Describing the Macro-Prudential Surveillance Approach

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FINANCIAL STABILITY DEPARTMENT

Preface

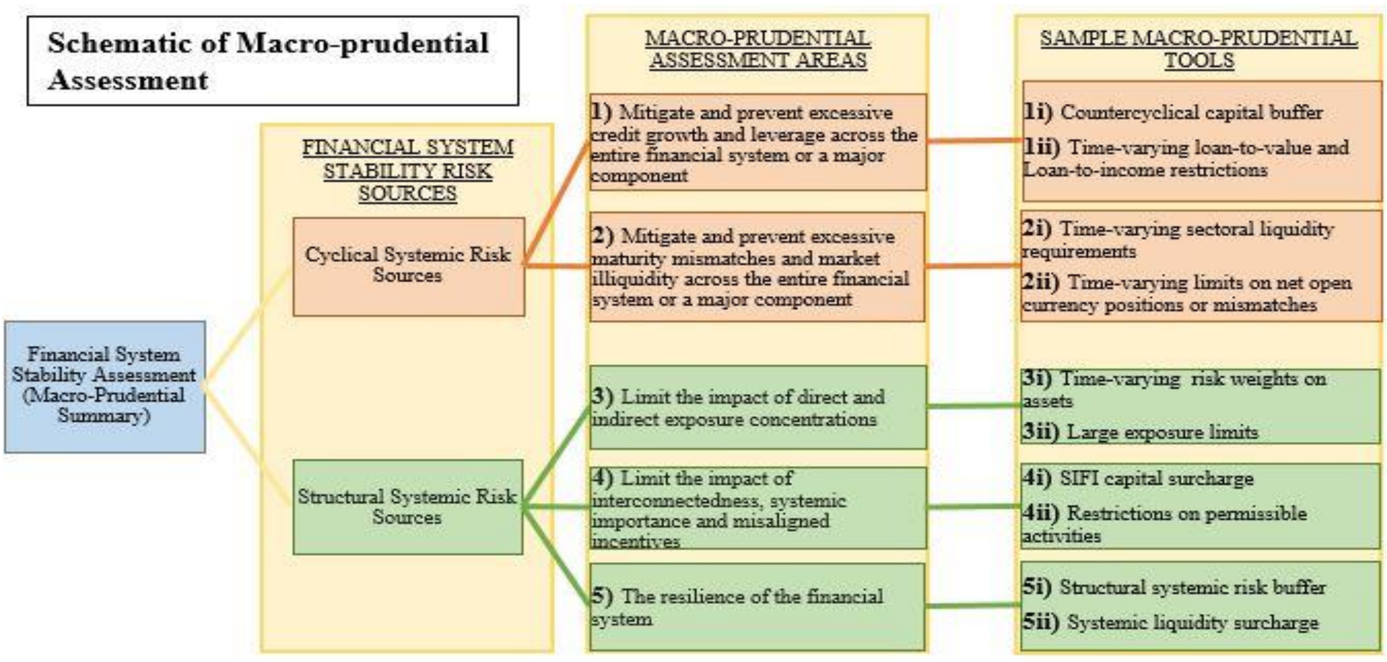
This aim of this document is to provide a summary of the Bank's approach to *Macro-Prudential Surveillance*. It includes a description of the broad analytical framework by which financial system stability is assessed which is supplemented with a table of the main indicators used in analysis.

The aim of the *Macro-prudential surveillance* is to assess the key threats to financial system stability. The methodology for assessment is arranged around along two broad dimensions (see Schematic below):

i. Systemic risks emanating from procyclicality in the financial cycle.

ii. Systemic risks emanating from the structure of the financial system.

Both dimensions of assessment are informed mainly by leading and near-coincident indicators that relate to the specific type of vulnerability.



