Bank of Jamaica
Financial Stability Report
2010
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Preface

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. 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 banks, the 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, in particular banks, 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 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 2010 provides an assessment of the main financial developments, trends and vulnerabilities influencing the stability of Jamaica’s financial system during the year. 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

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1 Financial institutions include inter alia banks, securities firms, insurance companies, unit trusts, mutual funds and pension funds. Financial markets include inter alia foreign exchange, money and capital markets. Financial infrastructure refers to payment and settlement systems.
1. Financial Stability Overview

Macroeconomic Environment
In line with ensuring financial stability, the Bank of Jamaica (BoJ) continued to monitor the financial system during 2010 to identify any potential risks and vulnerabilities to which financial institutions may be exposed. The financial health of the corporate, household and government sectors as well as structural developments were also closely observed to detect, in a timely manner, possible signs of stress that may negatively affect the financial system. Financial stability risks in 2010 remained muted despite continued deterioration in credit quality from 2009.

The 2009 Financial Stability Report (FSR) judged that the outlook for financial stability in 2010, although remaining stable, was uncertain due to weak and uneven growth prospects. These conditions were thought likely to heighten the credit risk facing deposit-taking institutions (DTIs), as downward pressures on household and the corporate sectors’ income generation impacted negatively on their capacity to service their debts. Against this background, the 2009 Report expressed some concerns about the adequacy of loan loss provisioning by DTIs. These concerns still existed in 2010 as growth in non-performing loans (NPLs) outpaced the increase in loan loss provisioning by DTIs, despite positive movements in some key macro-economic variables.

Despite improvements in key macro-economic indicators, the annual change in the gross domestic product (GDP) at end-2010 continued to reflect weak activity compared to the growth rates recorded prior to the international crisis that started in 2007. The evolution of improved economic activity in 2010 was supported by performance of the household and corporate sectors (see Chapter 4).

Global Environment
The global economic recovery remained uncertain over the review year, although the counterparty risks emanating from the fallout of the global financial crisis have dissipated in 2010 relative to 2009. Concerns about resiliency of global economic recovery arose in 2010, as new risks emerged related to the sustainability of sovereign debt in parts of Europe.

The continuation of loose monetary policy in the US since 2007, contributed to a weaker US dollar in 2010. In this context, several economies in advanced and emerging markets stepped up intervention in their foreign exchange market in a bid to arrest the appreciation of their respective currencies vis-à-vis the US dollar.

Domestic Financial System Developments
Despite marginal improvement in economic activity, there were several identified risks to the domestic financial sector in 2010. First, a more pronounced increase in NPLs (to both households and corporations) evidenced heightened credit risk for the review period. Second, the introduction of risk weights on foreign Government of Jamaica (GOJ) bonds as a benchmark requirement under the IMF Standby Arrangement with Jamaica, led to increased risk connected with the capital adequacy in relation to these instruments. This necessitated an increase in the regulatory capital holding for financial institutions. Third, a slower pace of increase in financial institutions’ operating profits was due largely to both a flattening of the yield curve and declines in interest margins following the implementation of the Jamaica Debt Exchange (JDX) early in the year.

For the year under review, financial institutions remained well capitalized, with regulatory ratios
above the minimum (see Chapter 4). Indeed, capital adequacy ratios (CARs) improved during the year, despite an annual increase in risk-weighted assets of 7.3 per cent. The former was due largely to increases in regulatory capital from retained earnings, while the latter reflected a rebalancing towards more interbank lending, as well as subdued loan growth.

The performance in the insurance sector was muted over the review period, with low growth in premiums written in general insurance. Nevertheless, the life insurance segment enjoyed increased premium revenue for the year. On balance, risks to financial stability from the insurance sector remained negligible given that the aggregate solvency ratio in this sector was quite robust.

Financial System Exposures

The adverse economic shocks triggered by the global financial crisis in 2008 continued to permeate the domestic financial system in 2010, albeit at diminishing levels compared to 2009. Financial institutions experienced an overall decrease in profitability in 2010, relative to 2009 (see Chapter 4). This lower profitability is corroborated by lower efficiency levels and profit margins brought about primarily by a reduction in loans to the household sector, as well as all economic sectors except Construction, Transport, and Distribution (see Chapter 5).

The financial strength of the non-financial corporate sector showed mixed signals in 2010. In particular, there was an overall reduction in profitability in all sectors, with the exception of Retail and Insurance. Improvements in the financial strength of Retail and Insurance reflected higher consumer demand (see Chapter 4). This overall picture is corroborated by the marginal growth in the main JSE Index.¹

Risk Assessment of the Financial System

Financial resiliency remained strong throughout 2010 supported by strong capitalization and liquidity conditions of financial institutions. Stress test results reaffirmed the capacity of the financial system to absorb potential shocks even at ‘worst case’ macro-economic scenarios.

Concerns about the quality of financial institutions’ credit exposures still remained from the previous year. Nevertheless, indications were that financial institutions could withstand all the hypothetical shocks which were modeled at end-2010; namely, a deterioration in average deposits, a depreciation in the Jamaica Dollar, an increase in domestic and foreign interest rates and an increase in the stock of NPLs (see Chapter 6). Despite this, however, DTIs continued to strengthen their capital buffers to be able to withstand possible further challenges. The continued strengthening of capital buffers during the first half of the review period, when the risk of fallout from the JDX was highest, would have bolstered confidence in the financial system. In addition, the Financial Sector Support Fund, which was established with the objective of providing assistance to financial institutions in the event of liquidity shortfalls arising from participating in the JDX, was not utilized throughout the year.

Payment System Developments

The Bank continued to promote and oversee the operations of major domestic payment and settlement systems in 2010. Against this background, the payment and settlement systems in Jamaica remained resilient and continued to

¹ The JSE index grew by 2.3 per cent in 2010, relative to growth of 4.0 per cent in 2009 (see Chapter 4).
operate efficiently throughout 2010, contributing to the stability of the financial system.

During the year, the recently established real time gross settlement (RTGS) and Central Securities Depository (CSD) systems experienced significant increased activity (see Chapter 6). This occurred in a context where these systems began to facilitate payments and settlements of GOJ securities after the immobilization and dematerialization of these securities in the early part of 2010.

Outlook
Although credit risk is expected to increase in 2011, the overall outlook for financial stability remains stable. While economic activity has picked up both abroad and in Jamaica, the financial system remains susceptible to any weakening in the recovery which could give rise to further credit risk. The performance of the corporate sector is expected to remain at the improved level experienced during 2011. The repayment capacity of the household sector is also expected to be stronger within a lower interest rate environment projected for 2011, subject to economic and financial conditions remaining stable. Supported by low interest rates as well as the extension of GOJ bond maturities under the JDX, the public sector’s debt servicing capacity should continue to improve in 2011.

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2 In February 2009, the BOJ established a real time gross settlement (RTGS) system, to replace the Customer Inquiry Funds Transfer System (CIFTS). In addition, the Central Securities Depository (CSD) was established in May 2009.
2. Macro-Financial Risks

2.1 Overview

During 2010, macro-economic conditions in global financial markets reflected investor uncertainty due to concerns over major monetary and fiscal decisions and heavy indebtedness of some industrial nations. On the domestic front, the enhanced economic performance in 2010 was assisted primarily by the successful implementation of the Jamaica Debt Exchange (JDX) and the signing of a 27-month Stand-By Arrangement with the International Monetary Fund (IMF).

The Bank’s measures of financial stability reflected mixed performance overall. Despite a marginal deterioration in the macro-prudential index during 2010, only the building societies’ sector reflected deterioration in its micro-prudential index, albeit marginally, during the year. In addition, all micro-prudential indices remained well within the 1996-1999 financial crisis threshold values indicating that there were no heightened risks to financial stability. The movements in these measures were supported by an increase in the distance to default measure for the publicly-listed DTIs over 2010, which was indicative of an increase in the market value of DTIs assets. However, in contrast, the Z-score index of DTI insolvency deteriorated in the review year, primarily reflecting increased variability of profit levels. In relation to publicly-listed non-bank financial institutions, the distance to default measure decreased in 2010. Finally, there was a decline in the exposure of DTIs to sovereign debt default, as measured by the ratio of holdings of external GOJ debt to capital, during 2010. In spite of this decline, however, the exposure of DTIs to sovereign default, as measured by the credit risk exposure (CRE) to capital base, increased marginally for the review year.

2.2 Macroeconomic Risks in the Domestic and Global Environment

Positive developments in the Jamaican macro-economy during 2010 resulted in an improved performance of a number of economic variables, such as inflation, GDP growth and the current account of the balance of payments (see Figure 2.1). The broader overview of the financial environment for 2010 is reflected in the Bank of Jamaica “cobweb” diagram, which is used to indicate financial stability risks across several different dimensions (see Figure 2.2). In particular, there has been a marked improvement in the domestic economic environment, funding and liquidity conditions in 2010 relative to 2009, signaling recovery from the global financial crisis. However, risks to the global economic environment, as well as risks to capital and profitability position of DTIs, remained generally unchanged in 2010 relative to 2009. Additionally, there was a slight deterioration in risks to financial markets (see Figure 2.2).

Figure 2.1 Selected macroeconomic indicators
In 2010, the global economy recovered from the recession with an estimated real growth of 5.0 per cent, relative to a contraction of 0.6 for the previous year (see Figure 2.3). However, there was heightened sovereign debt and deflation concerns which contributed to increased macroeconomic risks. In addition, risks associated with the health of the global financial sector increased during the period. However, due to a stronger corporate sector, overall counterparty risks within the sector remained unchanged. Further, financial stability risks associated with emerging markets recorded some improvement due to strong fundamentals and a better growth outlook. In the case of the U.S.A., a major trading partner of Jamaica, while reduction of inventories was a positive development, persistence of high unemployment, low growth in consumer spending and a dormant housing sector point towards a prolonged recovery. Further, the current deleveraging is expected to be a protracted process.

In mid-2010, worries over Greece’s sovereign risk caused global stock prices to fall sharply, while emerging market bond yields rose. This heightened level of uncertainty in the financial markets was reflected in a spike in the Bank of America-Merryl Lynch Global Financial Stress Index (see Figure 2.4). Although counterparty risk for several emerging markets, measured by Credit Default Swaps (CDS) prices, declined in 2010 relative to 2009, investors remained risk-averse demanding higher yields on sovereign debt of many industrialized nations, mainly in the EU bloc (see Figure 2.5).

Over the past two years, the effects of severe limitations in credit availability and a dramatic decrease in world trade, resulted in sovereign rating agencies downgrading the sovereign debt of several Caribbean countries. Of interest, were the downgrades in Jamaica and Barbados. However, debt consolidation in Jamaica in 2010, by way of the Jamaica Debt Exchange (JDX), resulted in a reversal of the debt downgrade from the rating agencies.
Box 2.1 A Cobweb Diagram of Financial Stability

The cobweb diagram seeks to assess broad risks to financial stability stemming from, and feedback to, inter alia, credit markets, the economy, market or funding liquidity and leverage. The purpose of the cobweb diagram is to give a summary of the risk exposure of financial institutions in Jamaica to potential systemic shocks.

The cobweb diagram distinguishes vulnerabilities across five different dimensions. Three of the dimensions are designed to identify the systemic shocks that would trigger major difficulties for financial institutions. These are propagated through the domestic macroeconomic environment, financial market conditions and the global environment. The remaining two dimensions reflect the capacity of financial institutions to absorb a shock to either side of their balance sheets, measured through their capital and profitability as well as their funding and liquidity.

A score across each of these dimensions is calculated as a weighted average of a range of data from different sources. Twenty five data series are used to construct the five dimensions of the cobweb (see Table 1). There are a number of considerations for selecting the data series to represent each of the five dimensions.

The domestic environment dimension primarily captures the risk that economic developments will combine with existing risks leading to substantial losses for financial institutions. The financial market conditions dimension measures the risk of sharp movements in asset prices or shortfalls in market liquidity. This dimension is weighted between domestic and international factors. The global environment dimension captures the risk that external shocks, such as a sharp downturn in the world economy, translates into credit losses for financial institutions in Jamaica. The capital and profitability dimension captures the ability of the banking sector to absorb shocks to the asset side of their balance sheet and to generate or obtain enough capital to withstand credit losses if necessary. With respect to the funding and liquidity dimension, this measures the ability of financial institutions in Jamaica to absorb a shock to the liability side of the balance sheet through higher costs or reduced availability of funding.

