**ADB**

# Technical Assistance Consultant's Report

# Supporting Financial Stability in Bhutan and the Maldives
(Financed by the Financial Sector Development Partnership Fund)

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For  Maldives Monetary Authority

## Asian Development Bank

# *Bringing Change*

## TA-8284 REG: Supporting Financial Stability in Bhutan and the Maldives (46114-001)



*Final Report*

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*Mar'15*

pwc

ADB

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# *List of Abbreviations*

| Acronym | Full Form | Acronym | Full Form |
|---|---|---|---|
| ADB | Asian Development Bank | MCB | Mauritius Commercial Bank |
| AFSI | Aggregate Financial Stability Index | MIB | Maldives Islamic Bank |
| BCBS | Basel Committee on Banking Supervision | MIRA | Maldives Inland Revenue Authority |
| BML | Bank of Maldives Ltd | MLFC | Maldives Lease Finance Company |
| BOC | Bank of Ceylon | MMA | Maldives Monetary Authority |
| BSD | Banking Supervision Department | MOC | Market Operations Committee |
| CAD | Current Account Deficit | MoF | Ministry of Finance |
| CEE | Central and Eastern Europe | MPR | Macro-prudential Regulation |
| CFR | Core Funding Ratio | MPRD | Monetary Policy and Research Division |
| CIB | Credit Information Bureau | MRR | Minimum Reserve Ratio |
| CIC | Currency in Circulation | MSME | Micro Small and Medium Enterprises |
| CPI | Consumer Price Index | NFA | Net Foreign Assets |
| EBIT | Earnings before Interest and Tax | NPL | Non performing loan |
| ECB | European Central Bank | NSFR | Net Stable Funding Requirement |
| EFTPOS | Electronic Fund Transfer Point of Sale | ODF | Overnight Deposit Facility |
| EMP | Exchange Market Pressure | OFC | Other Financial Corporations |
| ERP | Enterprise Resource Planning | OLF | Overnight Lombard Facility |
| EUR | Europe | OMO | Open Market Operations |
| EWS | Early Warning System | PCR | Provisioning Coverage Ratio |
| FC | Foreign Currency | PDU | Public Debt Unit |
| FDI | Foreign Direct Investment | RBC | Risk Based Capital |
| FI | Financial Institution | RBI | Reserve Bank of India |
| FII | Foreign Institutional Investment | RECI | Regional Economic Climate Index |
| FSB | Financial Stability Board | RHS | Right Hand Side |
| FSI | Financial Soundness Indicators | RMA | Royal Monetary Authority of Bhutan |
| FSSC | Financial System Stability Committee | ROE | Return on Equity |
| FSU | Financial Stability Unit | RTGS | Real Time Gross Settlement System |
| FVI | Financial Vulnerability Index | RWA | Risk Weighted Assets |
| FX | Foreign Exchange | SAARC | South Asian Association for Regional Cooperation |
| GBP | Great Britain Pound | SARS | Severe Acute Respiratory Syndrome |
| GDP | Gross Domestic Product | SBI | State Bank of India |
| GFC | Global Financial Crisis | SCR | Sectoral Capital Requirement |
| HBL | Habib Bank Ltd. | SING | Singapore Dollar |
| HDFC | Housing Development and Finance Corporation | SRLD | Spread between Reference Lending and Deposit Rates |
| HICP | Harmonised Index of Consumer Prices | TA | Technical Assistance |
| HP | Hodrick Prescott | UAE | United Arab Emirates |
| HQLA | High Quality Liquid Assets | UL | Upper limit |
| IFC | International Finance Corporation | US | United States of America |
| IIS | Interest in Suspense | WPI | Wholesale Price Index |
| IMF | International Monetary Fund | | |
| IPR | Indicative Policy Rate | | |
| LCR | Liquidity Coverage Ratio | | |
| LL | Lower limit | | |
| LTI | Loan to Income Ratio | | |
| LTV | Loan to Value Ratio | | |

# 1. Introduction

This is the first Interim Report to be submitted by PwC under the ADB project 'Supporting Financial Stability in the Bhutan and the Maldives'. It reports on the progress made since the beginning of the project in July 2013.

Subsequent sections of this report present a background of the project, its objectives as given in the Terms of Reference and the progress made against these objectives. The Annexures record all the deliverables submitted till now to the client, Maldives Monetary Authority. These are subject to review from the Asian Development Bank and the MMA.

## 1.1 Background of this project

The recent financial crisis has pushed economies, both developed and developing, across the globe to take a relook at their reform agenda on financial stability. The theory of decoupling of economies has proved to be the contrary over the course of the 2008 crisis. For instance, it is seen that an adverse impact on financial stability in the US economy had widespread economic ramifications on both emerging and other developed economies, leading to de-stabilization of their macro-financial systems. Such inter-dependencies between nations have increased over a period of time – both in real and financial terms, there is a need to institute more effective macro-prudential frameworks, including institutional strengthening and capacity building in the financial sectors. This will not only provide a cushion against domestic shocks but also protect the country against any major global financial disorder.

Given this backdrop, the Asian Development Bank initiated dialogues on policy measures intended to help in developing sound policy framework in member countries. This was carried out as part of the ADB Regional Forum on the Impact of Global Economic and Financial Crisis, which brought together policy makers in government as well as representatives of the private sector from developing member countries. These dialogues have helped member countries seek policy support from ADB on reform interventions targeted at supporting sustained economic growth and preserving financial stability. Amongst the smaller economies, Bhutan and Maldives have also expressed interest for ADB support in developing systems and processes to effectively manage risk to financial stability. These would serve to provide early warning of impending crisis, necessitating the supervisory and regulatory authorities to take appropriate actions in order to forestall external shocks translating into crises situation.

Financial markets in Bhutan and Maldives are at a nascent stage, where the banking sector is more dominant. Institutional framework and financial market infrastructure are at an evolving stage. Among the other hurdles, there are capacity constraints owing to geographical limitations, low private sector participation in the financial systems, greater use of international currencies for domestic financial transactions. The economies are more reliant on foreign funding, including development aid.  Since the economies are more globally integrated and use foreign currencies (e.g., rupee in Bhutan and dollar in Maldives)/capital markets, maintaining macro-financial stability becomes a challenge over the medium term. Maintaining financial stability becomes even more demanding, due to data limitations and absence of policy instruments to implement the Central Bank's regulatory and supervisory functions.

On the basis of these constraints, ADB commissioned two studies in Bhutan and Maldives aimed at understanding and then developing a macro-financial monitoring and surveillance system for Bhutan and the Maldives. Discussions between ADB and government officials from the Ministry of Finance and the central banks, Royal Monetary Authority of Bhutan and Maldives Monetary Authority led to finalization of the objectives, scope, financing plan, and implementation details of the technical assistance (TA) to be provided by the donor. The current TA is the outcome of the dialogue process between ADB and its member countries.

Under the current arrangement, ADB is the executing agency to support financial stability in Bhutan and Maldives. The implementing agencies are the Royal Monetary Authority (RMA) and the Maldives Monetary Authority (MMA) respectively. PwC is entrusted the responsibility to provide the technical assistance.

The assignment aims to help in the development of a macro-prudential framework and a liquidity management plan and strategy for both Bhutan and Maldives. This will feed into ADB's broader objectives of partnering with other donor agencies and international financial institutions like the World Bank and IMF to develop regional surveillance mechanisms for strengthening the prevalent banking and financial systems in South Asia. The

broader objective of this assignment is enhanced financial stability and sustainable growth in member countries in South Asia.

# 1.2 Terms of Reference of the assignment

To achieve the objectives outlined above, consultants from PwC are using their domain knowledge and expertise to undertake the following tasks as envisaged in the Terms of reference of this project:

1. **Develop macro-prudential policies, tools, and monitoring framework:** Consultants are supporting the RMA and MMA to develop macro-prudential policies and framework for monitoring and examining financial soundness. This involves the following tasks:

    i. Review and undertake gap analysis of the RMA and MMA's current practices for systemic stability regulation, including assessment of staffing resources needed for performing financial stability monitoring functions in the central bank;
    ii. Preliminary study, design, identification, and collection of better information and data (macroeconomic and financial soundness indicators) to support systemic risk identification and modeling;
    iii. Design of an early warning system or techniques to identify and measure systemic risk, including stress testing, following international best practices;
    iv. Design of appropriate macro-prudential instruments; and
    v. Preparation of guidelines and production of pilot financial stability reports

2. **Develop and implement liquidity management plan and strategy:** Consultants are supporting the RMA and MMA in developing a liquidity management plan and strategy. This involves the following tasks:

    vi. Review and undertake needs assessment of present liquidity measurement and management in Bhutan and the Maldives;
    vii. Development of an effective liquidity management plan, which covers liquidity risk management policy and liquidity management strategy in the context of Bhutan and the Maldives; and
    viii. Preparation of a road map to implement the liquidity management plan and strategy in a phased manner.

3. **Capacity building of central bank staff in performing financial stability functions:** Consultants are supporting capacity building of key central bank staff in performing the functions of macro-prudential regulation and liquidity management. This involves the following tasks:-

    i. Undertake capacity and training needs assessment;
    ii. Development of detailed training manuals on the preparation of financial stability reports;
    iii. Design of a training manual for the new liquidity management strategy; and
    iv. Conduct in-house training program for key central bank staff on macro-prudential monitoring, stress testing, and liquidity management

# *2 Progress Report*

This section describes the progress made and the achievements to date vis-à-vis the specific deliverables.

Table 1 lists the theme-wise deliverables and reports on our progress along each of these.

**Table 1: Deliverables-Progress and Timelines**

| Theme | Deliverable | Timelines | Progress Update |
|---|---|---|---|
| | Review and conduct of gap analysis of the central bank's current practices for systemic stability regulation | Dec-2013 | We completed this task during the Inception phase. Details are available in Chapter 5 of the Inception Report ('*Financial Sector Assessment*') |
| | Preliminary study, design, identification, and collection of better information and data (macroeconomic and financial soundness indicators) to support systemic risk identification and modeling | July-2014 | We assessed the data collection practices of Maldives, against international practices for macro-prudential surveillance. Accordingly an excel based template for future data collection and a document explaining the details of the same were prepared and shared with the client. |
| Macro-prudential policies, tools, and monitoring framework | Design of early warning systems or techniques to identify and measure systemic risk, including stress testing, following international best practices | Sep-2014 (EWS) July-2014 (Stress-testing) | An Aggregate Financial Soundness Index for providing early warning signals for systemic risk. An excel template showing the working and a document explaining the same have been shared with the client. <br><br> We also conducted an excel based stress testing exercise for the country for Dec-2013 data. This has been shared with the Central Bank along with a list of data required to complete the exercise. |
| | Design of appropriate macro-prudential instruments | May-2014 | The first draft of the 7 regulations, as per the Terms of Reference, have been shared with the MMA. We also presented the regulations to the senior executives of the Central Bank and the staff of the Banking Supervision Department (BSD), the department responsible for implementing the regulations. |
| | Preparation of guidelines and production of pilot financial stability reports | In progress | In progress |

| | | | |
|---|---|---|---|
| | Review and conduct of a needs assessment of the present liquidity measurement and management the Maldives | Dec-2013 | This was done during the inception phase. A discussion paper was submitted earlier to the MMA. One version of the document was also incorporated into the Inception Report. |
| Improved liquidity management plan and strategy. | Development of an effective liquidity management plan, which covers liquidity risk management policy and liquidity management strategy in the Maldives | July-2014 | A document describing a liquidity management plan for the Maldives has been shared. We are now awaiting Central Bank feedback on the same. |
| | Preparation of a road map to implement the liquidity management plan and strategy in a phased manner | | A document describing a liquidity management plan for the Maldives has been shared. We are now awaiting Central Bank feedback on the same. |
| | Capacity and training needs assessment | Dec-2013 | The training needs assessment was conducted during the inception phase. See the Annexure to the Inception Report for a report on the same. |
| | Development of detailed training manuals on the preparation of financial stability reports | In progress | Will be done post finalization of the pilot Financial Stability Report. |
| Enhanced capacity building and training of central bank staff. | Design of training manual for the new liquidity management strategy | In progress | In progress |
| | Conduct of an in-house training program for key central bank staff on macro-prudential monitoring, stress testing, and liquidity management | In progress | Guidance note on conducting stress-testing has been shared with the client. A discussion paper on implementation of macro-prudential regulations has also been submitted to help Central Bank staff use the instruments. In house training programmes for the staff on different project components will be provided in subsequent field visits. |

Table 2 lists the documents that have already been shared with the client. These can be accessed by viewing the Annexures later in the document.

**Table 2: List of Deliverables Submitted**

| S. No | Name of Deliverable | Theme | Type of File | Annexure Number |
|---|---|---|---|---|
| 1 | Macro-prudential rules and regulations | Macro-prudential policies, tools, and monitoring framework | Word/ pdf | Annexure 1 |
| 2 | Macro-prudential rules and regulations- examples | | Spreadsheet | Annexure 1 |

| 3 | Macro-economic and Financial Soundness Indicators | | Word/ pdf | Annexure 1 |
|---|---|---|---|---|
| 4 | Macro-economic and Financial Soundness Indicators | | Excel based template | Annexure 1 |
| 5 | Model for stress testing and scenario analysis | | Excel based template | Annexure 1 |
| 6 | Rationale for a Financial Stability Unit | | Word/ pdf | Annexure 1 |
| 7 | Early Warning System | | Word/ pdf | Annexure 1 |
| 8 | Early Warning System | | Excel based template | Annexure 1 |
| 9 | Discussion Paper entitled "Liquidity Management and Forecasting by Central Bank: A Case of Maldives" | Liquidity Management Plan and Strategy | Word/ pdf | Annexure 2 |
| 10 | Liquidity Management Plan and Strategy document | | Word/ pdf | Annexure 2 |
| 11 | Guidance Note on Stress testing | Capacity Building and Training of Central Bank staff | Word/ pdf | Annexure 3 |
| 12 | Discussion Paper on Macro-prudential Rules and Regulations | | Word/ pdf | Annexure 3 |

# *3 Way Forward*

The activities that remain to be conducted are as given in Table 3 below.

**Table 3: Supporting Financial Stability-the Way Forward**

| Theme | Activity | Expected Timeline |
|---|---|---|
| Macro-prudential policies, tools, and monitoring framework | Completion of the stress-testing exercise. (Awaiting data) | Sep-14 |
| | Finalisation of macro-prudential regulations. (Awaiting feedback) | Sep-14 |
| | Preparation of guidelines and production of pilot financial stability reports | Oct-14 |
| Improved liquidity management plan and strategy. | Finalisation of liquidity management plan and strategy, post MMA feedback | Oct-14 |
| Enhanced capacity building and training of central bank staff. | Development of detailed training manuals on the preparation of financial stability reports | Nov-14 |
| | Design of training manual for the new liquidity management strategy | |
| | Conduct of an in-house training program for key central bank staff on macro-prudential monitoring, stress testing, and liquidity management | Oct-14 |

# *Annexures*

## Output wise deliverables

Annexure 1: Macro-prudential policies, tools, and monitoring   framework

Annexure 2: Liquidity management plan and strategy

Annexure 3: Capacity building and training of central bank staff

# Annexure.1   Macro-prudential policies, tools, and monitoring framework (Output-1)

# Regulation 1.     Counter-cyclical Capital Buffer

## *Part.1     Introduction*

**1.1     Short title**

1.1.1     Counter-cyclical Capital Buffer

**1.2     Authorization**

1.2.1     The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act,  in pursuance of the objective listed in Section 2(a)(3) under the Act.