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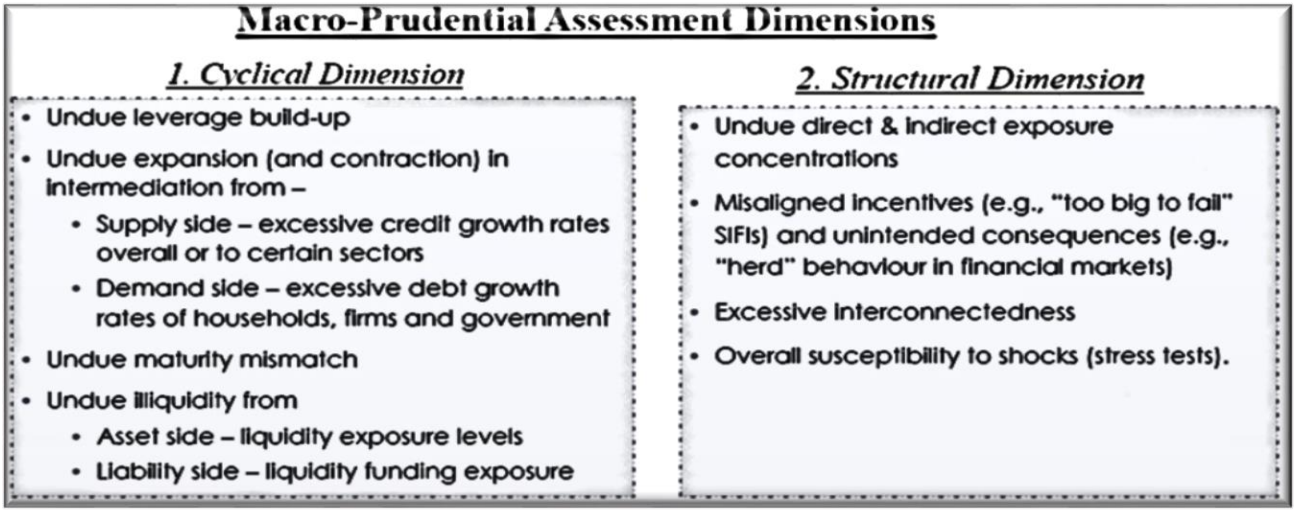
1. INTRODUCTION

The *Bank of Jamaica (Amendment) Act, 2015* includes provisions for the establishment of the Financial System Stability Committee (FSSC) that broadly serves: (i) to make assessments in relation to financial system stability, (ii) make recommendations to the Bank for carrying out its financial system stability mandate and (iii) help inform the Bank's use of macro-prudential rules, standards and codes.

To aid the members of the FSSC in overseeing the output of the Financial Stability Department the Bank will produce a Macro-prudential Policy Summary Report for tabling at each meeting. This Report will provide an outline of current developments in financial system stability by evaluating systemic threats that are characterized by cyclical financial imbalances and risks stemming from the structure of the system.

The cyclical dimension deals with the evolution of aggregate risk over time; otherwise known as "procyclicality". Procyclicality is fueled by the collective tendency of financial agents to assume excessive risk during financial upswings due to an over-optimism in expectations and is often reflected in excessive leverage or excessive balance sheet maturity mismatch. In practice, even if financial participants take decisions which are prudent by institution- or individual-specific assessments, their actions could create fragility across the system. As a result, the system will be vulnerable to shocks and, if they occur, could lead to unexpected market illiquidity and widespread "firesale" losses.

The structural dimension is related to the distribution of risk across the financial system at a given point in time. The structure of the financial system can be comprised of *inter alia*: (i) the extent of common exposures to specific markets; (ii) the degree of interconnectedness of financial institutions, markets and infrastructure; (iii) the extent of systemic importance of few firms and, (iv) the loss absorbing capacity of the system to withstand extreme but plausible shocks. Developments related to common exposure, inter-linkage and resilience might create systemic risks that multiply the possibilities for financial contagion.



2. THE MACRO-PRUDENTIAL ASSESSMENT OBJECTIVES

For operational purposes, macro-prudential surveillance is organized around the two main dimensions of systemic risk, the cyclical and the structural. Each dimension is further apportioned across five quantifiable "macro-prudential objectives".

There are some 40+ targeted macro-prudential indicators associated with each objective whose selection are guided by international best practices. Each indicator is compared over time to its historical empirical cumulative distribution. Observations in the indicator time series are then ranked in the empirical distribution and compared to thresholds to produce a heat map. This heat map then guides a more detailed assessment of systemic risk if signaling. The tables below lists and details each of these indicators by macro-prudential objective.