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2 A heavier weight was placed on domestic factors (70.0 per cent), relative to international factors (30.0 per cent).
To produce financial stability scores across each dimension, the data is first standardized into $z$-scores. The $z$-scores are computed as:

$$z = \frac{x - \mu}{\sigma}$$  \hspace{1cm} (1)$$

where $x$ is the data point, $\mu$ is the mean of the series and $\sigma$ is the standard deviation of the series. The sign on the $z$-score is of importance as it helps to determine the appropriate ordering for the respective dimensions in relation to risk adjustments.

These scores are ordered with ordinal numbers of one to nine, such that the black band represents a normal level of risk. Movements away from the centre of the diagram represent an increase in financial stability risks. Movements towards the centre of the diagram represent a reduction in financial stability risks (see **Figure 2.2**).

The results of the cobweb model of financial stability suggests that there was marked improvements in the domestic economic environment as well as funding and liquidity conditions in 2010, relative to 2009 (see **Figure 2.2**). In contrast, there was a slight deterioration in financial market conditions, primarily driven by conditions in the international market. Global macro-economic environment and the capital and profitability conditions for domestic financial institutions remained unchanged in 2010 relative to conditions in 2009.

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### TABLE 1a.

<table>
<thead>
<tr>
<th>Domestic Economic Environment</th>
<th>Global Economic Environment</th>
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<tr>
<td>Real GDP</td>
<td>Global equity prices</td>
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<td>External debt sustainability</td>
<td>Global VIX index</td>
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<td>Terms of trade</td>
<td>TED spread</td>
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<td>Output gap</td>
<td>EU benchmark credit spread</td>
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<tr>
<td>Aggregate household</td>
<td>Main JSE index</td>
</tr>
<tr>
<td>LVR</td>
<td>Bid/ask spread forex market</td>
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<tr>
<td>Aggregate household debt service ratio</td>
<td>180-day T-bill rate</td>
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</table>

### TABLE 1b.

<table>
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<th>Financial Market Conditions</th>
<th>Capital &amp; Profitability</th>
<th>Funding &amp; Liquidity</th>
</tr>
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<td>Tier 1 capital</td>
<td>Deposit/loan ratio</td>
</tr>
<tr>
<td>Fiscal account imbalances</td>
<td>Leverage ratio</td>
<td>Deposit growth</td>
</tr>
<tr>
<td>OECD unemployment rate</td>
<td>Asset quality</td>
<td></td>
</tr>
<tr>
<td>EMBI Global spread</td>
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</tr>
</tbody>
</table>

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Main trading partners real GDP
2.3 Domestic Financial Markets

The domestic bond market experienced generally improved conditions in 2010 relative to 2009. The most significant development in the bond market for 2010 was the JDX which was launched on the 14 January 2010. This initiative facilitated a reduction in Government of Jamaica (GOJ) bond yields throughout much of the review period (see Figure 2.6). The successful completion of the JDX as well as the signing of the IMF Stand-By Arrangement (IMF-SBA) brought about increased confidence in the domestic financial markets, which enabled the BOJ to ease monetary policy throughout the year (see Figure 2.6). This policy stance was supported by the reduction of the deficit on the external current account, a significant build-up of international reserves and continued resilience of the financial system.

During 2010, the spread between the Jamaica Global Bond Index and the Emerging Markets Bond Index (EMBI+) decreased. This reduction in the spread was associated with adjustments in the credit ratings of Jamaica’s debt throughout 2010 (see Figure 2.7). Of note, the positive factors that brought about increased confidence in the GOJ domestic and global bond markets were also echoed in the domestic money market as evidenced by an increase in investor risk appetite (see Figure 2.8). The significant increase in risk appetite in the interbank market suggests a reduction in counterparty risk aversion in 2010 relative to 2009.

The domestic foreign exchange market in 2010 was characterized by significant volatility in the second half of the year compared to relative stability in the first six months of 2010, largely reflecting improved US dollar supply conditions by way of increased net private capital inflows. Despite the BOJ adjusting downwards its policy rate (30-day OMO) on four occasions in 2010, the market continued to exhibit an appreciating pattern relative to 2009.
Note: The money market risk appetite index is estimated based on the annual relationship between daily overnight (o/n) money market interest rates and the corresponding volatility (estimated as the standard deviation of o/n interest rates over a one year period).

The risk appetite index for the foreign exchange market decreased in 2010 to -0.2 from 0.4 in 2009 (see Figure 2.11). This reduction was as a result of lower demand for US dollars which translated into reduced trading activity in the foreign exchange market relative to the previous year.

The Jamaica Stock Exchange (JSE) Main Index recorded an increase of 2.3 per cent during 2010. In support of this expansion, the Amihud Index decreased slightly to 0.25 at end-2010 relative to 0.34 at end-2009, indicating an incremental increase in the level of participation by investors in the equities market (see Figure 2.12).

Also supporting the rise in the Main JSE index was the increase in the JSE risk appetite index during 2010, reflecting a reduction in investors risk aversion (see Figure 2.13). However, the risk of losses on Jamaica’s stock market index, as measured by the 10-day VaR outturn increased to 7.9 per cent, relative to 4.6 per cent at end-2009, suggesting greater potential for losses in equity values compared to 2009.
2.4 Micro- and Macro-Prudential Indices

The Bank’s macro-prudential index (MAPI) deteriorated in 2010, relative to its value at end-2009. At end-2010 the index recorded a value of 38.0 points, 2.0 points above the index at end-2009 (see Figure 2.14). The performance in 2010 was attributed mainly to increases in the ratio of national debt to GDP and the real effective exchange rate (REER) index. Specifically, these indicators increased to values of 1.3 per cent and 109.8 points at end-2010, relative to tranquil period threshold values of 1.0 per cent and 99.4 points, respectively.

At end-2010 the Bank’s micro-prudential indices (MIPIs) for the commercial banks, institutions licensed under the Financial Institutions Act (FIA licensees) and building societies showed mixed results compared to end-2009. In particular, the MIPIs for commercial banks and FIA licensees declined in severity while the index for the building societies increased during the review period. Nonetheless, the MIPIs for all three sectors remained within the 1996-1999 financial crisis threshold value of 50.0 points.

For the commercial banks, the improvement in the MIPI was primarily influenced by increases in the average ratios of deposits to loans, deposits to total assets, deposits & repos to assets as well as the 12-month growth in deposits, all indicative of reduced vulnerability to liquidity risk. Additionally, a decrease in the ratio of employee salaries to total assets supported the improvement in the index. However, partially offsetting the impact of this improvement was a decline in the weighted ratio of net income to total assets (see Figure 2.15).

3 The BOJ macro- and micro-economic prudential indices of the banking sector are monitored via a non-parametric approach to signal banking sector vulnerability. The signal is based on micro-prudential scores for each indicator, which is computed based on the number of standard deviations of each indicator from its ‘tranquil period’ mean value. The tranquil period refers to an eight quarter period of relative stability that precedes the beginning of a signaling window. The scores range from 0 to 5 with a score of 5 representing the most severe signal. Banking sector vulnerability at a point in time is determined by the trend in the aggregate micro-prudential score (or index) over the previous eight quarters (signaling window).

4 Indicators used in the micro-prudential indices are weighted by asset size.
For the building societies sector, the deterioration in the MIPI was influenced by decreases in both the ratio of liquid assets to total assets and the 12-month growth in deposits, indicative of increased vulnerability to liquidity risks. Additionally, loan loss reserves to total assets, an indicator of asset quality, increased during the review period, resulting in the signal from this indicator moving to a severe signal of 5.0, relative to zero the prior year (see Figure 2.16).

Similar to the commercial banks, the MIPI for the FIA licensees decreased in severity during 2010. The improvement in the index was mainly influenced by an increase in the ratios of net income to total assets and deposits and repos to total assets which both moved to zero relative to signals of 5.0 the prior year. The decline in the index was moderated by the impact of an increase in the ratio of non-performing loans to total loans as well as decreases in the ratios of loans to total capital and foreign currency liability to foreign currency assets (see Figure 2.17).


2.5 Insolvency Risk of DTIs

Deposit-taking institutions reflected increased insolvency risks evidenced by a lower Z-score index, an index of insolvency risk, as at end-2010 (see Figure 2.18). The index for the DTIs decreased by an average of 11.6 points to an average of 45.4 points for 2010. The deterioration in the Z-score index for the review period was largely influenced by increases in variability of profits for the building societies sector.

The commercial banking sector revealed an increase in its susceptibility to the risk of insolvency during the 12-month period ended December 2010. The Z-score index for the commercial banking sector decreased to an average of 47.9 points at end-2010 from an average of 56.1 points for 2009. This overall outturn for 2010 was a result of significant increases in the volatility of profits (see Figure 2.18).

During 2010, the Z-score for the FIA licensees declined by an average of 35.1 points to an average of 43.7 points (see Figure 2.18). The significant decline in the index for this sector was as a result of a substantial decline in the capital to asset ratio. This ratio declined by an average of 1.0 percentage point to 10.5 per cent in 2010, relative to 2009, reflecting a faster pace of reduction in capital than the fall in total assets.

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5 The Z-score (insolvency risk) index is used as a measure of a bank’s financial soundness. The ratio is calculated as:

\[ z = \frac{ROA - C/A}{\text{STD DEV (ROA)}} \]

where ROA is the bank’s return on assets, C/A is its regulatory capital to asset ratio and \( \sigma_{ROA} \) is its standard deviation of return on assets computed over the sampling period. The Z-score is used to capture the likelihood of a bank’s earnings in a given year becoming low enough to eliminate the bank’s capital base and thus, the likelihood of the bank becoming insolvent. A higher Z-score implies a lower probability of insolvency.

6 A Z-score of 20.0 is equivalent to a probability of insolvency of approximately 0.13 per cent, which was the average individual-bank probability of insolvency for New England banks that failed between 1989 and 1992 (see Hannan and Hanweck 1988).

7 The Z-Scores are weighted based on the relative total assets of the sectors.
2.6 Distance to Default for DTIs

The vulnerability of DTIs to the risk of default declined significantly over 2010. Specifically, the distance to default for DTIs increased by an average of 8.2 per cent in 2010, relative to an average increase of 6.2 for the previous year. The improvement in the one-year-ahead outlook for DTIs occurred against the backdrop of an increase in the market value of equity of the sector which was informed by growth in the market weighted share price for listed DTIs at end-2010. The outlook also reflected an increase in the market value of the sector's assets, which more than offset the marginal expansion in the sector's default barrier (see Figure 2.19).\(^8\,^9\)

In contrast to the DTIs, the one-year-ahead solvency outlook for the non-bank financial sector deteriorated over 2010 as the distance between the market value of the sector's assets and its liabilities narrowed further. Specifically, the distance to default for the non-bank financial sector declined to 0.3 at end-2010 from 5.7 at end-2009 and 17.9 at end-2008. The increased vulnerability occurred in spite of a marked reduction in the implied volatility of assets of the sector as well as virtually no change in the sector's default barrier year-on-year. The primary driver for the deterioration was in fact the decline in the market value of the non-bank system's assets over the review year (see Figure 2.20).

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\(^8\) Default barrier = \(\frac{1}{2}\) *(short-term + long-term liabilities)  
\(^9\) In addition, there was a reduction in the DTIs' implied volatility by one percentage point to 5.0 per cent over the review year.
2.7 Exposure to Sovereign Debt Default Risk of DTIs

The exposure of the banking system to sovereign debt default, as measured by the ratio of holdings of external GOJ debt to capital, moderated during 2010. At end-2010, this exposure totalled approximately 60.1 per cent, 202.2 per cent and 60.1 per cent for commercial banks, FIAs and building societies, respectively. These exposures represent respective declines of 7.4 percentage points, 58.5 percentage points and 5.3 percentage points for commercial banks, FIAs and building societies respectively, relative to end-2009 (see Figure 2.21).

In spite of the improvement in macro-economic stability post-JDX, the probability of sovereign debt default increased by 6.2 percentage points to 23.1 per cent at end 2010 relative to the end of the previous year.\(^{10}\) At the same time, the exposure of the banking system to sovereign credit risk, as measured by the credit risk exposure (CRE), moderated during 2010.\(^{11}\) The exposure of the banking system to sovereign default moderated as reflected in marginal increases to 9.7 per cent, 32.7 per cent and 4.1 per cent of the capital bases for the commercial, FIA and building societies, respectively. This was relative to 8.0 per cent, 30.8 per cent and 3.6 per cent for the commercial, FIA and building societies, respectively at the end of the previous year (see Figure 2.22).

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\(^{10}\) The probability of default is estimated using a logit-model which evaluates the likelihood of a debt-rescheduling event contingent on developments in the macro-economic environment based on data from 36 countries between 1986 and 2005.

