ended September 2018 (see **Figure 3.33**). The growth in total income was supported by increases in both gross written premium and total investment income earned. Furthermore, there was growth of 22.9 per cent in the sector's profit before tax and extraordinary items. Profit before tax and extraordinary items amounted to \$32.3 billion for the year ended September 2018 relative to \$26.3 billion for the year ended September 2017. The improvement in profit performance reflected growth of 35.3 per cent in GI profits before taxes (see **Figure 3.34**).

The ROA and ROE of the LI sub-sector increased to respective values of 8.9 per cent and 33.5 per cent at end-September 2018 relative to values of 7.7 per cent and 31.3 per cent at end-September 2017. Similarly, the ROA and ROE of the GI sector increased to 5.1 per cent and 14.7 per cent respectively from 4.0 per cent and 11.2 per cent for the year ended

¹⁷ 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.

¹⁸ The breakdown of data required for the calculation of this ratio is not available for LI companies.

Figure 3.23 Major components of Select SDs' FUM assets¹⁹

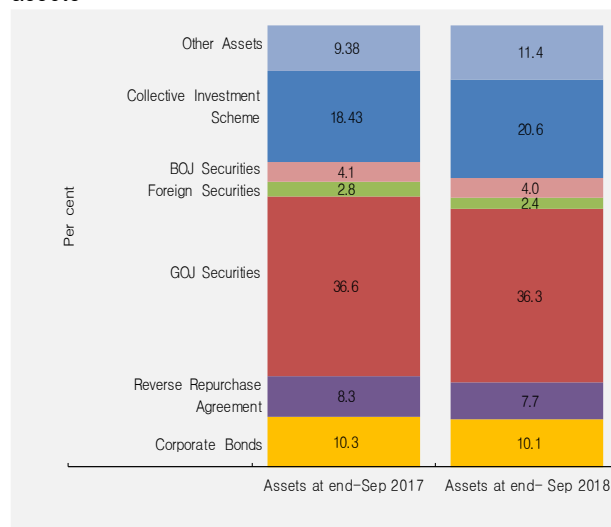


Figure 3.24 SDs' regulatory capital, capital adequacy and primary ratios

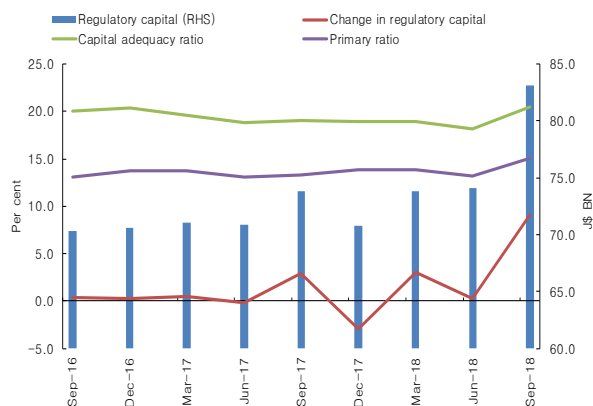
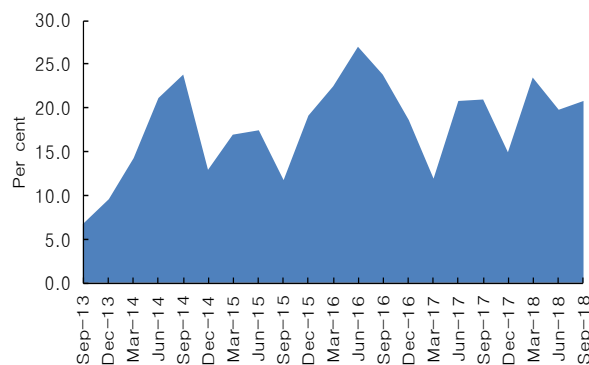


Figure 3.25 SDs' NOP to capital



¹⁹ Select SDs are those for which weekly and monthly financials are shared with the BOJ from the Financial Services Commission (FSC).

Figure 3.26 SDs' ROA and ROE

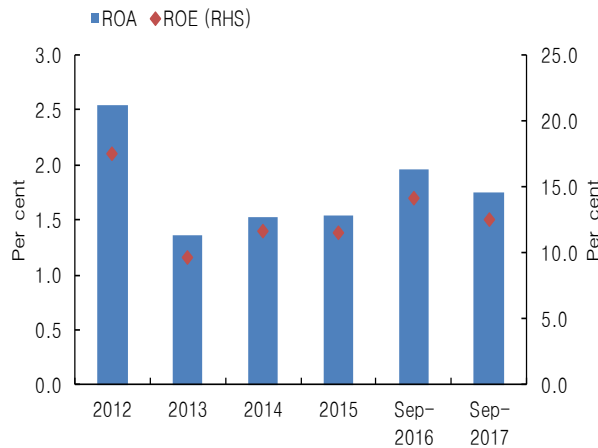


Figure 3.27 Total assets of ICs

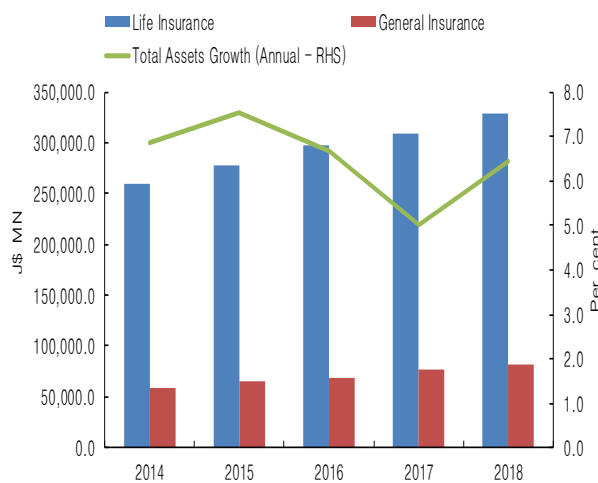
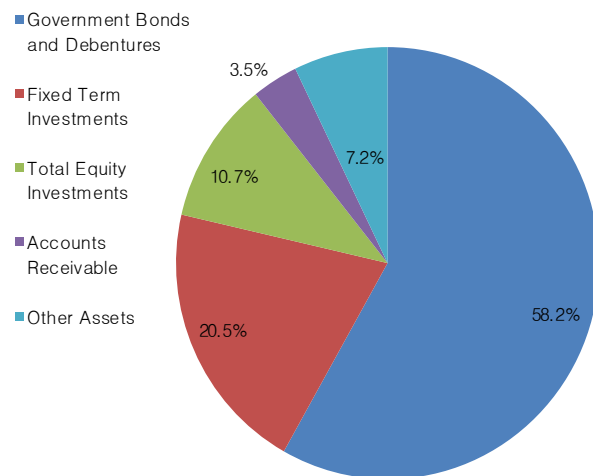


Figure 3.28 Distribution of assets of LI companies



September 2017. The increase in profitability largely resulted from a reduction in underwriting losses for GI companies. Additionally, the combined operating ratio for GI increased by 4.1 percentage points to 56.9 per cent at end-September 2018 compared to the prior review period.²⁰

The capital adequacy and solvency of ICs remained at adequate levels during the review year. In particular, the sector's median solvency ratio, as measured by available capital to total liabilities, increased to 157.6 per cent from 154.0 per cent at the close of the prior review period (see **Figure 3.35**). Furthermore, there was an increase in the ratio of capital to total assets to 23.3 per cent at end-September 2018 from 21.7 per cent at end-September 2017 (see **Figure 3.36**).

All LI companies surpassed the Minimum Continuing Capital and Surplus Requirements (MCCSR) ratio prudential benchmark.²¹ In particular, the MCCSR ratio was 240.8 per cent in comparison to the minimum requirement of 150.0 per cent. Similarly, all GI companies exceeded the Minimum Capital Test (MCT) prudential benchmark of 250.0 per cent.²² The MCT ratio for the GI sub-sector was 323.5 per cent at end-September 2018.

Of note, the reinsurance retention ratio for LI companies remained at 98.3 per cent at end-September 2018 relative to end-September 2017. On the other hand, the GI companies' reinsurance retention ratio increased to 43.7 per cent at end-September 2018 from 40.2 per cent

²⁰ The combined operating ratio is a financial measure of insurance core profitability and is expressed as the total of claims costs, commissions and management expenses as a percentage of premiums.

²¹ 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.

²² 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.

at the end of the previous review period (see Figures 3.37 and 3.38).²³

Figure 3.29 Distribution of assets of GI companies

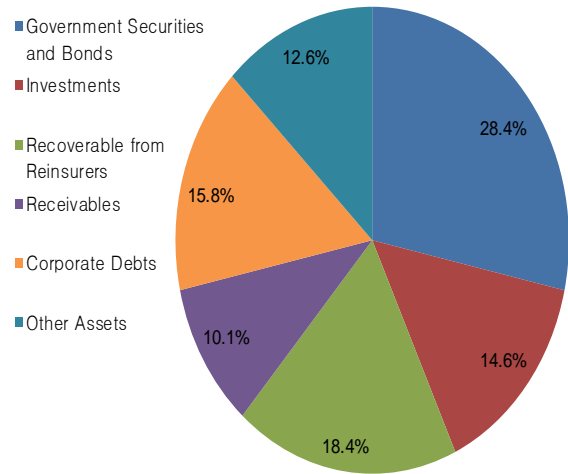


Figure 3.30 Insurance Penetration

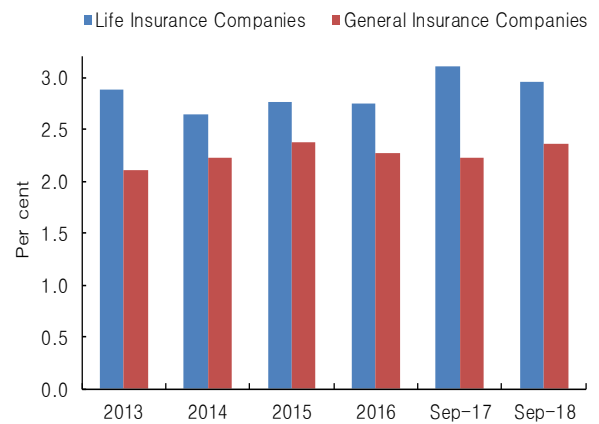
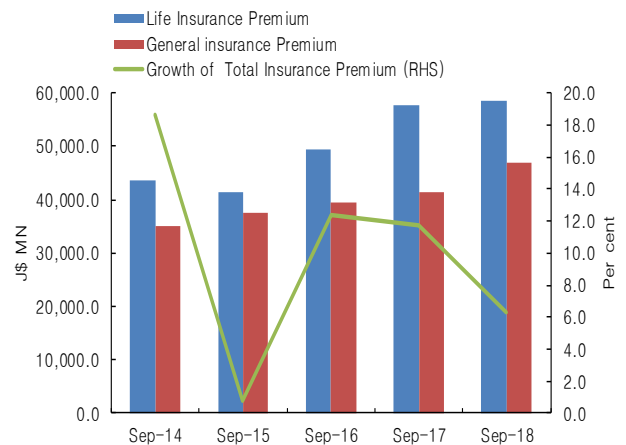


Figure 3.31 Premium income and growth of insurance sector



²³ 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.

Figure 3.32 Earned premium, claims incurred and claims ratio of insurance sector

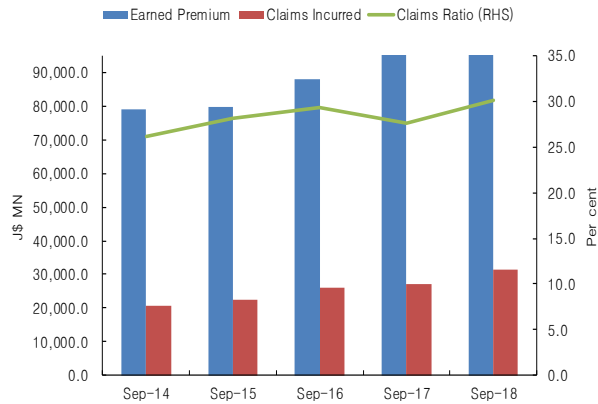


Figure 3.35 Distribution of the solvency of ICs



Figure 3.33 Total income (GWP + investment income) of the insurance sector

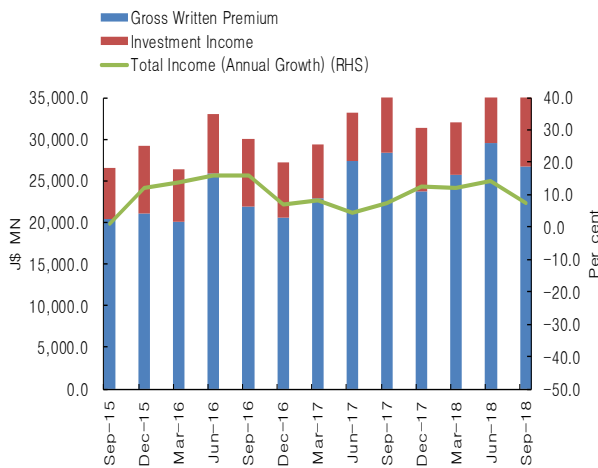


Figure 3.36 Capitalization of the insurance sector

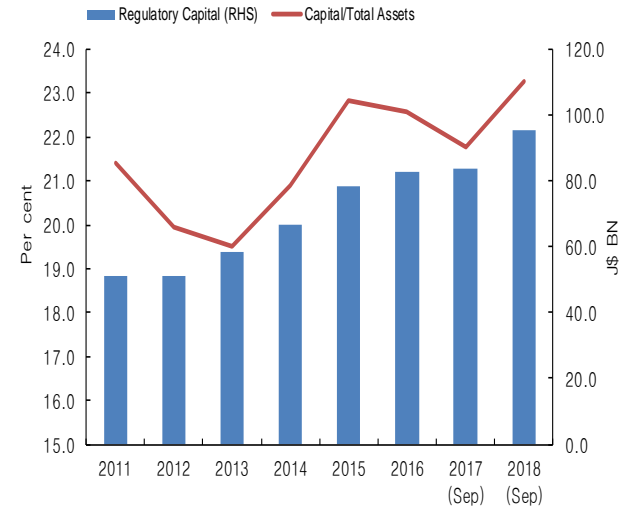


Figure 3.34 Growth in profit before tax for ICs

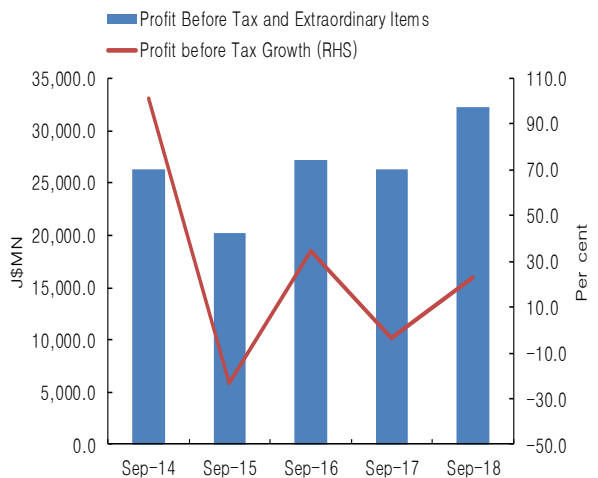


Figure 3.37 Retention ratio of LIs

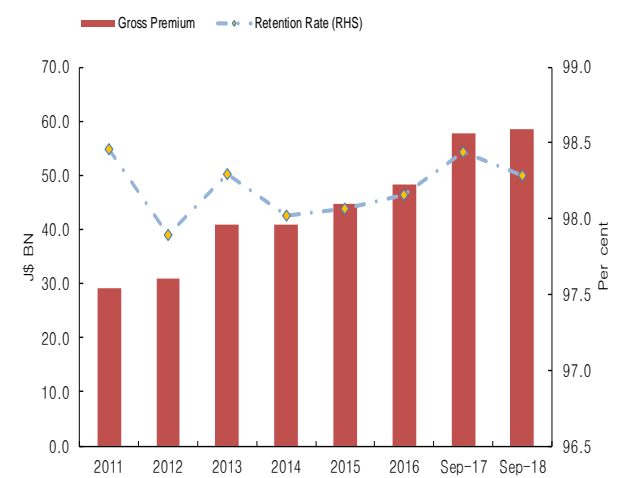


Figure 3.38 Retention ratio of GIs

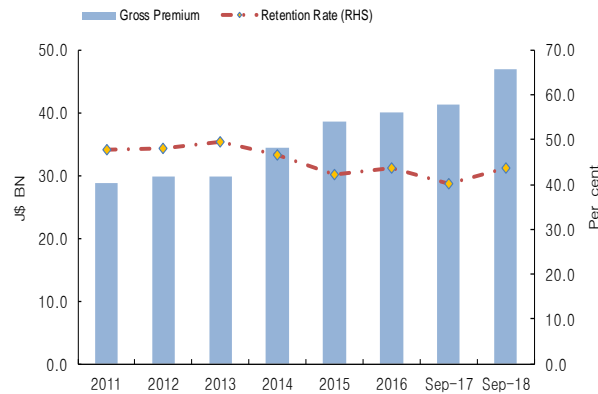


Table 3.2 Quarterly Financial Soundness Indicators for DTIs

Indicator (%)	Categories	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18
Core Indicators								
Regulatory capital to risk-weighted assets	Capital adequacy	14.8	14.9	14.8	15.5	15.3	15.2	14.9
Tier 1 capital to risk-weighted assets	Capital adequacy	14.7	14.8	14.6	15.2	15.0	14.3	13.8
Non-performing loans (net) to capital	Capital adequacy	-2.4	-2.5	-2.6	-2.6	-2.0	-1.8	-1.7
Non-performing loans to total loans	Assets quality	2.8	2.7	2.6	2.6	2.7	2.7	2.6
Return on assets	Earnings & Profitability	0.7	0.7	0.7	0.6	0.7	0.8	0.7
Return on equity	Earnings & Profitability	4.5	4.3	4.4	3.9	5.1	5.4	4.9
Interest margin to income	Earnings & Profitability	47.1	48.0	42.5	48.3	45.3	45.3	41.5
Non-interest expenses to income	Earnings & Profitability	23.8	23.1	22.8	26.1	22.7	21.9	24.7
Liquid assets to total assets	Liquidity	34.0	25.4	25.9	25.9	25.3	24.2	24.2
Duration on assets - Domestic Bonds	Sensitivity to Market Risk	0.9	1.2	0.7	1.0	1.2	1.4	1.5
Duration on assets - Global Bonds	Sensitivity to Market Risk	2.9	2.7	3.3	4.0	3.3	3.3	3.2
NOP to capital	Sensitivity to Market Risk	6.4	1.6	8.3	0.3	5.2	1.7	3.9
Encouraged Indicators								
Capital to assets	Capital adequacy	15.9	15.9	16.2	14.3	14.0	14.1	14.2
Trading income to total income	Earnings & Profitability	13.8	14.7	12.2	12.3	14.6	17.9	23.2
Personnel expenses to non-interest expenses	Earnings & Profitability	37.9	38.1	38.8	38.8	36.4	37.6	35.1
Spread between lending & deposits rates ^{1/}	Earnings & Profitability	12.7	11.9	12.4	12.4	12.5	12.6	12.7
Deposits to total (non-interbank) loans	Liquidity	133.9	142.1	142.6	142.5	144.3	142.0	142.4
Foreign-currency-denominated loans to total loans	Foreign Exchange risk	26.0	25.6	25.3	22.0	22.0	23.0	23.4
Foreign-currency-denominated liabilities to total liabilities	Foreign Exchange risk	41.9	42.0	40.5	39.5	40.1	39.3	39.3
Household debt to GDP	Household sector leverage	17.2	16.6	20.8	18.1	16.5	16.7	17.2

Notes:

^{1/} Weighted by assets size

Table 3.3 Quarterly Financial Soundness Indicators for SDs and ICs

Indicator (%)	Categories	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18
A. Securities Dealers ^{1/}								
Regulatory capital to risk-weighted assets	Capital adequacy	19.6	18.9	19.1	19.0	19.0	18.1	20.5
Tier 1 capital to risk-weighted assets	Capital adequacy	17.1	16.7	16.0	17.4	15.9	14.9	14.2
Non-performing loans (net) to capital	Capital adequacy	0.0	0.0	0.0	0.0	0.1	-0.2	-0.3
Non-performing loans to total loans	Assets quality	3.6	3.4	3.4	3.6	3.2	0.7	1.1
Return on assets	Earnings & Profitability	0.4	0.5	0.7	0.7	0.7	0.6	0.9
Return on equity	Earnings & Profitability	3.0	4.0	5.0	5.2	5.2	4.4	6.8
Interest margin to income	Earnings & Profitability	26.9	27.3	21.4	24.5	20.1	24.9	24.4
Non-interest expenses to income	Earnings & Profitability	36.3	30.8	31.3	35.5	35.9	35.5	38.1
Liquid assets to total assets	Liquidity	11.2	12.9	13.6	15.9	18.7	20.7	16.3
Duration on assets –Domestic Bonds	Sensitivity to Market Risk	2.6	2.8	2.3	3.6	2.5	3.4	3.2
Duration on assets– Global Bonds	Sensitivity to Market Risk	8.9	8.4	7.7	10.3	9.1	10.2	10.2
NOP to capital	Sensitivity to Market Risk	11.9	20.8	20.9	14.9	23.4	19.8	20.9
B. General Insurance								
Net premium to Capital	Capital adequacy	22.3	21.7	21.0	21.7	22.8	22.4	21.8
Capital to Assets	Capital adequacy	30.2	28.4	28.9	30.3	30.0	27.9	28.6
(Real estate + unquoted equities + debtors) to total assets ^{2/}	Assets quality	22.7	26.7	26.0	27.3	28.5	31.8	28.1
Receivables to gross premiums	Assets quality	147.2	134.7	193.4	204.2	174.9	164.2	185.4
Equities to total assets	Assets quality	3.3	3.3	3.5	3.1	3.1	2.7	3.8
Net technical reserves to net claims paid in last 3 years	Reinsurance & actuarial issues	464.4	464.0	427.4	376.5	401.4	406.8	391.1
Risk retention ratio (net premium to gross premium)	Reinsurance & actuarial issues	47.6	33.2	48.3	53.1	46.4	35.0	45.2
Gross premium to number of employees J\$(000)	Management Soundness	8.4	11.8	8.0	8.0	9.4	12.7	9.6
Assets per employee J\$(000)	Management Soundness	59.6	63.7	64.0	64.9	64.0	71.3	69.3
Net Claims to net premium (loss ratio)	Earnings & Profitability	63.4	66.5	59.6	65.6	61.6	58.8	61.6
Total expenses to net premium (expense ratio)	Earnings & Profitability	99.7	103.3	99.5	99.8	92.6	90.8	99.6
Combined ratio (loss + expense ratio)	Earnings & Profitability	163.1	169.8	159.0	165.3	154.2	149.6	161.3
Investment Income to net premium	Earnings & Profitability	19.4	19.1	23.2	27.6	13.5	14.8	12.6
Return on Equity	Earnings & Profitability	2.7	3.0	5.9	4.4	3.7	5.9	3.8
Liquid assets to total liabilities	Liquidity	86.4	77.4	85.2	77.1	71.8	69.5	72.5
C. Life Insurance								
Capital to technical reserves	Capital adequacy	88.1	87.5	82.6	89.0	88.4	95.6	95.4
(Real estate + unquoted equities + debtors) to total assets	Assets quality	3.9	3.8	4.1	4.7	3.9	4.1	4.3
Receivables to gross premiums	Assets quality	70.8	66.4	53.8	85.5	68.2	74.4	75.5
Equities to total assets	Assets quality	2.5	2.9	3.2	3.2	3.2	3.1	3.5
Net technical reserves to net premium paid in last 3 years	Reinsurance & actuarial issues	750.7	738.3	766.3	740.1	723.3	705.1	707.1
Risk retention ratio (net premium to gross premium)	Reinsurance & actuarial issues	98.1	98.3	98.5	98.7	98.3	97.9	98.2
Gross premium to number of employees J\$(000)	Management Soundness	6.7	7.0	9.8	7.4	7.6	7.5	8.0
Assets per employee J\$(000)	Management Soundness	151.1	152.7	159.9	161.4	163.8	166.6	170.3
Expenses to net premium (expense ratio)	Earnings & Profitability	52.8	42.9	35.5	47.8	47.4	45.8	44.6
Investment Income to investment assets	Earnings & Profitability	2.1	1.9	2.9	2.3	2.0	2.0	3.4
Return on Equity	Earnings & Profitability	8.1	8.6	6.0	7.7	6.5	8.8	10.3
Liquid assets to total liabilities	Liquidity	29.3	23.2	32.6	29.4	28.9	25.1	20.9
Duration on assets –Domestic Bonds	Sensitivity to market risk	1.2	1.2	1.1	2.8	1.6	2.3	1.6
Duration on assets– Global Bonds	Sensitivity to market risk	8.9	8.4	9.3	10.3	7.0	7.8	7.0

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 3.4 Annual Sectoral Indicators of Financial Development

Sub-sector	Indicator	Dec-13	Dec-14	Dec-15	Dec-16	Sep-17	Sep-18
Banking	Total number of DTIs	12	11	11	11	11	11
	Number of branches and outlets	166	165	165	165	165	157
	Number of branches/thousands population	0.06	0.06	0.06	0.06	0.06	0.06
	Bank deposits/GDP (%)	45.1	44.3	47.1	50.4	52.7	55.1
	Bank assets/total financial assets (%) ^{1/}	37.2	35.7	36.8	37.1	37.3	38.1
	Bank assets/GDP (%)	67.8	69.3	71.8	77.9	80.4	83.4
Insurance	Number of insurance companies ^{2/}	14	15	16	17	16	17
	Gross premiums/GDP (%)	5.0	4.9	4.8	5.0	5.3	5.3
	Gross life premiums/GDP (%)	2.9	2.6	2.5	2.8	3.1	2.9
	Gross non-life premiums/GDP (%)	2.1	2.2	2.3	2.3	2.2	2.4
	Insurance assets/GDP (%)	21.0	20.7	21.2	21.1	21.1	21.1
	Insurance assets/total financial assets (%)	10.8	11.0	10.7	10.5	10.1	9.6
Pensions	Types of pension plans						
	Total number of defined benefit plan	111	110	107	106	99	98
	Total number of defined contribution plan	333	319	308	304	300	295
	Pension fund assets/total financial assets (%)	11.9	11.4	11.5	12.0	12.8	13.7
	Pension fund assets/GDP (%)	21.6	22.1	22.4	25.2	27.6	29.9
Mortgage	Mortgage assets/total financial assets (%) ^{3/}	8.3	7.9	8.4	8.4	7.0	7.7
	Mortgage assets/GDP (%)	15.1	15.4	16.4	17.6	15.0	16.8
Securities Dealers	Total number of securities dealers	29	30	29	32	32	31
	Securities dealer's/total financial assets (%)	20.2	18.2	16.6	15.8	15.0	13.8
	Securities dealer's assets/GDP (%)	36.8	35.3	32.5	33.3	32.3	30.2
Credit Union	Total number of credit unions	38	37	37	37	29	26
	Credit union's assets/total financial assets (%)	3.0	2.7	2.7	2.4	2.6	2.5
	Credit union's assets/GDP (%)	5.4	5.3	5.3	5.1	5.6	5.6
Foreign exchange markets	Adequacy of foreign exchange (reserves in months of imports)	3.3	5.0	5.9	5.8	6.3	5.8
	Foreign exchange reserves as ratio to short-term external debt (%)	139.3	279.8	527.2	277.3	658.9	594.5
Collective investment scheme	Local unit trust and mutual funds (J\$BN) ^{4/}	58.0	111.0	136.4	181.2	211.5	266.9
	Number of local unit trust and mutual funds	10	11	12	13	14	18
	Local unit trust and mutual funds/total financial assets (%)	2.2	3.7	4.3	5.0	5.3	6.1
	Overseas mutual funds (value of units held by Jamaicans)US\$MN	165.0	177.0	200.9	223.0	258.6	275.5
	Overseas mutual funds/total financial assets (%)	0.7	0.7	0.7	0.8	0.8	0.8
Sub-sector	Indicator	Dec-13	Dec-14	Dec-15	Dec-16	Dec-17	Dec-18
Capital markets	Number of listed securities (equities) ^{5/}	56	54	64	68	66	73
	Number of new issues (equities) ^{6/}	14	7	1	7	8	15
	Number of new issues (bonds) ^{7/}	2	0	0	6	8	3
	Value of new issues (bonds) J\$BN	1.7	0	0.0	41.8	55.8	15.0
	Market capitalization/GDP (%)	34.6	19.0	36.9	39.7	55.9	69.6
	Value traded/market capitalization (%)	2.4	5.4	2.8	3.5	3.5	3.5

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 six life insurers and eleven general insurers. Of the eleven general insurers, two are 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

Box 3.1 Problem Assets Management, Provisioning Requirements and Accounting for Expected Credit Losses

The maintenance of good asset quality is integral to the soundness of a financial institution and the stability of the banking system. Yet, despite best efforts, deficient credit risk assessments and measurement practices have been known to impair a financial institution’s asset quality. Additionally, unanticipated deleterious events may occur, which can result in borrowers being unable to service their agreements with the institution as agreed, thereby resulting in a deterioration in the income earning capacity of the asset. When this occurs the asset is designated as a “problem asset” or an “impaired asset”.

Problem assets can adversely impact the profitability and liquidity as well as impair the soundness of a deposit-taking institution and possibly the financial system. Consequently, during 2018, the Bank of Jamaica established the *Standard of Sound Practice on Problem Asset Management, Provisioning Requirements and Accounting for Expected Credit Losses*. This uniform standard took effect on 01 January 2019, and is to be followed by licensees (financial holding companies on a consolidated basis, and deposit-taking institutions on a solo and consolidated basis).¹ Licensees will be allowed a transition period of 12 months to become compliant with this regime. The standard will ensure that:

- Assets (principally loans) are regularly evaluated using an objective grading system that is consistent with regulatory standards;
- The prudential treatment for non-performing or problem assets is consistent with regulatory and supervisory requirements;
- Timely and adequate provisioning and non-accrual criteria are established to recognize, measure and monitor asset impairment;
- Expected credit loss methodologies are developed to address the deterioration of credit quality from initial recognition, consistent with the IFRS accounting framework;

- Write-offs are applied to accurately reflect the capital and earnings performance of licensees; and
- The development of work-out plans for problem assets and effective internal controls to manage such assets are timely and effective.

Additionally, within the credit management framework, this guidance encourages DTIs to:

- Foster the use of traditional and non-traditional collateral and risk mitigants to allay the deleterious impact of credit risk and guide the attendant levels of specific provisions to be held against expected losses; and
- Formulate and implement adequate policies, procedures and information systems for the establishment of appropriate and robust provisioning levels (adjustments to the carrying amounts of assets) for each credit classification category at least quarterly based on a review of the DTI’s loan portfolio.

This Supervisory Guidance applies to all assets carried on a licensee’s balance sheet or reflected as off-balance sheet items. Furthermore, the Guidance is aimed at setting out the supervisory expectations related to sound problem asset management practices, consistent with *The Security Interests in Personal Property Act, 2013 (SIPPA)*. The framework presents minimum guidance and should be enhanced, where necessary based on, inter alia, the size, scope, interconnectedness, complexity and state of the institution’s asset portfolio. Notably, the requirements contained in this Guidance are intended to supplement, not replace any relevant accounting standards, and are structured around the following seven principles:

Principle 1: Role of board of directors and senior management

The Board of Directors and senior management of all licensed entities should oversee the nature and level of credit risk that is undertaken as well as fully understand their responsibilities in the oversight

¹See Standard at http://boj.org.jm/uploads/news/standard_of_sound_practice_o

[n_problem_asset_management_provisioning_and_accounting_f](#)
[or_ecls.pdf](#)

and management of the entity’s problem assets and provisioning practices, including an effective system of internal control to consistently determine adequate allowances. Accordingly, the Board of Directors and senior management of all licensees should take steps to ensure that these responsibilities are successfully effected in accordance with the licensee’s stated policies and procedures and the applicable accounting framework.

Principle 2: Portfolio reviews and monitoring of credit quality

All licensees should have robust and sound methodologies for assessing credit risk, which should include adequate processes, resources and systems in place for ongoing oversight and regular review of the overall composition and quality of the credit portfolio, asset classifications, and the condition of impaired assets, which include non-performing exposures. Licensees should have a system of independent, ongoing assessments of its credit risk management processes, impaired assets status and adequacy of provisioning levels, the results of which should be communicated directly to the Board of Directors and senior management.

Principle 3: Credit risk classification and grouping

All licensed entities should have an established credit risk classification system, including policies and processes and documented thresholds, to: classify the credit risk inherent in all on- and off-balance sheet activities, provide insight into the licensee’s credit quality and Board approved risk appetite, improve portfolio management and act as early warning system for asset impairment.

Principle 4: Identification, measurement and management of problem assets

All licensed entities should adopt, document and adhere to sound methodologies, established policies and processes, including documented thresholds as well as information systems and other organizational resources. These are necessary to measure and manage the credit risk inherent in all on- and off-balance sheet activities, to enable the early identification of impaired assets and exposures as well as reflect realistic repayment and recovery expectations.

Principle 5: Collateralization and other risk mitigants

Licensees should have appropriate mechanisms, policies and procedures in place to establish, record, effectively assess, monitor and control the eligibility and recognition of risk mitigants held against credit exposures, including guarantees and other collateral. Further, all licensees should on at least an annual basis, establish for individual and homogenous exposures, the market value of risk mitigants associated with credit exposures (on- and off-balance sheet) for senior management and Board review.

Principle 6: Expected credit losses

Licensees should adopt, document and adhere to sound methodologies that address policies, procedures and controls for assessing and measuring credit risk on all lending exposures as well as validating models used to assess and measure expected credit losses. The measurement of allowances should build upon those robust methodologies and result in the appropriate and timely recognition of expected credit losses in accordance with the applicable accounting framework.

Principle 7: Mechanisms to ensure timely provisioning

Licensees should formulate and implement adequate policies, procedures and information systems for the establishment of appropriate and robust provisioning levels, taking into account off-balance sheet exposures, and ensuring provisions are timely and reflect the impact of realistic economic conditions.

4.0 FINANCIAL SYSTEM SECTORAL EXPOSURES

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

4.1 Overview

Systemic risks emanating from the household, corporate and public sectors, as measured by debt to asset ratios of both deposit-taking institutions (DTIs) and non-deposit-taking financial institutions (NDTFIs), have remained relatively moderate over the review period. While the exposure of DTIs to both the household sector as well as the corporate sector increased marginally, there was a decline in exposure of NDTFIs to private sector loans for the year ended September 2018. Furthermore, with the exception of corporate sector debt, real annual growth in household and public sector debt remained below pre-global financial crisis average levels. This relative stability was also supported by low non-performing loans (NPLs) to total loans for DTIs and NDTFI.

In relation to sovereign risk, DTIs and NDTFIs recorded lower exposures to public sector debt during the year ended September 2018 relative to the previous review period. This decline was largely attributable to repayment of approximately \$69.9 billion on maturing benchmark investment notes (BINs) during the year, the ongoing trend of primary surpluses for Government of Jamaica (GOJ) as well as policies geared at reforming the retail repo business model.

4.2 Household debt and deposit-taking institutions' exposure

Consistent with overall credit growth in the economy, household sector debt incurred with DTIs expanded at a faster rate for the year ended September 2018 relative to the previous review period. However, this growth remained below pre-global financial crisis levels.^{1,2} Specifically, real household sector debt grew by 9.3 per cent for the year ended September 2018 relative to growth of 8.6 per cent for the year ended September 2017

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

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

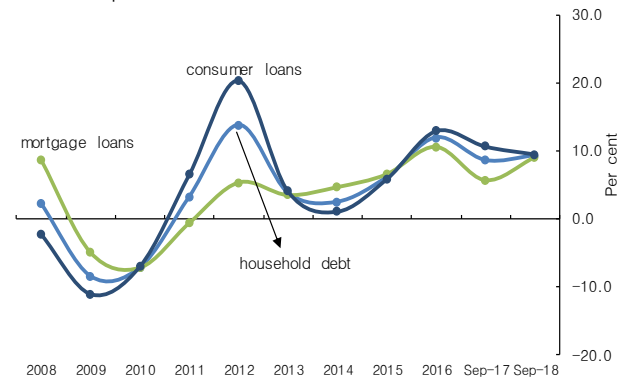
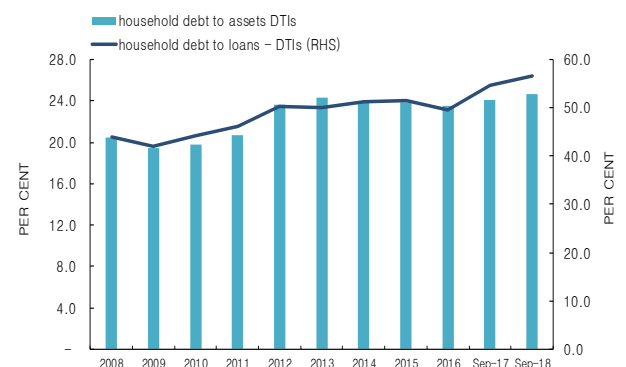


Table 4.1 Selected interest rates

Sectoral Interest Rates (per cent)	2014	2015	2016	Sep-2017	Sep-2018	Graphs
Building societies						
Real Mortgage Loans Rate*	3.1	5.6	7.1	3.9	3.9	
Mortgage Loans Rate	9.7	9.5	9.0	8.7	8.4	
Average Weighted Loan Rate	9.7	9.5	9.0	8.8	8.5	
Commercial banks						
Real Mortgage Loans Rate*	3.1	5.7	7.6	3.9	4.0	
Mortgage Loans Rate	9.7	9.6	9.4	8.7	8.5	
Installment Credit Rate	16.1	15.2	13.8	12.6	11.6	
Personal Credit Rate	25.6	26.2	25.5	24.0	23.1	
Commercial Credit Rate	12.9	12.9	12.3	12.3	11.5	
Average Weighted Loan Rate	17.2	16.9	16.2	14.6	14.0	
Merchant bank						
Personal Credit Rate	17.4	14.7	10.7	12.8	11.6	
Commercial Credit Rate	11.3	11.6	11.7	10.5	10.3	
Average Weighted Loan Rate	11.9	11.7	11.6	10.6	10.5	

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

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



² Prior to the global financial crisis in 2008, real growth in household sector debt averaged 13.7 per cent for the period 2003–2007.

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

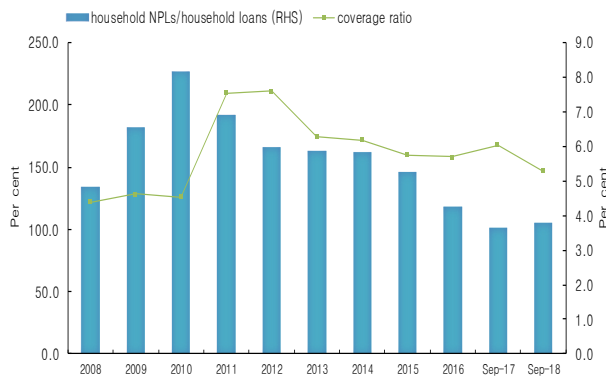


Figure 4.4 Household debt servicing capacity

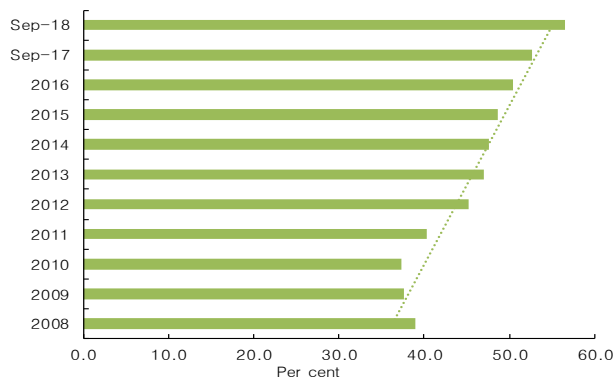
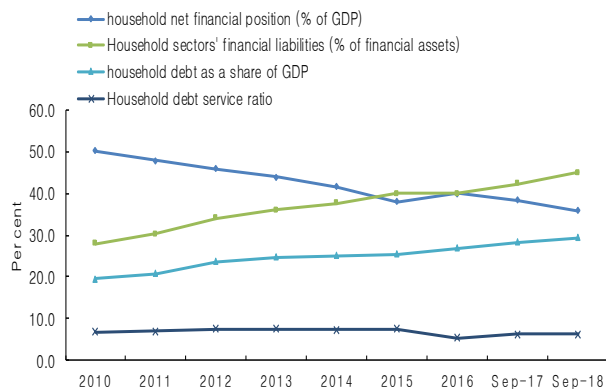


Figure 4.5 Other household sector indebtedness indicators



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.