**1.3     Application**

1.3.1     This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

**1.4     Definitions**

1.4.1     Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

  i.     **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

 ii.     **Tier 1 (core) Capital** refers to the sum of the following components (defined in Part 1, Clause 4(6) of the Prudential Regulation No. 1-2009):

  - Permanent shareholders' equity (issued and fully paid-up ordinary shares and non-cumulative perpetual preference shares) (+)

  - Disclosed Reserves (Additional paid-in share premium plus undistributed profits) (+)

  - Minority interests in the equity of consolidated subsidiaries (+)

  - Goodwill and other in-tangible assets (-)

  - Loan loss provisions (general and specific) (-)

  - Asset revaluation reserves (-)

  - Future income tax benefits (-)

  - Losses carried forward (-)

  - Encumbered assets (-)

  For branches of foreign banks operating in Maldives, Tier 1 (core) capital is the same as above with assigned capital substituting for permanent shareholder' equity.

iii. **Tier 2 (supplementary) capital** refers to the sum of the following components (as defined in Part 1, Clause 4(7) of the Prudential Regulation No. 1- 2009):

- Year to date earnings (or losses) (+)

- Undisclosed reserves (+)

- Asset Revaluation reserves (+)

- General loan loss provisions (Limited to 1.25% of risk weighted assets) (+)

- Subordinated term debt (Limited to 50% of Tier 1 capital) (+)

- Hybrid debt-equity capital instruments(+)

  Tier 2 capital is limited to 100% of Tier 1 capital

iv. **Total Capital** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Tier 1 capital plus Tier 2 capital less investments in and loans to unconsolidated banking and other financial subsidiaries, investments in the capital of other banks and financial institutions licensed to do business in the Maldives, and loans or investments of a capital nature.

v. **Leverage (equity) Capital** as defined in Part 1, Clause 4(3) of the Prudential Regulation No. 1- 2009, means Tier 1 (core) capital plus year-to-date profits (after charges for amortizations, depreciation and fully adequate loan loss provisions) and less any general loan loss provisions

vi. **Total Risk Based Capital (RBC) Ratio** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Total Capital divided by Total RWA.

vii. **Tier 1 Risk Based Capital (RBC) Ratio** is calculated by dividing Tier 1 Capital by Total Risk-Weighted Assets as given by Part 1, Clause 4(6) of the Prudential Regulation No. 1- 2009

viii. **Leverage Capital Ratio** as defined in Part 1, Clause 4(3) of the Prudential Regulation No. 1- 2009 is calculated by dividing Equity Capital by Total Assets

ix. **Capital adequacy requirements** are the minimum requirements on the Total RBC Ratio, Tier 1 RBC Ratio and the Leverage Capital Ratio, as set by MMA under Part 3, Clause 1 (1.2) of the Prudential Regulation No. 1- 2009

x. **Non-government sector credit** refers to credit given to Private Sector and Public Sector Undertakings.

# *Part.2     Statement of policy*

## 2.1   Purpose

2.1.1   This regulation intends to safeguard the financial sector from any adverse effects of credit cycle by way of building a buffer during upward phase of the cycle. This regulation shall ensure that banks have adequate capital to maintain the credit flow in the economy even during the downward phase while maintaining its solvency and minimum capital adequacy requirements.

## 2.2   Scope

2.2.1   The regulation shall cover all risk weighted assets (on and off balance sheet) of banks.

## 2.3 Responsibility

2.3.1 It is the responsibility of the Board of Directors of the banks to ensure compliance with the provisions of this regulation or any directive with reference to this regulation that the MMA issues from time to time.

# *Part.3 Implementation and specific requirements*

## 3.1 Limits and requirements

3.1.1 Operationalisation of the counter-cyclical capital buffer shall be based on MMA's assessment of risks emanating from excessive credit growth. MMA shall consider the following to decide the size and the timing of the CCyB:

a. The CCyB shall be initiated when the upward phase of the credit cycle is identified. The gap between Credit-to-GDP ratio from its trend value (henceforth, the 'Gap') shall be used to identify the upward phase of the credit cycle. Here, credit refers to aggregate non-government sector credit in the economy. In the event when this gap exceeds 500 basis points, the MMA may consider implementing the CCyB requirements.

b. In addition to Credit-GDP ratio, MMA shall review other macro-financial indicators/information to strengthen the decision-making process.

3.1.2 The size of the CCyB shall lie between zero and 2.5% of a bank's risk-weighted assets. The maximum CCyB size of 2.5% shall be prescribed by the MMA when the gap exceeds 1000 basis points or more.

3.1.3 The buffer size at various levels of the gap shall be as follows:

**Table 4: Gap and CCyB size**

| Gap ( Credit/GDP$_t$- Credit/GDP$_{trend}$) measured in basis points | Size of the buffer (as % of RWA) |
|---|---|
| 500 bps and above but below 600 bps | 0.5 |
| 600 bps and above but below 700 bps | 1 |
| 700 bps and above but below 800 bps | 1.5 |
| 800 bps and above but below 900 bps | 2 |
| 900 bps and above but below 1000 bps | 2.25 |
| 1000 bps and above | 2.5 |
| **Buffer maintenance period**- if the Gap is higher than zero but below 500, there shall be no further contribution to the buffer and the buffer accumulated shall be maintained. | |
| **Buffer release period**- As soon as the Gap is zero or less, the buffer shall be released | |

3.1.4    MMA shall communicate to banks the rationale for operationalizing CCyB along with the relevant directive.

3.1.5    Banks shall meet the additional capital requirement on account of the imposition of the CCyB, within the time-frame provided by the relevant MMA directive. The maximum time period allowed for compliance shall be 12 months from the date of issue of the directive.

3.1.6    Banks shall meet the additional capital requirement on account of the CCyB, with Tier 1 capital, in excess of the minimum requirement imposed by the MMA.

3.1.7    The additional Tier 1 capital maintained on account of this regulation shall be over and above (a) any existing minimum prudential capital requirements (b) any additional requirement due to other macro-prudential regulations.

3.1.8    Once the MMA directs the banks to release the buffer, the banks shall utilize the buffer in a manner it deems appropriate, subject to compliance with Prudential Regulations No.1- 11, 2009 and the Maldives Banking Act.

## 3.2    General

3.2.1    The MMA shall review the provisions of this regulation annually depending upon macro-economic and financial sector developments and other qualitative information.

## 3.3    Reporting requirements

3.3.1    Banks shall report its CCyB every quarter in the manner as prescribed by the MMA.

# *Part.4    Corrective measures*

## 4.1    Corrective measures and sanctions

4.1.1    Any bank that fails to maintain the CCyB requirement shall be subjected to restrictions on distribution of profits. These restrictions shall be over and above the restrictions imposed by the separate macro-prudential regulation called "Restriction on distribution of profit".

4.1.2    Banks will distribute dividends as per the table below:

**Table 5: CCyB buffer compliance and maximum dividends payable**

| CCyB as % of RWA | Maximum Dividends Payable<br><br>(as proportion of net profit eligible to be paid as dividend in line with Macro-prudential regulation on "restriction on distribution of profits") |
|---|---|
| 0% and above- but below 50% of CCyB requirement | 40% |
| 50% and above- but below  75% of CCyB requirement | 60% |
| 75% and above- but below 100% of CCyB requirement | 80% |

| 100% and above of CCyB requirement | 100% |
|---|---|

4.1.3 In addition to the restrictions on distribution of profits, in case of non-compliance with 'Counter-cyclical capital buffer for banks', the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

4.1.4 In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

    i. Issue a warning to the bank;

    ii. Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

    iii. Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

    iv. Require the board of directors to inject additional capital funds;

    v. Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

    vi. Suspend access to the credit facilities of the MMA;

    vii. Suspend or require the removal of any directors, executive officers or managers;

    viii. Appoint an advisor or a conservator;

    ix. Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

    x. Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

    xi. Suspend or revoke the bank's license.

# *Part.5    Effective date*

## 5.1   **Effective date**

5.1.1 The regulation shall come into effect on _____

5.1.2 MMA shall issue fresh directive regarding the implementation of the regulation.

# Regulation 2. Debt-to-Equity Ratio

## *Part.1 Introduction*

**1.1 Short title**

1.1.1 Debt-to-Equity ratio

**1.1.2 Authorization**

1.1.3 The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act, in pursuance of the objective listed in Section 2(a)(3) under the Act.

**1.2 Application**

1.2.1 This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

**1.3 Definitions**

1.3.1 Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

i. **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

ii. **Project** is defined as an economic venture with a future cash flow stream that adds to the capital stock of the economy;

iii. **Debt** in this regulation stands for borrowing from the bank for setting up an economic venture;

iv. **Equity** means capital component in the project either invested or brought in by the borrower. Equity could be brought in by the borrower either through cash or through movable/immovable assets

v. **Primary sources** refer to funds/assets which are not financed from any bank.

## *Part.2 Statement of policy*

**2.1 Purpose**

2.1.1 This regulation is intended to ensure that borrowers have adequate financial interest in the project. In addition, it aims to contain the credit risk by way of limiting lending exposure of the bank to the project.

**2.2 Scope**

2.2.1 This regulation is applicable to loans for financing all projects.

**2.3 Responsibility**

2.3.1    The responsibility of complying with the stipulations under the regulation on the 'Debt-to-Equity ratio' as prescribed by the MMA and its subsequent amendments lies with the respective Board of Directors of the banks.

# *Part.3    Implementation and specific requirements*

## 3.1    Limits and requirements

3.1.1    Debt-equity ratio shall be calculated as follows:

$$[Debt/Total\ Cost\ of\ the\ project]*100 <=75\%$$

$$[Equity/Total\ Cost\ of\ the\ project]*100 >=25\%$$

$$Where\ total\ cost\ of\ the\ project\ is\ Debt+ Equity$$

3.1.2    Banks shall ensure that the debt-equity ratio does not exceed 75:25 where 75% is debt and 25% is equity.

3.1.3    Banks shall ensure that equity for a project comes from 'primary sources' only.

3.1.4    Exemptions

   i.    The MMA may exempt loans to certain sub/sectors from the provisions of this regulation if the sub/sectors are of a priority nature, i.e. if lending to the sub/sectors is important for the social or economic development of the Maldives.

   ii.    The MMA may exempt loans advanced under loan schemes of the Government of Maldives or the MMA to encourage lending to priority sectors as defined above.

3.1.5    Banks shall ensure that the project loan is processed only through single bank or loan syndicate. There shall not be any multiple bank lending for the project (part financing) till such time that the MMA comes out with a relevant circular on this.

3.1.6    The Bank shall ensure that the debt-equity ratio is maintained at each critical milestone of the project as agreed with the borrower.

3.1.7    The underlying asset on which the economic venture is being developed and/or the assets which shall be developed through this project loan may be used as 'primary collateral'.

3.1.8    The loan amount that may be advanced against the primary collateral shall be decided as per the following formula:

   *Loan amount against primary collateral*

   *= Loan to collateral value ratio* (%) × Appraised value of primary collateral

3.1.9    Loan to collateral value shall vary by the size of the loan as indicated below:

**Table 6: Maximum Loan to collateral value ratio**

| Loan Amount | Maximum Loan to collateral value |
|---|---|
| Up to MVR. 10.0 Million | 90% |

| Above MVR 10 million and below MVR 20 million | 80% |
|---|---|
| MVR 20 million and above | 70% |

3.1.10  In case the primary collateral is insufficient to support the loan amount required, additional collateral shall be required.

3.1.11  The additional collateral requirement shall be determined as follows:

$$= \frac{\text{(Loan amount-Loan amount based on Primary Collateral)*100}}{\text{Applicable loan to collateral value ratio (\%)}}$$

3.1.12  The primary collateral/ additional collateral shall not have any encumbrance and can be released only when the loan is repaid.

3.1.13  Banks shall ensure that future cash flow from the project is sufficient to service the debt obligation arising out of the borrowing for this project.

3.1.14  The Board shall set the principles for valuation of the property subject to compliance with the definition of "current market value" specified by Part 1, Clause 4(3) under Prudential Regulation No. 05, "Asset Classification, Provisioning and Suspension of Interest". The appraised value of the property shall be determined by either:

   i.   an independent valuation agency as approved by MMA,  or

   ii.  the internal valuation team of respective banks which is not involved in the approval process of the loan.

## 3.2   General

3.2.1  This regulation and rules under the "Debt-Equity ratio" will be reviewed by the MMA from time to time on the basis of evolving macro-financial situation.

## 3.3   Reporting requirements

3.3.1  Banks shall submit returns in respect of Debt-to-Equity Ratio in the form and frequency as the MMA may prescribe.

# *Part.4     Corrective measures*

## 4.1  Corrective measures and sanctions

4.1.1  Banks subject to this regulation as detailed above shall comply with the same. If a bank fails to comply with the regulation and reporting requirements, the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

4.1.2  In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

   i.   Issue a warning to the bank;

   ii.  Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

iii.     Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

iv.     Require the board of directors to inject additional capital funds;

v.     Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

vi.     Suspend access to the credit facilities of the MMA;

vii.     Suspend or require the removal of any directors, executive officers or managers;

viii.     Appoint an advisor or a conservator;

ix.     Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

x.     Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

xi.     Suspend or revoke the bank's license.

# *Part.5     Effective date*

## 5.1   Effective date

5.1.1     The regulation shall come into effect on _____.

5.1.2     The above guidelines shall be applicable to the loans sanctioned on and after _____.

## Regulation 3.  Disclosure Requirements

## *Part.1     Introduction*

**1.1    Short title**

1.1.1    Disclosure requirements

**1.2    Authorization**

1.2.1    The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act,  in pursuance of the objective listed in Section 2(a)(3) under the Act.

**1.3    Application**

1.3.1    This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

**1.4    Definitions**

1.4.1    Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

    i.    **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

    ii.    **Leverage (equity) Capital**– as defined  in Part 1, Clause 4(3) of the Prudential Regulation No. 1-2009, means Tier 1 (core) capital plus year-to-date profits (after charges for amortizations, depreciation and fully adequate loan loss provisions) and less any general loan loss provisions

    iii.    **Leverage capital ratio**  as defined  in Part 1, Clause 4(3)of the Prudential Regulation No. 1- 2009 is calculated by dividing Equity Capital by Total Assets

    iv.    **Tier 1 (core) Capital** refers to the sum of the following components (defined in Part 1, Clause 4(6) of the Prudential Regulation No. 1-2009):

- Permanent shareholders' equity (issued and fully paid-up ordinary shares and non-cumulative perpetual preference shares) (+)

- Disclosed Reserves (Additional paid-in share premium plus undistributed profits) (+)

- Minority interests in the equity of consolidated subsidiaries (+)

- Goodwill and other in-tangible assets (-)

- Loan loss provisions (general and specific) (-)

- Asset revaluation reserves (-)

- Future income tax benefits (-)

- Losses carried forward (-)

- Encumbered assets (-)

For branches of foreign banks operating in Maldives, Tier 1 (core) capital is the same as above with assigned capital substituting for permanent shareholder' equity.

v. **Tier 1 Risk Based Capital (RBC) Ratio** is calculated by dividing Tier 1 Capital by Total Risk-Weighted Assets as given by Part 1, Clause 4(6) of the Prudential Regulation No. 1- 2009

vi. **Tier 2 (supplementary) capital** refers to the sum of the following components (as defined in Part 1, Clause 4(7) of the Prudential Regulation No. 1- 2009):

- Year to date earnings (or losses) (+)

- Undisclosed reserves (+)

- Asset Revaluation reserves (+)

- General loan loss provisions (Limited to 1.25% of risk weighted assets) (+)

- Subordinated term debt (Limited to 50% of Tier 1 capital) (+)

- Hybrid debt-equity capital instruments(+)

Tier 2 capital is limited to 100% of Tier 1 capital

vii. **Total Assets** as defined in Part 1, Clause4(8) of the Prudential Regulation No. 1- 2009  means gross assets less goodwill and other intangible assets, loan loss provisions (both general and specific) and all other asset revaluation reserves, future income tax benefits, losses carried forward, and encumbered assets. These items are all also excluded from Tier 1 capital.

viii. **Total Risk-Weighted Assets (RWA)** as defined in Part 1, Clause 4(9) of the Prudential Regulation No. 1- 2009  means the total of risk-adjusted assets as calculated and reported in financial returns required to be submitted to the MMA

ix. **Total Capital** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Tier 1 capital plus Tier 2 capital less investments in and loans to unconsolidated banking and other financial subsidiaries, investments in the capital of other banks and financial institutions licensed to do business in the Maldives, and loans or investments of a capital **nature..**

x. **Total Risk Based Capital (RBC) Ratio** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Total Capital by Total RWA

xi. **Capital adequacy requirements** are the minimum requirements on the Total RBC Ratio, Tier 1 RBC Ratio and the Leverage Capital Ratio, as set by MMA under Part III, Clause 1 (1.2) of the Prudential Regulation No. 1- 2009

xii. **Non-performing loans (NPL)** refer to assets that have turned "non-performing", as defined by the MMA in Part 1, Clause 4(8) of the Prudential Regulation No.05-2009.

xiii. **Net NPLs** refers to the non-performing loans of the Bank as defined above, net of specific provisions and interest in suspense.

xiv. **Specific Provisions** refer to loan loss provisions made against loans graded Substandard, Doubtful, and Loss, as specified by the MMA in Part 1, Clause 4(10) of the Prudential Regulation No.05-2009 and circular no. CN-CBSS/2012/5, as applicable.

xv.   **Net loans and advances** refer to the stocks of loans and advances on the Bank's balance sheet, net of provisions and interest in suspense.

xvi.   **Net NPL ratio** refers to the ratio of net non-performing loans to net loans and advances, as defined above.