\(^{11}\) The credit risk exposure (CRE) is a product of the holding of GOJ external holdings by banks, the probability of default (PD) and the loss given default (LGD).
At end-2010, 23.1 per cent of DTIs were migrated to a lower capital adequacy rating, 53.8 per cent remained within their previous rating and 23.1 per cent were upgraded in rating. This was in comparison to the preceding year-end, where only 7.3 per cent of the institutions were downgraded, 23.1 per cent remained unchanged and 69.2 per cent were upgraded.

There are nine possible ratings that can be attributed to any bank at a given point in time as function of its capital adequacy ratio (CAR). Banks with CARs which are greater than 20.0 per cent are rated SCAP, between 15.0 and 20.0 per cent are rated WCAP, between 10.0 and 15.0 per cent are rated CAP, between 9.0 to 10.0 per cent are rated UNDER, between 8.0 and 9.0 per cent are rated SUNDER, between 7.0 and 8.0 per cent are rated CUNDER, and CARs between 0.0 and 7.0 per cent are rated NFAIL. The transition probability matrix (TPM) for the banking sector is then calculated by evaluating the proportion of banks which have migrated from one rating to another over the period of a year. As is typical with TPMs the largest probabilities lie along the main diagonal indicating no change of rating for the period. Generalized maximum entropy is then used to condition these unconditional probabilities on bank-specific and macro-economic variables.

Table 2.1 One-year ahead transition probability matrix for the banking system at end-2010

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<thead>
<tr>
<th></th>
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Table 2.2 One-year ahead transition probability matrix for the banking system at end-2009

<table>
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<th>SUNDER</th>
<th>UNDER</th>
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<th>SCAP</th>
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12 There are nine possible ratings that can be attributed to any bank at a given point in time as function of its capital adequacy ratio (CAR). Banks with CARs which are greater than 20.0 per cent are rated SCAP, between 15.0 and 20.0 per cent are rated WCAP, between 10.0 and 15.0 per cent are rated CAP, between 9.0 to 10.0 per cent are rated UNDER, between 8.0 and 9.0 per cent are rated SUNDER, between 7.0 and 8.0 per cent are rated CUNDER, and CARs between 0.0 and 7.0 per cent are rated NFAIL. The transition probability matrix (TPM) for the banking sector is then calculated by evaluating the proportion of banks which have migrated from one rating to another over the period of a year. As is typical with TPMs the largest probabilities lie along the main diagonal indicating no change of rating for the period. Generalized maximum entropy is then used to condition these unconditional probabilities on bank-specific and macro-economic variables.
3 Financial System Developments

3.0 Overview
Institutions within the financial sector remained broadly profitable and adequately capitalized despite the relatively weak economic climate which prevailed during 2010. However, net profits declined during the year, primarily due to the fall off in DTIs’ interest income from lower interest rates, largely related to the JDX, as well as the continued weak performance in bank lending during the year. In addition, DTIs increased their capital adequacy amidst strong growth in NPLs. At the same time, there was a further slow-down in the growth in total assets of financial institutions, continuing the trend increase since 2008. Nonetheless, financial soundness indicators signalled improved balance sheet strength over the review period. More specifically, insurance companies and securities dealers recorded strong performance in key profitability indicators, most notably the ROA and ROE. Nonetheless, the securities dealers’ capital adequacy declined during 2010, despite reporting an increase in capital during the review period.

3.1 Deposit-taking institutions
There was a gradual weakening in the depth of financial intermediation in Jamaica in 2010, as measured by the ratio of total financial institutions assets as a share of GDP (see Figure 3.1). This ratio declined to 129.0 per cent at end-2010 relative to 140.8 per cent at the close of the previous year. This was primarily due to changes to the financial structure of the DTIs during 2010. In terms of a regional comparison, the ratio of financial sector assets to GDP strengthened in Barbados and Trinidad and Tobago to 163.0 per cent and 88.1 per cent, relative to 161.0 per cent and 67.6 per cent, respectively, at end-2009.¹

In 2010, commercial banks, building societies, credit unions and insurance companies increased their share in the sector’s total assets at the expense of securities dealers and FIAs (see Figure 3.2). With their share of sector assets increasing to 38.1 per cent in 2010

¹ Data on total assets for Trinidad and Tobago in 2010 were not available at the time of writing; hence, the percentages refer to total assets at end-2009.
from 37.1 per cent in 2009, commercial banks remained the dominant sector. Notably, the FIAs recorded a significant decline in total assets of 26.1 per cent during the review period relative to a marginal growth of 0.6 per cent in 2009. The decline in the FIAs’ assets was due to the merger of Scotia DBG Merchant Bank with Bank of Nova Scotia Jamaica Limited (BNS) in October 2010. The decline in assets of the FIAs also reflected the impact of reductions in the asset base of the two remaining institutions.

### 3.1.1 DTIs balance sheet position

The DTIs maintained total assets at around the same level (just over JMD J$820.0 billion) as the end of 2009. The sectors’ total assets grew by 3.3 per cent during 2010, relative to an average annual growth rate of 13.4 per cent for the five years prior to the 2008/9 crisis. This deceleration in asset growth mainly reflected reductions in the institutions’ stock of loans and advances as well as holdings of cash & bank balances, the impact of which was offset by a notable build-up in investments. The growth in domestic investments as a share of total assets during 2010 was influenced by the increase in the maximum value across all DTIs to 15.0 per cent relative 11.0 per cent in 2009 (see Figure 3.4). While there was a noticeable decline in the distribution of loans to total assets across DTIs in 2010, there was an increase in the interquartile range to 5.3 per cent from 3.7 per cent the previous year, indicating an increase in the dispersion around the mean for half the number of DTIs. Notwithstanding, Loans, Advances and Discounts still comprised the majority of DTIs’ asset base, totalling 46.0 per cent at-end 2010, relative to 47.0 per cent at end-2009.

Lending to domestic households represented the DTIs’ largest exposure to the private sector during 2010. Despite having declined in 2008 and 2009, the concentration in private sector lending increased during 2010 to 3.1 from 2.8 in the previous year as measured by the Herfindahl–Hirschman index (HHI) (see Figure 3.5). Aside from households, the DTIs’ other significant exposures were to tourism (9.4 per cent), distribution (8.2 per cent), professional & other services (6.2 per cent) and overseas residents (3.8 per cent) at end-2010 (see Table 1.0).
Credit to domestic households grew by approximately 4.2 per cent during the review period. Despite a decline in corporate sector loans, this accounted for 66.6 per cent of total lending to the private sector at end-2010 relative to 63.7 per cent at end-2009.

The decline in DTI credit during 2010 coincided with further deterioration in credit quality during the year. Weak aggregate demand and an increase in unemployment led to a pronounced increase in NPLs during the review period. Credit risk as a share of total bank risks – as measured by the ratio of capital requirements for credit risk to total capital requirements – averaged roughly 41.0 per cent during 2010. DTIs’ NPLs as a share of their loan portfolio increased to 6.5 per cent at the end of 2010, relative to 4.3 per cent at end-2009 (see Figure 3.6). This deterioration in credit quality largely reflected the performance of credit quality for Construction, Distribution, Manufacturing, Household and Mining during the review period. The evidence suggests that the average NPLs to total loans ratio in these sectors was approximately 8.8 per cent at end-2010, compared to 5.6 per cent exactly a year earlier.

The loan quality ratio for the building societies sector rose by only two percentage points during the review period to 6.9 per cent at end-2010. Loan quality in the commercial banks and FIAs deteriorated more significantly, to 5.4 per cent and 39.5 per cent at end-2010, relative to respective values of 4.3 per cent and 8.3 per cent at the end of the previous year. The significant deterioration in the loan quality ratio of the FIAs was as a result of deterioration in performance of past due loans –less than 3 months during the December 2010 quarter.
The volume of provisions for NPLs by DTIs continued to grow in 2010, albeit at a slower rate than the increase in NPLs. Loan loss provisions by DTIs grew by 25.0 per cent during 2010 from 21.2 per cent during 2009 (see Figure 3.7). Evidence regarding the distribution of the NPL coverage ratios for the DTIs suggests that although the aggregate ratio declined to 60.0 per cent at end-2010 from 86.7 per cent at end-2009, there was an increase in its minimum value across DTIs during the review period (see Figure 3.8). Moreover, although the NPL coverage ratio for the sector declined to 70.3 per cent at end-2010 from 75.2 per cent at end-2009, the ratio at end-2010 remained well above the BOJ’s required ratio of 50.0 per cent for the banking sector.

DTIs also maintained adequate levels of liquidity during 2010. Liquid assets, in particular, short-term government bonds, cash, claims on the BOJ and accounts receivable from banks on demand, expressed as a percentage of assets, increased to 26.1 per cent at end-2010, from 23.9 per cent at end-2009 (see Figure 3.9).

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2 This measures a bank’s ability to absorb potential losses from its non-performing loans. It is calculated as provision for loan losses plus provisioning for prudential losses (treated as an appropriation from net profits) to total NPLs.
Deposits, which accounted for 77.8 per cent of total liabilities at end-2010, relative to 75.0 per cent at end-2009, continued to represent the main source of asset financing (see Figure 3.10). Additionally, deposits as a share of loans increased to 143.0 per cent at end-2010 from 137.0 per cent at end-2009, which is indicative of reduced risks to financial stability given that deposits represent a relatively cheap and stable source of financing (see Figure 3.11 and 3.12).

3.1.2 Earnings and profitability

DTIs reported robust profits during 2010, despite the impact of the JDX and low aggregate demand on the performance of interest income for securities and loans (see Figure 3.13).

The DTIs ended 2010 with net profits of J$19.3 billion, a decline of 17.0 per cent over 2009. This corresponds with a return on equity (ROE) of 18.0 per cent at end-2010, relative to 23.5 per cent at end-2009 (see Figure 3.14). The fall in the ROE was mainly due to declines in leverage, risk-adjusted income and DTI’s profit margins during the review period. The impact of this was, however, partially offset by an increase in risk-adjusted income. Also, return on assets (ROA) declined to 1.4 per cent at the close of the review period from 2.1 per cent at end-2009, amidst only a marginal increase in total assets for 2010 (see Figure 3.15).

The leverage ratio of the DTIs has generally remained flat over the past decade (see Figure 3.16). Moreover, the distribution of these ratios has narrowed for DTIs while the median value across DTIs, which has been declining since 2008, fell to 6.6 at end-2010 from 7.2 at end-2009. Against this background, the sector’s profitability has been driven largely by DTIs higher profit margins.

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3 See 2006 Bank of Jamaica Financial Stability Report for more elaborate discussion of the decomposition of ROE.
Despite the weak economic climate and declining market interest rates during 2010, the main components of profit from DTIs' financial operations performed creditably during the year. A more detailed analysis of the outturn in net interest margin reveals that the robust performance in interest income was due primarily to a higher interest margin in the retail segment of deposits and loans as net interest income from the administration of securities and other financial operations declined (see Figure 3.17). Overall, DTIs reported net interest income of J$50.8 billion in 2010, down from J$54.5 billion recorded in 2009. As such, DTIs profit in 2010 was primarily driven by increases in fees & commission and gains from trading of J$14.0 billion and J$4.0 billion, relative to respective amounts of J$12.3 billion and J$-0.5 billion in 2009. In addition, DTIs' net interest margin declined for the review year (see Figure 3.18). This was evidenced in the narrowing of the distribution of the interest margin across the DTIs as a result of a larger decline in interest rates on loans than on deposits as well the sharp reduction in interbank rates during 2010.

3.1.3 Capital and Solvency

The strong performance in profits during 2010 was reflected in the improvement in DTIs’ capital adequacy to 21.2 per cent at end-2010, from 18.0 per cent at end-2009, due largely to increases in regulatory capital from retained earnings. Moreover, in spite of the new risk weights on GOJ foreign securities as prescribed by the IMF Standby Arrangement, all institutions’ capital adequacy ratio (CAR) remained above the 10.0 per cent minimum at end-2010 (see Figure 3.19). The quality of regulatory capital, as measured by the ratio of Tier 1 capital to total regulatory capital, totalled approximately 104.3 per cent at end-2010 relative to 102.3 per cent at end-2009.
Retained earnings remained the largest component of Tier 1 capital at end-2010. This component accounted for roughly 46.7 per cent of Tier 1 Capital while the reserve fund, share capital and minority interest accounted for 25.8 per cent 21.4 per cent and 12.3 per cent, respectively (see Figure 3.20).

While there were significant deteriorations in institutions’ loan quality, and thus an increase in the probability of loan default (PD), this was not a source of excessive growth in risk-weighted assets in 2010, as it was counteracted by a flat credit portfolio.