(see Figure 4.1). The acceleration in the growth of household sector debt primarily reflected an increase of 9.0 per cent in mortgage loans for the year ended September 2018 in comparison to growth of 5.7 per cent for the prior year. The outturn for the review period occurred within the context of a relatively stable macroeconomic environment supported by the Bank's accommodative monetary stance as well as growth in real GDP.

The exposure of DTIs to the household sector, as measured by household debt to assets, increased marginally to 24.7 per cent as at end-September 2018 from 24.1 per cent at end-September 2017 (see Figure 4.2). At the same time, the household sector loan quality ratio deteriorated for the review period, albeit marginally. Specifically, household NPLs as a share of total household loans for DTIs increased to 3.8 per cent at end-September 2018 from 3.7 per cent at end-September 2017 (see Figure 4.3). This slight uptick reflected an increase in household NPLs that outpaced the growth in the stock of household performing loans. Notwithstanding, 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

4.2.1 Household sector indebtedness

Since 2011, total real household debt to real disposable income has trended upward, reflecting increasing indebtedness. The ratio deteriorated by 4.0 percentage points to 56.6 per cent at end-September 2018 relative to end-September 2017 and remained well above the ten year annual average of 46.4 per cent (see Figure 4.4).^{4,5} This outcome was due to a faster pace of growth of 11.7 per cent in household debt relative to an increase of 3.9 per cent in disposable income for the review period. At the same time, the household debt servicing ratio remained moderate over the review period. Specifically, the debt

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

servicing ratio for households was 6.1 per cent at end-September 2018 relative to 6.3 per cent as at end-September 2017.⁶ Additionally, household debt to GDP remained relatively low, with only a marginal increase for the review period (see **Figure 4.5**). Congruently, the financial liabilities to financial assets ratio for the household sector rose to 45.0 per cent from 42.4 per cent as at end-September 2017, reflecting increased leverage.⁷ Of note, pension fund deposits were 46.0 per cent of household financial assets, accounting for the largest share of households' financial assets.⁸ Meanwhile, mortgage loans to financial liabilities stood at 57.5 per cent accounting for the largest share of financial liabilities. Furthermore, household sector's net financial assets as a percentage of GDP deteriorated slightly to 35.8 per cent at end-September 2018 from 38.4 per cent at end-September 2017.

4.3 Deposit-taking institutions' exposure to corporate sector debt

DTIs' exposure to the corporate sector, as measured by corporate sector debt to DTIs' assets, increased marginally to 18.4 per cent at the close of the review period relative to 17.1 per cent as at end-September 2017 (see **Figure 4.6**). Notably, corporate debt increased more rapidly than DTIs' assets during the review period. Real corporate debt also increased more rapidly during the year ended September 2018 as compared to the previous review period. Specifically, real corporate sector debt held by DTIs grew sharply to 14.2 per cent for the year ended September 2018. This was in contrast to the decline of 9.5 per cent for the year ended September 2017. On average, real corporate sector debt grew by 8.9 per cent for the 5-year pre-global financial crisis period (see **Figure 4.6**).⁹ This

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

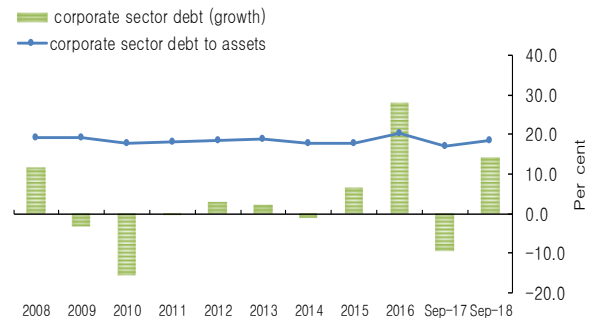
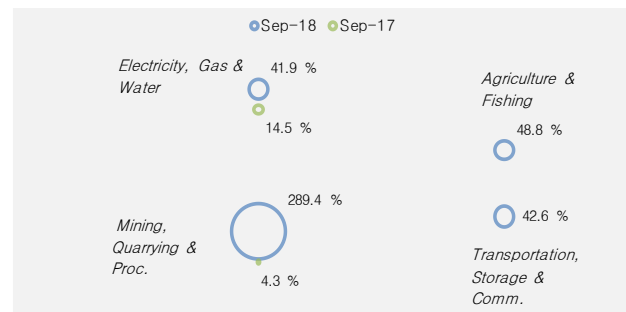
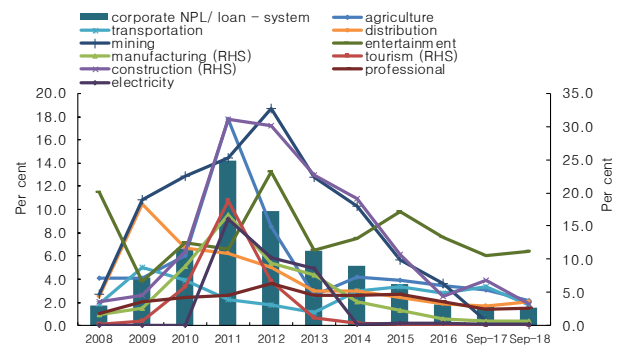


Figure 4.7 DTIs' exposure to corporate sector loans based on highest growth rates



Note: The growth rate for Agriculture was -1.5 per cent and the growth rate for Transportation was -8.2 per cent at end-September 2017

Figure 4.8 Ratio of corporate sector NPLs to corporate sector loans-DTIs



surplus of the household sector is excluded from personal income due to data availability.

⁶ The DSR for households is computed as follows:

$$DSR_{j,t} = \frac{i_{j,t}}{(1+i_{j,t})^{s_{j,t}}} * \frac{D_{j,t}}{Y_{j,t}}$$

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.

⁷ Financial assets of households include: pensions, deposits, on-balance sheet retail repos, life assurance and annuity contracts, and policyholder funds on deposit. Financial liabilities on the other hand include: consumer loans and mortgage loans.

⁸ Pension fund deposits are proxied by the asset values of private pension fund in Jamaica

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

Figure 4.9 Corporate sector debt to corporate operating surplus

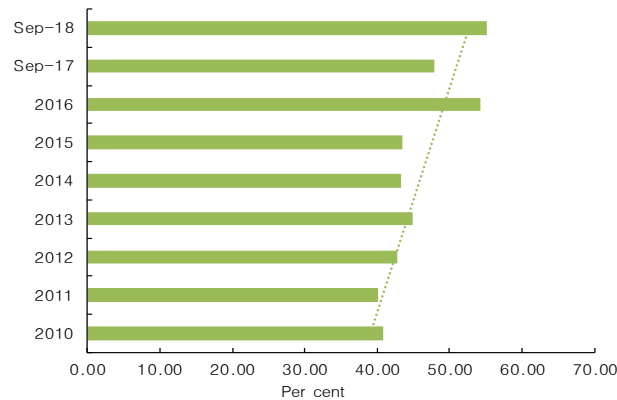


Figure 4.10 Other corporate sector indebtedness indicators

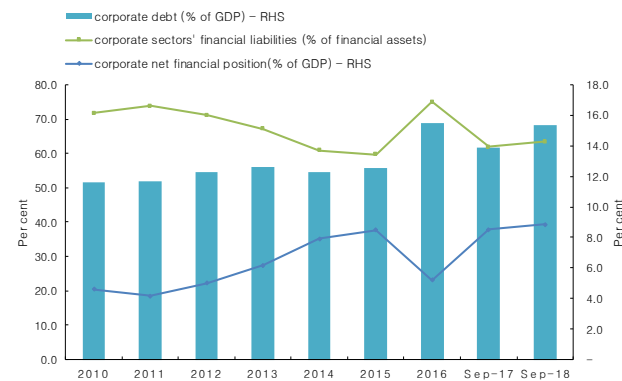
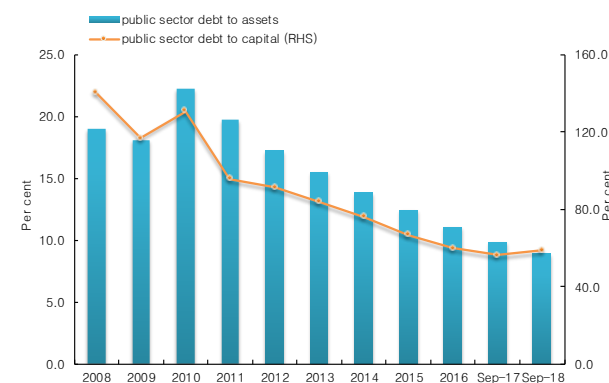


Figure 4.11 Public sector loans and securities to assets & capital – DTIs



¹⁰ 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

uptick in corporate sector debt can be partially attributed to relatively lower rates offered on commercial loans, increased use of corporate bond issues via exempt distribution and continued growth in the productive sectors. The expansion in corporate sector lending was reflected in all economic sectors, with the exception of Entertainment. Notably, *Mining*, *Electricity*, *Agriculture* and *Transportation* recorded the highest increases ranging between 41.9 per cent and 289.4 per cent for the review period (see **Figure 4.7**).

4.3.1 Corporate sector loan quality

The loan quality of the corporate sector continued to improve in the year ended September 2018. More precisely, the ratio of corporate sector NPLs to total corporate sector loans declined to 1.5 per cent at end-September 2018 from 1.8 per cent at end-September 2017 (see **Figure 4.8**). The improvement in the asset quality ratio was reflected across all economic sectors, with the exception of Distribution, Entertainment as well as Professional and other Services.

4.3.2 Corporate sector indebtedness

The debt servicing capacity of the corporate sector, as measured by the share of corporate sector debt to corporate sector operating surplus, deteriorated for the review period (see **Figure 4.9**). This result represented increased vulnerability of DTIs to the corporate sector. In contrast, corporate sector net financial position as a share of GDP improved to 8.9 per cent as at end-September 2018 from 8.5 per cent at end-September 2017.¹⁰ Additionally, corporate sector financial liabilities as a share of corporate sector assets increased by 1.5 percentage points to 63.4 per cent at end-September 2018. This reflected reduced solvency relative to the previous period (see **Figure 4.10**).

holdings of DTIs. Notably, corporate financial assets do not capture large shares and other classes of corporate assets

4.4.1 Public sector performance & indebtedness

Consistent with the Government’s efforts to reduce its debt, public sector debt as a share of GDP declined to 100.7 per cent at end-September 2018 from 108.5 per cent at end-September 2017. This result can be attributed to a decrease in the public sector debt stock by \$3.3 billion coinciding with growth in domestic GDP (see **Figure 4.12**). For the review period, the domestic debt stock declined by 1.9 per cent whereas the external debt stock rose by 1.9 per cent (see **Figure 4.13**).¹¹ The increase in the external debt stock was mainly due to revaluation reflecting depreciation of the domestic currency vis-à-vis the US dollar. The reduction in the domestic debt stock for the year ended September 2018 was largely influenced by the repayment of six BINs.

The fiscal stability ratio (FSR), which captures the stability of government finances, improved marginally to 0.96 at end-September 2018 from 0.98 at end-September 2017.¹² This result occurred within the context of increases in revenues and grants relative to expenditure, hence an increase in the fiscal surplus relative to the previous review period. There was also consistent improvement in other debt sustainability indicators for the year ended September 2018. In particular, debt servicing to budgetary revenues improved along with interest payment to GDP and external debt to exports of goods and services (see **Figure 4.14**).¹³

There was a lengthening of the maturity profile of domestic debt for the review period. Specifically, the proportion of domestic debt due to mature in 5 years or less decreased to 35.2 per cent at end-September 2018 from 37.2 per cent at end-September 2017, representative of a marginal reduction in refinancing risk for the

Figure 4.12 Debt to GDP ratios

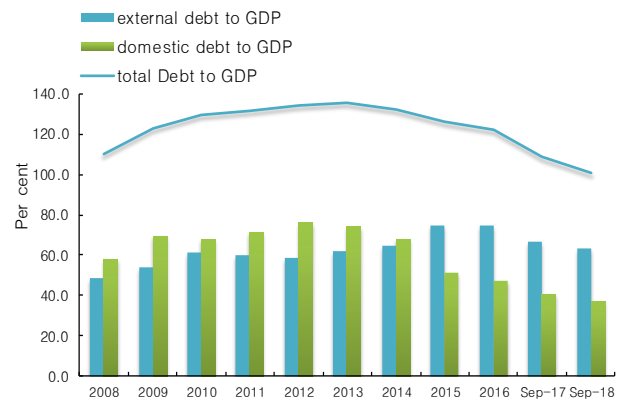


Figure 4.13 Growth in public sector debt stock

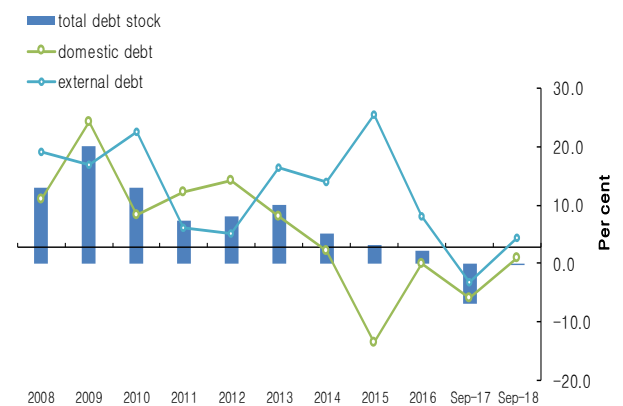
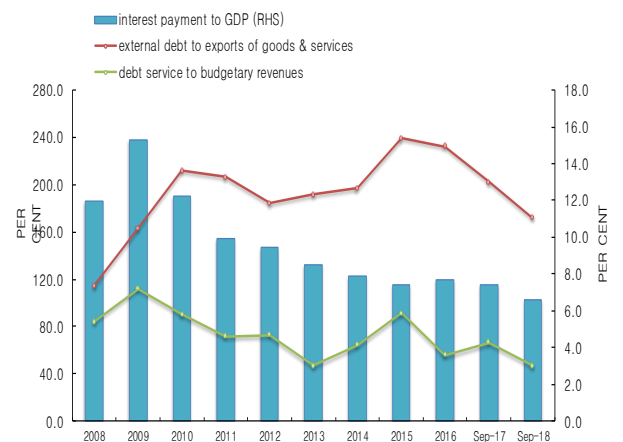


Figure 4.14 Debt sustainability indicators



¹¹ Domestic debt fell by \$14.1 billion whereas external debt rose by \$23.3 billion

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 Debt Servicing amounts to the sum of total amortization and interest payments in Jamaican dollars.

Figure 4.15 Domestic debt by maturity

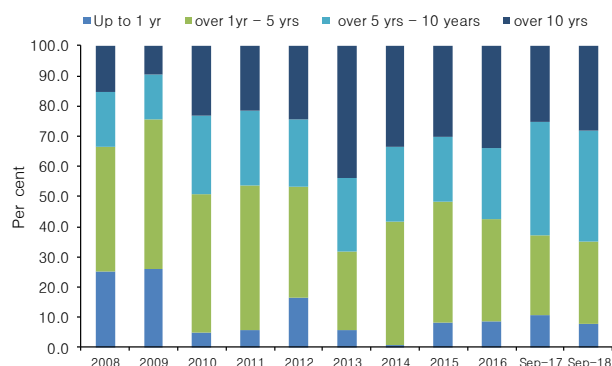
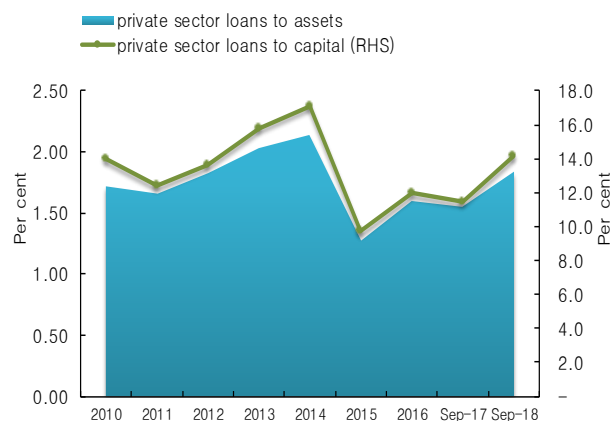


Table 4.2 Share of domestic debt by instrument type (%)

	Fixed rate	Variable rate	Non Interest Bearing Debt
2008	38.0	62.0	0.0
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

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



government (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 was 61.7 per cent at end-September 2018 compared to a ratio of 55.3 per cent at end-September 2017 (see **Table 4.2**).

4.5 Non-deposit-taking financial institutions' sector exposure

4.5.1 Securities dealers' exposure to private sector debt

The twelve core SDs continued to have low exposure to private sector debt for the review period.^{14,15} The ratio of private sector debt to assets for the SDs marginally increased to 1.8 per cent at end-September 2018 from 1.6 per cent at end-September 2017 (see **Figure 4.16**). Similarly, the ratio of SDs private sector debt to capital increased to 14.1 per cent at end-September 2018 from 11.4 per cent at end-September 2017. This development reflected a decline in capital concurrent with an increase in private sector debt. Notably, of the twelve SDs, eight institutions were exposed to private sector debt relative to seven as at end-September 2017.

SDs' loan quality ratio, measured as private sector NPLs to private sector loans, improved relative to the prior review period. Specifically, the ratio declined by 2.3 percentage points to 1.1 per cent at end-September 2018 (see **Figure 4.17**). This outturn was also well below the average of 7.4 per cent over the past five review periods and largely reflected the operations of one institution. Likewise, the coverage ratio, computed as loan loss provisioning as a per cent of non-performing loans for SDs increased to 291.2 per cent at end-September 2018 from 109.7 per cent at end-September 2017. This outturn reflected a substantial decrease in NPLs as well as an

¹⁴ Private sector loans include loans to corporate sector entities and personal (household) loans.

¹⁵ Core SDs include dealers whose business models were predominantly securities dealing activities and include the top 5 largest SDs.

expansion in loan loss provisions for most dealers in the sector.

4.5.2 Public sector debt & securities dealers' exposure

The decline of SDs' exposure to public sector debt persisted during the review period.¹⁶ This performance occurred within the context of the repayment of six BINs during 2018. Specifically, the ratio of public sector debt to SDs' assets decreased by 4.0 percentage points to 20.5 per cent at end-September 2018 relative to the previous review period (see **Figure 4.18**). Correspondingly, public sector debt holdings to capital declined to 157.4 per cent at end-September 2018 from 180.7 per cent at end-September 2017.

4.5.3 Insurance sector exposure to public sector debt

As with DTIs and SDs, the insurance sector's exposure to public sector debt declined for the review period. Specifically, the ratio of public sector debt holdings to insurance assets declined by 6.9 percentage points to 37.2 per cent at end-September 2018 relative to the previous review period (see **Figure 4.19**). This ratio was generally higher for the life insurance sub-sector, although falling by 7.7 percentage points to 40.3 per cent at end-September 2018. Public sector debt holdings for the insurance sector as a proportion of capital decreased to 141.6 per cent at end-September 2018 from 179.9 per cent at end-September 2017 (see **Figure 4.20**).