# *Part.2      Statement of policy*

## 2.1   Purpose

2.1.1   This regulation specifies the form and content of information that banks must disclose on a quarterly basis. This shall enhance transparency in banking operations which would make the public aware of the risks that a bank faces in comparison with other banks, so as to enable informed decisions with regard to providers of banking services.

## 2.2   Scope

2.2.1   This regulation applies to financial information that must be published by each domestic bank and each branch or subsidiary of a foreign bank in the form and frequency as the MMA may specify.

## 2.3   Responsibility

2.3.1   It is the responsibility of the Board of Directors of domestic banks and the domestic subsidiary of a foreign bank and the responsibility of the branch manager and the branch accounting manager of a branch of a foreign bank, to prepare and publicly disclose the financial information about their bank or branch in full compliance with the provisions set forth in this regulation.

# *Part.3      Implementation and specific requirements*

## 3.1   Quarterly Disclosure Requirements

3.1.1   This regulation shall supplement the existing regulations on disclosure requirements in the Maldives. Banks shall continue to meet the provisions of Prudential Regulation No. 08-2009 on "Publication and Disclosure" and relevant accounting and financial reporting standards.

3.1.2   The disclosure requirements laid down below constitute the minimum requirements. Banks may make additional disclosures if such information is deemed material. Information is material if its omission or misstatement could change or influence the assessment or decision of a user relying on that information for the purpose of making economic decisions.

3.1.3   The disclosures as per the requirements of this regulation shall be made available on the website of the bank within 30 days of the end of a quarter.

3.1.4   Banks that do not host a website shall make arrangements for hosting a website for the purpose of this regulation.

3.1.5   All banks shall have to make the following disclosures on a quarterly basis:

**Table 7: List of Quarterly Disclosures**

| Capital Adequacy | |
|---|---|
| Qualitative Disclosures | i.   A summary discussion of the bank's approach to assess capital adequacy to support current and future activities |

| Quantitative Disclosures | ii. | Tier 1 capital and a breakdown of its components |
| | iii. | Tier 2 capital and a breakdown of its components |
| | iv. | Deductions from capital |
| | v. | Total risk weighted assets exposure table |
| | vi. | Total RBC ratio, Tier 1 RBC ratio and Leverage Capital Ratio |
| | vii. | Of which CCyB and SCR (if applicable) |
| **Credit risk** | | |
| Qualitative Disclosures | i. | Definitions of past due and impaired (for accounting purposes); |
| | ii. | Discussion of the bank's credit risk management policy; |
| Quantitative Disclosures | iii. | Total gross credit risk exposures |
| | iv. | Geographic distribution of exposures |
| | v. | Distribution of loans by sector (industry) |
| | vi. | Residual contractual maturity breakdown of assets |
| | vii. | Amount of NPAs (Gross) by type of NPA |
| | viii. | Net NPAs |
| | ix. | Gross NPAs to gross advances |
| | x. | Net NPAs to net advances |
| | xi. | Movement of NPAs (Gross) |
| | xii. | Movement of provisions for NPAs |
| | xiii. | Total exposure to top five NPA accounts |
| **Concentration of Exposures** | | |
| Quantitative Disclosures | i. | Loans to 10 largest borrowers as proportion of total loans |
| | ii. | Loans to 5 largest borrowers as proportion of capital |
| **Concentration of Deposits** | | |
| Quantitative Disclosures | i. | Total Deposits of ten largest depositors |
| | ii. | Percentage of Deposits of ten largest depositors to Total Deposits of the bank |

3.1.6    The detailed format of quantitative exposures is given in Appendix.1 below.

## 3.2    General

3.2.1    The MMA shall review and revise the form and content of the disclosures as specified in Section 3.1.5 above as and when the banks in the Maldives move to more advanced approaches of measuring capital adequacy, viz. Basel II and Basel III.

# Part.4     Corrective measures

## 4.1    Corrective measures and sanctions

4.1.1    Banks subject to this regulation as detailed above shall comply with the same. If a bank fails to comply with the regulation and reporting requirements, the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

4.1.2    In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

    i.    Issue a warning to the bank;

ii.  Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

iii.  Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

iv.  Require the board of directors to inject additional capital funds;

v.  Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

vi.  Suspend access to the credit facilities of the MMA;

vii.  Suspend or require the removal of any directors, executive officers or managers;

viii.  Appoint an advisor or a conservator;

ix.  Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

x.  Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

xi.  Suspend or revoke the bank's license.

## *Part.5     Effective date*

### 5.1   Effective date

5.1.1   The above guidelines shall come into effect on _____.

## *Appendix.1 Format for Quarterly Disclosures*

Item 1: Tier 1 capital and a breakdown of its components

| S. no. | Item | Current Period | Previous Period |
|---|---|---|---|
| 1 | Tier 1 (core) capital | | |
| 1.1 | Share Capital (or assigned capital) | | |
| 1.2 | Noncumulative perpetual preference shares | | |
| 1.3 | Share Premium | | |
| 1.4 | Retained earnings (accumulated losses) | | |
| 1.5 | Statutory Reserve Fund | | |
| 1.6 | Reserves | | |
| 1.7 | Less Minority Interest in Consolidated Subsidiaries and Associates | | |
| 1.8 | Less goodwill | | |
| 1.9 | Less: Future Income tax benefits | | |
| 1.10 | Less: Losses carried forward | | |
| 1.11 | Less: Encumbered assets | | |

Item 2: Tier 2 capital and a breakdown of its components

| S.no. | | Current Period | Previous Period |
|---|---|---|---|
| 2 | Tier 2 (supplementary) capital | | |
| 2.1 | Year to date earnings (or losses) | | |
| 2.2 | Undisclosed reserves | | |
| 2.3 | Asset Revaluation reserves | | |
| 2.4 | General loan loss provisions (Limited to 1.25% of risk weighted assets) | | |
| 2.5 | Subordinated term debt (Limited to 50% of Tier 1 capital) | | |
| 2.6 | Hybrid debt-equity capital instruments | | |

Item 3: Risk Weighted on-balance sheet assets

| S.no. | On balance sheet assets | Risk Weight | Principal Amount | Risk weighted amount |
|---|---|---|---|---|
| | Cash | | | |

| | | | | |
|---|---|---|---|---|
| | Local Currency | 0.0% | | |
| | Foreign Currency | 0.0% | | |
| | Balances Due From | | | |
| | MMA | 0.0% | | |
| | Depository Institutions Domestic | 20.0% | | |
| | Depository Institutions Abroad | 20.0% | | |
| | Debt Securities Issued by | | | |
| | MMA | 0.0% | | |
| | Other Depository Institutions Domestic | 20.0% | | |
| | Other Depository Institutions Abroad | 20.0% | | |
| | Central Government | 0.0% | | |
| | All Other Debt Securities | 100.0% | | |
| | Loans and Advances | | | |
| | Secured by Cash Deposits, or Government Securities | 0.0% | | |
| | To or Guaranteed by Government of Maldives | 0.0% | | |
| | Guaranteed by MMA | 0.0% | | |
| | Guaranteed by OECD Central Govt's and Central Banks | 20.0% | | |
| | Guaranteed by Commercial Banks (maturity < 1 yr.) | 20.0% | | |
| | Secured by Primary Mortgage on Residential Property | 100.0% | | |
| | All Other Loans and Advances | 100.0% | | |
| | Repurchase Agreements | | | |
| | MMA | 0.0% | | |
| | Depository Institutions (domestic and abroad) | 20.0% | | |

| | All Other Repurchase Agreements | 100.0% | | | |
|---|---|---|---|---|---|
| | Accrued Interest Receivable | | | | |
| | MMA and Central Government | 0.0% | | | |
| | Depository Institutions (domestic and abroad) | 20.0% | | | |
| | All Other Accrued Interest Receivable | 100.0% | | | |
| | Less: Interest in Suspense on Loans and Advances | 100.0% | | | |
| | Shares and Other Equity Investments (excluding investments in capital of other depository institutions) | 100.0% | | | |
| | Financial Derivatives | | | | |
| | MMA | 0.0% | | | |
| | Depository Institutions (domestic and abroad) | 20.0% | | | |
| | All Other | 100.0% | | | |
| | Prepayments | 100.0% | | | |
| | Settlement Accounts | 100.0% | | | |
| | Dividends Receivable | 100.0% | | | |
| | Items in the Process of Collection | 20.0% | | | |
| | Miscellaneous Asset Items | 100.0% | | | |
| | Non-Financial Assets (Net of Depreciation) | 100.0% | | | |
| | Total on-Balance Sheet Assets | 0.0% | | | |

Item 4: Risk weighted off balance sheet items

| | | Nominal Value | | | | | |
|---|---|---|---|---|---|---|---|
| S.no. | Off balance sheet assets | National Currency | Foreign Currency | Total | Conversion factor (%) | Risk Weight | Risk weighted |

| | | | | | | amount |
|---|---|---|---|---|---|---|
| Direct Credit Substitutes | | | | | | |
| General Guarantees of Indebtedness | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | - |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | - |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | - |
| Private Sector | | | | 100.0% | 100.0% | - |
| Standby LCs serving as Financial Guarantees | | | | | | - |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | - |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | - |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | - |
| Private Sector | | | | 100.0% | 100.0% | - |
| Bank Acceptances | | | | | | - |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | - |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | - |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | - |
| Private Sector | | | | 100.0% | 100.0% | - |
| Transaction-related Contingencies | | | | | | - |
| Performance Bonds, Bid Bonds & Warranties | | | | | | - |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 50.0% | 0.0% | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 50.0% | 20.0% | - |
| Local Govt. Authorities, Pubic Enterprises, | | | | 50.0% | 50.0% | - |
| Private Sector | | | | 50.0% | 100.0% | - |
| Standby LCs related to particular transactions | | | | | | - |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 50.0% | 0.0% | - |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 50.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 50.0% | 50.0% | |
| Private Sector | | | | 50.0% | 100.0% | |
| Short-term Self-Liquidating Trade-related Contingencies | | | | | | |
| Shipping Guarantees | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 20.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 20.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 20.0% | 50.0% | |
| Private Sector | | | | 20.0% | 100.0% | |
| Documentary Letters of Credit | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 20.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 20.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 20.0% | 50.0% | |
| Private Sector | | | | 20.0% | 100.0% | |
| Trade related acceptances | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 20.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 20.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 20.0% | 50.0% | |
| Private Sector | | | | 20.0% | 100.0% | |
| Sale/Repurchase Agreements and Assets Sold w/ Recourse | | | | | | |
| Sale and Repurchase Agreements | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Public Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Housing Loans sold with recourse | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Other Assets sold with recourse | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Private Sector | | | | 100.0% | 100.0% | |
| Forward Assets Purchases | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Partly Paid Shares/Securities | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Obligations under On-going Underwriting Agreement | | | | | | |
| Underwriting of Shares/Securities Issue | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Note Issuance or Revolving Underwriting Facilities | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, | | | | 100.0% | 20.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| and Domestic and Non-OECD Banks < 1 year | | | | | | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Other Commtmt's < 1 yr. or Cancellable at Any Time | | | | | | |
| Formal Standby Facilities and Credit Lines | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Public Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Undrawn Term Loans | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Public Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Undrawn Overdraft Facilities | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Public Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Other Commitments > 1 yr. | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Formal Standby facilities and Credit Lines | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Undrawn Term Loans | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 100.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 100.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 100.0% | 50.0% | |
| Private Sector | | | | 100.0% | 100.0% | |
| Undrawn Overdraft Facilities | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | | | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | | | |
| Local Govt. Authorities, Pubic Enterprises, | | | | | | |
| Private Sector | | | | | | |
| Off-Balance Sheet Credit Derivatives | | | | | | |
| Interest Rate Contracts | | | | | | |
| Less Than One Year | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 0.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 0.0% | 20.0% | |
| Local Govt. Authorities, | | | | 0.0% | 50.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pubic Enterprises, | | | | | | |
| All Other | | | | 0.0% | 100.0% | |
| One Year or More But Less Than 5 Years | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 0.5% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 0.5% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 0.5% | 50.0% | |
| All Other | | | | 0.5% | 100.0% | |
| Five Years or More | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 1.5% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 1.5% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 1.5% | 50.0% | |
| All Other | | | | 1.5% | 100.0% | |
| Foreign Exchange Contracts | | | | | | |
| Less Than One Year | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 1.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 1.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 1.0% | 50.0% | |
| All Other | | | | 1.0% | 100.0% | |
| One Year or More But Less Than 5 Years | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 5.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 5.0% | 20.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Local Govt. Authorities, Pubic Enterprises, | | | | 5.0% | 50.0% | |
| All Other | | | | 5.0% | 100.0% | |
| Five Years or More | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 10.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 10.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 10.0% | 50.0% | |
| All Other | | | | 10.0% | 100.0% | |
| Equity Contracts | | | | | | |
| Less Than One Year | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 10.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 10.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 10.0% | 50.0% | |
| All Other | | | | 10.0% | 100.0% | |
| One Year or More But Less Than 5 Years | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 12.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 12.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 12.0% | 50.0% | |
| Public Sector | | | | 12.0% | 100.0% | |
| Five Years or More | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 15.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 15.0% | 20.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Local Govt. Authorities, Pubic Enterprises, | | | | 15.0% | 50.0% | |
| All Other | | | | 15.0% | 100.0% | |
| Precious Metals Contracts | | | | | | |
| Less Than One Year | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 8.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 8.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 8.0% | 50.0% | |
| All Other | | | | 8.0% | 100.0% | |
| One Year or More But Less Than 5 Years | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 10.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 10.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 10.0% | 50.0% | |
| All Other | | | | 10.0% | 100.0% | |
| Five Years or More | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 12.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 12.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 12.0% | 50.0% | |
| All Other | | | | 12.0% | 100.0% | |
| Other Commodities Contracts | | | | | | |
| Less Than One Year | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 10.0% | 0.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 10.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 10.0% | 50.0% | |
| Public Sector | | | | 10.0% | 100.0% | |
| One Year or More But Less Than 5 Years | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 12.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 12.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 12.0% | 50.0% | |
| All Other | | | | 12.0% | 100.0% | |
| Five Years or More | | | | | | |
| Maldives Govt, MMA, Central Govts & Central Banks | | | | 15.0% | 0.0% | |
| MDBS, OECD Banks, and Domestic and Non-OECD Banks < 1 year | | | | 15.0% | 20.0% | |
| Local Govt. Authorities, Pubic Enterprises, | | | | 15.0% | 50.0% | |
| All Other | | | | 15.0% | 100.0% | |
| Total Off-Balance Sheet Assets | | | | | | |
| Total Risk-Weighted Assets | | | | | | |

Item 5: Capital Ratios

| S.no. | | Current Period | Previous Period |
|---|---|---|---|
| | Tier 1 RBC ratio | | |
| | Of which CCyB (if applicable) | | |
| | Of which SCR (if applicable) | | |
| | Total RBC ratio | | |
| | Leverage (capital) ratio | | |

Item 6: Exposures by geography

|  | Domestic | | International | | Total | |
|---|---|---|---|---|---|---|
|  | Current Year | Previous Year | Current Year | Previous Year | Current Year | Previous Year |
| Assets |  |  |  |  |  |  |
| Revenues |  |  |  |  |  |  |

Item 7: Exposures by Industry (sector)

| S.no | Industry | Current Period | Previous Period |
|---|---|---|---|
| 1 | Agriculture |  |  |
| 1.1 | Commerce |  |  |
| 1.2 | Construction |  |  |
| 1.3 | Fishing |  |  |
| 1.4 | Manufacturing |  |  |
| 1.5 | Personal |  |  |
| 1.6 | Services |  |  |
| 1.7 | Other sector 1 |  |  |
| 1.8 | Other sector 2... |  |  |