3.1.4 Interbank market
Most DTIs continued to utilize the domestic interbank market as a means of managing their short-term liquidity demands during 2010. This was also reflected in the fact that DTIs interbank activity during 2010 was concentrated in exposures with very short maturity. In addition, standard measures of connectivity in the interbank relationship network showed that the interrelationship matrix was relatively “sparse”. The average number of relationships between commercial banks and other financial institutions in Jamaica was around 5 at end-2010 (minimum 0, maximum 20). This implies an average connectivity of 26.3 per cent for the total 19 institutions analysed (see Figure 3.21).

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4 The connectivity for each institution is calculated as the number of relationships with the other institutions relative to the maximum possible number of relationships (19 in our case). It thus ranges between 0 and 100.0 per cent. The average connectivity is then the average for all institutions.

5 A risk to the banking system stability could arise in a situation where there are several institutions in the sector that are net debtors and have a high number of relationships with other banks. In such case, their collapse could then start a domino effect in a large part of the system, primarily because interbank exposures are generally unsecured below individual institutions’ critical internal threshold.
However, the analysis of the connectivity of institutions in terms of net creditor or net debtor positions did not indicate that net creditor institutions (i.e. commercial banks and other financial institutions) had a significantly different number of relationships than net debtor institutions at end-2010 (see Figure 3.21). At the same time, most commercial banks were net creditors to the rest of the financial system (see Figure 3.22). At end-2010, the average net credit position was approximately 2.5 institutions (J$2.3 billion), while the average net debtor position was approximately 2.5 institutions (J$3.2 billion). Moreover, the interbank contagion effect, which is assessed as part of the Bank’s routine stress test exercises, was generally limited even in the highly adverse scenarios given the presence of low connectivity in the interbank market.

3.2 Non-bank financial institutions

Similar to DTIs in the financial system, NBFIs were significantly challenged in 2010. The sector’s asset base contracted by 2.8 per cent in 2010, relative to an expansion of 9.5 per cent in the previous year. This falloff in the sector’s total assets was driven largely by declines in total assets of securities dealers and life insurance companies by 3.2 per cent and 5.2 per cent, respectively. The impact of these performances were, however, largely offset by growth of 7.1 per cent in total assets of general insurance companies (see Figure 3.23).

3.2.1 Securities Dealers

The funds under management (FUM) of the major securities dealers declined by 14.5 per cent to J$640.0 billion at end-2010 following strong growth of 22.2 per cent to J$748.0 billion for 2009 (see Figure 3.24). This was driven by declines in these institutions’ holdings of debt securities (GOJ & BOJ), foreign currency assets, loans to the public sector and other assets.
Risk weighted assets of the securities dealers increased by 53.5 per cent to J$13.4 billion at end-2010 following a decline of 11.7 per cent in 2009. This increase in risk weighted assets during the review period was largely due to the introduction of risk weights on GOJ foreign currency securities in March 2010 (see Figure 3.25). As a result, the sector’s CAR declined by 23.8 percentage points to 45.6 per cent at end-2010 relative to growth of 45.5 percentage points in 2009. In contrast, the sector’s primary ratio, measured as a ratio of regulatory capital to total assets, increased to 13.5 per cent at end-2010, relative to 10.1 per cent at end-2009. This increase was driven by the robust growth in regulatory capital by 18.5 per cent to J$61.2 billion as well as the decline in the sector’s total assets during 2010. The increase in the sector’s capital base during the review period was due to strong growth in profitability by institutions within this sector.

The positive performance in profits was also reflected in key profitability indicators such as the ROA and ROE. The distribution of securities dealers’ ROA showed that while the ratio decreased to 8.8 per cent at end-2010, relative to 12.1 per cent at end-2009, there was an increase in its maximum value (see Figure 3.26). The ROE of these institutions also remained high during 2010. Despite a decline in the ROE to 15.3 per cent at end-2010 from 19.3 per cent at end-2009, there was an increase in the maximum value of this ratio across securities dealers relative to 2009. The lower outturn in the ROE for the review period, relative to end-2009 was partly due to the strong growth in capital (see Figure 3.37).

The leverage ratio of the securities dealers declined in 2010 relative to levels that were observed in 2009, largely due increases in capital during the review period (see Figure 3.28). This ratio totalled 8.2 per cent at end-2010 relative to 9.8 at end-2009.

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"securities" include securities (treasury bills, bonds etc.) issued by approved G10 and CARICOM countries.
At end-2010, securities dealer’s holdings of liquid assets and current liabilities were roughly the same as at end-2009 (see Figure 3.29). In addition, during 2010, the ratio of liquid assets to current liabilities among the securities dealers remained at a similar level of 100.0 per cent relative to 2009.

Securities dealers’ sensitivity to foreign exchange risk declined throughout most of 2010. This reduction was primarily due to the signing of the IMF Standby Arrangement with Jamaica in addition to the successful completion of the JDX which engendered confidence and stability in the financial markets. Within this context, the securities dealers’ foreign currency net open position to capital ratio declined to 22.1 per cent at end-2010 relative to 30.6 per cent at end-2009 (see Figure 3.30).

### 3.2.2 Insurance companies

The insurance sector in 2010 recorded flat growth in premiums written in general insurance, while premiums written in life insurance sector increased. The flat growth in premiums written in the general insurance sector in 2010, relative to growth of 25.0 per cent during 2009, was largely due to weak domestic demand during the review period. In contrast, premiums written in the life insurance sector grew by 10.1 per cent in 2010, following a decline of 7.0 per cent in 2009, owing primarily to an increase in premium payments in investment life insurance (see Figure 3.31).

Total assets, financial placements and premiums written increased gradually during 2010 in the domestic insurance sector. However, insurance penetration continued to be low for the review year. The ratio of financial placements to GDP for general insurance companies was very low and totalled only 0.5 per cent of GDP at end-2010 (see Figure 3.32). In the case of life insurance companies, the distribution, albeit wider, indicated that the maximum financial placement by an institution in this sector fell short of 5.0 per cent of GDP at end-2010.
During 2010, insurance companies continued to record strong performance in profits as the fall-off in interest income as a result of the JDX was more than offset by earnings from other areas of operation. The insurance sector ended 2010 with a high ROE of 17.8 per cent, albeit lower than the 24.0 per cent at end-2009 (see Figure 3.33). The capital and solvency of the domestic insurance companies remained at adequate levels at end-2010. The ratio of disposable solvency to required solvency in the domestic insurance sector is relatively high as compared to international benchmarks (see Figure 3.34). In addition, at end-2010 the sector was adequately capitalized, as the ratio of capital to total assets totalled 25.0 per cent and corresponded to a relatively small leverage multiple of 3.2 (see Figure 3.35).

Preparations are currently on-going for a new regulatory measure for general insurance companies’ capital requirements. The introduction of this new capital requirement, known as the minimum continuing capital surplus requirement (MCCSR) should lead to an improvement in resilience in the sector to any adverse shocks and serve to strengthen the sector’s financial stability.

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9 Measured as the ratio of capital and surplus, investment and capital reserves to total assets, this ratio captures the company’s leverage. The higher the ratio, the more the company is able to withstand financial distress and difficult periods.

10 The Minimum Continuing Capital and Surplus Requirement is a measure of capital adequacy for life insurance companies. It is a risk-based minimum requirement determined by applying factors for a number of risk components to specific on- and off-balance sheet assets or liabilities.
Figure 3.33 Return on equities of the insurance sector (%)

- The graph shows the return on equities for the insurance sector from 2004 to 2010.

Figure 3.34 Solvency of insurance companies
(available to required solvency ratio; %)

- The broken red line indicates the FSC’s required minimum solvency ratio for insurance companies.

Figure 3.35 Capitalization of the insurance sector
(JMD billions and %)

- The graph displays the capitalization of the insurance sector from 2004 to 2010.
4. Financial System Sectoral Exposures

4.1 Overview

In 2010, deposit-taking institutions’ (DTIs) exposure to household debt remained relatively flat while their exposure to corporate sector debt declined in comparison to 2009. With respect to non-bank financial institutions (NBFIs), their exposure to private sector debt remained low during 2010. This occurred against the background where domestic economic activity continued to contract which was reflected in weaker consumer demand. Despite relatively lower exposure to household and corporate sector debt in 2010 relative to 2009, the loan quality ratio for DTIs showed continued deterioration. However, for NBFIs, the ratio improved marginally during 2010.

In contrast to household and corporate debt exposures, DTIs and NBFIs exposure to public sector debt increased in 2010. This might have been influenced by an improvement in the debt servicing capacity of the Government during the review period. The improved position of the Government was associated with the successful completion of the Jamaica Debt Exchange (JDX) programme which enabled an increase in the fixed rate proportion of the domestic debt portfolio, an extension and smoothing of the maturity profile of domestic debt and reduction of the foreign currency exposure of the portfolio.

4.2 Household Debt and DTIs Exposure

In light of continued domestic economic contraction, household debt held by DTIs in 2010 grew marginally by 4.3 per cent relative to growth of 3.0 per cent in 2009. Furthermore, this growth was substantially below the average annual increase of 23.1 per cent over the last five years, reflecting the spill-over effects of the global financial crisis on the Jamaican economy (see Figure 4.1). The incremental growth in 2010 was primarily due to expansion in consumer loans which increased by 5.1 per cent compared to a contraction of 3.0 per cent in 2009. Growth in household debt was also supported by a 3.4 per cent increase in mortgage loans. However, this increase represented a sharp deceleration

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1 Household debt incurred with the banking sector is proxied by the sum of residential mortgage loans and consumer loans (which includes credit card receivables).
The marginal growth in household sector credit occurred against the background of an estimated contraction of 1.2 per cent in economic activity during 2010. Furthermore, since 2008, there has been a gradual decline in residential construction, as determined by the number of housing completion projects, to 3,241 in 2010 from 4,622 and 7,964 in 2008 and 2009, respectively. Additionally, in spite of continued lowering of interest rates by the Central Bank, rates on long-term loans such as instalment and mortgage loans have remained relatively high. As at end-2010, the average weighted loan rate remained at similar levels for all sub-sectors in 2010 relative to end-2009 which contributed to the sluggish growth in household debt over the review period (see Table 4.1).

Despite the sluggish growth, household debt accounted for 51.7 per cent of DTI credit relative to 48.9 per cent in 2009. With respect to household debt as a share of assets, this ratio remained relatively flat at 23.2 per cent in 2010 compared to 22.6 per cent in 2009 (see Figure 4.2).

Consistent with increased levels of unemployment and the general slowdown in economic activity, household sector loan quality ratio continued to deteriorate in 2010. As a result non-performing household loans (NPLs) as a share of total household loans deteriorated to 7.0 per cent at end-2010, relative to a ratio of 5.6 per cent at end-2009 and an average ratio of 4.1 per cent for the past five years (see Figure 4.3).

Notably, over the past few years household sector coverage ratio has been steadily declining. For 2010, the household

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2 This contraction in GDP compares to a 3.0 per cent decline during 2009. Additionally, at end-2010, the unemployment rate increased to 12.0 per cent relative to 11.6 per cent in 2009.

3 Coverage ratio is measured as the ratio of loan loss provisions to non-performing household loans.
coverage ratio declined to 53.9 per cent relative to 66.7 per cent in 2009 (see **Figure 4.4**). This deceleration can be attributed to faster pace of growth in household NPLs, relative to the growth in loan loss provisioning by DTIs.

### 4.2.1 Household Sector Performance

The debt servicing capacity of the household sector is estimated to have remained virtually flat in 2010. Household debt as a proportion of disposable income declined marginally to 16.6 per cent at end-2010, slightly below the 17.0 per cent recorded in 2009 (see **Figure 4.5**). This was attributed to a faster pace of growth in disposable income relative to household sector debt during the year. Disposable income grew by 8.2 per cent while household sector debt recorded an increase of 5.9 per cent.

### 4.3 Corporate Sector Debt and DTIs Exposure

Corporate sector debt contracted in 2010, consistent with the reduced demand for overall goods and services by consumers since 2008. During 2010, corporate sector debt held by DTIs contracted by 5.7 per cent relative to growth of 6.7 per cent in 2009 and an average growth of 20.9 per cent for the past five years (see **Figure 4.6**). This decline was influenced by a 5.7 per cent reduction in lending for private commercial purposes, as this category represented 98.5 per cent of total corporate sector debt at end-2010.

Furthermore, DTIs holding of corporate sector debt to DTIs total assets declined to 17.8 per cent at end-2010, compared to 19.2 per cent at end-2009. Additionally, there was a marginal decline in the share of corporate sector debt to total loans in 2010 to 39.6 per cent from 41.5 per cent the prior year. This

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4 Household debt is proxied by the sum of residential mortgage loans, consumer loans (which includes credit card receivables) and NHT loans.