4.6 Exposure to other assets

NDTFIs maintained a relatively low exposure to equities and real estate during the review period. Specifically, the ratio of equity investments to assets for SDs decreased to 1.8 per cent as at end-September 2018 from 2.2 per cent as at end-September 2017. However, for insurance companies, this ratio increased by 1.0 percentage

Figure 4.17 Private sector NPLs to total private sector loans & coverage ratio for the 12 largest SDs

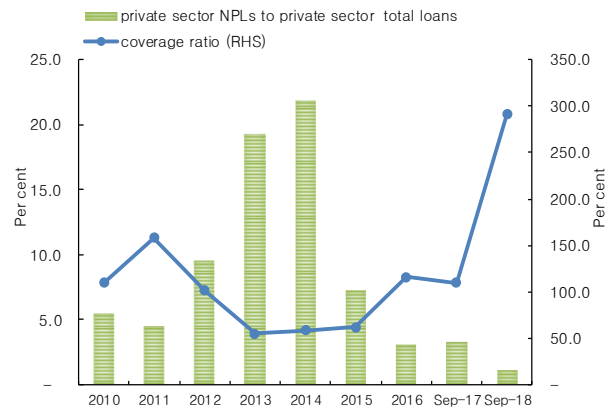


Figure 4.18 Public sector debt holdings to assets & capital for the 12 largest SDs

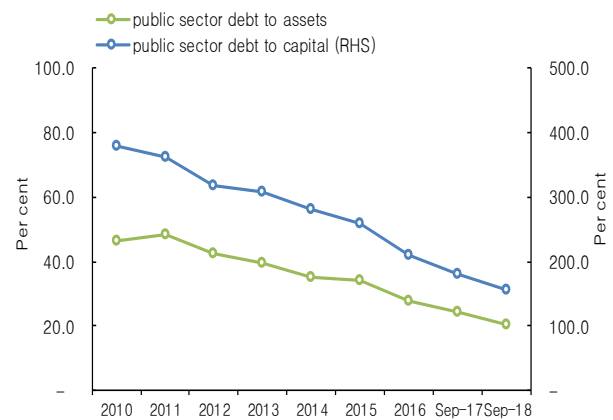
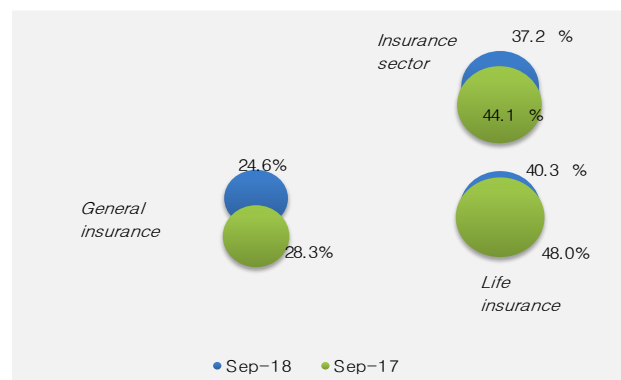


Figure 4.19 Public sector debt holdings to assets for ICs



¹⁶ Public sector debt is measured as the sum of public sector loans and public sector securities. Exposure is defined as public sector debt as a proportion of assets.

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

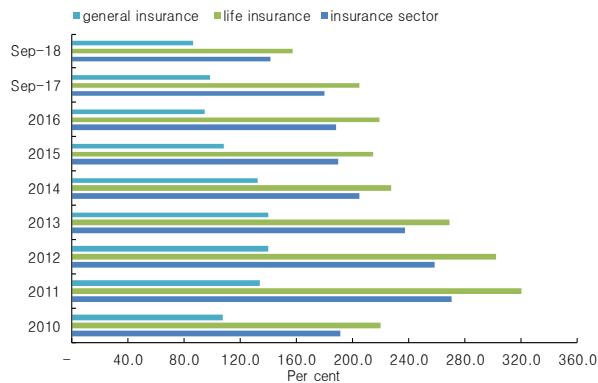


Figure 4.21 Investment in other assets for the DTIs, SDs & ICs

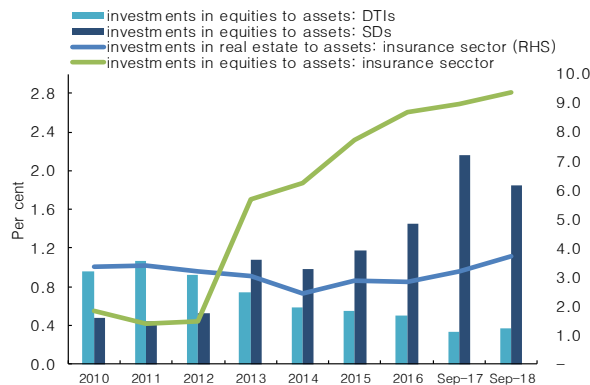


Table 4.3 Investment classes as a per cent of total assets for pensions industry

	2013	2014	2015	2016	Sep-17	Sep-18
Investments in Governments Securities to Assets (%) ¹⁷	42.5	40.5	33.6	30.4	26.1	25.0
Investments in Equities to Assets (%)	9.8	9.3	14.6	17.0	20.3	23.8
Investments in Real Estate to Assets (%)	5.9	5.8	5.4	4.8	4.0	3.8
Investment Arrangements to Assets (%) ¹⁸	29.0	29.5	32.8	36.6	38.0	36.9
Other Investments to Assets (%)	12.1	14.1	13.2	11.1	11.5	10.7
Total Asset values (J\$BN)	307.1	341.4	336.9	453.1	513.3	565.1

Notes

¹⁷ Government securities includes Government of Jamaica securities and other sovereign securities from the US.

¹⁸ An investment arrangement describes investments in deposit administration contracts and pooled funds.

point to 10.0 per cent for the year ended September 2018. Regarding real estate investment, the insurance sector demonstrated a marginal increase to 1.2 per cent of total assets for the year ended September 2018 from 1.0 per cent for the prior review period (see **Figure 4.22**).

For DTIs, investment in equities generally continued the downward trend evidenced since 2010. However, as at end-September 2018 exposure to equities increased marginally to 0.4 per cent of DTIs' assets from 0.3 per cent as at end-September 2017.

4.7 Pension industry exposure to government's securities, equities & real estate¹⁷

The exposure of the pension industry to investment arrangements declined for the year ended September 2018, although still accounting for the largest share of its assets.¹⁸ Additionally, the exposure to investments in GOJ and other governments' securities, though declining, remained relatively high in comparison to other investment classes (see **Table 4.3**).¹⁹ Specifically, exposure to investment arrangements and investments in GOJ and other governments' securities was 36.9 per cent and 25.0 per cent, respectively, at end September 2018. Comparatively, these values for the previous review period were 38.0 per cent and 26.1 per cent, respectively. The results at end-September 2018 reflected the continued shift away from government securities to limit sovereign risk. In contrast, exposure to equities investments increased by 3.5 percentage points to 23.8 per cent for the year ended September 2018. However, the pension industry's exposure to real estate continued to decline.

¹⁷ The data for the industry represents data for the pension fund as at end-September 2018.

¹⁸ Investment Arrangements describe Investments in Deposit Administration Contracts and Pooled Funds

¹⁹ Pension industry refers to private pension plans within the regulatory oversight of the Financial Services Commission.

5.0 RISK ASSESSMENT OF THE FINANCIAL SECTOR

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

5.1 Overview

Stress test results showed that DTIs generally remained resilient to hypothetical shocks to key risk exposures. In particular, the average exposure to foreign exchange risk fell while exposures to credit and interest rate risks were relatively unchanged for the year ended September 2018. However, liquidity risks increased marginally for the review period.

As it relates to the SD sector, stress test results demonstrated that these institutions remained most vulnerable to interest rate risks due to maturity mismatches. Furthermore, the sector was exposed to foreign exchange liquidity risks due to a shortfall in foreign currency assets to cover short term foreign currency repo liabilities financing needs. The SD sector, however, continued to be less impacted by the remaining risk factors.

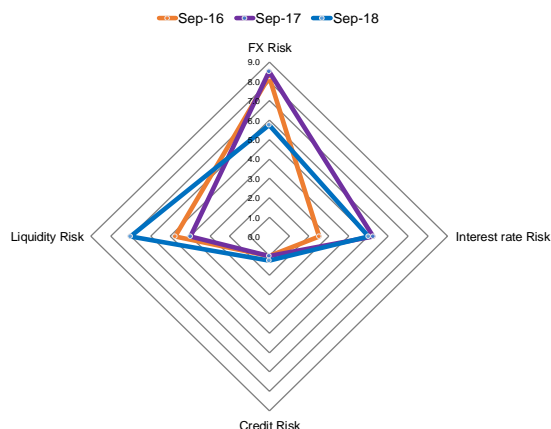
As it relates to the insurance sector, there was improved resilience to interest rate risks as at end-September 2018 relative to end-September 2017. Of note, the most significant risk exposure for the life-insurance sub-sector was FX appreciation.

5.2 Risk exposure assessment for deposit taking institutions

The financial risk exposure “cobweb” reflected improvements in exposure to foreign exchange risks as measured by NOP to capital and loans to non-foreign exchange earners as a share of total foreign exchange loans. However, there was an increase in DTIs’ exposure to liquidity risks largely due to a reduction in the holding of GOJ securities as there was a maturity of GOJ securities in July 2018 (see **Figure 5.1**).¹

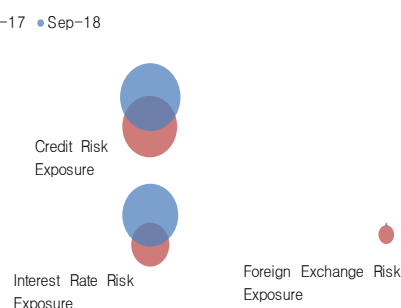
Notwithstanding, DTIs generally reflected lower average exposure to financial risks throughout the year ended September 2018 relative to the previous review period. This performance was

Figure 5.1 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 5.2 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).

¹ Government of Jamaica (GOJ) securities (benchmark investment notes) matured July 2018.

Figure 5.3 Trends in the liquid asset ratio and excess reserves in liquid assets

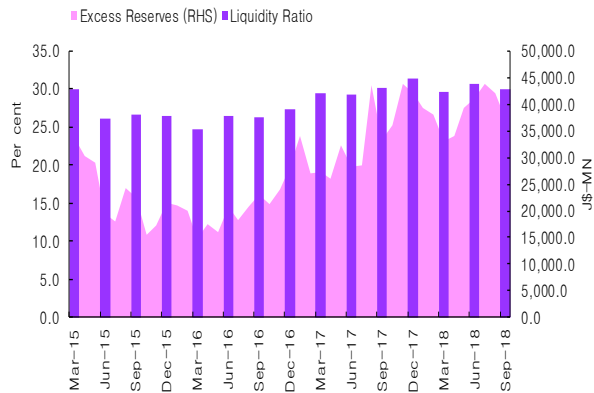


Figure 5.4 The ratio of assets maturing within 3 – months to liabilities maturing within 3 – months for DTIs

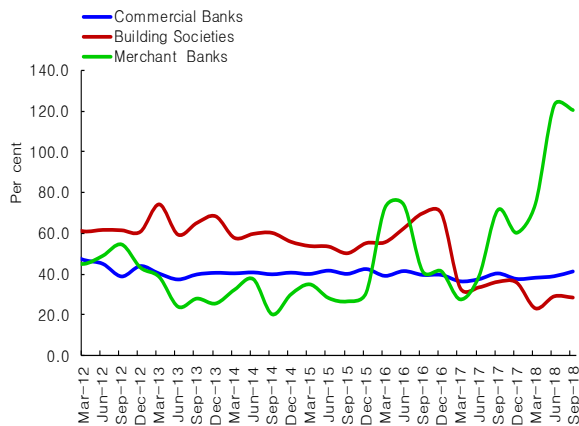
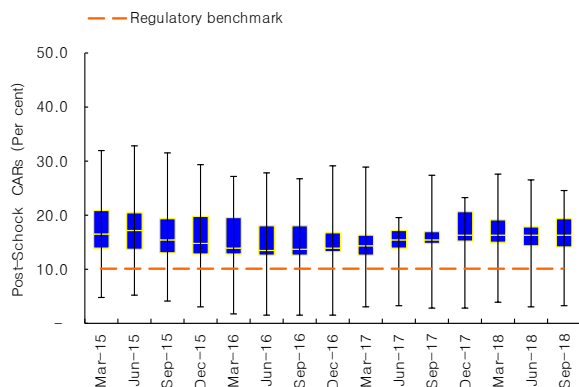


Figure 5.5 Distribution of liquidity funding risk stress test results for DTIs (10.0 per cent decline in average deposits)



primarily due to a reduction of foreign currency gains from a depreciation of the domestic currency, particularly in the latter half of the review period (see **Figure 5.2**). However, there was a greater exposure to interest rate risk which was mainly influenced by fair value losses. Nonetheless, DTIs remained resilient to hypothetical interest rate, liquidity, foreign exchange and credit shocks as at end September 2018.

5.3 Liquidity funding risk assessment for deposit taking institutions

Jamaica Dollar liquidity conditions were relatively unchanged during the year ended–September 2018. Specifically, the liquidity ratio of the sector was 30.0 per cent at end–September 2018 relative to 30.1 per cent at end–September 2017. Notably, the dollar value of DTIs’ excess liquid asset holdings was above the level recorded at the end of the previous review year (see **Figure 5.3**).

At the same time, there was improvement in the ratio of short–term assets to short–term liabilities for the merchant bank and commercial bank sub–sectors. This contributed an improvement in the ratio for the DTI sector during the review period (see **Figure 5.4**). Specifically, the ratio for the merchant bank sub–sector increased by 69.1 percentage points to 120.3 per cent. For commercial banks, the ratio increased by 2.5 percentage points to 41.2 per cent at end–September 2018, relative to the close of the previous year. Additionally, the loan–to–deposit ratio for the DTI sector increased marginally by 0.2 percentage point to 70.4 per cent at end–September 2018 relative to end–September 2017. Of note, this ratio remained below 100.0 per cent, indicative of continued and increased viability in meeting short–term liquidity needs.

As it relates to funding sources, deposits continued to account for the dominant share of DTIs’ funding base. However, deposits as a proportion of total funding decreased marginally to 63.6 per cent at end–September 2018 from 64.0 per cent at end–September 2017. In contrast, ‘repos’ as a share of total funding increased to 5.2 per cent from 4.4 per cent. Concurrently, ‘other funding’ liabilities as a share

of total funding was 5.0 per cent at end-September 2018 relative to 5.1 per cent at end-September 2017.

Regarding funding risk stress tests results, all DTIs were adequately capitalized to absorb losses associated with hypothetical declines in deposits during the first three quarters of 2018. 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 Notwithstanding, there was a decline in the interquartile range of post-shock CARs for the system during the review period. Furthermore, as at end-September 2018 it would take a 61.0 per cent reduction in deposits for the CAR of the DTI sector to breach the statutory benchmark of 10.0 per cent, which is a deterioration to end-September 2017 (see Figures 5.5 & 5.6).

5.4 Market risk assessment of deposit taking institutions

The DTI sector reflected an increase in the Jamaica Dollar value of foreign currency securities held during the review period. This growth mainly reflected increased holdings of foreign currency investments as DTIs adjusted portfolios within the context of depreciation of the domestic currency, particularly during the June 2018 quarter (see Figure 5.7). Against this background, foreign currency securities as a share of the total investments increased to 60.9 per cent at end-September 2018 relative to 58.6 per cent the previous period ended September 2017. Specifically, foreign investments increased to 61.5 per cent and 56.0 per cent at end-September 2018 for the commercial banks and building societies, respectively, from 59.6 per cent and 48.8 per cent at end-September 2017.

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).

Figure 5.6 Liquidity funding risk stress test results for DTIs³

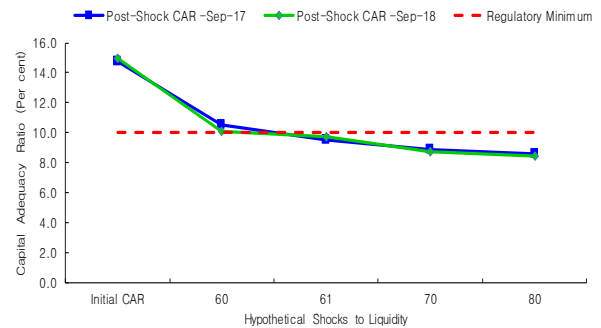


Figure 5.7 DTIs' domestic currency and foreign currency investment holdings as a ratio to total investments

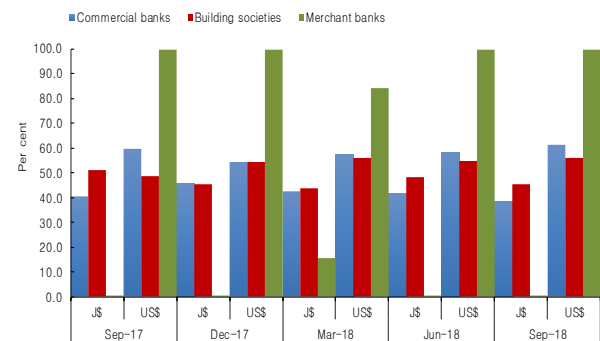
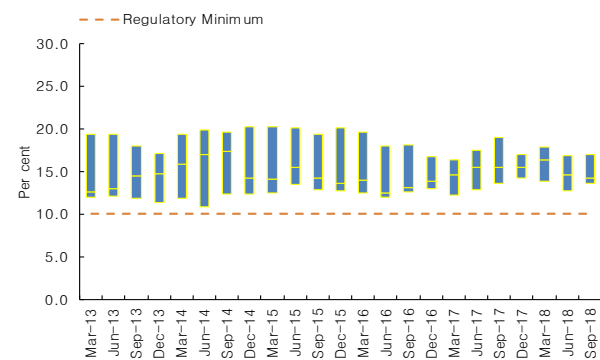


Figure 5.8 Interquartile range for post-shock CARs due to interest rate risk stress tests of DTIs (impact on CAR of 1100 bps/ 100 bps & 275 bps/ 15 bps shock to interest rates)⁴



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,

Figure 5.9 Quarterly ratio of DTI NOP to tiered capital

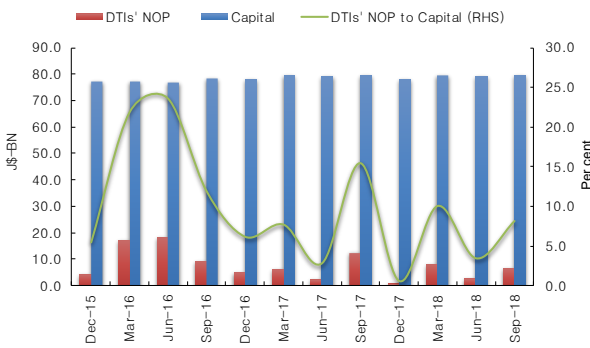


Figure 5.10 Analysis of foreign loans to non-foreign currency earners for DTIs

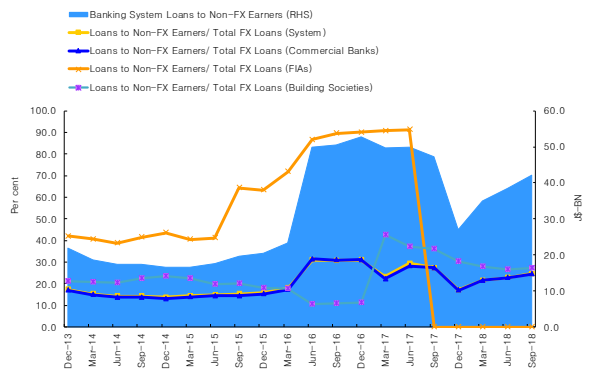
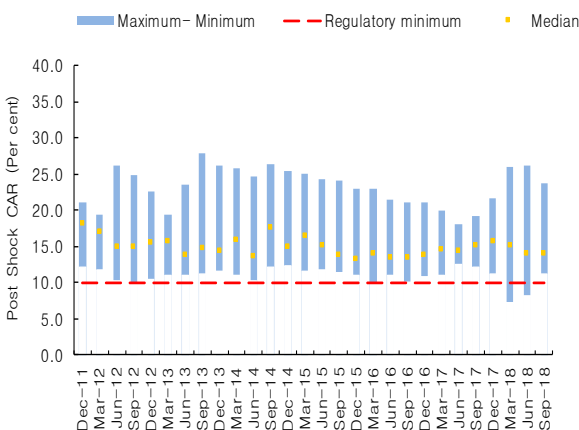


Figure 5.11 Distribution of foreign exchange risk stress test results for DTIs (impact on CAR of 30.0 per cent depreciation)



respectively. A shock of 275 bps and 15 bps was applied to the foreign securities portfolio and the foreign deposits & loan portfolio, respectively.