Item 8: Credit exposures by residual maturity

| As of quarter ending ___, year | Up to 1 month | 1-3 months | 3-12 months | 1-5 years | Over 5 years | Total |
|---|---|---|---|---|---|---|
| Cash and Balances with Banks |  |  |  |  |  |  |
| Treasury Bills |  |  |  |  |  |  |
| Loans and Advances |  |  |  |  |  |  |
| Other Assets |  |  |  |  |  |  |
| Total Assets (MVR million) |  |  |  |  |  |  |

Item 9: Non-performing assets and provisions

| S. No. | Item | Current Period | Previous Period |
|--------|------|----------------|-----------------|
| 1 | Amount of NPAs (Gross) | | |
| 1.1.1 | Substandard | | |
| 1.1.2 | Doubtful | | |
| 1.1.3 | Loss | | |
| 1.2 | Specific Provisions | | |
| 1.2.1 | Substandard | | |
| 1.2.2 | Doubtful | | |
| 1.2.3 | Loss | | |
| 1.3 | Net NPAS | | |
| 1.3.1 | Substandard | | |
| 1.3.2 | Doubtful | | |
| 1.3.3 | Loss | | |
| 1.4 | Net loans and advances | | |
| 1.5 | Gross loans and advances | | |
| 1.6 | Net NPAs to net advances | | |
| 1.7 | Gross NPAs to Gross Advances | | |
| 1.8 | Movement of NPAs | | |
| 1.8.1 | Opening balance | | |
| 1.8.2 | Additions | | |
| 1.8.3 | Reductions | | |
| 1.8.4 | Closing balance | | |
| 1.9 | Movement of provisions for NPAs | | |
| 1.9.1 | Opening balance | | |
| 1.9.2 | Provisions made during the period | | |
| 1.9.3 | Write-off | | |
| 1.9.4 | Write-back of excess provisions | | |
| 1.9.5 | Closing balance | | |
| 1.10 | Total exposure to top five NPA accounts | | |
| 1.11 | Total exposure to top five NPA accounts as percentage of total NPAs | | |

Item 10: Concentration of Deposits

| Particulars | Current Period | Previous Period |
|-------------|----------------|-----------------|
| Total Deposits of ten largest depositors (Amount in MVR | | |

| | | |
|---|---|---|
| million) | | |
| % of deposits of ten largest depositors to total deposits of the bank | | |

Item 11: Concentration of Advances

| Particulars | Current Period | Previous Period |
|---|---|---|
| Total advances to ten largest borrowers (Amount in MVR million) | | |
| % of advances to ten largest borrowers to total advances of the bank | | |
| Advance to largest borrower as percentage of capital base | | |
| Advance to second largest borrower as percentage of capital base | | |
| Advance to third largest borrower as percentage of capital base | | |
| Advance to fourth largest borrower as percentage of capital base | | |
| Advance to fifth largest borrower as percentage of capital base | | |

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# Regulation 4.  Restrictions on Distribution of Profit

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## *Part.1      Introduction*

### 1.1    Short title

1.1.1    Restrictions on distribution of profit

### 1.2    Authorization

1.2.1    The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act,  in pursuance of the objective listed in Section 2(a)(3) under the Act.

### 1.3    Application

1.3.1    This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

### 1.4    Definitions

1.4.1    Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

   i.    **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

   ii.   **Leverage (equity) Capital**  – as defined  in Part 1, Clause 4(3) of the Prudential Regulation No. 1- 2009, means Tier 1 (core) capital plus year-to-date profits (after charges for amortizations, depreciation and fully adequate loan loss provisions) and less any general loan loss provisions

   iii.  **Leverage Capital ratio**  as defined  in Part 1, Clause 4(3)of the Prudential Regulation No. 1- 2009 is calculated by dividing Equity Capital by Total Assets

   iv.   **Tier 1 (core) Capital** refers to the sum of the following components (defined in Part 1, Clause 4(6) of the Prudential Regulation No. 1-2009):

   - Permanent shareholders' equity (issued and fully paid-up ordinary shares and non-cumulative perpetual preference shares) (+)

   - Disclosed Reserves (Additional paid-in share premium plus undistributed profits) (+)

   - Minority interests in the equity of consolidated subsidiaries (+)

   - Goodwill and other in-tangible assets (-)

   - Loan loss provisions (general and specific) (-)

   - Asset revaluation reserves (-)

   - Future income tax benefits (-)

   - Losses carried forward (-)

- Encumbered assets (-)

For branches of foreign banks operating in Maldives, Tier 1 (core) capital is the same as above with assigned capital substituting for permanent shareholders' equity.

v. **Tier 1 Risk Based Capital (RBC) Ratio** is calculated by dividing Tier 1 Capital by Total Risk-Weighted Assets as given by Part 1, Clause 4(6) of the Prudential Regulation No. 1- 2009

vi. **Tier 2 (supplementary) capital** refers to the sum of the following components (as defined in Part 1, Clause 4(7) of the Prudential Regulation No. 1- 2009):

- Year to date earnings (or losses) (+)

- Undisclosed reserves (+)

- Asset Revaluation reserves (+)

- General loan loss provisions (Limited to 1.25% of risk weighted assets) (+)

- Subordinated term debt (Limited to 50% of Tier 1 capital) (+)

- Hybrid debt-equity capital instruments(+)

Tier 2 capital is limited to 100% of Tier 1 capital

vii. **Encumbered asset** as defined in Part 1, Clause 4(2) of the Prudential Regulation No. 1- 2009 means an asset that is pledged to secure a loan, advance or other debt obligation such that the asset is no longer available to support liabilities to depositors and creditors. For purposes of capital calculations, the amount to be deducted is the lesser of (i) the book value of the asset pledged or (ii) the outstanding balance of the loan secured by such asset.

viii. **Total Assets** as defined in Part 1, Clause4(8) of the Prudential Regulation No. 1- 2009 means gross assets less goodwill and other intangible assets, loan loss provisions (both general and specific) and all other asset revaluation reserves, future income tax benefits, losses carried forward, and encumbered assets. These items are all also excluded from Tier 1 capital.

ix. **Total Risk-Weighted Assets (RWA)** as defined in Part 1, Clause 4(9) of the Prudential Regulation No. 1- 2009 means the total of risk-adjusted assets as calculated and reported in financial returns required to be submitted to the MMA

x. **Total Capital** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Tier 1 capital plus Tier 2 capital less investments in and loans to unconsolidated banking and other financial subsidiaries, investments in the capital of other banks and financial institutions licensed to do business in the Maldives, and loans or investments of a capital nature. All assets required to be deducted from Total Capital are also deducted from Total Risk-Weighted Assets.

xi. **Total Risk Based Capital (RBC) Ratio** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Total Capital divided by Total RWA.

xii. **Capital adequacy requirements** are the minimum requirements on the Total RBC Ratio, Tier 1 RBC Ratio and the Leverage Capital Ratio, as set by MMA under Part 3, Clause 1 (1.2) of the Prudential Regulation No. 1- 2009

xiii. **Non-performing loans (NPL)** refer to assets that have turned "non-performing", as defined by the MMA in Part 1, Clause 4(8) of the Prudential Regulation No.05-2009.

xiv.    **Net NPLs** refers to the non-performing loans of the bank as defined above, net of specific provisions and suspended interest

 xv.    **Specific Provisions** refer to loan loss provisions made against loans graded Substandard, Doubtful, and Loss, as specified by the MMA in Part 1, Clause 4(10) of the Prudential Regulation No.05-2009 and circular no. CN-CBSS/2012/5, as applicable.

xvi.    **Interest-in-suspense** means interest which is no longer accrued on the books of the bank nor taken into income unless the borrower has paid the full amount of outstanding and unpaid interest in cash.

xvii.   **Net loans and advances** refer to the stocks of loans and advances on the bank's balance sheet, net of provisions and interest-in-suspense

xviii.  **Net NPL ratio** refers to the ratio of net non-performing loans to net loans and advances, as defined above.

xix.    **Dividend payout ratio** refers to the ratio of total eligible dividend to net profit after tax

 xx.    **The extra-ordinary profits/income** refers to any kind of "windfall gain" that is one-time in nature and not due to usual business practices.

xxi.    **Net profit after Tax** shall be defined as interest income minus interest expense plus non-interest income minus non-interest expenses, plus provision for losses on loan minus applicable income taxes minus net extraordinary items.

# *Part.2    Statement of policy*

## 2.1    Purpose

2.1.1    The Maldives Monetary Authority duly recognizes the importance of distribution of profit in any bank while protecting the interest of small deposit holders.

2.1.2    This regulation aims to bring discipline and uniformity in dividend distribution practice.

## 2.2    Scope

2.2.1    This regulation applies to profits which are considered for distribution to the shareholders of the bank.

## 2.3    Responsibility

2.3.1    It is the responsibility of the Board of Directors of the bank to establish policies and procedures to ensure that the dividend is distributed in full compliance with the provisions set forth in this regulation.

2.3.2    The Board of the bank shall take into account the interests of all stakeholders and the following aspects while deciding on the proposals for declaring dividend:

i.    The bank satisfies all prescriptions mentioned in this regulation;

ii.    The annual inspection findings of the MMA having bearing on net profits;

iii.    The auditors' qualifications pertaining to the statement of accounts;

iv.    The bank's long term growth plans;

     v.      The amount actually distributed as 'dividend' does not differ from the amount as approved by MMA.

2.3.3    The bank shall distribute the eligible dividend thus arrived, only after obtaining necessary approval from the MMA.

# *Part.3*    *Implementation and specific requirements*

## 3.1    Eligibility criteria for declaration of dividend

3.1.1    Only those banks, which comply with the following criteria, would be eligible to declare dividends:

    i.    The bank shall have:

        a.    Total Risk-Based Capital ratio of at least 12% for preceding two completed years and the accounting year for which it proposes to declare dividend.

        b.    Net NPL of less than 7% for the accounting year for which it proposes to declare the dividend.

    ii.    In case any bank is unable to meet the capital adequacy requirements in the previous two completed years, it may declare up to 15% dividend as proportion of net profit after tax provided in the accounting year for which dividend is being considered:

        a.    Total Risk Based capital ratio is at least 12%

        b.    Net NPL ratio is less than 5%

3.1.2    The bank shall comply with Part 3, Clause 1.1, 1.2 and 3 of the Prudential Regulation, No. 01-2009.

3.1.3    The bank shall comply with the provisions of Sections 12 (a), 12(b), 12(d), 12(e) 13 and 14 of Chapter 4 of the Maldives Banking Act.

3.1.4    The proposed dividend shall be payable out of the current year's profit.

3.1.5    If banks distribute dividends out of actual profits derived out of previous years' operations in compliance with Section 12 (c) of the Maldives Banking Act, the conditions for distributing profits shall have to be met for the current year for which dividends are being distributed, in line with Section 3.1.1 above.

3.1.6    The MMA should not have placed any explicit restrictions on the bank regarding declaration of dividends.

3.1.7    The bank shall have obtained all necessary approval from its Board before submitting the requests to MMA for declaration of dividends.

3.1.8    The MMA shall review the entire prescriptions of distribution of profit, once in a year, in the light of the evolving macro-economic and financial sector development.

## 3.2    Quantum of dividend payable

3.2.1    Banks, which fulfill the eligibility criteria set out in Section 3.1 of this regulation, may declare and pay dividends, subject to the following:

    i.    The dividend payout ratio (including any interim dividend) shall not exceed 50% of the net profit after tax of the accounting year for which the bank proposes to declare dividend and it shall be as per the norm furnished in Appendix.1 of this regulation.

ii. In case the net profit after tax includes any extra-ordinary profits/income, the dividend payout ratio shall be computed after excluding such extra-ordinary items from the net profit after tax.

iii. The auditor(s) should not have mentioned any qualification in the audited report, which has a bearing on the net profit after tax figures for the year for which the dividend is being considered. If so, net profit after tax should be adjusted to this effect, so that funds available for distribution are free from any such qualification.

3.2.2 The MMA shall not entertain any application for a higher dividend payout ratio than the one for which the banks qualify as given in the Appendix.1.

## 3.3 General

3.3.1 The bank shall inform the stakeholders of the dividends payable, as approved by the MMA, within 30 days of approval by MMA through press release and banks' website.

## 3.4 Reporting requirements

3.4.1 All banks declaring dividends shall report details of dividend declared during the accounting year as per the pro-forma furnished in Appendix.2. The report shall be furnished within a fortnight of dividend declaration.

3.4.2 The banks shall submit a status report on compliance with other macro-prudential regulations to the MMA when the request for dividend distribution is made to MMA.

3.4.3 In the event of non-compliance of any macro-prudential regulation in force, the bank shall submit an action plan for compliance along with the status report as given in Appendix.3.

# *Part.4*     *Corrective measures*

## 4.1 Corrective measures and sanctions

4.1.1 Banks subject to this regulation as detailed above shall comply with the same. If a bank fails to comply with the regulation and reporting requirements, the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

4.1.2 In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

i. Issue a warning to the bank;

ii. Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

iii. Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

iv. Require the board of directors to inject additional capital funds;

v. Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

vi. Suspend access to the credit facilities of the MMA;

vii.    Suspend or require the removal of any directors, executive officers or managers;

viii.   Appoint an advisor or a conservator;

ix.    Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

x.    Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

xi.    Suspend or revoke the bank's license.

# *Part.5     Effective date*

## 5.1    Effective date

5.1.1   This regulation shall come into effect on _____

5.1.2   The above guidelines will be applicable to the dividends declared for the accounting year ending _____.

### *Appendix.1 Norms for dividend payout ratio*

Matrix of criteria for maximum permissible range of Dividend Payout ratio

| | Net NPL Ratio | | | |
| --- | --- | --- | --- | --- |
| | **Up to 3%** | **More than 3% but less than 5%** | **5% and above but less than 7%** | **7% and above** |
| | **Total Risk-Based Capital Ratio of 12% or more in past 3 years** | | | |
| Maximum Dividend Payout Ratio | 50% | 40% | 30% | Nil |

**Notes:** Banks should have Total Risk-Based Capital Ratio of at least 12% for the preceding two years and the accounting year for which it proposes to declare dividend and Net NPL of 3% or less in the accounting year for which dividend is being declared to be eligible to pay dividend payout ratio at the rate of 50%.

In case any bank does not meet the above capital norm, but is having Total Risk-Based Capital Ratio of more than 12% for the accounting year for which it proposes to declare dividend, it would be eligible to declare dividends up to 15% only if Net NPL is less than 5%.

## *Appendix.2     Reporting Format for banks declaring dividend*

Details of dividend declared during the financial year beginning on DD/MM/YYYY.

Name of the bank:

| Accounting year | Net profit after tax for the accounting period (MVR In Millions) | Amount of dividend (MVR Millions) | Dividend Payout ratio (%) |
|---|---|---|---|
| 1 | 2 | 3 | 4= [(3)/(2)]*100 |
| | | | |

## *Appendix.3    Compliance report*

| S. No. | Macro-prudential rules and regulations | In compliance with the regulation (Yes/No/Not in force) | If No, then the explanation along with the revised time line for compliance |
|---|---|---|---|
| 1. | Counter-cyclical capital buffer | | |
| 2. | Sectoral capital requirements | | |
| 3. | Debt-equity ratio for project financing | | |
| 4. | Loan to value and loan to income restrictions | | |
| 5. | Time varying capital provisioning and margin requirements | | |
| 6. | Disclosure requirements | | |

# Regulation 5.    Sectoral Capital Requirements

## *Part.1    Introduction*

**1.1    Short title**

1.1.1    Sectoral Capital Requirements

**1.2    Authorization**

1.2.1    The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act,  in pursuance of the objective listed in Section 2(a)(3) under the Act.