5 Disposable income for 2010 was estimated based on the annual estimated growth rate in nominal Gross Domestic Product (GDP).

6 Corporate sector debt is defined as loans for commercial purposes, loans to other financial institutions and notes & debenture holdings of the banking sector. Corporate sector debt as a proportion of total assets increased to 19.2 per cent at end-2009, in comparison to 19.1 per cent at end-2008.
lower exposure might be due to more stringent lending requirements amidst continued increase in NPLs as well as lower loan demand.

For the review year, the decreased exposure to corporate sector debt reflected reductions in lending to all economic sectors except Construction, Transport and Distribution (see Figure 4.8). The sectors that recorded the steepest decline in credit growth included Tourism, Agriculture and Electricity, averaging a decline of 16.9 per cent in 2010 relative to an average growth of 27.5 per cent in 2009. With the exception of Tourism, which is estimated to have grown, the declines in lending to these sectors were consistent with the reductions in their rates of economic growth. Agriculture and Electricity are estimated to have declined by 0.4 per cent and 4.2 per cent, respectively, in 2010 relative to growth of 13.9 per cent and 2.2 per cent in 2009.

4.3.1 Corporate Sector Loan Quality
Corporate sector loan quality continued its trend deterioration in 2010 relative to 2009. The ratio of corporate sector NPLs to total corporate sector loans increased to 6.6 per cent at end-2010, relative to a value of 4.3 per cent at end-2009. Additionally, the ratio at end-2010 was well above the five year annual average of 2.7, per cent which underscores DTIs increasing susceptibility to credit risk (see Figure 4.9). In examining the delinquency rate by sector, relative to 2009, the loan quality ratio for all economic sectors with the exception of Distribution and Transport deteriorated in 2010. Notably, Mining, Construction and Manufacturing, recorded the highest NPL ratios of 12.9 per cent 11.9 per cent and 8.8 per cent in 2010 (see Figure 5.10).

4.3.2 Performance of Companies listed on the Jamaica Stock Exchange (JSE) during 2010
Despite favourable conditions for stock market expansion, including high domestic liquidity levels, a low interest rate environment and a stable foreign exchange market, the Main JSE Index advanced only marginally in 2010. The JSE index grew by 2.3 per cent in 2010 relative to growth of 4.0 per
cent for the previous year (see Figure 4.11). The performance of the Index reflected weak earnings performance in light of the continued contraction in the local economy and the impact of the Jamaica Debt Exchange (JDX) programme on interest income of listed companies, in particularly, financial sector stocks.

Notwithstanding the lackluster performance of the JSE Index, there was a marked improvement in trading activity as reflected in the overall volumes traded during 2010. Year-over-year, the volume of shares traded grew by 58.9 per cent relative to a decline of 27.6 per cent in 2009. However, it must be noted that the significant improvement in market activity was primarily concentrated in the first quarter of 2010 and reflected renewed investor interest associated with the successful completion of the JDX programme as well as the signing of the SBA between Jamaica and the IMF.

During 2010, listed corporate sector entities’ financial leverage ratio declined marginally. The ratio of total debt to total assets declined to 80.7 per cent in 2010 relative to 82.7 per cent in 2009 (see Figure 4.12). Of note, companies within Finance and Insurance remained highly leveraged while companies within Manufacturing and Other recorded the lowest leverage ratio for the review period. Notwithstanding the high leverage ratio for financial sector stocks, companies within this sector have been deleveraging since 2008 in comparisons to other sectors listed on the exchange.

Overall profitability of listed companies remained relatively flat in 2010 relative to the previous year. The asset utilization ratio as measured by average return on assets (ROA) for listed companies declined to 3.7 per cent in 2010 relative to 3.9 per cent in 2009, reflecting lower net profits during the review period. Notably, with the exception of Retail and Insurance, all the sectors recorded declines in ROA (see Figure 4.13).

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7 A debt to asset ratio in excess of 65.0 per is typically associated with excessive debt.
8 ROA measures net profits as a proportion of average total assets. This ratio is indicative of how efficiently institutions are utilizing their assets to generate profits. The weighted ROA for all listed entities was weighted by the market capitalization for each sector.
Similarly, the ratio of net profits to revenues for listed entities declined in 2010 relative to 2009. This ratio declined to 24.4 per cent relative to 28.4 per cent in 2009. Furthermore, Retail, Conglomerate and Finance continued to record the highest profit margin ratios while Communications and Other recorded the lowest ratios (see Figure 4.14).

The weighted price to earnings (P/E) ratio for listed companies improved marginally in 2010 relative to 2009. At end-2010, the weighted P/E ratio across sectors averaged 1.1 times relative to a ratio of 0.9 times in 2010 (see Figure 4.15). With the exception of Finance and Insurance all the listed sectors recorded a weighted P/E ratio below 1.0 times.

Despite lower levels of profitability, the solvency ratio for listed companies continued to be high. At end-2010, the capital to asset ratio increased to 19.3 per cent relative to 17.3 per cent in 2009. With the exception of Communication, all other sectors on the Exchange showed an improvement in their solvency in 2010 relative to the prior year. Finance recorded a solvency ratio of 10.7 per cent, well above the regulatory benchmark of 6.0 per cent (see Figure 4.16).

In spite of declared efforts by listed companies to improve operating efficiency, there was deterioration in the ratio of operating expenses to revenues in 2010 (see Figure 4.17). This ratio increased to 63.4 per cent across sectors in 2010 relative to 60.3 per cent in 2009. The deterioration in the ratio reflected the performance of companies in Communication, Retail and Other. However, Manufacturing and Insurance recorded improved efficiency ratios relative to the prior year, consistent with aggressive efforts to reduce costs and maximize earnings within these sectors.

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9 This implies that for every $1.00 of revenue generated, $0.25 went to the companies’ net profit.
10 The P/E ratio is calculated as the market value per share divided by the per share earnings of a company. The ratio was then weighted by the market capitalization of each listed company.
4.4. Public Sector Debt & DTIs Exposure

Within a context where there was an overall decline in the stock of loans for DTIs, there was a notable increase in the holdings of public sector securities in 2010, particularly for commercial banks. This was reflected in an increase in the ratio of public sector loans and securities to DTIs assets to 22.3 per cent at end-2010, relative to 18.1 per cent at end-2009 (see Figure 4.18). The performance was mainly influenced by a 37.5 per cent increase in the holdings of public sector securities during the year and a 1.7 per cent increase in banking system assets. However, public sector demand for loans from DTIs recorded a modest decline of 11.7 per cent, possibly influenced by multilateral flows to the Government during 2010.

4.4.1 Public Sector Indebtedness & Performance

Public sector debt as a share of GDP increased to 129.0 per cent at end-2010 from 123.0 per cent at end-2009, reflecting a faster rate of growth in public sector debt stock relative to GDP (see Figure 4.19). During 2010, the public sector debt stock grew by 13.0 per cent which was notably below the annual growth at the end of the previous year by 7.1 percentage points. The increase in the debt stock during 2010 reflected growth of 21.9 per cent and 6.1 per cent in external and domestic currency debt, respectively (see Figure 4.20). This compares to respective growth rates of 15.7 per cent and 23.8 per cent for external and domestic currency debt stock during 2009. The marked increase in external debt was largely attributed to inflows from multilateral creditors in the context of the IMF–SBA.

The slower rate of growth in the public sector debt in 2010, relative to the previous year occurred against the background of improvement in revenue flows and cost containment by the Government. This resulted in a marginal improvement in the fiscal stability ratio (which captures the stability of government finances) to 1.3 at end-

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11 Exposure to public sector debt is measured by public sector loans and securities as a share of DTIs assets. Public sector comprises Public Entities and Central Government.

12 Despite improvements in revenue flows during the year, government expenditure was impacted by the passage of Tropical Storm Nicole which resulted in substantial damage to Jamaica’s road network.
2010 relative to a ratio of 1.4 at end-2009 (see Figure 4.21). The improvement in revenue flows was due to increased tax administration efforts and new tax measures that were implemented during December 2009. Additionally, cost containment was achieved through expenditure savings due to lower than projected interest and exchange rate paths and a reduction in capital expenditure.

The JDX which was completed in the first quarter of 2010 was deemed a success with a participation rate of 99.2 per cent of total eligible Government of Jamaica instruments. Accordingly, this enabled the Government to increase the fixed rate proportion of the domestic debt portfolio, extend and smooth the maturity profile of domestic debt and reduce the foreign currency exposure of the portfolio. This served to improve the sustainability of the debt profile during 2010.

For 2010 98.5 per cent of new offers were at fixed rates of interest. This resulted in the share of fixed rate instruments growing by 10.4 percentage points to 59.3 per cent for the review year (see Figure 4.22).

Additionally, during 2010, the alteration of the maturity profile of the domestic debt portfolio arising from the JDX resulted in reduced refinancing risk to the Government. The proportion of domestic debt due to mature in 5 years or less declined to 50.7 per cent at end-2010 from 75.5 per cent at end-2009 (see Figure 4.23). In terms of the external debt maturity profile, there was a marginal increase of 0.9 per cent in Investments in the 5-year & under maturity bucket during 2010 (see Figure 4.24).

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13 The FSR is computed as the ratio of overall fiscal balance to total revenue less 1 (one). The closer the FSR is to zero indicates more stable government finances.
14 The JDX was aimed at providing fiscal space and ensuring the sustainability of its fiscal position.
15 Long term domestic debt represents investments in the ‘over 5-year’ maturity bucket.
4.5. Non-Bank Financial Sector Exposure

4.5.1 Private Sector Debt & Securities Dealers Exposure

The exposure of the 12 largest securities dealers (SDs) to the private sector was low during 2010.\(^{16}\) The ratio of private sector debt to assets for the SDs increased marginally to 1.7 per cent at end-2010 relative to 1.5 per cent at end-March 2010 (see Figure 4.25).\(^{17}\) This increase was mainly influenced by average growth of 32.9 per cent in private sector credit for three institutions which resulted in a 12.2 per cent increase in overall private sector debt relative to a decline in assets of 3.3 per cent.

Private sector debt incurred by SDs as a proportion of capital averaged 13.7 per cent for much of 2010. Notably, relative to end-March 2010, there was a decline of 0.4 percentage point in the ratio to 14.0 per cent at end-2010 implying a marginal reduction in credit risk exposure.

The SDs loan quality ratio as measured by private sector NPLs to private sector loans increase slightly to 5.6 per cent at end-2010, relative to 4.7 per cent at end-March 2010 (see Figure 4.26). This compares favourably to the loan quality ratio for DTIs which recorded a household and corporate sector NPL ratio in excess of 6.0 per cent at end-2010. The deterioration in the loan quality ratio for SDs of 0.8 percentage point was due to an increase in private sector NPLs for two of the top 12 institutions.

The coverage ratio for SDs declined at end-2010 to 110.0 per cent when compared to a ratio of 118.7 per cent at end-March 2010. The ratio at end-2010, however, represented an improvement from a low of 75.3 per cent at end-June 2010. Notably, at end-2010 the ratio was approximately 3.0 times that of the DTIs and represented strong levels of provisioning (see Figure 4.26).

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\(^{16}\) Private sector loans incorporate loans to corporate sector entities and personal (household) loans.

\(^{17}\) Data on private sector debt for non-banks was only available for 2010.
4.5.2 Public Sector Debt & Securities Dealers Exposure
SDs holdings of public sector debt increased at end-2010 relative to their holdings at end-March 2010. The ratio of public sector debt to assets grew to 46.7 per cent at end-2010 (twice that of DTIs) compared to a ratio of 43.8 per cent at end-March 2010 (see Figure 4.27). This increase reflected growth in the holdings of public sector securities and public sector loans of 3.2 per cent and 11.3 per cent, respectively. Conversely, public sector debt holdings to capital declined steadily during 2010. Relative to end-March 2010, this ratio declined to 380.4 per cent at end-2010 from a ratio of 425.5 per cent.

4.5.3 Public Sector Debt & Insurance Sector Exposure
Similar to the DTIs and SDs, exposure to public sector debt increased for the insurance sector during 2010. The ratio of public sector debt holdings for insurance companies to assets increased incrementally to 56.9 per cent at end-2010 relative to 55.1 per cent at end-March 2010 (see Figure 4.28). Of note, this ratio averaged 63.1 per cent for the life insurance companies compared to an average ratio of 32.9 per cent for the general insurance companies during 2010.