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

5.5 Interest rate risk assessment for deposit taking institutions

At end-September 2018, the results of interest rate risk stress tests showed that DTIs' resilience to these shocks were largely unchanged (see **Figure 5.8**). As at end-September 2018, the DTI sector was adequately capitalized to absorb losses associated with large but plausible hypothetical increases in interest rates, with the CAR remaining above the 10.0 per cent prudential minimum. Notwithstanding, at end-September 2018, the CAR of one DTI fell below the prudential benchmark, in response to the aforementioned interest rate shocks.

5.6 Foreign exchange risk assessment for deposit taking institutions

DTIs' NOP fell by 47.1 per cent to \$6.5 billion at end-September 2018, relative to end-September 2017 (see **Figure 5.9**).⁵ Consequently, the NOP to capital ratio for the DTI sector decreased to 8.2 per cent at end-September 2018 from 15.4 per cent at end-September 2017, reflective of reduced foreign currency risks. The reduction for the review period was due to a decrease in the long position for all DTI sub-sectors, particularly for commercial banks. Additionally, loans to non-foreign exchange earners as a proportion of total foreign currency loans declined to a quarterly average of 24.6 per cent for the review period from an average of 27.5 per cent for the corresponding period in 2017 (see **Figure 5.10**).⁶

In addition to the reduced foreign currency risk, as measured by NOP to capital, DTIs remained generally resilient to hypothetical depreciation of the Jamaica Dollar vis-à-vis the U.S. dollar during the calendar year to end-September 2018. Of note, DTIs' were adequately capitalized to absorb losses associated with these shocks. Moreover, subsequent to a hypothetical 30.0 per cent depreciation, the average median post-shock CAR across all DTIs was lower for the review

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.

period, relative to end-September 2017 (see Figure 5.11).⁷

A sectoral analysis of the impact of these shocks showed the building societies sub-sector with a greater quarterly average post-shock CAR relative to 2017. Of note, all DTI sub-sectors showed improved responses to the hypothetical depreciation shocks. DTIs also remained resilient to all the hypothetical appreciation shocks.

5.7 Credit risk assessment of deposit taking institutions

DTI's loan quality, as measured by the ratio of NPLs to total loans, was relatively unchanged at 2.6 per cent at end-September 2018 in comparison to end-September 2017. For the commercial banks and merchant banks sub-sectors, the ratios remained at 2.5 per cent and zero per cent, respectively. Of note, for the commercial bank sub-sector, growth in NPLs was offset by an increase in total loans. The loan quality ratio for the building societies sub-sector improved to 3.5 per cent from 3.8 per cent the previous review period.

Against the background of the increase in commercial banks' NPLs, the NPL coverage ratio for the sector deteriorated. Specifically, the NPL coverage ratio for the commercial banking sub-sector fell to 118.1 per cent at end-September 2018 from 128.2 per cent at end-September 2017 (see Figure 5.12).⁸ In contrast, due to the greater than proportional increase in provisions relative to NPLs, the NPL coverage ratio for the building societies sub-sector rose to 86.4 per cent at end-September 2018 from the 80.9 per cent recorded at the close of the previous review period. Of note, the outturn in the NPL coverage ratio was influenced by an increase in write-offs for the sector. Specifically, loan write-offs as a per cent of total loans, increased to 0.7 per cent at end-September 2018 from 0.5 per cent at end-

Figure 5.12 NPL coverage ratios for DTIs and write-off rates for NPLs for commercial banks

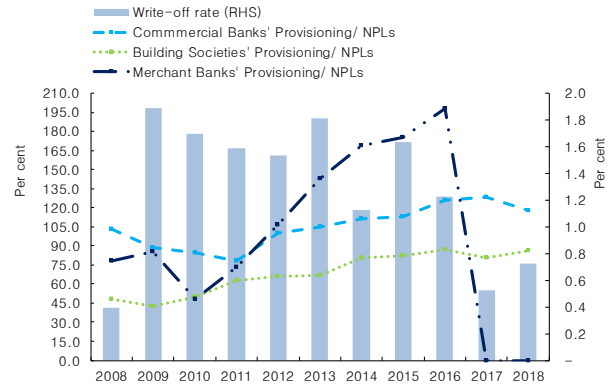


Figure 5.13 Credit risk stress test results for DTIs (Scenario: Impact on CAR of a 30% increase in NPLs)⁹

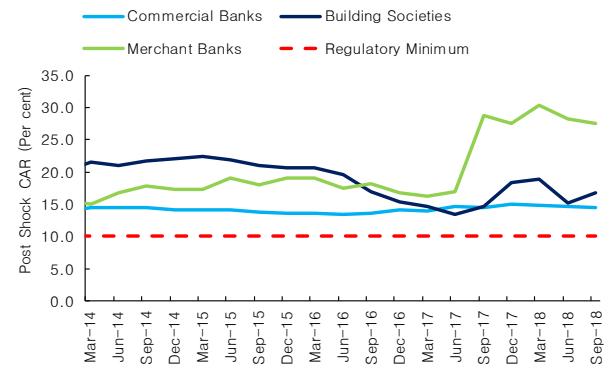
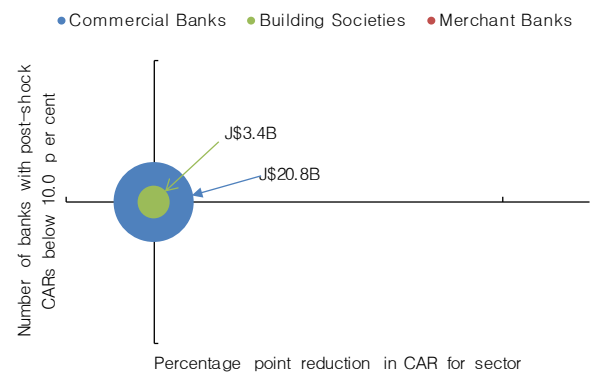


Figure 5.14 Credit risk exposure for DTIs at end-September 2018 (scenario: 100.0 per cent write-off of past due loans less than 3 months)¹⁰



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 merchant banking sector had no NPLs as at September 2018. As such, there was no impact on the sub-sector's CAR subsequent to a hypothetical increase in NPLs.

⁹ 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.

¹⁰ No institution's CAR fell below the prudential minimum.

Figure 5.15 Reverse stress testing the credit risk exposure of DTIs

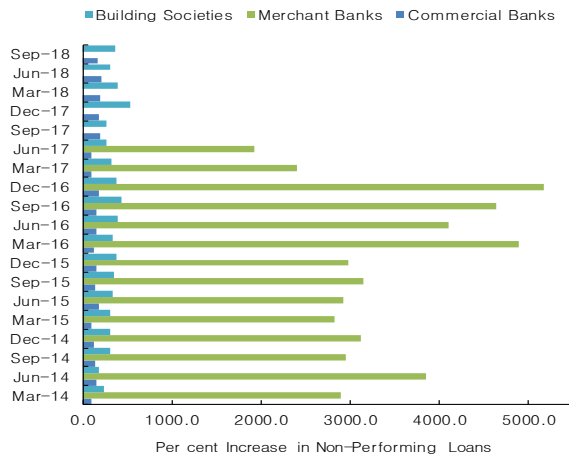


Figure 5.16 Impact on DTIs' CAR from an increase in NPLs

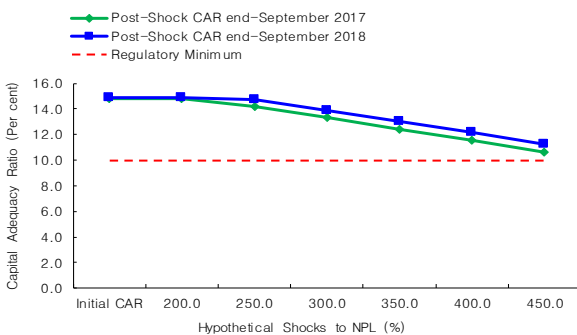
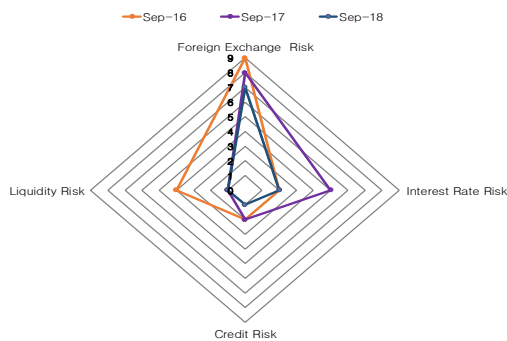


Figure 5.17 Evolution of risk exposure indicators for the 12 largest SDs



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-term liabilities

–September 2017 (see **Figure 5.12**).¹¹

The maximum ratio of NPLs to capital across all DTIs declined to 21.4 per cent from 25.3 per cent at end-September 2017. Furthermore, there was a narrowing of the inter-quartile range of NPLs to capital for DTIs, which reflected lower exposure to credit risk for four institutions. The ratio was within an inter-quartile range of 7.1 per cent to 18.5 per cent at end-September 2018 relative to the range of 5.8 per cent to 19.2 per cent at end-September 2017.

Stress test results at end-September 2018 showed that each DTI sub-sector was adequately capitalized to absorb a hypothetical increase of 30.0 per cent in NPLs. Of note, there was an improvement in building societies' resilience to this hypothetical increase in NPLs at end-September 2018, largely due to improved loan quality and stronger capitalisation over the review period. In response to the hypothetical scenarios, post-shock CARs for the commercial bank and merchant bank sub-sectors remained the same relative to the previous period (see **Figure 5.13**).

DTIs' experienced heightened exposure to credit risk emanating from a hypothetical write-off of 100 per cent of past due loans (< 3 months) at end-September 2018. In particular, the credit risk exposures of commercial banks and building societies increased to \$20.8 billion and \$3.4 billion, respectively, at end-September 2018 from \$17.8 billion and \$2.5 billion recorded at end-September 2017 (see **Figure 5.14**).

Reverse stress testing exercises showed that the DTI sector would remain generally robust when hypothetical shocks ranging between 200.0 per cent and 450.0 per cent were applied to NPLs at end-September 2018. Of note, it would take a hypothetical increase of 505.0 per cent in NPLs at end-September 2018 for the CAR of the DTI sector to breach the prudential minimum, relative

¹¹ Write-off rate is computed as the ratio of "charged off assets" for the year to "loans, advances & discounts (net of provisions)".

to an increase of 474.0 per cent at end-September 2017 (see Figures 5.15 and 5.16).^{12,13}

5.8 Risk exposure assessment for securities dealers

There was improvement in the SDs sector’s response to all assessed risk exposures at end-September 2018 relative to end-September 2017 (see Figure 5.17).¹⁴ In particular, the SDs’ exposure to foreign exchange risks improved in the context of a decrease in the NOP to capital ratio. The performance of the credit risk dimension was impacted by a marginal decrease in the NPLs to total loans ratio.¹⁵ The fall in liquidity risk exposure was due to an increase in SDs’ liquid assets position. With regard to the decrease in interest rate risk exposure, this predominantly reflected 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.

Notwithstanding improvements in SD average risk exposures, the results of the aggregate stress test at end-September 2018 showed deterioration in resilience relative to the performance at end-September 2017.¹⁶ This deterioration was largely reflective of continued vulnerability to interest rate risk (see Figure 5.18).

5.9 Liquidity funding risk assessment of securities dealers

Stress test results, based on data at end-September 2018, showed that SDs continued to be resilient to hypothetical reductions in repo

Figure 5.18 Impact of scenario based aggregate stress tests on SDs’ CARs

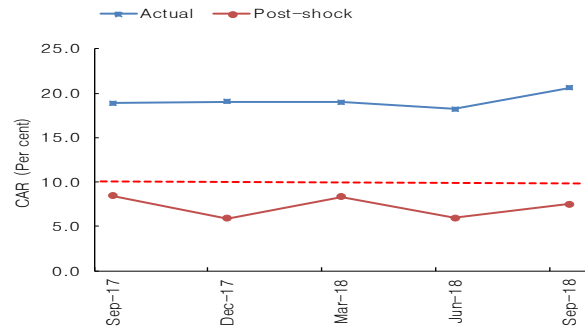


Figure 5.19 Liquidity funding risk stress test results for SDs (Scenarios: 10.0 per cent to 50.0 per cent decline in Retail Repo-liabilities)

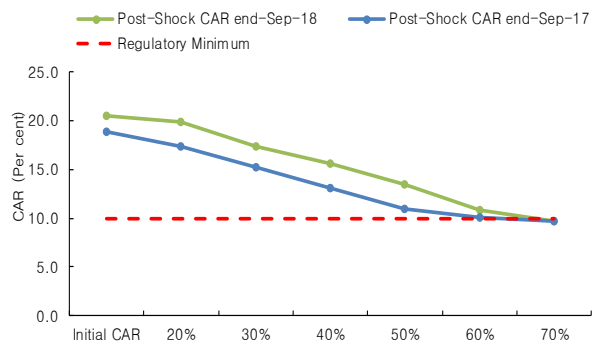
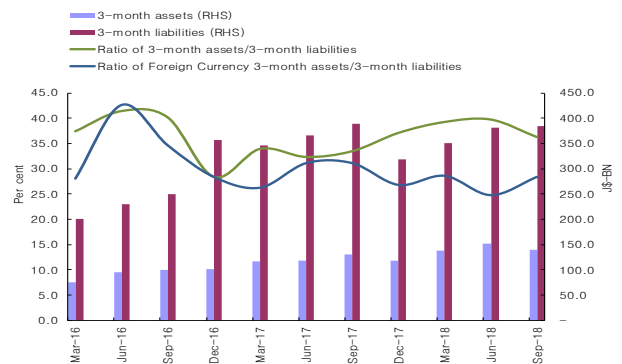


Figure 5.20 The ratio of assets maturing within 3-months to liabilities maturing within 3-months for SDs



¹² 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.

¹³ The merchant banking sub-sector had zero NPLs and as a result no reverse stress testing was applied.

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.

Figure 5.21 Cumulative gap to asset positions – SDs

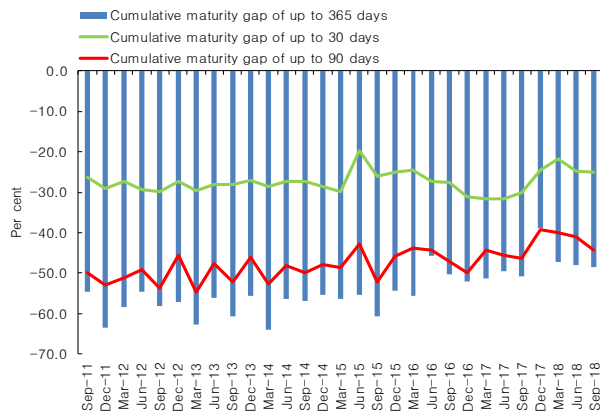


Figure 5.22 Interest rate stress test results – SDs¹⁷

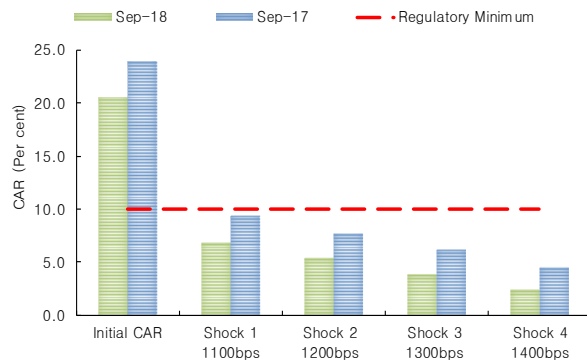
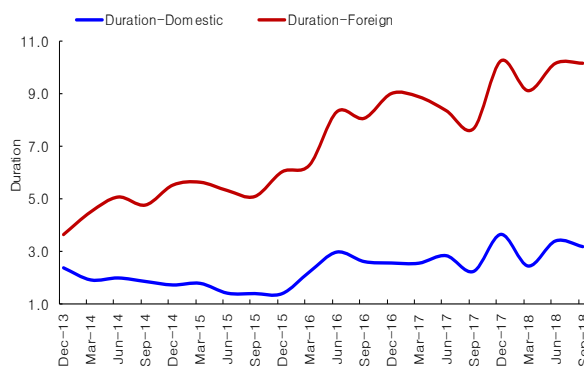


Figure 5.23 Evolution of duration for domestic and foreign securities for top 12 largest securities dealers



¹⁷ 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.

¹⁸ The current 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.

liabilities.¹⁸ A decline of 67.0 per cent in retail repo liabilities would result in the sector’s CAR falling below 10.0 per cent, relatively in line with the result at end-September 2017 (see **Figure 5.19**).¹⁹ 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 16.9 per cent at end-September 2018 from 17.9 per cent at end-September 2017.

There were also improvements in key liquidity indicators for the SD sector for the year ended September 2018. Specifically, the ratio of liquid assets to total assets increased to a quarterly average of 17.9 per cent for the review period from a quarterly average of 12.3 per cent for the corresponding period of 2017.²⁰ There was also a narrowing of the cumulative 30-day and 90-day maturity gaps between interest sensitive assets and liabilities (see **Figure 5.21**). Furthermore, the ratio of short-term assets (less than three months) to short-term liabilities increased to a quarterly average of 38.1 per cent from 32.0 per cent for the year-ended September 2017 and exceeded the five-year average of 32.4 per cent. Despite the overall improved liquidity conditions of the sector, the foreign currency short-term assets to short-term liabilities ratio declined to a quarterly average of 27.2 per cent for the year-ended September 2018 from a quarterly average of 29.3 per cent for the previous review period (see **Figure 5.20**).

5.10 Interest rate risk assessment 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

¹⁹ 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.

²⁰ 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.

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 6.9 per cent at end-September 2018 from 9.4 per cent at end-September 2017 (see **Figure 5.22**).

The weaker performance of the SDs as at end-September 2018 was mainly attributable to lower capital adequacy relative to the prior review period. Additionally, increases in duration on foreign investment contributed to higher fair value losses (see **Figure 5.24**). Furthermore, SDs remained susceptible to interest rate risk due to the continued gap between the duration on the asset and liability portfolio at end-September 2018 (see **Figure 5.25**).

5.11 Foreign exchange risk assessment of securities dealers

At end-September 2018, the SDs' sector remained resilient to hypothetical exchange rate shocks despite a marginal increase in the NOP.²¹ Specifically, these institutions were resilient to hypothetical depreciations of 10.0 to 50.0 per cent and hypothetical appreciations of 10.0 to 50.0 per cent in the exchange rate (see **Figure 5.26**). Of note, following a hypothetical appreciation of 50.0 per cent in the exchange rate, the CAR for the SD sector declined by 4.4 percentage points to 16.1 per cent. This was in comparison to a decline of 6.3 percentage points to a post-shock CAR of 17.6 per cent at end-September 2017 following a similar shock. The sector's CAR remained above the 10.0 per cent benchmark due to the strong level of capital.