3. TABLES OF MACRO-PRUDENTIAL OBJECTIVE INDICATORS

Objective 1: Mitigate and prevent excessive credit growth and leverage across the entire financial system or a major component		
Aimed at signaling whether the financial system is susceptible to asset price and credit boom-bust cycles, both of which are monitored by measures of asset price and credit markets as well as financial institutions' leverage. Three variations of the credit-to-GDP gap measures are typically analyzed. Private credit is defined as loans and advances extended by DTIs plus corporate securities held by these subsectors. Total credit is defined as private sector credit plus DTIs' loans and advances to the public sector. "All sectors" will reflect calculations of the specific indicator for CBs, MBs & BSs, SDs, LIs, Gls.		
<u>**Assessment Area**</u>	<u>**Indicator**</u>	<u>**Interpretation**</u>
Credit Cycle	**Private Credit-to-GDP gap**	This indicator measures the extent of deviations of private credit relative to GDP from its long-term trend and is used to assess credit cycles within an economy. Generally, large positive values can indicate excessive growth in private sector credit relative to the growth in the economy. Periods of sustained excessive asset price growth that are not aligned with fundamentals have typically proceeded asset sharp price declines.
Asset Price	**Residential Real Estate Price Index (RREPI): year-on-year growth rate**	The Index takes into consideration year-to-year changes in prices of residential real estate across Jamaica. The purpose of the RREPI is to monitor inflation conditions in the residential property market relative to CPI inflation.
Leverage	**Leverage Ratio**	This ratio is monitored to evaluate financial institutions' balance sheet exposure to sharp declines in asset prices. The ratio assess the ability of a financial institution to meet unplanned financial obligations without causing "knock on" asset price effects on other institutions in the system.

Objective 2: Mitigate and prevent excessive maturity mismatches and market illiquidity across the entire financial system or a major component		
Thin market liquidity as reflected in widening market spreads creates difficulty for the financial system's stable and efficient intermediation of funds. Measures of institutions' maturity gaps and liquidity funding ratios are also analysed.		
Assessment area	**Indicators**	**Interpretation**
Financial Intermediation	**Volatile Deposits to Total Loans - DTIs**	Volatile deposits include demand and time deposits maturing within 30 days against the total credit offered by DTIs. This ratio captures exposure to liquidity funding risk.
	Volatile Liabilities to Total loans - DTIs	Total volatile liabilities is the aggregate of volatile deposits and other volatile liabilities (all non-deposit liabilities are considered to be volatile, unless otherwise determined by institution specific information). This ratio captures liquidity funding risk.
	Retail Repo Liabilities to Total Assets - SDs	This ratio is defined as total "retail repo" liabilities divided by total balance sheet assets. It measures the usage of short-term/liquid funding sources to finance longer-term assets held by SDs. An increase in this ratio indicates an increase in the likelihood of funding risk due to greater mismatch in the tenors of funding sources and usage.
	Repo Liabilities to Total Assets - SDs	This ratio is defined as total "retail repo" liabilities plus other repo liabilities divided by total balance sheet assets. It measures the extent of reliance on deposit-like funds in the financing of investment activities for SDs. High levels of this ratio indicates increases in liquidity funding risk.
Market liquidity ratios	**Amihud Index of Market Depth – Foreign Exchange Market**	This Index is calculated by the daily change in the JMD/USD exchange rate divided by daily level of trading (turnover).The Amihud Index measures to degree of the responsiveness of price changes to the overall foreign exchange market activity. A reduction in the Index suggests that daily volumes traded have a minimal impact on prices implying greater market depth.
	Amihud Index of Market Depth – Stock Market	This Index is calculated by the daily change in the Jamaica Stock Exchange (JSE) Main Index value divided by the daily level of trading (turnover). A reduction in the Index suggests that daily volumes traded have a minimal impact on prices, thus implying greater market depth.
	TRE Spread	This Spread measures the premium priced in the repo rate for default risk and is computed as the difference between the 30-day private money market repo rate and the 30-day GOJ T-bill rate. A narrowed TRE spread depicts improvement in private money market liquidity conditions.
	Foreign Exchange Bid-ask spread	This Spread is calculated as the difference between the current USD/JMD bid price and the current USD/JMD offer price in the foreign exchange market. The FX bid-ask spread measures the degree of liquidity within the foreign exchange market. A narrowed FX bid-ask spread depicts improved FX market liquidity conditions.
	Lending Spread - DTIs	This Spread is computed as the difference between the weighted average loan and deposit rates of CBs, BSs and FIA licensees which is further weighted by asset share. A narrowed lending spread depicts improved credit market liquidity conditions.
Maturity Transformation	**(Long-term Assets – Long-term Liabilities - Non-redeemable Equity) / Total Financial Assets (all sectors)**	This ratio measures the reliance of short-term funding sources to invest in longer-term assets. An increase in maturity transformation indicates greater mismatch in the maturity of assets and liabilities.
Liquidity Transformation	**Short-term Liabilities [≤ 30 days] / Liquid Assets (all sectors)**	This ratio captures the capacity to meet short-term funding obligations through the liquidation of assets. An increase in the liquidity transformation ratio indicates greater liquidity risk.

Objective 3: Limit the impact of direct and indirect exposure concentrations

Risks to the system could stem from a lack of diversification due to financial concentration in a particular sector or asset type. Concentrated exposures to financial markets, financial institutions, sovereigns, sectoral loans as well as the real estate market are assessed.