Also similar to DTIs and SDs, the ratio of public sector debt holdings to capital for the insurance sector averaged above 100.0 per cent during 2010 (see Figure 4.29). The high ratio was influenced mainly by the life insurance sector which recorded an average ratio of 226.8 per cent while the general insurance companies averaged 91.4 per cent.

4.5.4 Other Assets & Insurance Sector Exposure
The insurance sector’s exposure to equities and real estate investments was relatively small compared to their exposure to public sector debt. During 2010, the ratios of equity investments to assets and real estate investments to assets averaged 1.5 per cent and 1.0 per cent, respectively. In contrast the SDs and DTIs exposure to equities investments

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18 Public sector debt is measured as the sum of public sector loans and public sector securities. While, exposure is defined as public sector debt as a proportion of assets.
averaged 0.6 per cent and 0.9 per cent, respectively, during 2010 (see Figure 4.30).

Figure 4.30 Investments in other assets for the financial sector

![Figure 4.30 Investments in other assets for the financial sector](image)
5. Risks Assessment of the Financial Sector

5.1 Overview
Deposit-taking institutions (DTIs) remained robust to hypothetical liquidity, market and credit shocks during 2010. While liquidity and market risk exposures remained benign during 2010, the exposure to credit-related risks persisted during the year. Based on stress test results, exposure to credit risk remained the most significant exposure of the DTIs. In contrast, the exposure of DTIs to interest rate risk declined significantly, while foreign exchange risk and liquidity-related risks remained negligible (see Figure 5.1 and Figure 5.2). The non-banking financial sector also remained robust to a wide range of market and liquidity shocks during 2010. However, during 2010, while securities dealers lessened their exposure to interest rate risk their exposure to liquidity funding risk increased.

5.2 Liquidity Funding Risk Assessment of the Banking System
The DTI sector continued to rely primarily on deposits to fund its activities during 2010. Deposits as a proportion of banking system funding increased to 78.1 per cent at end-2010 from 75.8 per cent at end-2009. In terms of other sources of funding, DTIs relied marginally less on inter-bank funding relative to the preceding year and relatively more on ‘other borrowing’. Specifically, inter-bank funding and borrowings accounted for an average of 18.2 per cent and 4.3 per cent of the funding base of DTIs during 2010, respectively, relative to an average of 20.5 per cent and 4.7 per cent at end-2009. There was also a slowdown in the annual growth of the DTI’s funding base to 1.8 per cent for 2010 relative to a five-year average growth of 10.1 per cent. The marginal increase in the funding base was influenced by growth in borrowings of 6.9 per cent, the impact of which was partially offset by the 11.2 per cent reduction in inter-bank funding. In addition, deposits grew by 4.8 per cent during 2010 relative to an increase of 8.7 per cent in 2009 and a five-year average of 10.0 per cent (see Figure 5.3).

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1 In Figure 6.1 the size of each node is scaled in proportion to the total value of exposure arising from the stress test as at end-March 2010 and end-2010.
The liquidity risk exposure of the DTI sector remained low during 2010 as reflected in the positive trends in the various measures of liquidity risk. The loans-to-deposit ratio declined to 67.0 per cent at end-2010 from 71.1 per cent at end-2009. The reduction in this ratio was a result of both a slow-down in the annual growth rate of deposits as well as the reduction in loan growth. Furthermore, the liquidity ratio of the system trended upwards for the year, as DTIs recorded a ratio of 36.2 per cent at end-2010 relative to 31.1 per cent as at end-2009. Additionally, DTIs held buoyant reserves of liquidity in excess of those prescribed by the Bank. These reserves trended upwards between March 2008 and December 2010 (see Figure 5.4). Finally, the ratio of short-term assets to short-term liabilities for DTIs, with the exception of the FIA sector, remained high during the year, indicating low short-term liquidity risk (see Figure 5.5). At end-2010, in excess of 100.0 per cent and 80.0 per cent of short-term liabilities were backed by short-term assets for commercial banks and building societies, respectively. In contrast, only 5.6 per cent of short-term liabilities were backed by short-term assets of the FIA sector.

During 2010, liquidity funding stress tests indicated that all DTIs were adequately capitalised to absorb hypothetical losses associated with a decline in deposits. Specifically, after a hypothetical 10.0 per cent decline in average deposits, it was revealed that all DTIs had post-shock capital adequacy ratios (CARs) above the regulatory benchmark of 10.0 per cent.\(^2\) There was also an increase in the median post-shock CAR of the system during 2010 which underscored the improved resilience of banks to liquidity funding risk (see Figure 5.6).

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\(^2\) The 'hair cut' (\% loss in value) applied in the stress testing framework on liquidating each category of assets are: items in course of collection (10.0\%), non-liquid investments (20.0\%), accounts receivables (20.0\%), loans & advances (28.0\%), Fixed Assets (36.0\%), Other Assets (90.0\%) and resultant losses are written off against the capital buffers first and then statutory capital.
5.3 Market Risk Assessment of Deposit-Taking Institutions

The composition of the investment portfolio of commercial banks and building societies was more heavily weighted in Jamaica Dollar denominated bonds relative to positions in foreign currency denominated securities and equities for 2010. In contrast, the FIA sector held the largest proportion of their portfolio in foreign currency securities. Relative to end-2009, all sub-sectors within the DTI system increased their position in Jamaica Dollar securities and reduced their holdings of foreign currency bonds (see Chapter 3.13).

Conditions in the domestic financial markets remained benign as reflected in a downward trend in yields on domestic instruments, complemented by a significant reduction in the volatility in yields following the successful completion of the JDX. Improved market perceptions of the stability of the system, was reflected in the trend decline in the median implied volatility of assets of publicly-listed DTIs. However, latent concerns about financial system stability remained post-JDX as indicated by the widening of the inter-quartile range for the implied volatility of assets of publicly-listed DTIs relative to end-2009 (see Figure 5.7).

Concurrently, the duration of domestic bonds held by DTIs declined to 0.66 at end-2010 from 0.77 at end-2009 (see Figure 5.8). This represented a reversal in the increasing trend in duration for the sector recorded for 2009. The trend in 2010 was largely influenced by the commercial bank and the building society sectors. The duration of foreign currency securities held by DTIs declined to 1.97 at end-2010 from 2.52 at end-2009. The reduction in the duration factors for the system highlighted a reduced exposure to interest rate risk during 2010. Similar trends were observed for the interest rate risk exposure of the DTIs to both domestic and foreign currency securities. Specifically, the domestic dollar value of a percentage point to capital (DDVPC) for DTIs declined to 0.26 per cent at end-2010 from 0.47 per cent at end-2009. Similarly, during 2010 the DDVPC for foreign...
currency securities declined by 0.55 percentage point to 1.24 per cent relative to end-2009 (see Figure 5.9). During 2010, interest rate risk stress tests indicated that all DTI sectors were adequately capitalised to absorb losses associated with large but plausible hypothetical increases in interest rates. Additionally, during 2010 both the inter-quartile range and the median quarterly post-shock CAR increased after a hypothetical 1 100.0 basis point increase in rates (see Figure 5.10). Further, consequent on the relatively small movements in yields in bond markets and the trend declines in the duration targeted by DTIs, the downside risk of the system declined during 2010. This was evidenced in the decline as well as the narrowing in the inter-quartile range for the DTIs’ value-at-risk (VaR) estimates during 2010 (see Figure 5.11).

The foreign exchange market returned to relative stability during 2010 compared to the bouts of instability observed over the previous two years. This stability was particularly noticeable in the latter part of 2010 as there was a significant uptick in volatility in the second quarter of the year. This uptick was largely influenced by a sharp appreciation in the exchange rate following the successful completion of the JDX and the receipt of large flows from Multilateral Financial Institutions in line with the IMF Stand-by Arrangement which Jamaica signed in the first quarter of 2010 (see Figure 5.12). At end-2010 the exchange rate was US$1:J$85.22, reflecting an appreciation in the Jamaica Dollar of 4.9 per cent for 2010.

Consistent with the relatively low demand for foreign currency and increased investor confidence relating to Jamaica Dollar denominated investments the net open position (NOP) of the DTI system declined during 2010. Relative to end-2009, DTIs reduced their long position in US dollar assets by 40.8 per cent to US$195.6 million (see Figure 5.13). This decline in the NOP was observed across each of the DTI sectors. Consequently, DTIs’ exposure to foreign currency risk declined as reflected in a reduction in the NOP to capital by 15.1 percentage points to 21.9 per cent. DTIs also continued to limit their exposure to non-

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3 The DVPC captures the dollar value loss of a percentage point increase in domestic bond yields as a proportion of the capital base.
foreign currency earners during the review year. This was reflected in DTIs loans to non-foreign exchange earners which declined to $17,665 million at end-2010 relative to $20,338 million at end-2009. Further, loans to non-foreign exchange earners as a proportion of total loans extended by DTIs remained flat relative to end-2009 at an average of 14.7 per cent for the review year (see Figure 5.14).

At end-2010, all DTIs were adequately capitalised to absorb losses associated with significant hypothetical depreciations of the Jamaica Dollar vis-à-vis the U.S. dollar. Specifically, after a hypothetical 30.0 per cent depreciation, the median post-shock CARs across all DTI sectors trended upwards relative to the average median post-shock CARs recorded during 2009. The post-shock CARs for commercial banks remained relatively flat and comfortably above the 10.0 per cent CAR benchmark during 2010. Building societies were minimally affected by the shocks applied in 2010 and generally exhibited a relatively unchanged median post-shock CAR. However, the most susceptible institutions to foreign exchange risk for building societies became increasingly more vulnerable during 2010, though they remained comfortably above the minimum benchmark. The median post-shock CAR for the FIA sector showed an upward trend during 2010 reflecting lower levels of risk to foreign exchange rate-related shocks. However, increased levels of vulnerability to a foreign exchange rate shock for the FIA sector were observed at end-2010 as reflected in the decline in the median post-shock CAR as well as a narrowing of the inter-quartile range for the year (see Figure 5.15).

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4 Shocks are applied firstly 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 January and May 2003.
5.4 Credit Risk Assessment of DTIs

Over 2010, exposure to credit risk remained increasingly the most significant risk to DTIs based on aggregate stress test results (see Figure 5.16).

The increased susceptibility of the DTI sector to credit risk was underscored by deterioration in the non-performing loans (NPL) ratio, reserves for loan losses ratio and loans and securities provision ratios. The write-off rate increased to 1.7 per cent of total loans at end-2010 from 0.4 per cent at the beginning of 2009, having peaked at 2.3 per cent at end-October 2010. Write-off rates remained elevated relative to a five year historical average of 0.8 per cent. At the same time, provisioning ratios increased marginally for building societies but declined for both commercial banks and FIAs for 2010. The building societies sector recorded an increase in their ratio of provisioning to NPLs to 47.8 per cent at end-2010 relative to 42.6 per cent at end-2009. In contrast, the ratio of provisioning to NPLs declined by 4.5 percentage points and 37.8 percentage points to 84.4 per cent and 47.8 per cent for commercial banks and FIAs, respectively, relative to end-2009 (see Figure 5.17). An overall decline in provisioning ratios for DTIs was consistent with increased write-off rates observed during the year.

The median NPL to capital ratio for DTIs increased during 2010. The ratio was stable around 20.0 per cent for the review year, relative to 16.8 per cent recorded over 2009. In addition, the widening of the inter-quartile range for NPLs to capital for DTIs underscored an increasing exposure to credit risk. This ratio increased to within an inter-quartile range of 17.8 per cent to 40.0 per cent at end-2010 relative to a range of 12.5 per cent to 30.4 per cent at end-2009. Additionally, the maximum ratio of NPLs to capital recorded across all DTIs increased sharply to 119.6 per cent from 53.8 per cent at end-2009 (see Figure 5.18).

Despite the continued deterioration in DTI loan quality, the CAR for all sectors remained adequate to absorb a hypothetical 30.0 per cent increase in NPLs. Specifically, both the commercial bank and the building society sectors showed increased levels of robustness against large but plausible hypothetical shocks to NPLs over the review year. However, the FIAs’ post-shock...
CAR, particularly at end-2010 showed an increased level of susceptibility to the hypothetical shock (see Figure 5.19).