5.12 Evolution of risk indicators – life and general insurance companies

At end-September 2018, the cobweb map of risk exposures for GI companies showed deterioration in the asset quality, liquidity and reinsurance and actuarial risks relative to end-September

Figure 5.24 Investment holdings as a ratio to total investments – top 12 SDs

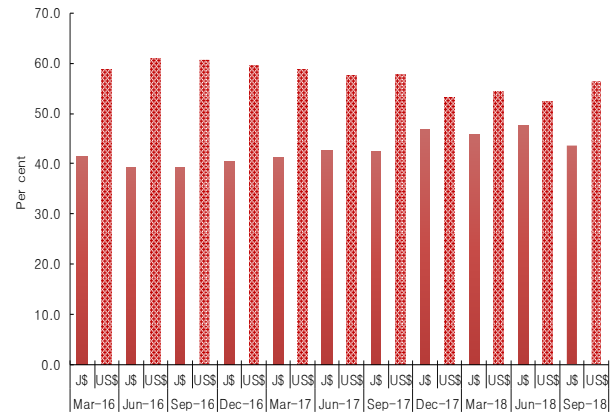


Figure 5.25 Duration gap vs. percentage point change in CAR after a 1100bps/100bps interest rate shock at end-September 2018

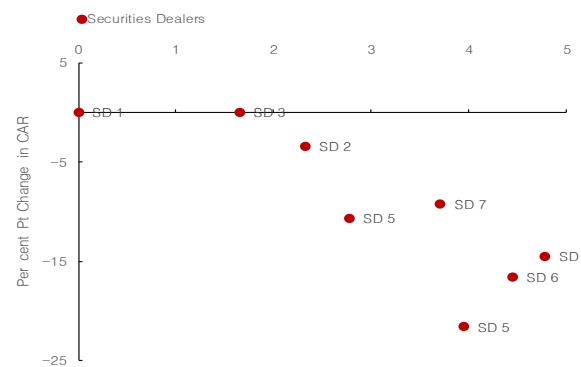
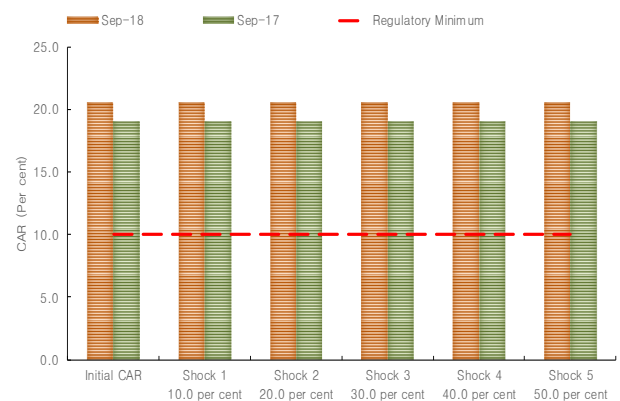
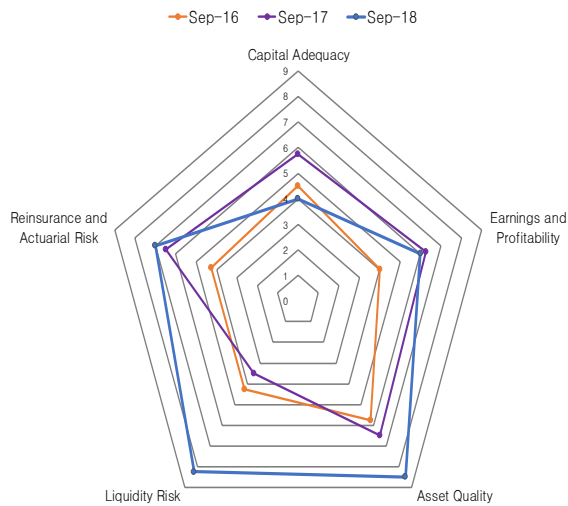


Figure 5.26 Foreign exchange risk stress test results – SDs (Scenarios: Impact on CAR of 10.0 per cent to 50.0 per cent depreciation)



²¹ The NOP to capital ratio for the SDs marginally increased to 20.9 per cent at end-September 2018 from 20.8 per cent at end-September 2017.

Figure 5.27 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

2017 (see **Figure 5.27**). The deterioration in asset quality largely reflected the impact of increases in the equities to total assets and receivables to gross premiums ratios. The worsening in the liquidity dimension largely reflected the impact of a weakening in the liquid assets to total assets ratio. Nonetheless, there was improvement in the earnings and profitability dimension which largely reflected the impact of total expenses as a proportion of net premiums written. Capital adequacy improved in the context of a higher capital to assets ratio.

As it relates to the LI sub-sector, there was deterioration across the reinsurance & actuarial issues as well as earnings & profitability dimensions for the review period (see **Figure 5.28**). The strongest improvement was evidenced in the sensitivity to market risk dimension, driven by duration of assets and liabilities of global bonds.

Figure 5.28 Evolution of Risk Exposures – LI



Note: Core FSI indicators: (i) Capital Adequacy – MCCR, 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

5.13 Foreign exchange risk assessment of insurance companies

The LI sub-sector was less resilient to hypothetical depreciations in the exchange rate at end-September 2018, relative to the end of the previous review period. Specifically, following a hypothetical depreciation of 50.0 per cent, the post-shock MCCR for the LI sub-sector declined to 179.0 per cent from 211.2 per cent at end-September 2017.

Additionally, the LI sub-sector was very susceptible to hypothetical appreciations of the exchange rate as most institutions held significant net long positions. Specifically, following a hypothetical appreciation of 30.0 per cent in the exchange rate, the LI sector's MCCR fell below the prudential benchmark to 129.1 per cent. At end-September 2017, the post-shock MCCR was 188.1 per cent (see **Figure 5.29**).

5.14 Market and interest rate risk assessment of insurance companies

LI and GI companies showed increased resilience to hypothetical interest rate shocks at end-September 2018 relative to end-September 2017.

The performance of each sub-sector reflected strong levels of capitalization as well as lower net interest income losses for the LI sub-sector (see **Figure 5.30**). The capital ratios of sub-sectors remained above their respective prudential minimums at end-September 2018.

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. In response to these hypothetical interest rate shocks, the post-shock capital ratios of all ICs, except two LI companies, remained above the statutory benchmarks (see **Figure 5.31**).

5.15 Liquidity funding risk assessment 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 during the review period. However, in response to a hypothetical shock involving a 10.0 per cent loss of liquid liabilities, the MCCSRs of LI companies decreased to a quarterly average of 235.7 per cent for the year-ended September 2018. This was relative to a quarterly average MCCSRs of 237.7 per cent for the year-ended September 2017 in response to a similar shock (see **Figure 5.30**).

Nonetheless, the post-shock MCCSR was well above the prudential minimum for all institutions in the LI sub-sector. In addition, the quarterly average post-shock MCT for GI companies was 324.8 per cent relative to a quarterly average of 311.6 per cent for the previous review period. The improved performance for the sector was also driven by increases in the capital positions of the sub-sectors.

Aggregate stress test results for the life and GI companies showed post-shock capital ratios which remained above the prescribed statutory

Figure 5.29 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)

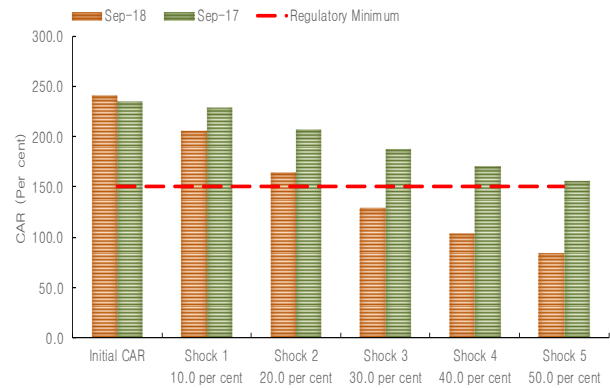


Figure 5.30 Liquidity funding rate risk stress test results for the insurance sector (Scenario: Impact on CAR of 10.0 per cent decline in liquid liabilities)

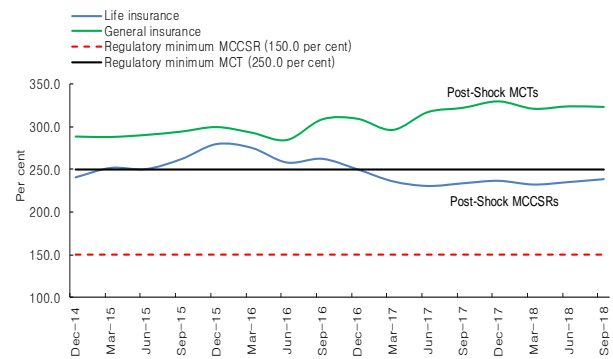
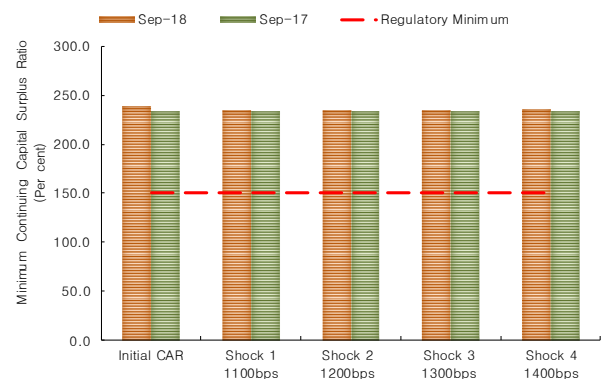


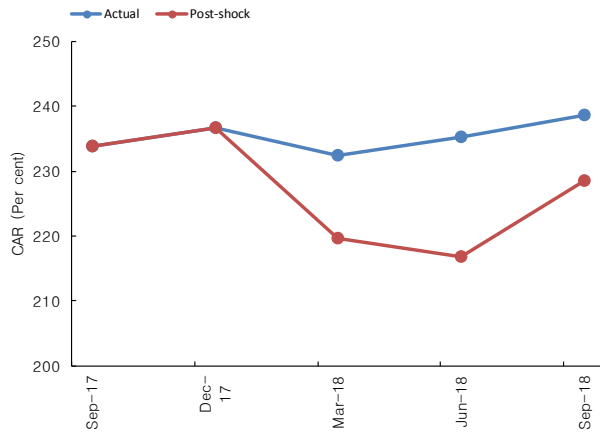
Figure 5.31 Interest rate risk stress tests for the LI sector²²



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

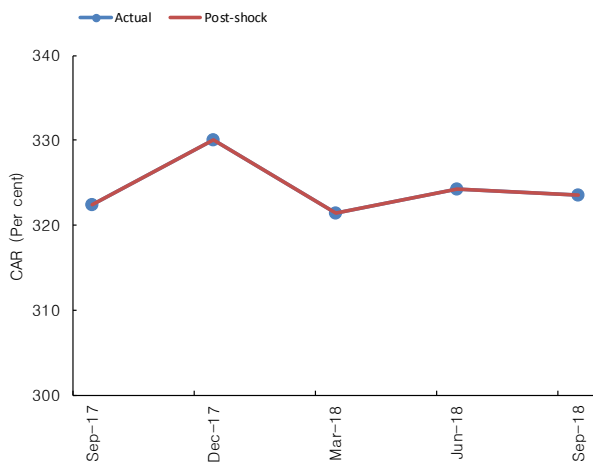
bps/70 bps in interest rates on domestic/foreign rate sensitive assets and liabilities

Figure 5.32 Impact of Scenario based aggregate stress tests on LI sector's MCCR



benchmarks (see **Figures 5.32 & 5.33**). Of note, the LI sub-sector was largely impacted by a hypothetical shock involving a loss of 10.0 per cent in liquid liabilities.

Figure 5.33 Impact of Scenario based aggregate stress tests on GI sector's MCT



Box 5.1 Predicting Bank Failures in Jamaica: A Logistic Regression Approach

The global banking and financial crisis of 2007-2008 reignited efforts to develop early warning models that can aid in predicting bank failures. To this end, changes have been made to supervisory frameworks in many jurisdictions, in order to strengthen the environment in which financial institutions operate. Regulators have developed early warning systems (EWS) in an attempt to identify factors that can predict failure of financial entities. As such, EWS are important for monitoring and evaluating financial institutions given that they can be used to pre-empt financial system instability. Against this background, the logistic regression methodology was used to construct a new EWS index based on the financial ratios obtained from the balance sheets and income statements of DTIs over the period March 2008 to December 2017.¹

Logit Methodology

A logistic regression was used to differentiate a bank that is sound from one that is highly fragile. The methodology involved the creation of an index of banking fragility (BF_t), as shown in equation 1. The index BF_t , motivated by the works of Zaghdoudi (2013) and Kibritcioglu (2002), was constructed using three indicators: banking deposits (DEP), total loans (TL) and the net open position (NOP) as follows:

$$BF_{i,t} = \frac{\left(\frac{DEP_{i,t} - \mu_{dep}}{\sigma_{dep}}\right) + \left(\frac{TL_{i,t} - \mu_{tl}}{\sigma_{tl}}\right) + \left(\frac{NOP_{i,t} - \mu_{nop}}{\sigma_{nop}}\right)}{3} \quad (1)$$

Equations 2, 3 and 4 capture the annual variations in the total volume of banking deposits ($LDEP$), total loans (LTL) and net open positions ($LNOP$), respectively. These equations capture the economic risks related to banks' balance sheets associated with liquidity risk, asset quality and foreign currency risk, respectively. In addition, parameters μ and σ

represent the arithmetic average and standard deviation, respectively, of the three variables.^{2,3}

$$DEP_{i,t} = \left(\frac{LDEP_{i,t} - LDEP_{i,t-12}}{LDEP_{i,t-12}}\right), \quad (2)$$

$$TL_{i,t} = \left(\frac{LTL_{i,t} - LTL_{i,t-12}}{LTL_{i,t-12}}\right) \quad (3)$$

$$NOP_{i,t} = \left(\frac{LNOP_{i,t} - LNOP_{i,t-12}}{LNOP_{i,t-12}}\right), \quad (4)$$

Following the construction of $BF_{i,t}$, the dependent variable used in the logit model, equation 5, was derived using the following transformation:

$$\begin{cases} 0 > BF > -0.5, & \text{low fragility, } s_{i,t} \text{ is assigned } 0 \\ -0.5 \geq BF, & \text{high fragility, } s_{i,t} \text{ is assigned } 1 \end{cases}$$

The logit curve

The probability of default for the banking sector, outlined in equation 5, was derived using the output from the transformation above and the normalized values of the explanatory variables listed in table 1. The explanatory variables comprise thirteen financial ratios based on the six categories of the CAMELS rating system (see Table 1).

$$S_{i,t} = \frac{1}{1 + e^{-b_0 - \sum_{i=1}^N b_{i,t} x_{i,t}}} \quad (5)$$

The logit curve, $s_{i,t}$, represents the probability of default of a bank at the one year forecast horizon. The parameter $b_{i,t}$ represents the coefficients of the relevant scoring functions indicators while $x_{i,t}$ denotes the financial ratios of a bank. Of note, the value of $s_{i,t}$, which ranges from 0 to 1, expresses the aggregate view of the riskiness of the banking sector.

¹ See Baker, C., "Predicting Bank Failures in Jamaica: A Logistic Regression Approach", Bank of Jamaica, 2018

² See Zaghdoudi, T., "Bank failure prediction with logistic regression". International Journal of Economics and Financial Issues, 3(2), 537-543, 2013

³ See Kibritcioglu, A., "Excessive risk-taking, banking sector fragility, and banking crises", U of Illinois, Commerce and Bus. Admin. Working Paper, (02-0114), 2002.

Subsequent to applying the backward stepwise regression procedure, the model shown in **equation 6** was estimated.

$$S_{i,t} = \frac{1}{1 + e^{-(b_0 + b_1ca_1 + b_2aq_1 + b_3mq_1 + b_4mq_2 + b_5ep_1 + b_6sr_1)}} \quad (6)$$

Table 1 Explanatory variables

CAMELS categories	Ratios
Capital Adequacy	Regulatory capital to risk-weighted assets (ca ₁)
	Loan loss provisions to non-performing loans (ca ₂)
Asset Quality	Non-performing loans to total loans (aq ₁)
	Total loans to Total assets (aq ₂)
	Coverage of NPLs (aq ₃)
Management Quality	Operating expense to total assets (mq ₁)
	Deposit interest expenses to total deposits (mq ₂)
Earnings and Profitability	Return on assets (ep ₁)
	Return on equity (ep ₂)
	Interest margin to income (ep ₃)
	Non-interest expenses to income (ep ₄)
Liquidity	Liquid assets to total assets (li ₁)
Sensitivity to Market Risk	Net open position to capital (sr ₁)

Results

The findings showed that the best performing explanatory variables to predict banking defect were regulatory capital to risk-weighted assets, non-performing loans to total loans, operating expense to total assets, deposit interest expenses to total deposits, return on assets and net open position to capital (see **Table 1**). The positive relationship between the NPLs to total loans ratio and bank failure highlights the importance of monitoring the quality of the NPLs portfolio since high levels of NPLs may erode the profitability of banks and heighten financial stability risks.

The positive relationship between regulatory capital to risk-weighted assets and bank failure was unexpected and was supported by literature amidst the ongoing debate in this area.⁴ Specifically, banks may be incentivised to take on additional risks in a context of higher capital requirements. The results also led to the conclusion that operating expense to total loans and net open position to capital have positive impacts on bank fragility. Conversely, deposit interest expenses to deposits and return on assets are negatively related to the level of financial risks.

Usefulness of the model for identifying periods of financial stress

The model (**equation 6**) identified three known periods of financial stress in Jamaica (see **Figure 1**). First, the increasing evolution of the probability of default from September 2008 to its peak in September 2009 captured the lagged effect of the 2007–2008 global financial crisis on the local banking sector. The global financial crisis and the subsequent recession fueled high levels of NPLs and increased foreign exchange risk exposures as a result of the depreciation of the Jamaica dollar.

The other two periods of financial stress captured by the model were March 2010 to June 2010 and December 2012 to March 2013. These periods were associated with the Jamaica Debt Exchange (JDX) and the National Debt Exchange (NDX), respectively. Both the JDX and NDX were implemented in an attempt to improve the Government of Jamaica’s debt sustainability via the exchange of existing bonds for new bonds with the same principal value but lower interest rates and longer maturities.

With regard to the impact on the banking system, the debt exchanges contributed to reductions in the net interest income as well as increases in total loans and NPLs. Overall, the score has shown a decreasing trend from June 2014 onwards, largely driven by continued

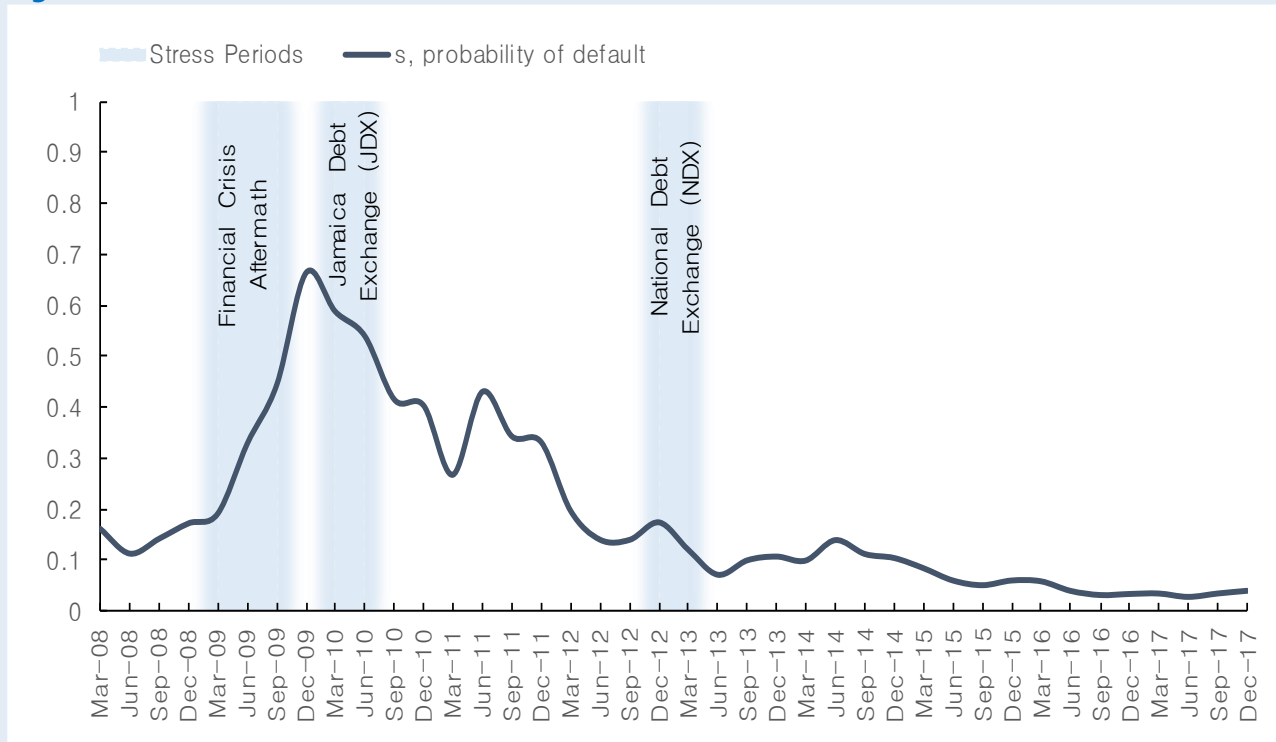
⁴ See, for instance, De Bandt, O., Camara, B., Pessarossi, P., & Rose, M., “Does the capital structure affect banks’

profitability? Pre- and post financial crisis evidence from significant banks in France”, Banque de France, 2014.

improvement in the NPLs to total loans ratio. The dynamics of the index from March 2008 to December 2017 suggest that the banking sector has been steadily lowering its vulnerability.