Assessment area	Indicators	Interpretation
Exposure to Financial Markets	**Composite Indicator of Systemic Stress**	This Indicator measures the joint impact of activity in the money, equity, bond and foreign exchange markets using portfolio theory to determine contemporaneous stress in the most active financial markets. Higher values indicate greater risk of contagion across markets and hence financial institutions.
	Foreign Currency Loans to Total Loans - DTIs	This ratio measures the extent of DTI exposure to both credit and currency risk. The higher the ratio the more exposed the DTI is to asset dollarisation risks.
	Net Open Position to Capital	This ratio measures DTIs' & SDs' sensitivity to market risk. It can be interpreted as the mismatch of foreign currency asset and liability positions, which is used to assess vulnerability to exchange rate movements. Significant increases in this ratio indicates heightened depreciation, which implies greater systemic risk.
Exposure to Sovereign Risk	**Public Sector Debt to Total Assets (all sectors)**	This ratio measures the extent of DTIs' exposure to sovereign default risk.
Exposure to Households and Corporates	**Herfindahl Index of Loan Concentration**	This Index reflects common exposures to specific sectoral loans of DTIs.
	Herfindahl Index of Loan Concentration - Excluding Personal Loans	This Index reflects common exposures to specific sectoral loans of DTIs, with the exclusion of personal loans.
	Household Debt to GDP	Household debt is comprised of household loans extended by DTIs and NHT loans. A high debt-to-GDP ratio increases DTIs exposure to household credit default risk.
	Household Coverage Ratio	Household coverage ratio is measured as the ratio of loan loss provisions plus prudential provisioning to non-performing household loans. It measures a bank's ability to absorb potential losses from its non-performing loans.
	Household Net Financial Position to GDP	Net Financial Position is calculated as H/H's financial assets minus H/H's financial liabilities. Financial assets comprise pensions, household deposits with DTIs, retail repos, life assurance and annuity contracts and policyholder funds on deposit, while financial liabilities include consumer and mortgage loans extended by the DTIs to the household sector. A decline in households' net financial position as a share of GDP, reflects increased exposure to H/H default risk.
	Non-Financial Corporate Sector Debt to GDP	Non-financial corporate sector (NFCS) debt consists of NFCS loans extended by the DTIs and securities issued as "exempt distributions". The ratio measures the level of indebtedness of the sector relative to the size of the economy. High levels of borrowing increases the vulnerability of the sector to economic and financial market shocks.
	Corporate Sector Net Financial Position to GDP	Net financial position represents NFCS financial assets minus NFCS financial liabilities. Additionally, financial assets are comprised of deposits held with DTIs and repo liabilities placed with securities dealers while financial liabilities include loans extended by the DTIs, securities and exempt distributions. A

		decline in the NFCS's net financial position as a share of GDP reflects increasing exposure to NFCS default risk.
Exposure to Financial Infrastructure	**Herfindahl Index of Payment Concentration (%)**	This Index is a measure of the magnitude of overall payment activity conducted by a relatively small number of participants in in the system. It is also an indicator of the level of concentration of liquidity with the system.
	Share of BOJ Intra-day Repos Demanded by the Top 4 Financial Institutions (%)	This measure captures the percentage of funds utilized by the four institutions with the highest demand for liquidity and is indicative of liquidity concentration risks within the payments system.
	Risk Index of Payment Concentration - Two Most Active Banks	This Index is computed based on payments made and received by the largest two banks as a share of overall payments for the system. It is also a measure of concentration, with a higher ratio being indicative of increased concentration risks.
Exposure to Financial Institutions	**Distance to Default Indicator – DTIs (listed companies)**	This Indicator assesses the likelihood that the market value of an entity will fall below the value of its liabilities. That is, it measures the number of standard deviations from the market value before a firm's assets falls below the default barrier.
Exposure to Real Estate	**Residential and Commercial Mortgages to Assets - DTIs**	The ratio indicates the exposure of the DTI sector to real estate market price shocks.

Objective 4: Limit the impact of interconnectedness, systemic importance and misaligned incentives

Increases in interbank exposures, the number of institutions deemed systemically important and the size of the shadow banking sector will lead to increased susceptibility to narrow-based shocks to the system. Regarding interbank exposures, an assessment of bilateral balance sheet exposures is useful in capturing the degree of interconnectedness within the financial system as this has the potential to pose systemic risks to stability. Concerning SIFIs, their relative share within the financial system is useful in gauging the degree concentration and potential for contagion risks. Shadow banking is assessed based on the asset share of NDTFIs within the financial system as this may be reflective of the extent of intermediation outside the traditional DTI system. In addition, an assessment of financial dollarization on both the asset and liability side of institutions' balance sheets is important in gauging the preference for foreign currency relative to domestic currency holdings.