**1.3    Application**

1.3.1    This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

**1.4    Definitions**

1.4.1    Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

    i.    **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

    ii.    **Tier 1 (Core) Capital** refers to the sum of the following components (defined in Part 1, Clause 4(6) of the Prudential Regulation No. 1-2009):

- Permanent shareholders' equity (issued and fully paid-up ordinary shares and non-cumulative perpetual preference shares) (+)

- Disclosed Reserves (Additional paid-in share premium plus undistributed profits) (+)

- Minority interests in the equity of consolidated subsidiaries (+)

- Goodwill and other in-tangible assets (-)

- Loan loss provisions (general and specific) (-)

- Asset revaluation reserves (-)

- Future income tax benefits (-)

- Losses carried forward (-)

- Encumbered assets (-)

For branches of foreign banks operating in Maldives, Tier 1 (core) capital is the same as above with assigned capital substituting for permanent shareholder' equity.

    iii.    **Tier 2 (supplementary) capital** refers to the sum of the following components (as defined in Part 1, Clause 4(7) of the Prudential Regulation No. 1- 2009):

- Year to date earnings (or losses) (+)

- Undisclosed reserves (+)

- Asset Revaluation reserves (+)

- General loan loss provisions (Limited to 1.25% of risk weighted assets) (+)

- Subordinated term debt (Limited to 50% of Tier 1 capital) (+)

- Hybrid debt-equity capital instruments(+)

Tier 2 capital is limited to 100% of Tier 1 capital

iv. **Total Capital** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Tier 1 capital plus Tier 2 capital less investments in and loans to unconsolidated banking and other financial subsidiaries, investments in the capital of other banks and financial institutions licensed to do business in the Maldives, and loans or investments of a capital nature.

v. **Leverage (equity) Capital** as defined in Part 1, Clause 4(3) of the Prudential Regulation No. 1- 2009, means Tier 1 (core) capital plus year-to-date profits (after charges for amortizations, depreciation and fully adequate loan loss provisions) and less any general loan loss provisions

vi. **Total Risk Based Capital Ratio (RBC)** as defined in Part 1, Clause 4(10) of the Prudential Regulation No. 1- 2009 means Total Capital divided by Total RWA

vii. **Tier 1 Risk Based Capital (RBC) Ratio** is calculated by dividing Tier 1 Capital by Total Risk-Weighted Assets as given by Part 1, Clause 4(6) of the Prudential Regulation No. 1- 2009

viii. **Leverage Capital Ratio** as defined in Part 1, Clause 4(3) of the Prudential Regulation No. 1- 2009 is calculated by dividing Equity Capital by Total Assets

ix. **Capital adequacy requirements** are the minimum requirements on the Total RBC Ratio, Tier 1 RBC Ratio and the Leverage Capital Ratio, as set by MMA under Part 3, Clause 1 (1.2) of the Prudential Regulation No. 1- 2009

x. **Sector specific exposures** refer to a bank's assets in a particular sector.

xi. **Outstanding credit of the economy** refers to total credit to the private sector.

# Part.2     Statement of policy

## 2.1     Purpose

2.1.1     This regulation intends to ensure that all banks have adequate capital to cover unexpected losses against their sector-specific exposures.

## 2.2     Scope

2.2.1     These rules and regulations shall be applicable to all loans and advances of banks to sector(s)/sub-sector(s) that are judged by the MMA as contributing to build up of systemic risk.

## 2.3     Responsibility

2.3.1     It is the responsibility of the Board of the bank to ensure compliance with the provisions of this regulation or any directive with reference to this regulation that the MMA issues from time to time.

# Part.3     Implementation and specific requirements

## 3.1     Limits and requirements

3.1.1 Operationalization of the Sectoral Capital Requirement (SCR) shall be based on MMA's assessment of sector specific risks arising due to macro-economic and financial sector developments in Maldives. The MMA shall notify all banks of the sector(s)/sub-sector(s) thus identified, through a directive.

3.1.2 The sector(s)/sub-sector(s) shall be subject to sectoral capital requirements if the sector in the last 12 quarters:

    i. has an average share of 15% or more in the aggregate outstanding credit of the economy. This shall be calculated by taking the share of a sector in the total outstanding credit at the end of each quarter and averaging the same over the last 12 quarters i.e., $\frac{\sum_{j=1}^{12} S_{ij}}{12}$, where $S_{ij}$ is the share of the $i^{th}$ sector in aggregate credit $j^{th}$ quarter.

    ii. exhibits a higher growth of at least 500 basis points over the growth rate of outstanding credit in the economy. This shall be calculated as follows:

        1. calculate the Year-On-Year (Y-O-Y) growth rate of outstanding credit of the economy and of the sector at the end of each quarter for past 12 quarters;

        2. Take the average of the Y-O-Y growth rate of the outstanding credit of the economy (*X*) and the sector (*Y*);

        3. Take the difference of *Y* and *X*.

3.1.3 Exemptions

    i. MMA shall exempt those sectors from the provisions of this regulation where the sectors are deemed to be of critical importance to the social and economic development of the Maldives.

    ii. MMA shall apply its discretion in allowing exemptions to any other sector.

3.1.4 The sectoral capital requirement imposed on any sector shall be expressed as a percentage of the risk-weighted assets in that sector. However, the overall additional capital requirements so imposed shall not exceed 2.5% of the bank's total risk-weighted assets.

3.1.5 Banks shall meet the additional capital requirement on account of the imposition of the SCR, within the time-frame provided by the relevant MMA circular. The maximum time period allowed for compliance shall be 12 months from the date of issue of the circular.

3.1.6 Banks shall meet the sectoral capital requirements with Tier I capital.

3.1.7 The additional Tier 1 capital maintained on account of this regulation shall be over and above (a) any existing minimum prudential capital requirements (b) any additional requirement due to other macro-prudential regulations.

3.1.8 The MMA shall communicate the effective date from which contribution to SCR could cease. Banks shall discontinue contributing to SCR buffer in case the 'difference' as given in 3.1.2 (ii) falls below 500 basis points. Banks can utilize the buffer in a manner it deems fit not exceeding 25% of the accumulated buffer in a quarter, and subject to compliance with Prudential Regulations No.1- 11, 2009 and the Maldives Banking Act.

## 3.2 General

3.2.1 The MMA shall review the regulation for sectoral capital requirements depending upon macro-economic and financial sector developments.

## 3.3 Reporting requirements

3.3.1   Banks shall report their SCR buffer every quarter in the manner as prescribed by the MMA.

# *Part.4      Corrective measures*

## 3.4   Corrective measures and sanctions

3.4.1   All banks subject to this regulation as detailed above shall comply with the same. If a bank fails to comply with the regulation and reporting requirements, the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

3.4.2   In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

     i.    Issue a warning to the bank;

     ii.    Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

     iii.    Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

     iv.    Require the board of directors to inject additional capital funds;

     v.    Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

     vi.    Suspend access to the credit facilities of the MMA;

     vii.    Suspend or require the removal of any directors, executive officers or managers;

     viii.    Appoint an advisor or a conservator;

     ix.    Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

     x.    Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

     xi.    Suspend or revoke the bank's license.

# *Part.5      Effective date*

## 5.1   Effective date

5.1.1   This regulation shall come into effect on _____.

5.1.2   MMA shall issue fresh directive regarding the implementation of the regulation.

# Regulation 6. Time varying capital provisioning and Margin Requirements

## *Part.1 Introduction*

### 1.1 Short title

1.1.1 Time-varying capital provisioning and margin requirements

### 1.2 Authorization

1.2.1 The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act, in pursuance of the objective listed in Section 2(a)(3) under the Act.

### 1.3 Application

1.3.1 This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

### 1.4 Definitions

1.4.1 Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

    i. **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

    ii. **Non-performing loans (NPL)** refer to assets that have turned "non-performing", as defined by the MMA in Part 1, Clause 4(8) of the Prudential Regulation No.05-2009.

    iii. **Specific Provisions** refer to loan loss provisions made against loans graded Substandard, Doubtful, and Loss, as specified by the MMA in Part 1, Clause 4(10) of the Prudential Regulation No.05-2009 and circular no. CN-CBSS/2012/5, as applicable.

    iv. **General Provisions** refer to loan loss provisions made against loans graded Pass and Special Mention, as specified by the MMA in Part 1, Clause 4(10) of the Prudential Regulation No. 5-2009.

    v. **Interest-in-suspense** means interest which is no longer accrued on the books of the bank nor taken into income unless the borrower has paid the full amount of outstanding and unpaid interest in cash.

## *Part.2 Statement of policy*

### 2.1 Purpose

2.1.1 This regulation is intended to prevent pro-cyclicality in loan loss provisioning arising due to low specific provisions in upward phase and high specific provisions in the downturn phase of the credit cycle. The regulation requires banks to build a countercyclical provisioning buffer during an upswing that can be used to cover higher specific provisioning needs linked to loan delinquencies during the subsequent downturn.

## 2.2    Scope

2.2.1    This regulation is applicable to all loans and advances of banks licensed by the MMA to perform banking operations in the Maldives.

## 2.3    Responsibility

2.3.1    The responsibility of complying with the stipulations under the "Time varying capital provisioning and margin requirements" lies with the respective Board of the banks.

2.3.2    The Board of Directors of the bank shall formulate the credit policy for loans against shares, government securities and other securities subject to the provisions of this regulation.

# *Part.3    Implementation and specific requirements*

## 3.1    Limits and requirements

### Time Varying Capital Provisioning

3.1.1    A Bank shall maintain minimum provisioning coverage ratio of 70% of the additional gross NPLs on a yearly basis. The provisioning coverage ratio for each year shall be calculated as follows:

Provisioning Coverage ratio in year i= 70%

$$\frac{(\text{Specific Provisions owing to additional NPLs in year i} + \text{addition to interest-in-suspense in year i} + \text{Accretion to counter-cyclical provisioning buffer in year i})*100}{\text{Additional gross NPLs in year i}}$$

In case the additional gross NPL in a year is zero or negative i.e., *Gross NPL$_t$-Gross NPL$_{t-1}$≤0*, the accretion to the counter-cyclical provisioning buffer in that year will be 50% of the provisions made by the financial institution under the PCR in the preceding year.

3.1.2    Provisions made under this regulation shall be over and above the 'general provisions' as imposed by the MMA.

3.1.3    The buffer shall be used by banks for making specific provisions for NPLs during periods of economic downturn

3.1.4    Each bank shall ensure that provisioning coverage ratio be disclosed in the Notes to Accounts to the Balance Sheet.

### Margin requirements

3.1.5    Banks shall compute the margin against security for a borrower who is applying for credit facilities by using the following formula:

$$Margin\ Against\ Security = \frac{\text{Value of security used as collateral} - \text{Loan Value}}{\text{Loan Value}} \times 100$$

3.1.6    Securities used as collateral may be shares, corporate bonds, government securities and other securities as approved by the MMA.

3.1.7    The margin requirement for different types of securities shall be as per Table 8. The value of the securities shall be considered on the basis of market value or book value of the securities, whichever is lower.

**Table 8: Minimum Margin Requirements and Ceilings**

| Type of Security | Minimum Margin Required | Ceiling on Value of Loan given to Individuals (in MVR.) |
|---|---|---|
| Government Securities | 20% | None |
| Corporate Bonds | 50% | Up to 2 million |
| Shares | 50% | None |

## 3.2 General

3.2.1 The regulations and rules under the "Time varying capital provisioning and margin requirements" shall be reviewed by the MMA from time to time with according to macro-financial developments in the Maldives.

## 3.3 Reporting requirements

3.3.1 Financial institutions shall report the provisions made every year in the manner prescribed by the MMA.

# *Part.4     Corrective measures*

## 4.1 Corrective measures and sanctions

4.1.1 All banks subject to this regulation as detailed above shall comply with the same. If a bank fails to comply with the regulation or reporting requirements, the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

4.1.2 In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

  i. Issue a warning to the bank;

  ii. Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

  iii. Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

  iv. Require the board of directors to inject additional capital funds;

  v. Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

  vi. Suspend access to the credit facilities of the MMA;

  vii. Suspend or require the removal of any directors, executive officers or managers;

  viii. Appoint an advisor or a conservator;

  ix. Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

x.    Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

xi.    Suspend or revoke the bank's license.

# *Part.5      Effective date*

## 5.1    Effective date

5.1.1    This regulation shall come into effect on _____

5.1.2    The guidelines for the regulation of Time varying capital requirements shall be applicable to financial institutions on and after _____

5.1.3    The guidelines for the regulation of margin requirements shall be applicable to financial institutions on and after _____

## Regulation 7. Loan to Value and Loan to Income Restrictions

## *Part.1 Introduction*

**1.1 Short title**

1.1.1 Loan to value and loan to income restrictions

**1.2 Authorization**

1.2.1 The Maldives Monetary Authority is authorized to issue this regulation under Section 27 (b) of the Maldives Banking Act, in pursuance of the objective listed in Section 2(a)(3) under the Act.

**1.3 Application**

1.3.1 This regulation is applicable to all banks and deposit-taking institutions (collectively 'banks') licensed by the MMA to conduct banking business in the Maldives.

**1.4 Definitions**

1.4.1 Terms used within this regulation are as defined below, or as reasonably implied by contextual usage:

   i. **Bank** means all banks and deposit-taking institutions licensed by the MMA to conduct banking business in the Maldives as given in Part 1, Clause 4(1) of the Prudential Regulation No. 1- 2009. For the purpose of this regulation, branches and subsidiaries of foreign banks operating in the Maldives shall be treated as a bank.

   ii. **Residential property** for the purpose of this regulation, has the same meaning as in Part1, Clause 4(5) of the Prudential Regulation No. 1- 2009 i.e., it is that property of which at least one-half of the property must be occupied by the owner and used by him/her as living space, and at least 75% of all lease income received from the remainder of the property must derive from tenant-occupied living space.

   iii. **Down payment** refers to the payment which is made by the borrower/customer to cover the difference between the value of the approved loans and value of the asset to be acquired through loans.

   iv. **Total Monthly debt obligation** means the sum of the monthly repayment of the principal and interest amount on all outstanding loans.

   v. **Fixed income** means income that is received on a regular and periodic basis and does not vary materially from month to month. It could also include a proportion of expected rental income from the property which is purchased/ constructed out of the current loan.

   vi. **Variable income** means income that is irregular and non-periodic and the amount is not fixed ex-ante.

   vii. **Loan to Value (LTV) ratio** is defined as the ratio of loan amount to the appraised value of the asset which is being purchased/ constructed with the help of credit facility from the bank. For the purpose of this regulation, the appraised value of the asset shall be the same as the "current market value" as specified by Part 1, Clause 4(3) under Prudential Regulation No. 05, "Asset Classification, Provisioning and Suspension of Interest".

    viii.    **Loan to Income (LTI)** is defined as ratio of total monthly debt obligation to that of monthly disposable income from all sources, expressed in per cent.

    ix.    **Disposable Income** means gross income minus taxes.

# *Part.2      Statement of policy*

## 2.1    Purpose

2.1.1    In the Maldives, loan to value ratio has been used by banks as "*micro-prudential measure*" as part of their credit risk management policies. Any risk emanating from individual institutions (micro-risk), if not contained, can lead to systemic risks. Hence, MMA is introducing LTV ratio as a "*macro-prudential measure*" so as to mitigate the risks of default due to fall in the value of the underlying asset and to avoid any speculation in the housing market which may exacerbate systemic risks.

2.1.2    Similarly, loan to income ratio criteria is being followed by banks as a "*micro-prudential measure*" to assess the repayment capability of the borrowers. MMA is introducing LTI ratio as "*macro-prudential measure*" to ensure that households are not excessively leveraged.

## 2.2    Scope

2.2.1    LTV and LTI shall apply to all credit facilities meant for purchase/construction of residential property. However, a bank may establish internal LTV and LTI limits and rules for other credit facilities.

## 2.3    Responsibility

2.3.1    The responsibility of adhering to this regulation lies with the Board of the Bank.

2.3.2    The Board of Directors subject to compliance with this regulation shall:

    i.    Establish, assess and approve the LTV / LTI limits that will be applicable to its borrowers when granting credit facilities, as an integral part of the bank's credit risk management policy;

    ii.    Review, at least once a year, the LTV / LTI limits applicable to credit facilities;

    iii.    Ensure, through audit and inspection, adherence to the LTV / LTI limits;

    iv.    Develop and implement information systems, procedures and techniques that accurately, identify measure and monitor adherence to the LTV/ LTI limits when granting credit.