Based on the results of this scoring model, supervisors of financial institutions in Jamaica and the Caribbean can use the framework to aid in the prudential surveillance of individual financial institutions.

Figure 1 S-score for the Jamaican banking sector, March 2008 – December 2017



Box 5.2 Cyber Risk and its Impact on Financial Stability

*While growth in digitalization within financial institutions has contributed significantly to operational efficiency and financial deepening, it also creates new exposures to risks, particularly for cyber security. Accordingly, regulators globally and domestically have become increasingly concerned about the growing number and sophistication of cyber attacks on financial institutions as well as the threat to financial stability. Cyber attacks/risks, according to Cebula and Young (2010), refers to "operational risks to information and technology assets that have consequences affecting the confidentiality, availability or integrity of information or information systems."*¹

Nature of cyber risks

Data breaches on financial institutions are seen regularly in both the printed and social media. These include and are not limited to breaches to money transfer services and third party processors. In addition, financial market infrastructures have negatively affected by cyber-attacks. Given the financial reliance on a small set of systems, a sudden shock to these services, as a result of these attacks, may be systemic in nature. Unsurprisingly, Jamaica's financial system has not been exempt from cyber-attacks. In fact, several DTIs have over the years confirmed data losses or disruptions. Moreover, everybody is exposed to cyber risks and many countries have adopted cyber security and standards as important policy objectives.

Cyber risk and its systemic features

Some of the most disastrous cyber events range from the denial of service, intrusion or hacking for the introduction of Malware infection (for example Wanna Cry 2017). Such cyber-attacks can impact the profitability of financial institutions. For the review period, January 2018 to September 2018, there were 62 counts of internet banking fraud in Jamaica totaling \$38.2 million. In just one month, there was a total of

\$10.0 million in losses. Though not systemic, this highlights the need to strengthen the financial system's resilience to cyber risk.

Difficulties in estimating the cost and likelihood of cyber events

Most of the difficulties confronted in estimating cyber risks are related to the inexperience with significant and unusual events. Some of these events include unfamiliar shock transmission channels, the lack of detailed information about events and, particularly, the long term implications of cyber breaches. These events limit the estimation of the extent and likelihood of these shocks.

Vulnerabilities arising from cyber risk

Financial systems are particularly vulnerable to cyber-attacks because of their important role in financial intermediation. Moreover, a successful cyber-attack may cause spillover effects in the financial system. Accordingly, these cyber events may have a direct material consequence through financial losses and indirect costs such as the impairment of the entity's reputation.

Effective risk management commensurate with the underlying cyber risk

Similar to operational and financial risks, financial institutions must decide on how to manage cyber risks. These may be managed through risk reduction, risk transfer or simply risk avoidance. Due to the negative externalities posed by cyber risk which may in turn affect the real economy, Bank of Jamaica has continued to regulate the deposit-taking institutions such that information asymmetries are minimized while maintaining systemic risk.

Bank of Jamaica recognizes that cyber security is increasingly emerging as a risk exposure for financial institutions. As such, given the potential impact of cyber breaches, the Bank is keen to ensure that all licensees have proper

¹ Cebula, J.J. and L.R. Young, "A taxonomy of Operational Cyber Security Risks", Technical Note CMU/SEI-2010-TN-028,

Software Engineering Institute, Carnegie Mellon University, 2010.

measures in place to mitigate such occurrences.

Accordingly, the Bank is in the process of establishing guidelines on the management of cyber risk pursuant to the Banking Services Act (BSA), section 132 (m). This will give power to the Supervisory Committee to make rules for the operations of licensees. Until these guidelines are promulgated deposit-taking institutions are expected, at minimum, to comply with international cyber risk best practices.

6.0 PAYMENT SYSTEM DEVELOPMENTS

This chapter monitors activities and developments within the payment system.

6.1 Overview

Against the background of improvements in domestic liquidity conditions, the payment and settlement systems continued to demonstrate growth in financial activities. For 2018, activities in the JamClear®-Real-Time Gross Settlement (RTGS) system showed a marked increase. The overall value of transactions amounted to 20.5 times GDP relative to 15.2 times GDP for 2017. Similarly, the JamClear®-Central Securities Depository (CSD) system increased to 26.6 times the size of the economy from 18.6 times GDP for 2017. However, there was a reduction in the number of transactions in the CSD. Despite the increase in electronic payments, there was continued strong growth in the usage of cash. Concurrently, the number of cheque transactions continued to decline.

During 2018, there was continued susceptibility to concentration risk in the payment system. This vulnerability reflected concentration of liquidity in the large-value transfer system as the majority of payment activity was undertaken by two active participants.

Regarding interconnectedness and systemic importance, commercial banks continued to significantly influence the flow of liquidity within the financial system. Contagion risk moderated during the review year, as the level of network connectivity declined relative to 2017. Notwithstanding, there remained a high degree of interconnectivity within the system.

Figure 6.1 JamClear®-RTGS systems monthly turnover

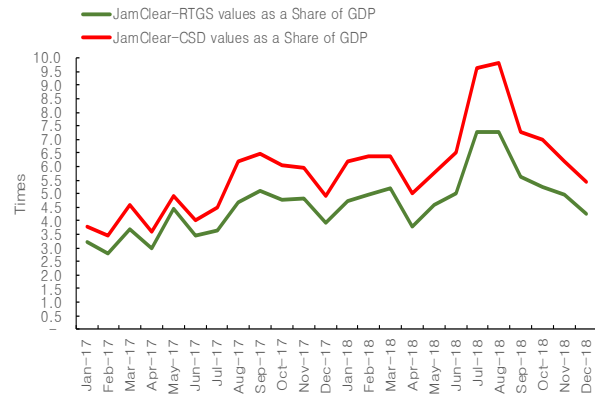


Figure 6.2 JamClear®-RTGS monthly transaction values and volumes

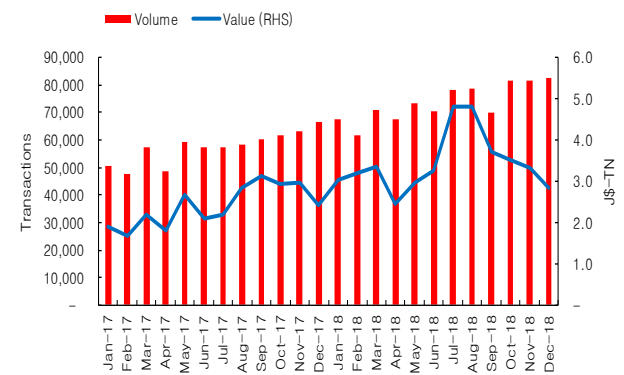


Figure 6.3 JamClear®-CSD monthly transaction values and volumes

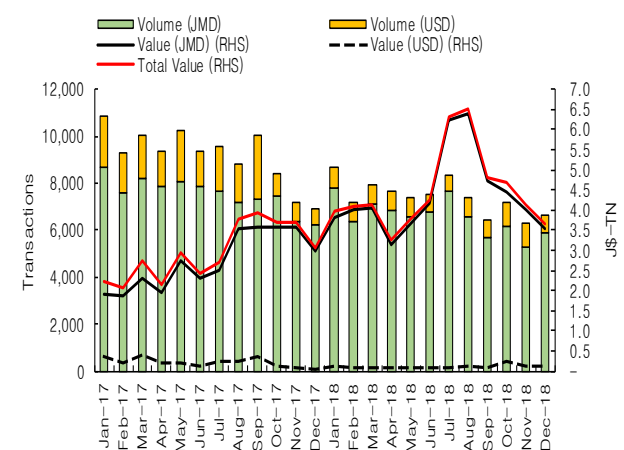


Figure 6.4 Automated Clearing House monthly transaction values and volumes

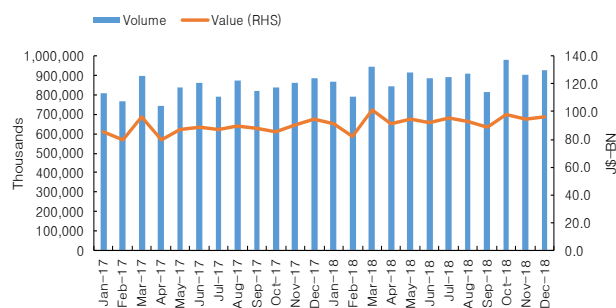


Figure 6.5 MultiLink monthly transaction values and volumes

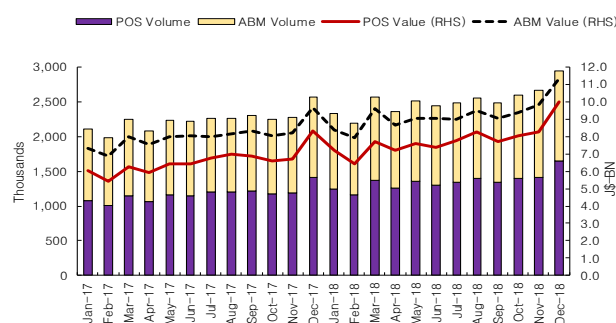


Table 6.1 Proportion (%) of average monthly retail payment transactions

	2017		2018	
	Value	Volume	Value	Volume
Cheques	52.5	14.1	46.3	9.8
Card Payments				
Debit	29.9	69.0	32.4	69.3
Credit	12.9	17.4	15.8	18.2
Other Electronic Payments	4.8	2.2	5.5	2.7

6.2 Key developments in payment systems

6.2.1 JamClear®-Real-Time Gross Settlement System^{1,2}

The payment system continued to be strongly influenced by expansion of activities in the RTGS system during 2018. Specifically, overall transaction values increased to \$41.3 trillion from \$28.8 trillion for 2017. This growth influenced an increase of system turnover to 20.5 times GDP.³ The average monthly transaction value also increased to \$3.4 trillion for 2018 from \$2.4 trillion for 2017. This transactional value contributed to an average monthly turnover of 5.2 times monthly GDP relative to 2.8 times monthly GDP for 2017 (see Figure 6.1).^{4,5} A disaggregation of payments activity showed that JamClear®-CSD accounted for approximately 77.8 per cent of the total transaction value of the RTGS system.

Correspondingly, total volume of JamClear®-RTGS transactions grew by 28.5 per cent to 883 773 transactions for 2018 for 2018 (see Figure 6.2). Customer credit transfers (single and multiple) accounted for approximately 91.6 per cent of the total transaction volumes in comparison to 87.0 per cent for 2017.

6.2.2 JamClear®- Central Securities Depository⁶

Activity within the JamClear®-CSD showed mixed results for 2018. In particular, the value of transaction increased over the review period, while the volume of transactions declined (see Figure 6.3).⁷ Of note, overall transactional value increased to \$53.5 trillion from \$35.4 trillion for 2017, reflecting a system turnover of 26.6 times GDP. This performance was also reflected in an

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, nine primary dealers (broker dealers), the Jamaica Central Securities Depository (Trustee), Accountant General Department (AGD) and Bank of Jamaica (BOJ).

³ JamClear®-RTGS overall value does not include general ledger and billing transactions.

⁴ Turnover is a ratio of the total transaction value as percentage of GDP.

⁵ The monthly GDP was derived based on the interpolation of quarterly nominal GDP using the quadratic match sum method.

⁶ JamClear®-CSD statistics include both JMD and USD denominated transactions.

⁷ Reduction in the number of securities transaction is reflective of the policy call that the Bank made on February 1, 2017 to issue 30-days CDs once per week instead of daily and also the restriction placed on the issuance of GOJ bonds in the market. In addition, the settlement of securities under the retail repurchase agreement (repo) operations in JamClear®-CSD have further contributed to a reduction in the number of securities traded due to the processing of multiple trades in one file¹.

increase in the average monthly value of JamClear®-CSD transactions to \$4.5 trillion for 2018 from \$2.9 trillion for 2017, or average monthly turnover of 6.8 times monthly GDP (see Figure 6.1). Conversely, the overall volume fell by 19.4 per cent to 88 673 transactions for 2018.

6.2.3 Retail Payment Systems

Development in commercial bank sector

Automated Clearing House (ACH)⁸

Consistent with the impact of the ACH value threshold, the number of cheques processed by the ACH declined for 2018.⁹ The reduction in the ACH value threshold by the Bank was to enhance the safety of the payment system and encourage the use of real-time means of payment. Transactions exceeding the threshold were migrated to the JamClear®-RTGS system in order to reduce settlement and concentration risks.

Cheques processed decreased by 2.2 per cent to 6.1 million transactions for 2018.¹⁰ However, the value of these transactions increased by 1.8 per cent to \$816.5 billion for the period. The average monthly value of cheques processed also increased to \$134 303 per transaction from \$129 069 per transaction for 2017 (see Figure 6.4).

6.2.2 MultiLink

For 2018, activity within the MultiLink debit card network continued to grow. Of note, during this period, total value of MultiLink transactions increased by 26.5 per cent to \$221.1 billion. Likewise, the overall transactions volume increased to 32.6 million from 26.7 million transactions for 2017. The increase in activity within the MultiLink network resulted from growth in through both point-of-sale (POS) and automated bank machines (ABM). Notably, the number of POS transactions increased by 25.4 per cent and amounted to \$17.6 billion while the number of ABM transactions increased to \$15.0 billion representing growth of 17.9 per cent (see Figure 6.5).

⁸ 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.

Figure 6.6 Currency in circulation

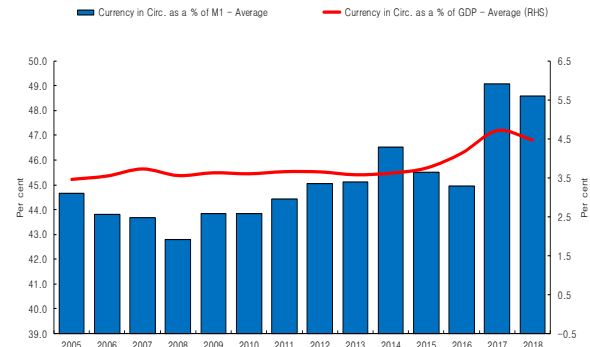


Figure 6.7 Inter-bank and intra-bank cheque volumes and values per 1000 persons

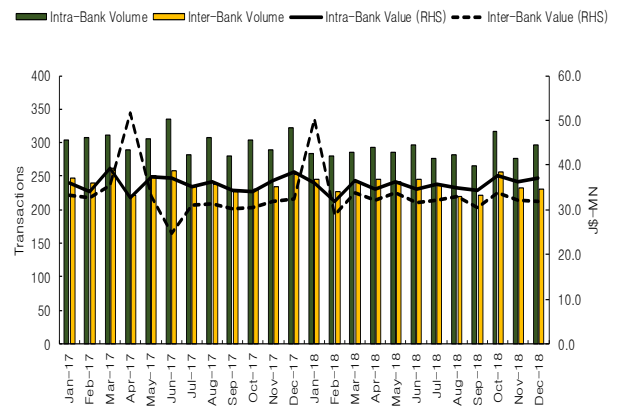
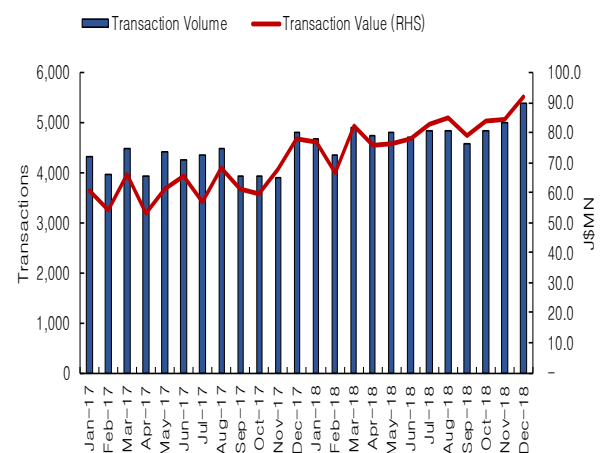


Figure 6.8 E-payment volumes and values per 1000 persons



⁹ The ACH threshold value remained at \$1.0 million.

¹⁰ Commercial banks faced a charge of J\$5 000.0 per transaction greater than and equal to the targeted ACH threshold of J\$1.0 million.

Figure 6.9 Debit & credit card volumes and values per 1000 persons

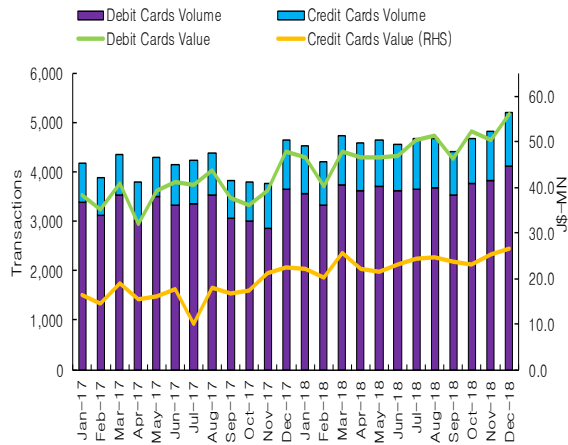


Figure 6.10 Monthly payment card penetration

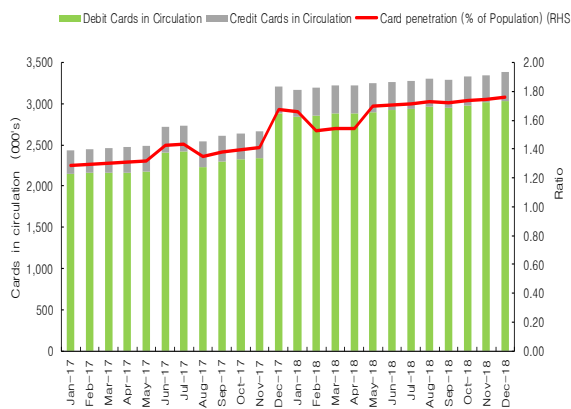
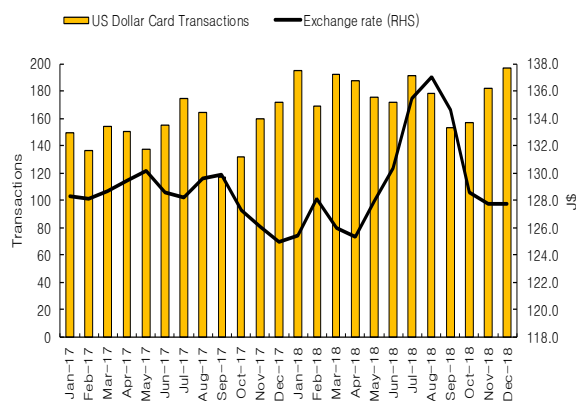


Figure 6.11 US dollar card transaction per 1000 persons and exchange rate



¹¹ All retail payments figures except cash data are per 1000 persons of working age (age 14 and older).

6.2.4 Key trends & developments in retail payments¹¹

There was continued expansion in total retail payments activity for 2018.¹² This growth occurred against the background of further improvement in the level of employment and economic activity. Notably, the average monthly transactional value increased to \$149.3 million per 1000 persons for the period from \$131.8 million in 2017. At the same time, average monthly transaction volumes increased to 5 323 transactions per 1000 persons for 2018 relative to 4 770 transactions per 1000 persons for the previous year. Notably, for 2018, debit cards continued to be the most utilized retail payment instrument accounting for 69.3 per cent of the total number of retail payment transactions. The value of cheques as a percentage of the total value of retail transactions declined to 46.3 per cent for 2018 from 52.5 per cent for 2017. This decline reflected the continued migration from paper-based means of payments to electronic forms (see **Table 6.1**).