Reverse stress testing exercises conducted for the commercial banking sector suggest that it would take a larger increase in the NPLs at end-2010 to cause the most vulnerable institution to have its CAR fall below 10.0 per cent relative to end-2009. Specifically, at end-2010 it would take a 175.0 per cent increase in NPLs for the first commercial bank to breach the regulatory minimum CAR relative to an increase of 150.0 per cent at end-2009. In contrast, reverse stress testing assessments of the FIA sector revealed increasing susceptibility of the sector to credit-related risks as it would take a smaller increase in NPLs at end-2010 to cause the most vulnerable institution to have its CAR fall below 10.0 per cent. Specifically, at end-2010 it would take a 65.0 per cent increase in NPLs to bring the CAR of the weakest institution below the 10.0 per cent benchmark relative to an increase of 220.0 per cent in NPLs at end-2009. Similarly, for the building societies sector, at end-2010 it would take a 50.0 per cent increase in NPLs for the CAR of the weakest institution to fall below the regulatory minimum relative to an increase of 90.0 per cent at end-2009 (see Figure 5.20).

5.5 Liquidity Funding Risk Exposure Assessment of Securities Dealers

There was a trend increase in the liquidity funding risk of the securities dealers sector as measured by the ratio of short-term assets to liabilities. The ratio of short-term assets to liabilities declined to 16.0 per cent at end-2010 from 30.4 per cent at end-March 2010. The decline in the ratio reflected a 77.0 per cent reduction in short-term assets to $22 384 million at end-2010. On the other hand, short-term liabilities declined by 56.3 per cent to $139 797.6 million at end-2010 (see Figure 5.21).
The liquidity funding stress test for the twelve largest securities dealers, involving a hypothetical 10.0 per cent reduction in retail repo-liabilities showed that all entities had post-shock CARs above the regulatory minimum of 12.0 per cent. The average median post-shock CAR during 2010 was 57.5 per cent. However, the increased exposure to liquidity funding risk was reflected in both a downward trend and narrowing of the inter-quartile range of the post-shock CARs over the year. The median post-shock CAR declined to 48.0 per cent at end-2010 from 60.0 per cent at end-March 2010 (see Figure 5.22).

5.6 Market Risk Exposure Assessment of Securities Dealers

During 2010, the investment portfolio of the securities dealers sector remained tilted towards Jamaica Dollar denominated bonds. For 2010, securities dealers held on average 58.2 per cent of their investment portfolio in Jamaica Dollar securities compared to 41.1 per cent in foreign currency securities. Investments in equity securities remained marginal during 2010.

Securities dealers lessened their exposure to interest rate risk during 2010 by reducing the duration of both their domestic and foreign currency bond portfolios. This was more pronounced in their foreign currency bond portfolio which recorded a decline in duration to 1.6 at end-2010 from 5.3 at end March-2010 (see Figure 5.23). Interest rate risk stress testing revealed that securities dealers were robust to large hypothetical shocks to interest rates. The sector recorded a median post-shock CAR of 51.0 per cent during 2010 (see Figure 5.24). Concurrently, consistent with the trend reduction in durations, the downside risk of the sector declined during 2010. The highest value-at-risk (VaR) estimate declined below 0.4 per cent of the sector’s investment portfolio post-JDX and trended downwards during 2010. Further, the maximum security dealer VaR declined post-JDX to 0.36 per cent at end-2010 relative to 0.4 per cent at end-March 2010 (see Figure 5.25).
The exposure of the securities dealers sector to foreign exchange rate risk declined during 2010. The NOP of the securities sector declined to US$138.3 million at end-2010 from US$192.5 million at end March 2010. As a proportion of regulatory capital, the exposure of the sector declined to 21.7 per cent at end-2010 relative to 35.7 per cent at end-March 2010. Further, the median ratio of NOP to capital declined to 20.9 per cent at end-2010 relative to 23.7 per cent at end-March 2010 (see Figure 5.26). Against this background, the post-shock CARs of the securities dealers sector remained above the 12.0 per cent benchmark as a result of the contemplated 30.0 per cent depreciation in the exchange rate (see Figure 5.27).

5.7 Liquidity Funding Risk Exposure Assessment of Insurance Companies

Life insurance companies’ balance sheets remained robust to large but plausible hypothetical shocks to funding sources during 2010. Of note, post-shock minimum continuing capital surplus requirements (MCCSRs) for the life insurance sector increased during 2010 and remained comfortably above the regulatory benchmark of 150.0 per cent, signalling an improvement in the resiliency of the sector to absorb the contemplated shocks. The general insurance sector, on the other hand, showed increased vulnerability to the contemplated shocks to funding sources. However, most, if not all, of the resulting post-shock minimum asset tests (MATs) reflected deterioration in the actual ratios rather than the impact of the liquidity shock (see Figure 5.28).

5.8 Market Risk Exposure Assessment of Insurance Companies

The exposure of the life insurance sector to market risk remained low during 2010. The VAR for the sector recorded an average of 0.08 per cent for the year (see Figure 5.29). This outturn occurred in the context of benign movements in bond yields and in spite of increases in both the durations of domestic and foreign bond portfolios held by the sector. The duration on the foreign bond portfolio increase to 5.6 years at end-2010.
relative to 3.3 years at end-March 2010. Similarly, the duration on the domestic bond portfolio increased to 1.7 years relative to a duration of around 0.0 at end-March 2010 (c.f. Figure 5.29). Life insurance companies’ balance sheets remained robust to large but plausible hypothetical shocks to interest rates during 2010 as the post-shock MCCSRs for the sector remained comfortably above the regulatory benchmark of 150.0 per cent (see Figure 5.30).

5.9 Contagion Risk Assessment of the Domestic Financial System

Following the intensification of the global financial crisis in September 2008, activity in the domestic inter-bank market declined for two consecutive years. Specifically, borrowing in the inter-bank sector declined on an annual basis by 15.5 per cent and 4.7 per cent at end-2010 and end-2009, respectively. These declines were catalyzed by increased uncertainty related to counter-party risk in this market.

The disruption in inter-bank activity post-September 2008 reflected itself in increased periods of non-trading in the inter-bank market as well as sharp and persistent increases in inter-bank rates. For instance, the number of days with no reported trading activity increased to 41 for 2010 compared to 38 and 20 recorded in 2009 and 2008, respectively. Correspondingly, the maximum inter-bank rate for 2010 declined to 18.0 per cent relative to maximum rate of 32.0 per cent and 41.0 per cent recorded over 2009 and 2008, respectively (see Figure 5.31). Further, the reduced reliance on the intermediation facility during 2010, which had peaked during 2009 further signaled a return to normalcy within the inter-bank market (see Figure 5.32).

At end-2010, the building societies sector were net borrowers in the inter-bank market while securities dealers and commercial banks were generally net lenders. The securities dealers sector had the largest net exposure, both in dollar value as well as relative to the size of their capital base, in the inter-bank market followed by the commercial banking sector. The building

\[5\] In response, the Bank established an intermediation facility for Jamaica Dollar and US dollar transactions within the inter-bank market in 2008. This facility assisted in the provision of liquidity to net-borrowers in the inter-bank market as well as the mitigation of counter-party risks to net lenders in the market (see Figure 5.23).
societies sector, however, also had significant exposure to the securities dealer and commercial banking sectors relative to the size of their capital base at end-2010 (see Figure 5.33). The exposure to counter-party risk of the insurance sector and the FIA sector remained marginal at end-2010.

Stress testing of counter-party risk exposures for the financial system revealed that the securities dealers sector was most exposed to contagion risk emanating from the building societies sector. Building societies were also exposed significantly to counter-party risk from the securities dealer sector. However, following the hypothetical shock there were no domino impacts leading to second round effects. The median post-shock CARs were 20.2 per cent, 18.3 per cent, and 42.5 per cent for the commercial bank, building society and securities dealer sectors, respectively (see Figure 5.34).

**Figure 5.31** Daily ranges for inter-Bank Rates

**Figure 5.32** Total monthly Jamaica Dollar and US dollar repos issued under the Intermediation Facility

**Figure 5.33** Network of large exposures between financial institutions at end-2010

**Figure 5.34** Counterparty risk exposures for the financial system (Scenario: Impact on CAR of the failure of institution(s) on financial entity with large net credit exposure)

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6 A large exposure is one that exceeds 10% of a lending bank’s regulatory capital at the end of a period.

7 The size of each node is scaled in proportion to the total value of net credit exposure to other financial institutions while the direction of the arrow indicates the counter-party to which the institution is exposed.

8 The thickness of the line is proportional to the value of a single bilateral exposure. Red lines represent exposure in excess of 35.0 per cent of capital, and black lines indicate exposures in excess of 10.0 per cent of capital. Dotted black lines represent exposures which are less than 5.0 per cent of capital.

9 Stress testing of counter-party risk exposures for the financial system involved the assessment of the hypothetical failure of a financial entity which exposed the financial system to the largest counter-party credit risk.
6. Payments System Developments

6.1 Overview
Growth in currency was marginal during 2010, reflecting continued weak performance in economic activity since the previous year. Also consistent with the weak GDP performance of the economy during 2010, growth in the average value and volume of transactions by cheque remained relatively flat during the year. Furthermore, overall average monthly Automated Banking Machine (ABM) and Point-of-Sale (POS) volumes and values declined by 12.0 per cent and 5.0 per cent, respectively, during the year, also reflecting weakened household balance sheets since the previous year.

Activities in the JamClear systems – JamClear-RTGS and JamClear CSD - increased substantially during 2010 following the dematerialization of Government debt securities. Additionally, the average credit transfers under the RTGS increased by 9.6 per cent during 2010, while the average transaction size in the CSD increased by 133.0 per cent during the year.

6.2 Traditional Means of Payment
During 2010, currency in circulation increased by 8.7 per cent to $48.5 billion relative to an average annual growth of 4.7 per cent recorded over the previous 2 years. However, this increase remained substantially below an average growth of approximately 15.0 per cent for the five years prior to 2008 reflecting continued weak performance in economic activity. In addition, the average monthly level of currency in circulation as a share of GDP, which is a measure of the role of cash in the level of economic activity, declined by 0.1 percentage point to 3.5 per cent at the close of the year. Furthermore, the average monthly level of currency in circulation as a share of M1 remained flat totaling 43.8 per cent at end-2010 relative to end-2009 (see Figure 6.1).

Additionally, in the context of the dampened performance in economic activity, the average monthly volume and values of transactions by cheque remained relatively flat at approximately 1.7 million and $393.0 billion, respectively, compared during 2010. In spite of this relatively flat performance, there was a decline in the proportion of inter-bank cheque payments to 59.0 per cent at end-2010 relative to 57.0 per cent at end-2009, reflecting a higher level of payment system safety during the year (see Figure 6.2 and Figure 6.3). Consequently, there were higher volumes and values of proprietary or intra-bank cheque payments relative to inter-bank cheque payments for 2010. In addition, the average size of intra-bank cheque payments ($199 742.0)
was substantially lower than the average size for inter-bank cheque payments ($265,793.0) for the review period.

**Figure 6.3** Cheque inter-bank volumes and values

Source: JETS

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### 6.3 Electronic Payment Instruments

Average monthly ABM and POS values and volumes declined by 5.1 per cent and 12.0 per cent to $26.2 billion and 4.7 billion in 2010, respectively, compared to growth of 22.6 per cent and 21.9 per cent for 2009. These movements were largely reflective of the performance in ABM values and volumes which was adversely impacted by higher fees imposed on ABM transactions across the multilink network during 2010 as well as continued weakness in household balance sheets during the year.

Household balance sheets were adversely impacted by the acceleration in the pace of decline in real wages during 2010 (see Chapter 3). Consistent with the weakening in disposable income, average monthly ABM values declined by 14.5 per cent for 2010 to $15.7 billion relative to growth of 27.5 per cent for 2009 (see Figure 6.4). In addition, average monthly ABM volumes declined by 18.8 per cent relative to growth of 26.4 per cent during 2009. Conversely, average monthly POS values grew by a slower rate of 13.5 per cent for 2010 to $10.5 billion compared to growth of 14.0 per cent in 2009 (see Figure 6.5). Average monthly POS volumes also grew by 3.9 per cent during 2010 relative to growth of 12.6 per cent during 2009. Furthermore, the average transaction size from these alternative means of payments (AMB and POS) increased by 7.8 per cent to $5,516 for 2010 relative to 2009.

1 See BOJ Annual Report (2010).

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**Figure 6.4** ABM values

Source: JETS

**Figure 6.5** POS values

Source: JETS

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**Figure 6.6** ABM/POS intra-bank volumes and values

Source: JETS

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Similar to cheque payments, the level of payment system safety through these electronic payments instruments increased during 2010. Average monthly ABM and POS inter-bank values and volumes decreased by 28.5 per cent and 32.3 per cent in 2010 to $8.4 billion and 1.7 billion, respectively, compared to respective growth rates of 52.8 per cent and 50.5 per cent in 2009. In contrast, average monthly intra-bank values and volumes increased by 12.2 per cent and 5.0 per cent in 2010 to $17.8 billion and 3.1 billion, respectively, compared to growth rates of 7.0 per cent and 5.2 per cent in 2009. Against this background, the share of ABM and POS intra-bank value increased moderately to 68.0 per cent at end-2010, relative to 66.0 per cent in 2009. Similarly, for ABM and POS intra-bank volume, the ratio increased to 65.0 per cent at end-2010 from 63.0 per cent at the close of the previous year (see Figure 6.6 and Figure 6.7).