Assessment area	Indicators	Interpretation
Bilateral Balance Sheet Exposures	**DTIs' Gross Interbank Exposures to SDs to Total DTI capital**	The measure captures total unsecured loans and investments from the DTIs sector to the SDs sector as a percentage of the DTIs' total capital. An increase in this ratio implies a reduction in the ability of the DTIs sector to withstand adverse shocks emanating from the SDs sector.
Systemically Important Financial Institutions (SIFIs)	**Total SIFI Group Assets to Total System Assets[1]**	The ratio captures the degree of importance of SIFI groups within the financial system in terms of size, which is measured by total group assets. SIFIs are identified using scoring methodology based on size, interconnectedness, non-substitutability and complexity.
Shadow Banking	**NDTFIs Asset Share to Total Financial System Assets**	NDTFIs asset share refers to the total financial assets owned by securities dealers, pension schemes, insurance companies and collective investment schemes relative to the combined asset size of the DTIs and NDTFIs. Higher values for this ratio means greater system exposure to the performance of less regulated NDTFIs.
Dollarization Indicators	**Foreign Investment Holdings to Total Investment**	The greater the ratio is the larger the substitution of foreign currency holdings to its domestic currency counterpart. This indicator is used to measure exposure to foreign exchange rate risk for both SDs and DTIs.
	Foreign Currency Deposits to Total Deposits-DTIs	This ratio provides insight on the level of depositors' confidence in the domestic currency as well as DTIs exposure to foreign exchange rate risk.

Objective 5: Strengthen resilience of financial system		
Weak financial performance or soft resilience to stress testing will indicate fragility in the sector. Stress testing is important in determining the degree of resilience of the system to changes in both macroeconomic, and microeconomic factors by measuring the impact on capital. Composite indices are used to support financial stability analysis and are used to monitor the degree of build-up of risks and the level of vulnerability within the financial system.		
Assessment area	**Indicators**	**Interpretation**
Stress Test Results	**Liquidity funding risk stress test: 40.0 per cent decline in average deposits - DTIs**	The purpose of the funding risk stress test is to calculate the impact on capital adequacy due to potential losses from the sale of illiquid assets resulting from hypothetical deposit runs.
	Foreign Exchange Risk Stress Test: 50.0 Percent Depreciation	Foreign exchange risk stress tests capture the risk that hypothetical exchange rate changes will adversely affect the local currency value of financial institutions' assets and liabilities, as well as off-balance sheet items, and ultimately the capital position of these entities. It also accounts for the impact on capital adequacy due to hypothetical increases in foreign currency NPLs, and loan provisions from extending foreign currency loans to non-foreign currency earners.
	Credit Risk Stress Test: 30.0 Percent Increase in NPLs - DTIs	The purpose of the credit risk stress test is to determine the impact of loses from hypothetical shocks to NPLs on the capital adequacy ratio of the banking system. More specifically, shocks to NPLs lead to increased provisions, which feeds through to impacting the capital holdings of financial institutions as well as the risk-weighted assets.
Composite Indices	**Shift in Absorption Ratio for Commercial Banks**	The absorption ratio accounts for the co-movement of bank returns over time. Significant shifts in the absorption ratio indicates possible market fragility as returns across institutions are behaving in a more correlated manner.
	Macro-Financial Index	The Macro-financial index is constructed to reflect the influences of the financial sector, the real sector, the private sector, the public sector, and the external sector on bank soundness. Higher values of the index signal a worsening in macroeconomic conditions relative to a defined tranquil period.
	Micro-Prudential Index (Aggregate)	The Micro-prudential index involves the monitoring of a comprehensive set of banking sector indicators relative to a defined tranquil period via a non-parametric approach to signal banking sector vulnerability. Higher values of the index is indicative of increased banking sector vulnerability.
	Banking Stability Index	The BSI is an aggregate banking sector stability indicator, which combines partial indicators of soundness, asset quality, profitability, liquidity, interest rate risk and foreign exchange risk. These partial indicators are assessed in terms of standard deviations from their relevant 10-year historical average, with declines in the Index representing greater banking sector fragility.
	Aggregate Financial Stability Index	The AFSI is comprised of 19 indicators which are reflective of different aspects of financial sector conditions, including financial development; financial vulnerability, financial soundness, as well as the world's economic climate. Lower values of the Index signal deterioration in banking sector soundness.