Paper-based Instruments

Cash

Cash continued to be the most preferred means of payment, despite the increase in the electronic payment channels. Currency in circulation rose by 20.9 per cent to \$129.1 billion, albeit slower than the growth of 23.6 per cent for 2017. In addition, the average monthly level of currency in circulation as a share of GDP, marginally declined to 4.5 per cent from 4.7 per cent for 2017. Average currency in circulation as a share of M1 also fell to 48.6 per cent for 2018 from 49.1 per cent for 2017 (see **Figure 6.6**).

¹² Retail payments include cheque payments, debit and credit card payments and other electronic forms of payment.

Cheques¹³

There was continued reduction in the value of cheque payments for 2018. Average monthly cheque transactions value marginally declined to \$69.0 million per 1000 persons for the period from \$69.1 million per 1000 persons for 2017. The average monthly intra-bank cheque transactions value declined slightly by 1.3 per cent to \$35.5 million per 1000 persons, while the value of inter-bank transactions marginally increased by 1.4 per cent to \$33.6 million per 1 000 persons.

At the same time, average monthly cheque transaction volumes declined by 3.8 per cent to 524 transaction per 1000 persons. This reduction reflected declines in intra-bank and inter-bank average cheque volumes by 5.5 per cent and 1.8 per cent to 287 and 237 transactions per 1000 persons, respectively (see **Figure 6.7**).

Electronic payment instruments¹⁴

There was continued growth in value and usage of electronic payment instruments offered by commercial banks during 2018. The value of electronic payments increased to \$962.2 million per 1000 persons reflecting growth of 28.0 per cent. Similarly, the total number of electronic transactions increased by 13.6 per cent to 57 591 transactions per 1000 persons (see **Figure 6.8**). 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

Consistent with the expansion in credit, the growth in the number and value of credit cards processed by commercial banks continued to outpace that of debit cards processed during 2018. Of note, credit card transactions value reflected an increase of 38.1 per cent to \$282.3 million per 1000 persons. Further, credit card

Figure 6.12 Number of active POS and ABM Terminals

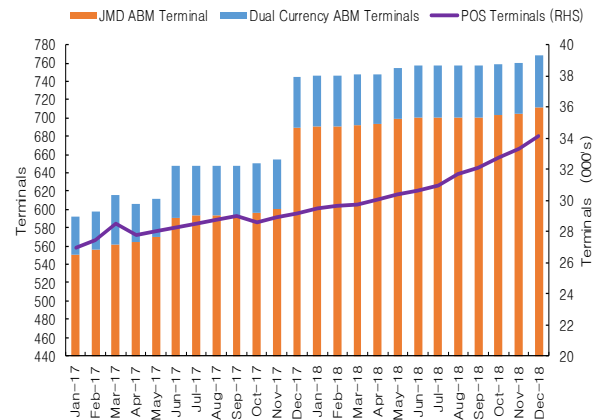


Figure 6.13 POS transactions to ABM withdrawals

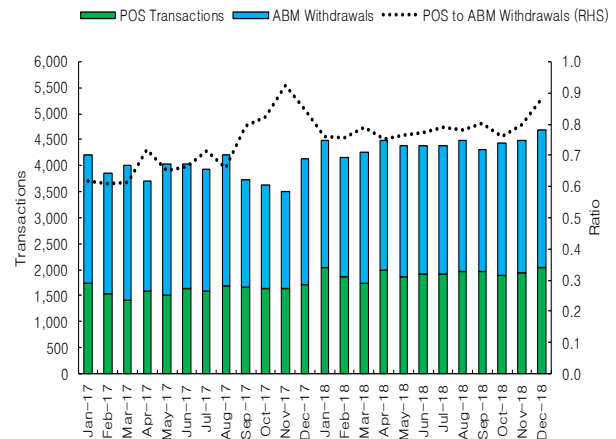
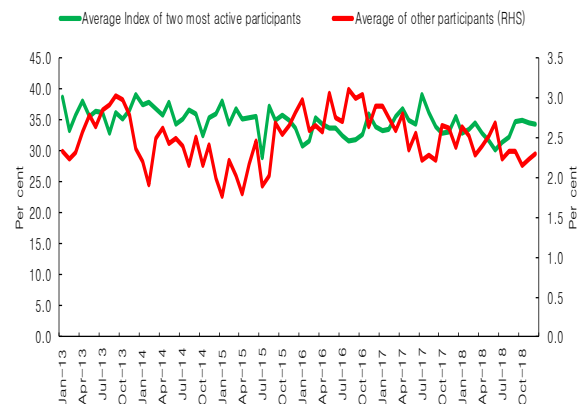


Figure 6.14 Large-value system concentration risk index



¹³ These transactions capture both interbank and intrabank cheque transactions.

¹⁴ Electronic payments include debit card, credit card and other electronic payments.

Figure 6.15 Herfindahl index of JamClear–RTGS payment activity

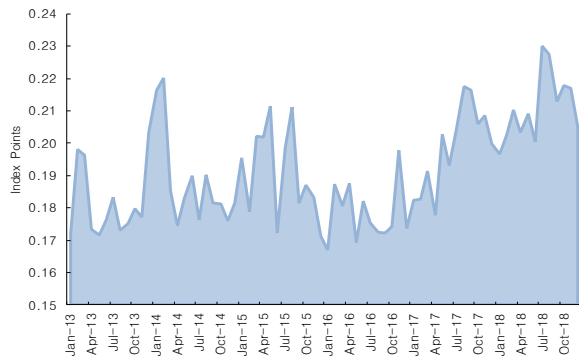


Figure 6.16 BOJ intraday repo facility monthly transaction value

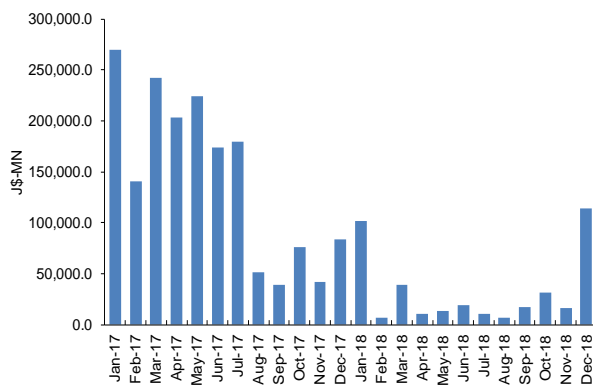
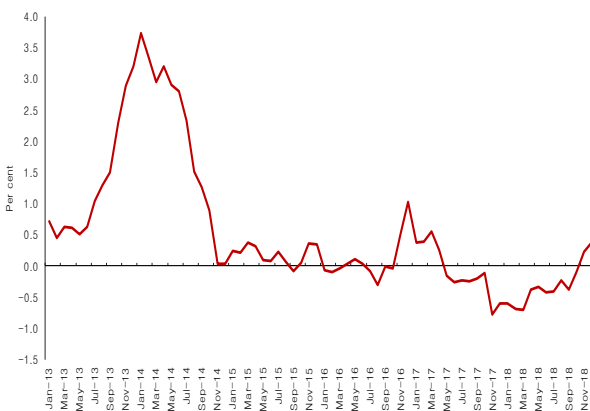


Figure 6.17 TRE Spread



volume increased by 16.7 per cent to 11 607 transactions per 1000 persons. Debit card transactional values also increased by 23.2 per cent to \$581.2 million per 1000 persons for the review year. Likewise, debit card volumes increased by 12.1 per cent to 44 279 transactions per 1000 persons (see **Figure 6.9**). The growth in card payment activities was influenced by an increase of 4.3 per cent to 3.5 million in the average number of cards in circulation for 2018. Against this background, average monthly card penetration increased to 1.7 cards per person for 2018 from 1.4 for 2017 (see **Figure 6.10**).¹⁵

There was continued expansion in the average monthly number of US dollar card transactions in 2018. This was mainly due to the appreciation of the Jamaica dollar vis-à-vis US dollar during the first half of the year. Specifically, the average monthly number of US dollar card transactions grew by 19.2 per cent to 179 transactions per 1000 persons (see **Figure 6.11**).

Electronic payment channels offered by commercial banks

There was an increase in the number of active ABM and POS terminals operated by commercial banks. Specifically, ABM active terminals increased by 3.2 per cent to 712, while the number of active POS terminals grew by 17.0 per cent to 34 098 (see **Figure 6.12**).

The number of ABM withdrawals continued to be greater than the number of POS transactions. In particular, the average monthly number of ABM withdrawals increased by 8.0 per cent to 2 486 transactions per 1 000 persons. Average monthly POS transactions volume grew by 19.2 per cent to 1 951 transactions per 1 000 persons.

Additionally, the ratio of POS transactions to ABM withdrawal increased to 0.8 POS transactions for every ABM withdrawal in 2018 from 0.7 in 2017 (more than one ABM withdrawal to POS transaction). This trend increase in the ratio reflected a slight improvement in customers’

¹⁵ Cards penetration is total credit and debit cards (JMD, USD and dual currency) to the working population (14 years and older).

preference for using POS method for transactions above a certain level (see **Figure 6.13**).

6.3 Assessing financial sector exposure to financial market infrastructures

6.3.1 Concentration risk

Large-value system concentration risk Index (LSCRI)¹⁶

Liquidity concentration, as measured by Large-value system concentration system Index, continued to be high during 2018.¹⁷ Of note, the share of payment activity continued to be dominated by the two most active participants. Nonetheless, the monthly average share of payment activity for the two most active participants marginally declined to 33.2 per cent from 34.9 per cent for 2017. Similarly, there was a decline in the monthly average share of activity for other participants within the system to 2.4 per cent for 2018 from 2.5 per cent for 2017 (see **Figure 6.14**).

Herfindahl Index of JamClear®-RTGS liquidity concentration

The level of concentration risk within the large value payment system was also reflected in the Herfindahl index of payment activity.¹⁸ This index averaged 0.2, in line with the annual average over the last five years, which reflected consistency in the level of liquidity concentration within the large value transfer system in Jamaica (see **Figure 6.15**).

Figure 6.18 Share of BOJ intraday repos (values) demanded by the top four subscribers during 2017 & 2018

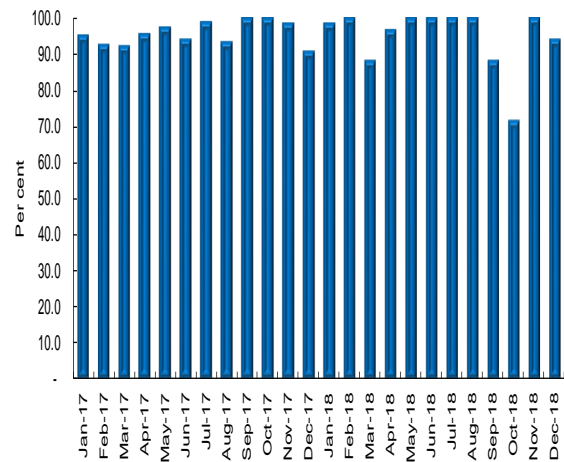
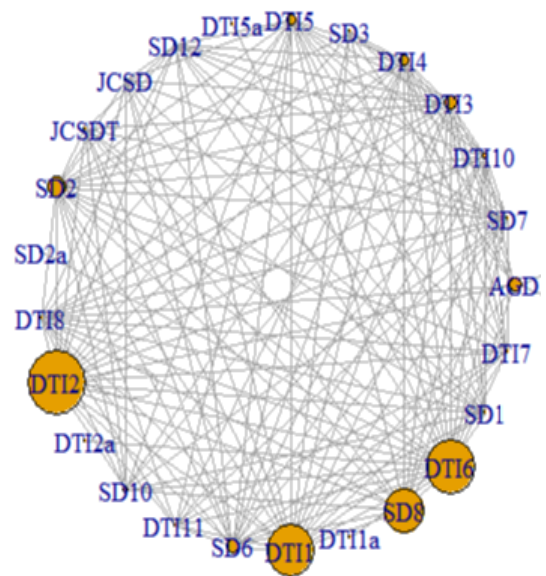


Figure 6.19 JamClear®-RTGS network (end-September 2018)



¹⁶ This measure is computed based on payments made and received by each bank as a share of overall payments for the system.

¹⁷ 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.

¹⁸ The Herfindahl index is a measure of the extent of a financial institution's payment activity in relation to the other participants in the system. It is also an indicator of the level of concentration of liquidity with the system.

Table 6.2 Core payment network statistics

	2017	2018
Number of Nodes	23	25
Number of Links	292	289
Density (%) – Connectivity	57.7	48.2
Average Path Length ¹⁹	1.4	1.4
Diameter ²⁰	6	10

Table 6.3 Financial institutions transfer network statistics

	2017	2018
Number of Nodes	21	21
Number of Links	191	175
Density (%) – Connectivity	45.5	41.7
Average Path Length	1.5	1.6
Diameter	6	6

¹⁹ An average path length of one indicates that all participants have sent a payment to all others. A longer path length indicates that activity is concentrated among fewer pairs of participants.

²⁰ The diameter indicates the maximum distance between any two participants in the network. The diameter can provide an indication of how easily or quickly an event affecting a participant could potentially affect the others in the network. A shorter diameter indicates a faster speed of contagion within the network.

6.3.2 Liquidity risk

Usage of BOJ’s intraday liquidity facility²¹

There was significant improvement in liquidity conditions during 2018 relative 2017. Of note, the average monthly and overall value of BOJ’s intraday liquidity facility usage declined to \$32.2 billion and \$386.3 billion, respectively, for 2018. The respective figures were \$144.0 billion and \$1.7 trillion for 2017. The respective figures were J\$144.0 billion and J\$1.7 trillion for 2017. (see **Figure 6.16**). Likewise, the number of intra-day liquidity transactions declined by 74.8 per cent to 749 from 2 974 transactions for 2017.

Favourable liquidity conditions were also observed in the money market during the review period as represented by a narrowing of the TRE spread (see **Figure 6.17**). Nonetheless, the percentage of funds demanded by the top four institutions remained consistently above 90.0 per cent for most of the review period, an indication of concentration of liquidity risks in the payment system (see **Figure 6.18**).

6.4 Evaluating interconnectedness & systemic importance

JamClear®-RTGS network topology

The commercial banking sector continued to be the most influential sector within the network as reflected by the larger nodes (see **Figure 6.19**). Notwithstanding, securities dealers continued to show a high level of importance within the payment network.

Network connectivity decreased significantly to 48.2 per cent at end-September 2018 from 57.7 per cent at end-2017.²² This substantial decline reflected continued lower potential contagion paths within the system. In addition, there was a decrease in the speed of contagion where the

²¹ 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.

²² Connectivity measures the density of the current network relative to all potential links it could have.

“diameter” increased to 10 participants at end-September 2018 from 6 participants at end-2017²³. This result indicated decreased susceptibility of the JamClear®-RTGS to contagion risk as a longer diameter indicates a slower speed of contagion within the network (see **Table 6.2**).

Analysis was also conducted on transactions in the RTGS system related to direct payments between JamClear®-RTGS participants (financial institution transfers). Connectivity decreased to 41.7 per cent at end-September 2018 from 45.5 per cent at end-2017. This decline also represented a reduction in potential contagion paths in the overall JamClear®-RTGS payment network. The speed of contagion was stable, as the diameter remained at 6 participants at end-September 2018 relative to end-2017 (see **Table 6.3**).

²³ The speed of contagion measures the rate at which a participant is able to absorb the shocks of a troubled participant within the system. The greater the number of institutions along the diameter, the lower the speed of contagion as there would be a greater

probability of institutions absorbing the shock rather than it filtering through the entire system.

Box 6.1 Updated Guidelines on Electronic Retail Payment Services and Summary Activities

Overview

The Bank of Jamaica published the updated Guidelines for Electronic Retail Payment Services (ERPS 2) on 01 November 2018 with an effective date on 01 February 2019. ERPS 2 forms part of an initiative to continuously support innovation and financial inclusion by deepening the payment infrastructure through the use of electronic retail payment products and services.¹

ERPS 2 was issued in accordance with the provisions of the Payment Clearing and Settlement Act, 2010 (PCSA) under which the Bank holds responsibility for oversight of the National Payment System (NPS). The Bank promotes the prudent and safe management of retail payment services in order to ensure the safety and soundness of the NPS and the overall financial system.

Major amendments to ERPS

The major amendments reflected in ERPS 2 are:

- A new definition for payment service providers (PSPs);
- An increase in operating limits to facilitate further usage of instruments and services;
- The removal of reference to customer account-based payment service;
- New provision for the treatment of merchants; and
- New provision for suspension and withdrawals.

New definition and categories of payment service providers (PSPs)

Payment Service Provider (PSP) is defined as a body corporate that is authorised by the Bank to provide electronic retail payment instruments and services to customers and businesses, for the purpose of effecting payments and funds transfers. This new definition for PSPs was included by the Bank to widen the scope and application of risk-based oversight and development of the sector. Payment service providers are categorized into three areas:

- issuers of payment instruments and services
- payment initiation service providers
- merchant acquirers

Increased operating limits to promote use of instruments and services²

Requirements for *Know Your Customer* (KYC) and *Customer Due Diligence* (CDD) are classified into three tiers of accounts according to operating limits. The limits have been increased to \$100 000, \$200 000 and \$300 000 to facilitate enhanced usage of instruments and services (see **Table 1**). In addition, provision has been made for special approval of Tier 3 limits up to a maximum account balance of one million dollars. Furthermore, this provision is subject to the PSP satisfying the Bank's criterion that a comprehensive risk management framework has been established for the mitigation of risks associated with the higher limits. This is in order to ensure the safety and integrity of transactions.

Table 1 Operating limits by tier

Maximum limits	Tier 1	Tier 2	Tier 3
Account limits (\$)	100,000	200,000	100,000
Transaction limits/daily (\$)	25,000	50,000	75,000

New provision for the treatment of merchants

The 2013 Guidelines for Electronic Retail Payment Services (ERPS) did not provide explicit provisions on the treatment of merchants and, as such, this was included in ERPS 2. This new provision states that “*All merchants engaged by PSPs shall be properly registered in conformity with the relevant KYC and AML guidelines. In addition, PSPs must*

¹See updated guidelines for more details: http://boj.org.jm/financial_sys/payments_systems_policy.php.

² Other defining factors such as KYC and Customer Due Diligence (CDD) requirements define each tier.

have appropriate merchant agreement(s) to address rights, responsibilities and obligations.”

Removal of customer account-based payment service

The removal of customer account-based payment services from the 2013 Guidelines mitigates regulatory overlaps and focuses solely on the oversight of PSPs. The Guidelines on entities operating a customer account-based payment service is regulated under the Banking Services Act (BSA).

New provision for monitoring, sanctions and remedial actions

A new provision for monitoring, sanctions and remedial actions was included in ERPS 2. This provision allows the Bank to suspend, revoke or

withdraw authorization as well as publicly disclose these suspensions or revocations.

E-Money Activity

As at end-December 2018, the authorized ERPS providers were National Commercial Bank Jamaica Limited (NCB Quisk mobile money), GraceKennedy Payment Services (GK MPay mobile wallet), Sagicor Bank Jamaica Limited (Sagicor MyCash) and Alliance Payment Services Limited (ePay card product).

The activities on ERPS indicated increased usage of retail payments and transaction accounts which can facilitate financial inclusion (see **Table 2**). Continuous monitoring and assessment of these activities can assist in better understanding the retail payments market and development of policies that support financial stability.

Table 2 Summary of ERPS activities³

ERPS Activities	1st Quarter 2018	2nd Quarter 2018	3rd Quarter 2018
Total accounts	21 901	37 316	37 570
Total active accounts	14 607	15 658	16 888
Total e-money value (J\$-MN)	20.3	12.3	13.5
Total transaction volume	640 264	708 715	785 847
Total transaction value (J\$-MN)	279.7	322.7	370.8

³ Information include data from three of the four payment service providers.

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 their 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 channelling 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 percent 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.



Financial Stability Department
Bank Of Jamaica
Nethersole Place
P.O. Box 621
Kingston, Jamaica, W.I.