# *Part.3      Implementation and specific requirements*

## 3.1    Limits and requirements

### Loan to Value Ratio

3.1.1    A bank shall compute the LTV ratio by using the following formula:

$$LTV = \frac{\sum_1^i Outstanding\ amount\ of\ loan\ i}{Appraised\ value\ of\ property\ being\ purchased/constructed} \times 100$$

Where ∑ refers to sum of all outstanding debt obligations (including the value of the current loan) taken against the property being purchased/constructed. *Outstanding amount of loan* shall be equivalent to value of the current loan if no other loan is taken against the underlying asset.

3.1.2    The Board shall set the principles for valuation of the property subject to compliance with the definition of "current market value" specified by Part 1, Clause 4(3) under Prudential Regulation No. 05, "Asset Classification, Provisioning and Suspension of Interest". The appraised value of the property shall be determined by either:

  i.   an independent valuation agency as approved by MMA,  or

  ii.  the internal valuation team of respective banks which is not involved in the approval process of the loan.

3.1.3    The bank shall ensure that the borrower has financial interest in the asset, which is being purchased with the loan. For this, the bank shall ensure that the difference between the value of the asset and loan amount (known as 'down payment') is deposited first by the borrower. The bank shall not disburse funds until and unless the borrower has made the down payment.

3.1.4    The bank shall take a written declaration from the borrower that the down payment is met from his/her own resources and is not borrowed from any other bank.

3.1.5    Banks shall take a written declaration from the borrower whether the underlying collateral is pledged for any other credit facility. This would supplement the information provided by the Maldives Monetary Authority Credit Information Bureau (CIB).

  i.    The bank shall take a written declaration from the borrower whether he/she is applying for the credit facility for purchase/construction of a second or any subsequent property.

  ii.   The bank shall consider disbursement of the loan amount in tranches as per the bank's internal risk management policy.

  iii.  In addition to the prescription of maximum LTV ratios, MMA may also prescribe the risk weights to be adopted for each category of loan, if MMA perceives that credit risk may escalate in future due to macro-financial developments.

### *Prudential Limits*

3.1.6    Limits on Loan to Value ratio for different categories of loan shall be as under:

**Table 9: Maximum LTV by loan type and size**

| Loan Amount | Maximum LTV |
|---|---|
| Residential property (Individual or Joint application in case of husband and wife) | |
| Up to MVR. 5.0 Million | 90% |
| Above MVR 5.0 million | 80% |

3.1.7    In case of a loan for purchase/construction of a second or subsequent property, LTV shall not exceed 70% of the value of the property.

3.1.8    In case of joint applications consisting of two or more borrowers (who are not husband and wife) for the purchase/construction of a property, LTV shall not exceed 70% of the value of the property.

3.1.9    Banks shall ensure that both LTV and LTI conditions are satisfied for any loan meant for purchase/construction of residential property.

### Loan to Income ratio

3.1.10 Loan to income ratio is the percentage of a borrower's monthly disposable income from all sources that goes towards paying his monthly total debt obligations.

3.1.11 A bank shall compute the LTI ratio of a borrower who is applying for credit facilities in accordance with the following formula:

$$LTI = \frac{Total\ monthly\ debt\ obligation}{Monthly\ disposable\ income\ from\ all\ sources} \times 100$$

3.1.12 The total monthly debt obligation of a borrower shall consist of the sum of the monthly repayment installments of all credit facilities granted by banks, including the monthly debt obligation arising from the current loan.

3.1.13 The monthly disposable income from all sources, including the income from the collateral, shall consist of:

| Source of Income | Income to be considered for the purpose of LTI calculation |
|---|---|
| (A) Fixed Income | Up to 100% of average of past 6 months of income<br><br>In case of rental income, a proportion of imputed rent shall be considered |
| (B) Variable Income | Up to 70% of the average income for the past 6 months |
| (C)Fixed and Variable Income | A+B |

3.1.14 The maximum LTI limit for various types of loans is as follows:

| Monthly Disposable Income | Maximum LTI |
|---|---|
| Single Application or Joint Application (Husband and Wife) | |
| Up to MVR 50,000 | 50% |
| MVR 50,000 to MVR 100,000 | 60% |
| MVR 100,000 and above | 70% |
| Joint Application (Two or more borrowers other than husband and wife) | |
| Any amount | 50% |

3.1.15 In case of joint applications consisting of two or more borrowers other than husband and wife, the bank shall:

    i. determine the monthly repayment installment of each borrower in a manner that is consistent with each borrower's monthly repayment capacity; and

    ii. ensure that the LTI ratio does not exceed 50 per cent.

3.1.16 The banks shall obtain a written declaration, with all documentary proofs, from each borrower regarding his/her monthly disposable income from all sources, all outstanding loan amount and monthly repayments towards them.

## 3.2 General

3.2.1    All banks shall ensure strict adherence to these LTV and LTI ratios while granting credit facilities, as part of their credit management process through audit and inspection. In addition, the banks should also have necessary MIS in this context and review periodically the efficiency of the same.

3.2.2    The regulations and rules under the "Loan to value and loan to income restrictions" may be reviewed by the MMA at least once a year.

## 3.3    Reporting requirements

3.3.1    Banks shall submit returns in respect of LTV and LTI in the form and frequency as the MMA may prescribe.

# *Part.4      Corrective measures*

## 4.1    Corrective measures and sanctions

4.1.1    Banks subject to these regulations as detailed above shall comply with the same. If a bank fails to comply with the regulation and reporting requirements, the MMA may take any one or more of the appropriate corrective measures or/and impose any penalties.

4.1.2    In alignment with extant statutory provisions, the corrective measures and sanctions may include, but are not limited to any of the following:

   i.    Issue a warning to the bank;

   ii.   Enter into an informal agreement with the bank for correcting violations and any unsafe and unsound practices and conditions;

   iii.  Issue an order to the bank requiring it to cease and desist from particular actions and further to take affirmative actions to correct violations and any unsafe and unsound practices and conditions;

   iv.   Require the board of directors to inject additional capital funds;

   v.    Restrict the scope of activities of the bank including imposing limitations on any foreign exchange activities, granting of credit, making of investments, acceptance of deposits, borrowing of money, or other activities as the MMA may deem appropriate;

   vi.   Suspend access to the credit facilities of the MMA;

   vii.  Suspend or require the removal of any directors, executive officers or managers;

   viii. Appoint an advisor or a conservator;

   ix.   Impose an administrative penalty on the bank or any of its directors, executive officers or managers;

   x.    Hold personally liable and seek restitution from, as the law allows, any directors, executive officers or major shareholders of the bank; or

   xi.   Suspend or revoke the bank's license.

# *Part.5      Effective date*

## 5.1    Effective date

5.1.1    This regulation shall come into effect on _____ .

5.1.2    The above guidelines shall be applicable to the loans sanctioned on and after
_____ .

# 4 Macroeconomic and financial Soundness Indicators

## 4.1 Introduction

### 4.1.1 What are Financial Soundness Indicators (FSIs)?

Soundness is defined as the 'the ability to withstand force or stress without being distorted, dislodged, or damaged'[1].   In the context of the financial system likewise, soundness does not refer to the absence of vulnerabilities. Rather, it refers to the ability of the financial system to perform its regular functions in spite of shocks[2]. These shocks may be exogenous or endogenous. Examples of exogenous shocks may be a currency depreciation that increases the size of the foreign currency denominated loans of the financial sector, which increases the credit risk. Endogenous risk may arise due to activities of the financial sector itself. For instance, lender optimism (due to high economic growth) may precipitate excessive lending without regard to borrower credit-worthiness. Large-scale defaults on these sub-prime loans can later cause financial distress.

Indicators that would be able to assess the soundness of an economy's financial sector-i.e., its resilience to shock, would qualify as FSIs. These could pertain to data specific to financial institutions as well as to data on financial markets. On the other-hand, macro-economic indicators would be able to signal the possibility of future crisis. For example, a low and declining growth rate could signal worsening repayment capacity of borrowers which would lead to financial distress. In other words, these would serve as leading indicators of crisis[3]. Monitoring both these types of indicators can inform regulators of extant and rising vulnerabilities in the financial sector.

### 4.1.2 Why use FSIs?

Financial crises can have enormous costs. The 2007-09 financial crisis for instance, reportedly led to a loss of 40-90% of one year's output to the US economy[4]. **In this context, it becomes important to monitor indicators that can warn regulators and policy makers to build-up of financial system risks, enabling them to take early action.** Davis (1998) points to the Asian Crisis of the late nineties, as an example of a crisis which in hindsight could have been foreseen, had adequate macro-financial surveillance systems been in place[5]. In particular, the run up to the Asian crisis was marked by deteriorating bank balance sheets in a number of affected countries, high current account deficits, rising leverage (specifically high foreign currency borrowing), rising asset prices and concentration of risk in terms of the presence of a few large borrowers. Moreover, in the earlier years, while high rates of return on investment had accompanied economic growth marginal returns had dropped in the years prior to the crisis. If monitored together in a systematic manner, these indicators could have potentially warned policy makers of the impending instability.

A note of caution is important here. Namely, any interpretation of FSIs and macro-economic indicators would have to be complemented by other additional information that may be available to the MMA at the time of analysis. This could be information on the structure of the financial sector for instance. Consider a scenario where three banks in the system made excessive loans to the real estate sector. Rapidly rising asset prices may be indicative of a speculative boom. If additionally the Central Bank were aware that the three banks dominated

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[1] http://www.merriam-webster.com/thesaurus/soundness
[2] "What is Financial Stability?", Abayami A. Alawode and Mohammed Al Sadek, March 2008, Central Bank of Bahrain.
[3] Macro-prudential Indicators of Financial System Soundness, IMF Occasional Paper no. 192, April 2000
[4] Atkinson T., D Luttrell and H Rosenblum, "How Bad was it? The Costs and Consequences of the 2007-09 Financial Crisis", July 2013, Staff Papers, Federal Reserve Bank of Dallas.
[5] Financial Data Needs For Macroprudential Surveillance – What Are The Key Indicators Of Risks To

Domestic Financial Stability?, E Philip Davis, Bank of England, London, Lecture Series No. 2, Centre for Central Bank Studies.

the financial sector (as reflected by their respective market shares-an indicator of financial market structure), it would assess the financial sector to be at greater risk than would be true if the banks were relatively small. This also means that establishing pre-determined thresholds of the respective indicators (which if crossed would signal crisis) would be both difficult and undesirable. Rather, a holistic approach where the Central Bank interprets the FSIs and the macro-economic information in conjunction with data on the financial system structure would be required.

### 4.1.3 IMF's FSI surveillance mechanism

The realization that the presence of relevant data on a timely basis could have averted the Asian financial crisis led to the IMF effort to compile 'Financial Soundness Indicators' (FSI)[6]. At present the IMF suggests a list of 39 indicators of which 12 are 'core', implying that data for these indicators would be available for all countries. These were shortlisted on the basis of a survey of IMF member countries' needs and practices, consultations with other international agencies and the results of the IMF-World Bank Financial Sector Assessment Program (FSAP) across countries. The consultative and extensive nature of the methodology behind the FSIs thus gives it universal acceptance.

### 4.1.4 Structure of the Report

Section 4.2 of the report first provides an overview of suggested macro-economic and financial soundness indicators for financial system surveillance in the Maldives. The note is accompanied by an excel file that can be used for compiling the results of the data collection exercise and for ease of monitoring. Subsequently, the report describes each indicator in detail, explaining its rationale and the manner of its measurement and compilation.

## 4.2 Macro-economic and financial soundness indicators

### 4.2.1 List of Indicators

Table 10 and Table 11 below provide a list of indicators that MMA can monitor to gauge whether the financial system is vulnerable to shocks. Table 10 largely corresponds to the IMF FSIs to monitor deposit taking corporations, other financial corporations, financial markets and other participants (e.g. households and the non-financial corporate sector).

Table 11 contains a list of insurance-sector specific indicators suggested by Das, Davies and Podpiera (IMF, 2003). Lastly, Table 12 lists a set of suggested macro-economic indicators[7]. Note that while some indicators may not be relevant for the Maldives immediately (for example, gross asset/ liability position in financial derivatives to capital), establishing a framework for recording this data early will allow for ease of use later, as and when these indicators assume importance.

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[6] Morehouse A, "An Introduction to Financial Soundness Indicators", Monetary and Financial Statistics, Bank of England, February 2004.

[7] The indicators for this section are taken from "Macro-prudential Indicators of Financial System Soundness", IMF Staff Team, April 2000; "Aggregate Financial Stability Index for an Early Warning System", Nicolas Cheang and Isabel Choy; "Development of a Regional Surveillance Framework for the SAARC region", Subir Gokarn, Asian Development Bank, September 2013.

**Table 10: IMF Financial Soundness Indicators (Core and Encouraged)**

| S.no | | Indicators | Year t | | | | Year t-1 | | | | Year t…. | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1. | | **Core FSIs for Deposit Takers** | | | | | | | | | | | | | | | | |
| | 1.1. | Regulatory Capital to Risk-Weighted Assets | | | | | | | | | | | | | | | | |
| | 1.2. | Regulatory Tier 1 Capital to Risk-Weighted Assets | | | | | | | | | | | | | | | | |
| | 1.3. | Net Non-performing Loans (net of Provisions) to Capital | | | | | | | | | | | | | | | | |
| | 1.4. | Non-performing Loans to Total Gross Loans | | | | | | | | | | | | | | | | |
| | 1.5. | Sectoral Distribution of Loans to Total Loans | | | | | | | | | | | | | | | | |
| | 1.5.1. | Residents | | | | | | | | | | | | | | | | |
| | 1.5.2. | Deposit-takers | | | | | | | | | | | | | | | | |
| | 1.5.3. | Central Bank | | | | | | | | | | | | | | | | |
| | 1.5.4. | Other Financial Corporations | | | | | | | | | | | | | | | | |
| | 1.5.5. | General Government | | | | | | | | | | | | | | | | |
| | 1.5.6. | Nonfinancial Corporations | | | | | | | | | | | | | | | | |
| | 1.5.7. | Other Domestic Sectors | | | | | | | | | | | | | | | | |
| | 1.5.8. | Nonresidents | | | | | | | | | | | | | | | | |
| | 1.6. | Return on Assets | | | | | | | | | | | | | | | | |

| S.no | Indicators | Year t | | | | Year t-1 | | | | Year t…. | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1.7. | Return on Equity | | | | | | | | | | | | | | | | |
| 1.8. | Interest Margin to Gross Income | | | | | | | | | | | | | | | | |
| 1.9. | Non-interest Expenses to Gross Income | | | | | | | | | | | | | | | | |
| 1.10. | Liquid Assets to Total Assets (Liquid Asset Ratio) | | | | | | | | | | | | | | | | |
| 1.11. | Liquid Assets to Short Term Liabilities | | | | | | | | | | | | | | | | |
| 1.12. | Net Open Position in Foreign Exchange to Capital | | | | | | | | | | | | | | | | |
| 2. | **Encouraged FSIs for Deposit Takers** | | | | | | | | | | | | | | | | |
| 2.1. | Capital to Assets | | | | | | | | | | | | | | | | |
| 2.2. | Large Exposures to Capital | | | | | | | | | | | | | | | | |
| 2.3. | Geographical Distribution of Loans to Total Loans | | | | | | | | | | | | | | | | |
| 2.3.1. | Domestic Economy | | | | | | | | | | | | | | | | |
| 2.3.2 | Advanced Economies, excluding China | | | | | | | | | | | | | | | | |
| 2.3.3 | Other Emerging Market and Developing Countries, including China | | | | | | | | | | | | | | | | |
| 2.3.4 | Africa | | | | | | | | | | | | | | | | |
| | Of which: Sub-Saharan Africa | | | | | | | | | | | | | | | | |
| 2.3.5 | Central and Eastern Europe | | | | | | | | | | | | | | | | |