Regarding credit card transactions using the internet, during 2010, there was improvement in the performance in the volumes and values of US dollar-denominated credit card transactions. This performance may have been influenced by increased confidence in making US dollar payments in the context of continued stability in the foreign exchange market during 2010 (see Figure 6.8). However, there was weak performance in Jamaica Dollar-denominated internet credit card transactions during most of 2010, reflective of the continued weakness in domestic aggregate demand (see Figure 6.9).

Figure 6.7 ABM/POS inter-bank volumes and values
At end-2010, there were 430 ABMs, an increase relative to 419 ABMs at end-2009. There were 13,233 POS terminals in operation at the close of the review period relative to 13,342 POS terminals in operation at end-2009 (see Figure 6.10).

The number of debit and credit cards in circulation continued to grow during 2010. Jamaica Dollar denominated debit cards in circulation increased steadily during 2010 to approximately 1.9 million at the close of the year from 1.7 million at end-2009 (see Figure 6.11). Moreover, consequent on cash flow challenges and worsening of real income, households may have supplemented their income by increasing debt via credit cards as reflected in a 15.9 per cent increase in credit card receivables of DTIs during 2010 (see Chapter 3). Credit cards in circulation also increased to 209,974 at end-2010 from 187,611 at end-2009. These increases supported the growth in POS volumes for the year.

6.4 Large Value Transfer System
Activities in the JamClear systems (JamClear-RTGS and JamClear CSD) increased substantially during 2010. This occurred in the context of dematerialization of GOJ securities during February 2010. These systems are fully integrated, facilitating settlement on a Delivery versus Payment (DvP) basis of all securities registered with the CSD.

During 2010, the total value of RTGS transactions was $10,403.2 billion, reflecting a significant increase of 41.8 per cent relative to the total value for the last 10 months of 2009. In addition, RTGS volumes totalled 125,086 for 2010, increasing by 29.4 per cent relative to the last 10 months of 2009. Furthermore, the average RTGS credit transfer was $83.2 million for the review period, significantly above the average RTGS credit transfer of $75.9 million for 2009. Against this background, transactions via the RTGS as a proportion of total value of transactions in the RTGS and Automated Clearing House (ACH) increased to 121.9 per cent for 2010 relative to 79.7 per cent for 2009, indicative of lower payment system credit risk given that the RTGS is based on real time settlement versus the deferred net settlement of the ACH.

There were increases in both the variability and amount of average volumes and values traded during 2010 relative to 2009. For 2010, the average monthly RTGS value was $866.9 billion while the monthly standard deviation accounted for 22.6 per cent of this total. During 2009, the average monthly RTGS value was $733.5 billion with a monthly standard deviation of $124.2 billion or 16.9 per cent (see Figure 6.12). For 2010, the average monthly RTGS volume was 10,424 with a monthly standard deviation of 21.0 per cent relative to average monthly RTGS volume and monthly standard deviation of 9,667 and 9.0 per cent, respectively, for 2009 (see Figure 6.13).

Transactions processed in the JamClear-CSD during 2010 included a wide range of transaction types, including repurchase and reverse repurchase transactions, pledges and primary issues. Liquidity conditions in the CSD increased in the second half of the year. The number of trades per quarter for Jamaica Dollar denominated instruments totalled 6,946, 17,148, 22,030 and 25,930 for the March, June, September and December quarters, respectively (see Figure 6.14). In addition, the average size of trades for Jamaica Dollar denominated instruments totalled $201.9 million, $70.6

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2 With the exception of Treasury Bills, all Government securities in the domestic market following the implementation of the JDX are electronically issued, registered, cleared and settled in JamClear-CSD.

3 Dematerialization enables the issue and trading of securities in electronic form only.

4 The RTGS system was implemented on February 27, 2009.
million, $71.3 million, $78.5 million for the March, June, September and December quarters, respectively (see Figure 6.15). The most liquid securities, in terms of volumes traded, were GOJ fixed rate (FR) notes and this was particularly evident in August 2010 which is an interest payment period for GOJ Benchmark securities. In terms of transaction size, for most months, the GOJ CPI-indexed notes accounted for the largest values traded during the year.

The introduction of GOJ securities to the CSD following the completion of the immobilization and dematerialization process in February 2010 led to significant increases in CSD usage during 2010. Prior to this, BOJ CDs were the only instrument traded in the CSD. The average monthly respective value and volume of CSD transactions increased considerably to $530.2 billion and 4,942, respectively, for 2010 from respective values and volumes of $60.2 billion and 1,309 during 2009 (see Figure 6.16).

Use of the intra-day repo facility provided by the BOJ grew rapidly both in terms of value and volume during 2010. Furthermore, the Bank’s provision of intra-day repos totalled $226,553.2 billion for the second half of 2010 relative to $60.2 billion for the same period in 2009. This provision of liquidity was concentrated mainly in the same two or three institutions. In addition, the median size of funds demanded by institutions was higher in the second half of 2010 and increased to $129.6 billion at end-2010 from $41.5 billion at end-June 2010 (see Figure 6.17).

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5 Access to the intra-day ‘Auto Repo’ facility was offered by the Bank starting in July 2009.
Based on monthly RTGS transaction values, the bulk of funds demanded and supplied were concentrated within only a few institutions during 2010. Furthermore, the median percentage of funds demanded and supplied remained at low levels during the year (see Figures 6.18 & 6.19). A further analysis of payment concentration showed that the Herfindahl index of payment activity averaged 0.2, and supported the notion of a fairly strong degree of concentration (see Figure 6.20).  

An analysis of The Risk Index for payment system concentration confirms that the system was concentrated in 2010. The Index values for the two most active banks declined to an average of 26.6 per cent during 2010 relative to an average of 30.9 per cent during 2009. The average Risk Index value for the remaining banks increased to an average of 2.8 per cent for the review period relative to an average of 2.5 for the prior year (see Figure 6.21). Inter-quartile ranges show that most institutions were low net demanders and suppliers of funds. At the same time, the maximum percentage of funds demanded and supplied were concentrated in few institutions during 2010.

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The Herfindahl index is computed as:

\[ HI_{\text{payments}} = \sum_{\text{Banks}} \left( \frac{\text{Bank}_i \times \text{Payments}_i}{\text{Total Payments}} \right)^2, \]

where if the Index is equally divided between \( N \) participants, then the Herfindahl measure of concentration equals \( 1/N \).

This measure is computed based on payments made and received by each bank as a share of overall payments for the system.
6.5 Traditional Versus Electronic Means of Payment

Cheques continued to be the dominant means of payment in terms of volumes and ranked second in terms of values when compared to ABM and POS and RTGS transactions during 2010 (see Figures 6.22 & 6.23). Nonetheless, the average monthly size of cheque transactions settled through the ACH declined by 2.7 per cent to $269 793.0, while the average transaction size regarding ABM and POS instruments increased by 7.8 per cent to $5 516.0 at end-2010. In addition, there was increased usage of the RTGS during 2010, as average monthly credit transfers via this medium increased by 9.4 per cent to $83.6 million. The average cheque size in the ACH is expected to decline during 2011 with the implementation of an upper limit on financial transactions. This development is expected to lead to increased efficiencies and reduced payments systems risks.

8 Cheques continued to be the dominant payment instrument among many business as well as statutory agencies such as the Ministry of Finance, which, on average issues over 300,000 cheques per month.

9 Effective 1 April 2011, financial transactions with a large value, i.e. $5 million and above are to be cleared via the RTGS system instead of through the ACH, where all cheques are now cleared – see BOJ Annual Report (2010).
**Glossary**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tr>
<td>Asset Utilization</td>
<td>This is a ratio which reflects the overall yield on earning assets.</td>
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<tr>
<td>Automated Clearing House</td>
<td>A facility that computes the payment obligations of participants, vis-à-vis each other based on payment messages transferred over an electronic system.</td>
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<tr>
<td>Central Securities Depository</td>
<td>An institution which provides the service of holding securities and facilitating the processing of securities transactions in a book entry (electronic) form.</td>
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<tr>
<td>Certificate of Participation</td>
<td>A financial instrument in which an investor has a pro rata share of lease revenue made by a municipal or government entity over a specified period.</td>
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<tr>
<td>Concentration Risk</td>
<td>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.</td>
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<tr>
<td>Consumer Confidence Index</td>
<td>An indicator of consumers’ sentiments regarding their current situation and expectations of the future.</td>
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<tr>
<td>Credit Rating</td>
<td>A rating assigned to a borrower, which may be alphabetic or numerical, which indicates the probability associated with the party paying back a loan.</td>
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<td>Term</td>
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<tr>
<td>Credit Risk</td>
<td>The risk that a counterparty will be unable to settle payment of all obligations when due or in the future.</td>
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<tr>
<td>Deferred Net Settlement</td>
<td>The settlement of transfer orders netted at designated times between or among counterparties in order to economize on the number and value of transactions.</td>
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<tr>
<td>Delivery versus Payment</td>
<td>A mechanism which ensures that the transfer of payment from a payment system occurs if and only if the delivery of securities from a securities system occurs.</td>
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<tr>
<td>Disposable Income</td>
<td>The remaining income after taxes has been paid which is available for spending and saving.</td>
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<tr>
<td>Financial Conglomerates</td>
<td>Financial institutions under common ownership which undertake a wide range of activities such as banking, stocking broking, insurance and fund management.</td>
</tr>
<tr>
<td>Financial Intermediation</td>
<td>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.</td>
</tr>
<tr>
<td>Fiscal Deficit</td>
<td>The excess of government expenditure over revenue for a given period of time.</td>
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<tr>
<td>Foreign Exchange Risk</td>
<td>The risk of potential losses which arise from adverse movements in the exchange rate incurred by an institution holding foreign currency-denominated instruments.</td>
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<td>Terms</td>
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<tr>
<td>Funds Under Management/ Managed Funds</td>
<td>The management of various forms of client investments by a financial institution.</td>
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<tr>
<td>Gap Ratio</td>
<td>The ratio of cumulative differences between interest bearing assets and liabilities over various time horizons (e.g. less than 1 year, 1-2 years) to total assets.</td>
</tr>
<tr>
<td>Hedging</td>
<td>Strategy designed to reduce investment risk or financial risk. For example, taking positions that offset each other in case of market price movements.</td>
</tr>
<tr>
<td>Interest Margin</td>
<td>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.</td>
</tr>
<tr>
<td>Interest Rate Risk</td>
<td>The risk associated with potential losses incurred on various financial instruments due to interest rate movements.</td>
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<tr>
<td>Intraday Credit</td>
<td>Credit extended to a payment system participant that is to be repaid within the same day.</td>
</tr>
<tr>
<td>Large Value Transfer System</td>
<td>A payment system designated for the transfer of large value and time-critical funds.</td>
</tr>
<tr>
<td>Liquid Ratio</td>
<td>The ratio of average prescribed assets to average prescribed liabilities.</td>
</tr>
<tr>
<td>Liquidity Risk</td>
<td>The risk that a counterparty will be unable to settle payment of all obligations when due.</td>
</tr>
<tr>
<td>Net Open Position</td>
<td>The difference between long positions and short positions in various financial instruments.</td>
</tr>
<tr>
<td>Non-Performing Loans</td>
<td>Loans whose payments of interest and principal are past due by 90 days or more.</td>
</tr>
<tr>
<td>Off-Balance Sheet Items</td>
<td>Contingent assets and debts that are not recorded on the balance sheet of a company. They are usually note worthy as these items could significantly affect profitability if realized.</td>
</tr>
</tbody>
</table>
Payment System

A payment system consists of the mechanisms - including payment instruments, institutions, procedures, and technologies - used to communicate information from payer to payee to settle payment obligations.

Payment Versus Payment

A mechanism which ensures that the transfer of payment occurs if and only if the final transfer of a counterparty payment is simultaneously received.

Preferences shares

Capital stock which provides a specific dividend that is paid before any dividends are paid to common stock holders and which takes precedence over common stock in the event of liquidation.

Prescribed Liabilities

These refer to a) deposit liabilities, b) reservable borrowings and c) interest accrued and payable on a) and b).

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.

Value at Risk (VAR)

A metric or statistical technique that seeks to estimate the loss that an institution will not exceed over a specified time period with a given probability.