| S.no | | Indicators | Year t | | | | Year t-1 | | | | Year t.... | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| | 2.3.6 | Commonwealth of Independent States and Mongolia | | | | | | | | | | | | | | | | |
| | 2.3.7 | Developing Asia, including China | | | | | | | | | | | | | | | | |
| | 2.3.8 | Middle East | | | | | | | | | | | | | | | | |
| | 2.3.9 | Western Hemisphere | | | | | | | | | | | | | | | | |
| 2.4. | | Gross Asset Position in Financial Derivatives to Capital | | | | | | | | | | | | | | | | |
| 2.5. | | Gross Liability Position in Financial Derivatives to Capital | | | | | | | | | | | | | | | | |
| 2.6. | | Trading Income to Total Income | | | | | | | | | | | | | | | | |
| 2.7. | | Personnel Expenses to Non-interest Expenses | | | | | | | | | | | | | | | | |
| 2.8. | | Spread Between Reference Lending and Deposit Rates (Basis Points) | | | | | | | | | | | | | | | | |
| 2.9. | | Spread Between Highest and Lowest Interbank Rate (Basis Points) | | | | | | | | | | | | | | | | |
| 2.10. | | Customer Deposits to Total (Non-interbank) Loans | | | | | | | | | | | | | | | | |
| 2.11. | | Foreign-Currency-Denominated Loans to Total Loans | | | | | | | | | | | | | | | | |
| 2.12. | | Foreign-Currency-Denominated Liabilities to Total Liabilities | | | | | | | | | | | | | | | | |
| 2.13. | | Net Open Position in Equities to Capital | | | | | | | | | | | | | | | | |
| 3. | | **Other Financial Corporations** | | | | | | | | | | | | | | | | |
| 3.1. | | Assets to Total Financial System Assets | | | | | | | | | | | | | | | | |

| S.no | Indicators | Year t | | | | Year t-1 | | | | Year t…. | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 3.2. | Assets to Gross Domestic Product (GDP) | | | | | | | | | | | | | | | | |
| 4. | **Non-financial Corporations Sector** | | | | | | | | | | | | | | | | |
| 4.1. | Total Debt to Equity | | | | | | | | | | | | | | | | |
| 4.2. | Return on Equity | | | | | | | | | | | | | | | | |
| 4.3. | Earnings to Interest and Principal Expenses | | | | | | | | | | | | | | | | |
| 4.4. | Net Foreign Exchange Exposure to Equity | | | | | | | | | | | | | | | | |
| 4.5. | Number of Bankruptcy Proceedings Initiated | | | | | | | | | | | | | | | | |
| 5. | **Households** | | | | | | | | | | | | | | | | |
| 5.1. | Household Debt to GDP | | | | | | | | | | | | | | | | |
| 5.2. | Household Debt Service and Principal Payments to Income | | | | | | | | | | | | | | | | |
| 6. | **Market Liquidity** | | | | | | | | | | | | | | | | |
| 6.1. | Average Bid-Ask Spread in the Securities Market | | | | | | | | | | | | | | | | |
| 6.2. | Average Daily Turnover Ratio in the Securities Market | | | | | | | | | | | | | | | | |
| 7. | **Real Estate Markets** | | | | | | | | | | | | | | | | |
| 7.1. | Residential Real Estate Prices | | | | | | | | | | | | | | | | |
| 7.2. | Commercial Real Estate Prices | | | | | | | | | | | | | | | | |

| S.no | Indicators | Year t | | | | Year t-1 | | | | Year t.... | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 7.3. | Residential Real Estate Loans to Total Loans | | | | | | | | | | | | | | | | |
| 7.4. | Commercial Real Estate Loans to Total Loans | | | | | | | | | | | | | | | | |

## Table 11: Financial Soundness Indicators for the Insurance Sector[8]

| S.no | Indicators | Year t | | | | Year t-2 | | | | Year t... | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | **FSIs for Insurance Sector** | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1.1. | Net premium/capital | | | | | | | | | | | | | | | | |
| 1.2. | Capital/total assets | | | | | | | | | | | | | | | | |
| 1.3. | Capital/technical reserves | | | | | | | | | | | | | | | | |
| 1.4. | (Real estate + unquoted equities + receivables)/total assets | | | | | | | | | | | | | | | | |
| 1.5. | Receivables/(Gross premium + reinsurance recoveries) | | | | | | | | | | | | | | | | |
| 1.6. | Equities/total assets | | | | | | | | | | | | | | | | |
| 1.7. | Nonperforming loans to total gross loans | | | | | | | | | | | | | | | | |
| 1.8. | Risk retention ratio (net premium/gross premium) | | | | | | | | | | | | | | | | |

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[8] "Insurance and Issues in Financial Soundness", Udaibir S. Das, Nigel Davies and Richard Podpiera, July 2003, IMF Working Paper

| S.no | Indicators | Year t | | | | Year t-2 | | | | Year t... | | | | Year t-10 | | | |
|------|-----------|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1. | **FSIs for Insurance Sector** | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1.9. | Net technical reserves/average of net claims paid in last three years | | | | | | | | | | | | | | | | |
| 1.10. | Net technical reserves/average of net premium received in last three years | | | | | | | | | | | | | | | | |
| 1.11. | Gross premium/number of employees | | | | | | | | | | | | | | | | |
| 1.12. | Assets per employee (total assets/number of employees) | | | | | | | | | | | | | | | | |
| 1.13. | Loss ratio (net claims/net premium) | | | | | | | | | | | | | | | | |
| 1.14. | Expense ratio (expense/net premium) | | | | | | | | | | | | | | | | |
| 1.15. | Combined ratio = loss ratio + expense ratio | | | | | | | | | | | | | | | | |
| 1.16. | Revisions to technical reserves/technical reserves | | | | | | | | | | | | | | | | |
| 1.17. | Investment income/net premium | | | | | | | | | | | | | | | | |
| 1.18. | Investment income/investment assets | | | | | | | | | | | | | | | | |
| 1.19. | Return on equity (ROE) | | | | | | | | | | | | | | | | |
| 1.20. | Liquid assets/current liabilities | | | | | | | | | | | | | | | | |
| 1.21. | Net open foreign exchange position/capital | | | | | | | | | | | | | | | | |
| 1.22. | Duration of assets and liabilities | | | | | | | | | | | | | | | | |

**Table 12: Macro-economic Indicators**

| S.no | Indicators | Year t | | | | Year t-1 | | | | Year t... | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1. | Macro indicators | | | | | | | | | | | | | | | | |
| 1.1. | GDP growth rate (Overall) | | | | | | | | | | | | | | | | |
| 1.2. | GDP growth rate (sectoral) | | | | | | | | | | | | | | | | |
| 1.2.1. | Primary sector | | | | | | | | | | | | | | | | |
| a. | *Agriculture and mining* | | | | | | | | | | | | | | | | |
| b. | *Fisheries* | | | | | | | | | | | | | | | | |
| 1.2.2. | Secondary sector | | | | | | | | | | | | | | | | |
| a. | *Manufacturing* | | | | | | | | | | | | | | | | |
| b. | *Electricity and water supply* | | | | | | | | | | | | | | | | |
| c. | *Construction* | | | | | | | | | | | | | | | | |
| 1.2.3. | Tertiary sector | | | | | | | | | | | | | | | | |
| a. | *Wholesale and retail trade* | | | | | | | | | | | | | | | | |
| b. | *Tourism* | | | | | | | | | | | | | | | | |
| c. | *Transport* | | | | | | | | | | | | | | | | |

| S.no | | Indicators | Year t | | | | Year t-1 | | | | Year t… | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1. | | Macro indicators | | | | | | | | | | | | | | | | |
| | d. | *Communication* | | | | | | | | | | | | | | | | |
| | e. | *Financial services* | | | | | | | | | | | | | | | | |
| | f. | *Real estate* | | | | | | | | | | | | | | | | |
| | g. | *Business services* | | | | | | | | | | | | | | | | |
| | h. | *Government administration* | | | | | | | | | | | | | | | | |
| | i. | *Education* | | | | | | | | | | | | | | | | |
| | j. | *Health* | | | | | | | | | | | | | | | | |
| | k. | *Social services* | | | | | | | | | | | | | | | | |
| 1.3. | | Current account deficit (level) | | | | | | | | | | | | | | | | |
| 1.4. | | Current account deficit as % of GDP | | | | | | | | | | | | | | | | |
| 1.5. | | Import Coverage Ratio | | | | | | | | | | | | | | | | |
| 1.6. | | Reserves as % of total debt service obligations | | | | | | | | | | | | | | | | |
| 1.7. | | M2/ Reserves | | | | | | | | | | | | | | | | |
| 1.8. | | External Debt as proportion of GDP | | | | | | | | | | | | | | | | |

| S.no | Indicators | Year t | | | | Year t-1 | | | | Year t... | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1. | Macro indicators | | | | | | | | | | | | | | | | |
| 1.8.1. | Rupee Debt | | | | | | | | | | | | | | | | |
| 1.8.2. | Convertible currency | | | | | | | | | | | | | | | | |
| 1.9. | Short term debt(private and public debt) as percentage of Gross Exports | | | | | | | | | | | | | | | | |
| 1.10. | Short term debt(private and public debt) as percentage of Foreign Exchange Reserves | | | | | | | | | | | | | | | | |
| 1.11. | Short term debt (private and public debt) as percentage of Total Debt | | | | | | | | | | | | | | | | |
| 1.12. | Debt service ratio | | | | | | | | | | | | | | | | |
| 1.13. | Terms of Trade | | | | | | | | | | | | | | | | |
| 1.14. | Exchange rate | | | | | | | | | | | | | | | | |
| 1.14.1. | USD | | | | | | | | | | | | | | | | |
| 1.14.2. | Yen | | | | | | | | | | | | | | | | |
| 1.14.3. | Euro | | | | | | | | | | | | | | | | |
| 1.15. | Real effective exchange rate | | | | | | | | | | | | | | | | |
| 1.16. | Interest rate differential | | | | | | | | | | | | | | | | |
| 1.17. | CPI inflation | | | | | | | | | | | | | | | | |

| S.no | Indicators | Year t | | | | Year t-1 | | | | Year t... | | | | Year t-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| 1. | Macro indicators | | | | | | | | | | | | | | | | |
| 1.18. | Interest rate | | | | | | | | | | | | | | | | |
| 1.19. | Credit to GDP ratio | | | | | | | | | | | | | | | | |
| 1.20. | M2 multiplier | | | | | | | | | | | | | | | | |
| 1.21. | Fiscal Deficit as % of GDP | | | | | | | | | | | | | | | | |
| 1.22. | MMA Credit to the Public Sector | | | | | | | | | | | | | | | | |
| 1.23. | Government Debt/ GDP | | | | | | | | | | | | | | | | |
| 1.24. | Interest Payments/Revenue Receipts | | | | | | | | | | | | | | | | |
| 1.25. | Foreign currency denominated debt/ Total Government debt | | | | | | | | | | | | | | | | |
| 1.26. | Short-term debt/ Total government debt | | | | | | | | | | | | | | | | |
| 1.27. | Debt on fixed interest rate/ Total Government debt | | | | | | | | | | | | | | | | |
| 1.28. | International Outlook | | | | | | | | | | | | | | | | |
| 1.28.1. | *Current growth rates and future outlook for Europe* | | | | | | | | | | | | | | | | |
| 1.28.2. | *Current growth rates and future outlook for China* | | | | | | | | | | | | | | | | |

## 4.3 Macro-economic and financial soundness indicators: Measurement and Interpretation

Table 13, Table 14 and

## 4.3 Macro-economic and financial soundness indicators: Measurement and Interpretation

**Table 15** below provide details on how each of the indicators in Section 4.2.1 above are to be calculated for the Maldives, and how each of them is to be interpreted.

**Table 13: Financial Soundness Indicators: Measurement and Interpretation**

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| Core FSIs for Deposit Takers | | | |
| Regulatory Capital to Risk-Weighted Assets (Total RBC ratio) | Capital Adequacy | Total Capital/ Total RWA<br>Where<br>Regulatory capital is the sum of Tier 1 and Tier 2 capital after applicable adjustments as given by Schedule 6 of the Financial Returns submitted to the MMA by all banks.<br>RWA stands for the sum of all risk weighted on-balance sheet assets and off balance exposures | Broadly measures the extent of capital adequacy of a financial institution in the system.<br>A higher RBC ratio for all financial institutions implies the system is more resilient to risk. |
| Regulatory Tier 1 Capital to Risk-Weighted Assets | Capital Adequacy | Tier 1 capital/ Total RWA<br>Where<br><br>Tier 1 capital is the sum of share capital (assigned capital for foreign banks), non-cumulative preference shares, share premium account, retained earnings, statutory reserve fund and reserves, net of any adjustments as given by Schedule 6 of the financial returns submitted by the banks to the MMA.<br><br>RWA stands for the sum of all risk weighted on-balance sheet assets and off balance sheet exposures | This is a narrower measure of capital adequacy.<br>Tier II capital includes items such as Subordinated Debt which impose higher repayment obligations on the FI than common stock or preference shares (that are included under Tier 1 capital). For this reason, Tier 1 capital is of higher quality and would serve as a more reliable measure of financial soundness. |
| Net Non-performing Loans (net of Provisions) to Capital | Capital Adequacy/ Asset Quality | Net NPL / Total Capital<br>Where<br><br>Non-performing loans are as defined by Section 4(8) of Prudential Regulation No. 05, 2009.<br><br>Net NPL =<br>Gross NPL-Interest in Suspense-Specific Provisions<br>Capital is the sum of Tier 1 and Tier 2 capital after applicable adjustments as given by Schedule 6 of the Financial Returns submitted to the MMA by all banks. | Specific provisions are kept as a proportion of NPLs that have materialised.<br>The given ratio measures the extent of additional provisions that may be needed to meet loan losses that are not covered by specific provisions. These would come from the FI's capital. A higher ratio implies lower capital adequacy-in terms of the capital's ability to withstand losses from NPLs. This indicator may be complemented with data on recovery rates (Cash recovery/ NPLs) to indicate the pressure likely to emerge on the capital. |
| Non-performing Loans to Total Gross Loans | Asset Quality | Gross NPLs/ Gross loans<br>Where<br>Non-performing loans are as defined by Section 4(8) of Prudential Regulation No. 05, 2009.<br>Gross loans include loans to depository institutions; other domestic financial | High and increasing values of the ratio signal worsening asset quality. It should be complemented with measures of corporate profitability to measure likelihood of future deterioration in credit portfolio. |

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | corporations, central government, public non- financial corporations, private sector and non-residents. NPLs and Gross loans include the measure of provisions and interest in suspense. | |
| Sectoral Distribution of Loans to Total Loans | Asset Quality | Loan to Sector i $$= \frac{\text{Loans to Sector i}}{\text{Total loans}}$$ Where the 'i'th sector is one of the following: <br> • deposit takers <br> • central bank <br> • general government <br> • other financial corporations <br> • nonfinancial corporations <br> • other domestic sectors (households and NPISHs) <br> • non-residents | Concentration of credit to a particular sector (represented by a high value of the ratio) signifies high risk. If a given sector is troubled, high dependence would translate into a larger proportion of loans turning non-performing. |
| Return on Assets (ROA) | Earnings and profitability | ROA= <br> Net income/ (Average value of total assets) <br> Where <br> Net income is calculated after tax and extraordinary profit is deducted9. <br> Average value of assets = <br> (Value at the beginning of the period+ Value at the end of the period)/2 | ROA measures the FI's efficiency in using its assets. A high ROA implies higher profitability of the banking sector. |
| Return on Equity (ROE) | Earnings and profitability | ROE= <br><br> Net income/ (Average value of total capital) <br> Where <br> Net income is calculated after tax and extraordinary profit is deducted9. <br> Average value of capital= <br> (Value at the beginning of the period+ Value at the end of the period)/2 | This ratio measures the efficiency of the financial institution in using its capital. It should be noted that high ROE could mean high profitability or low capital. Similarly, low ROE can mean low profitability or high capitalization. Hence, ROE should be interpreted with reference to capital adequacy measures and the ROA. A profitable deposit taker with large capital (and low ROE) will show high ROA. |
| Interest Margin to Gross Income | Earnings and profitability | Net interest income/ Gross income <br><br> Where <br><br> Net interest income= Interest earned- interest expenses | A higher ratio implies higher ability to absorb losses. Interest margin will also be higher for FIs with high capital because they will require lesser deposits to finance their lending. Hence interest expenses on this account will also be lower. |

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | Gross Income= Net interest income+ non-interest income | |
| Non-interest Expenses to Gross Income | Earnings and profitability | Non-interest expenses/ Gross Income Where Gross Income= Interest earned-interest expenses + non-interest income | This is a measure of the FI's efficiency in using its resources. A higher ratio implies that an FI's earnings are weakened due to administrative expenses. |
| Liquid Assets to Total Assets (Liquid Asset Ratio) | Liquidity | Liquid assets/total assets Where Liquid assets may be approximated by the sum of cash, balances at banks and balances at the MMA (excluding the amount kept as MRR). Total assets refer to the sum of the financial and non-financial assets. | A lower ratio implies that a disproportionately low share of total assets may be liquidated to meet liabilities. Hence a lower ratio poses higher liquidity risk. |
| Liquid Assets to Short Term Liabilities | Liquidity | Liquid assets/ Short term liabilities Where Liquid assets may be approximated by the sum of cash, balances at banks and balances at the MMA (excluding the amount kept as MRR). Short-term liabilities are demand deposits with a maturity of less than 1 year. | Lower ratio means lesser ability of the financial institutions to meet short term liabilities by liquidating their assets. |
| Net Open Position in Foreign Exchange to Capital | Sensitivity to Market Risks | (Net open position in Foreign exchange for on-balance sheet assets)/Capital Where Net Open Position of a financial institution is the difference between foreign exchange assets and liabilities (with exposure to all currencies expressed in a single value of account). For the purposes of this calculation, gold is to be treated as a foreign exchange asset[10]. The conversion to a single unit of account can be done using the mid-market spot exchange rate. Regulatory capital-sum of capital and reserves forms the denominator. | A higher exposure (reflected by a high value of the ratio) leaves banks more open to foreign exchange risk. |
| Encouraged FSIs for Deposit Takers | | | |

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[10] BCBS guidance regards gold as a foreign exchange rather than a commodity position because its volatility is more in line with foreign currencies and deposit takers manage it in a similar manner to foreign currencies. However, deposit takers in the Maldives do not mention gold explicitly when calculating FC exposures (in Schedule 9 of the Liquidity returns).

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| Capital to Assets | Capital Adequacy | Total capital/Total assets and off-balance sheet assets<br>Where<br><br>Total capital is the sum of Tier 1 and Tier 2 capital after adjustments as given by Schedule 6 of the Liquidity returns. | Total on balance sheet and off-balance sheet assets (not risk weighted) form the denominator. If the Tier 1 Risk Based Capital ratio and total RBC ratio are relatively stable while this measure of capital adequacy deteriorates, then it may be indicative of banks accumulating more assets in lower risk-weight categories. This in turn may be a sign of financial sector weakness if the risk-weighting procedure is not robust. Note that the measure of capital used in the numerator is different from that used by the Leverage (equity) capital ratio as given in Section 4(3) of the Prudential Regulation No. 01.-2009.[11] |
| Large Exposures to Capital | Capital Adequacy | Large exposures/ Total Regulatory capital<br><br>Where Large Exposures refer to loans to single persons or corporate groups exceeding 10% of the capital base. | A higher ratio implies more concentration risk and lower ability of the capital to withstand shocks arising from the large exposures turning non-performing.<br>This information could be complemented by data on the number of large exposures and the distribution of the same among banks. |
| Geographical Distribution of Loans to Total Loans | Asset quality | Lending to region/Gross loans | Concentration of loans in one region spells credit risk. |
| Gross Asset Position in Financial Derivatives to Capital[12] | Sensitivity to market risks | Market value of financial derivative assets/Total Capital<br>where<br>Total Capital is the sum of Capital and reserves | Higher ratios imply more exposure to counter-party risk in the derivatives market. |
| Gross Liability Position in Financial Derivatives to Capital12 | Sensitivity to market risks | Market Value of financial derivative liabilities/ Total Capital<br>where<br>Total Capital is the sum of Capital and reserves. | Higher ratios imply more exposure to counter-party risk in the derivatives market. |
| Trading Income to Total Income | Earnings and profitability | Trading Income/ Gross income<br>Where<br>Gross Income=<br>Net interest income+ non-interest income<br><br>Trading income is the Gain or loss on | Measures the reliance of the FI's earnings on market activity. Higher incomes from trading may not be sustainable, and thus represent a source of vulnerability. |

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[11] As per the Section 4(3) of the Prudential Regulation No. 01.-2009, leverage (equity) capital means Tier 1 (core) capital plus year-to-date profits (after charges for amortizations, depreciation and fully adequate loan loss provisions)and less any general loan loss provisions. However, to measure the leverage ratio, total capital (summation of Tier 1 and Tier 2 capital) is to be considered.

[12] May not be relevant for Maldives at the moment because derivatives market is limited.

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | (Held-for-trading) financial instruments arising during the review period. The unrealized/ realized gains in securities, foreign exchange instruments etc. are to be included. Change in the value of equity held of associates and subsidiaries have to be excluded[13].<br><br>Subsequently, if data gathering systems allow, unrealized and realized gains on all financial instruments may be included into the value of the trading income for the purpose of FSI computation. This would allow for more accurate estimates of returns to capital and 'current' health of financial institutions. | |
| Personnel Expenses to Non-interest Expenses | Earnings and profitability | Personnel expenses/ noninterest expenses<br>where<br>Personnel expenses are the total remuneration in cash or *kind* payable to the employees of the financial institution. | This is an indicator to measure the FIs' efficiency. High and increasing value of the ratio implies lower efficiency (and hence profitability). |
| Spread Between Reference Lending and Deposit Rates (SRLD) (Basis Points) | Spread between reference lending and deposit rates[14] | SRLD=<br>Weighted Average of Lending rate *less* Weighted average of deposit rates<br><br>Where<br>$$= \frac{Total\ interest\ income/expenses\ in\ quarter\ i}{Average\ value\ of\ stock\ of\ loans/deposits\ in\ quarter\ i}$$<br>$$= \frac{\sum_j R_j L_j}{\left[\frac{\sum S_t}{T}\right]}$$<br>Rj is the rate of interest on the jth loan/deposit<br>Lj is the value of the associated loan or deposit (that acts as the weight)<br>St is the stock of loans or deposits<br>T is the total number of observations [15] | Higher the ratio more is the underlying profitability of the financial sector. |
| Spread Between Highest and Lowest Interbank | Liquidity | Highest interbank rate-lowest interbank rate | A very high spread may indicate that certain FIs are viewed by their peers as being risky credit prospects. Even though only one or few financial institutions may be facing risk, a |

[13] For Maldives, this would be equal to the sum of net gain/loss on trading/ assets, net gain/loss on derivatives, net gain/ loss on foreign currency devaluation.

[14] These rates should not include inter-bank interest rates.

[15] $\sum R_i L_i$ can be understood as the total interest income/ expense accrued during the reporting period for the deposit takers. The denominator- St is the sum of the stock of loans/ deposits at the end of each sub-period which is divided by the number of sub-periods (observations, T) to arrive at an average measure of the stock of loans/ deposits.

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| Rate (Basis Points)[16] | | | highly inter-connected financial system may mean contagion risks. Financial institutions facing high interbank rates may also face liquidity issues in the future due to the inability to borrow easily. |
| Customer Deposits to Total (Non-interbank) Loans | Liquidity | Customer deposits/ Total loans<br><br>Where<br><br>Customer deposits are total deposits less interbank deposits. Deposits of all other parties-retail, corporate, government, government corporations, joint corporations and private companies are included in this measure.<br><br>Total loans are gross loans made by the deposit taker to all counter-parties except other banks. | A low ratio reflects banks are borrowings to lend. This raises the funding cost for financial institutions and impacts profitability of the financial institutions. Moreover, this may be indicative of lack of depositor confidence in the financial system sustainability. |
| Foreign-Currency-Denominated Loans to Total Loans | Sensitivity to market risks | Foreign currency denominated loans/ Total loans | A higher ratio implies more exposure to currency risk. When the value of domestic currency depreciates, the liability of the debtor increases in terms of domestic currency. Hence it may cause a credit risk. |
| Foreign-Currency-Denominated Liabilities to Total Liabilities | Sensitivity to market risks | Foreign currency denominated liabilities/ Total liabilities<br>Where<br>Foreign currency liabilities are foreign currency demand, saving, time and margin deposits kept with banks, borrowings undertaken in foreign currency, accrued interest payable in foreign currency, and settlement accounts in foreign currency. If financial derivatives are foreign currency denominated, then a net measure (liabilities less assets) must be added to the numerator.<br><br>Total liabilities is the sum of currency, deposits, borrowings, debt securities, other liabilities plus financial derivative liabilities less financial derivative assets[17]. | If a high value of the previous ratio is accompanied with a high proportion of liabilities being denominated in foreign currency terms, then the FI's foreign exchange exposure is lessened. |
| Net Open Position in | Sensitivity to market risks | Net open position in equities/ Total | The ratio measures the risk of equity price changes adversely affecting the |

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[16] This measure may not be relevant for Maldives at the moment due to limited inter-bank lending.
[17] Note that the derivative market is not well developed

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| Equities to Capital | | regulatory capital<br>Where<br>Net open position in equity is the sum of on-balance sheet equity holdings and notional position in equity derivatives (a long position being positive and a short position being negative)[18] | value of the FI's asset portfolio and causing capital deterioration. |
| **Other Financial Corporations (OFC)[19]** | | | |
| Assets to Total Financial Sector Assets | Size | Financial Assets of OFCs/Total financial system assets<br>Where<br>Financial assets of OFCs include currency & deposits, loans, debt securities, shares and other equity, insurance technical reserves, financial derivatives and other assets.<br>Total financial system assets are the assets owned by deposit takers, OFCs, Non- financial corporations, households, Government and the MMA[20]. | This ratio reflects the size of the OFC relative to the assets of the entire financial sector. |
| Assets to Gross Domestic Product (GDP) | Size | Financial Assets of OFCs/GDP<br>Where<br>Financial assets of OFCs include Currency & Deposits, loans, debt securities, shares and other equity, insurance technical reserves, financial derivatives and other assets. | This ratio reflects the size of the OFC relative to overall GDP, helping the MMA understand the sector's systemic importance. In general, rapid expansion of credit (assets) may be a sign of problems with the sector. |
| **Non-financial Corporations Sector[21]** | | | |
| Total Debt to Equity | Asset Quality | Debt/ Equity<br>Where<br>Debt is the sum of loans, debt securities, trade credit and other liabilities held by non- financial corporations.<br>Equity refers to the capital and equity of the non-financial corporations | The ratio measures the extent to which corporate sector activity is funded through non-owned sources. A higher ratio means that an economic or financial market shock is more likely to lead to loan default by impairing the corporations' debt servicing capacity. |
| Return on Equity | Asset Quality | Earnings Before Interest & Taxes (EBIT)/ (Average value of capital and reserves over the same period)<br>where<br>EBIT refers to Earnings of Non-financial corporations before interest and tax | This is a measure of corporate sector profitability. A decline in the ratio due to broader economic distress may mean lower repayment capacity in the future-thus serving as a forward-looking indicator of financial crisis. |

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[18] Note that the derivatives market in the Maldives is limited.

[19] OFCs may refer to insurance corporations, pension funds, securities dealers, investment funds, finance companies, leasing companies, asset management companies and financial auxiliaries (e.g. market makers). According to the MMA, OFCs include the HDFC, MLFC, three insurance companies and pension fund (Maldives Pension Administrative Office).

[20] However, limited data collection means that the MMA may not be able to report financial assets of households yet.

[21] These indicators may be difficult to compile immediately since the MMA does not collect data on the same at the moment.

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | Average value of capital and reserves= (Value at the beginning of the month + Value at the end of the month)/2 | |
| Earnings to Interest and Principal Expenses | Asset Quality | Earnings/ Debt service payments where Earnings is the sum of EBIT and interest income receivable from other non-financial corporations Debt service payments are interest and principal payments made on outstanding debt liabilities made during the same period for which 'Earnings' data is assessed. | This indicator measures the ability of the corporate sector to meet its debt servicing payments. A lower ratio implies a lower repayment capacity. |
| Net Foreign Exchange Exposure to Equity | Asset Quality | (Net open position in Foreign exchange for on-balance sheet assets)/Equity Where Net Open Position is the difference between foreign exchange assets and liabilities (with exposure to all currencies expressed in a single value of account). For the purposes of this calculation, gold is to be treated as a foreign exchange asset[22]. The conversion to a single unit of account can be done using the mid-market spot exchange rate. Equity is the sum of capital and reserves | This ratio represents the foreign currency risk to corporations. A higher ratio (exposure) signals vulnerability of the corporate sector to currency depreciation. This in turn may cause difficulty to their creditors- the FIs that have lent to the corporate sector. |
| Number of Bankruptcy Proceedings Initiated | Asset Quality | Sum of companies going bankrupt during the period under consideration[23]. | A higher number implies more financial sector distress to the extent that the bankrupt organizations were indebted to domestic lending institutions. |
| Households21 | | | |
| Household Debt to GDP | Asset quality | Outstanding Household debt/ GDP | A higher ratio reflecting higher household indebtedness leaves households more vulnerable to economic and financial market shocks due to lower repayment capacities. This in turn can spell distress for the financial sector if a high proportion of loans become non-performing on this account. |
| Household Debt Service and Principal Payments to Income | Asset quality | Household debt service payments/ Gross disposable Income Where debt-service payments are interest and principal payments made on outstanding debt liabilities within the specified time | This ratio assesses the ability of households to meet their debt obligations. A high current debt service ratio may also mean constrained future consumption that in turn can have implications for economic growth. |

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[22] BCBS guidance regards gold as a foreign exchange rather than a commodity position because its volatility is more in line with foreign currencies and deposit takers manage it in a similar manner to foreign currencies
[23] Maldives currently does not have a bankruptcy law.

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | period | |
| Markets | | | |
| Average Bid-Ask Spread in the Securities Market[24] | Market Liquidity | (Highest bid price-lowest ask price of a benchmark government security)/ (midpoint of bid and ask price) | The bid-ask spread is a measure of market tightness-i.e. the ability of the market to match demand and supply at low cost. A low bid-ask spread is reflective of more well-functioning markets (i.e. more comfortable market liquidity). |
| Average Daily Turnover Ratio in the Securities Market[25] | Market Liquidity | Number of securities traded in a given period/ Average total outstanding securities during the period<br><br>Where,<br><br>The security may be a benchmark Government of Maldives bond or a MMA debt security.<br><br>Average total outstanding securities is the average of the number of securities at the beginning of the period and at the end of the period. | The ratio is indicative of market depth-higher the ratio higher is the ability of the market to effect security trades with ease. |
| Real Estate Markets | | | |
| Residential Real Estate Prices[26] | Sensitivity to Market risks | | High and rapidly increasing prices may be indicative of an asset price bubble on account of speculative purchases and sells. This can cause excessive loan disbursal with the asset serving as collateral. However, once the bubble bursts, this may culminate into high non-performing loans and financial distress. |
| Commercial Real Estate Prices26 | Sensitivity to Market risks | | A decline of the price index from previously high levels may be the beginning of a rapid decline in prices-symptomatic of an asset price fall. |
| Residential Real Estate Loans to Total Loans | Sensitivity to Market risks | Outstanding Loans to the Residential Real Estate sector/ Gross outstanding loans | A high value of the ratio implies more riskiness due to susceptibility to asset price movements |
| Commercial Real Estate Loans to Total Loans | Sensitivity to Market risks | Outstanding Loans to the Commercial Real Estate sector/ Gross outstanding loans | A high value of the ratio implies more riskiness due to susceptibility to asset price movements |

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[24] This may not be relevant for Government securities in the Maldives since the rate of interest on T-bills is pre-determined by the MMA.

[25] This ratio may not be relevant for Maldives at the moment since secondary market trading in securities is limited.

[26] Data on this may not be forthcoming immediately since the MMA is yet to institute a mechanism for a price index.

**Table 14: FSIs for Insurance: Measurement and Interpretation**

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| Net premium/Capital (for Non-life insurance) | Capital Adequacy | Net Premium/ Total Capital<br><br>where<br><br>Net Premium=<br>Gross Premium-Reinsurance Costs<br><br>Capital is the total regulatory capital for the insurance companies | This is a measure of risks arising from underwriting operations of the insurance company. Net premium is a proxy for the risk retained after reinsurance, which must be met with its own funds. Hence, higher the ratio, higher is the risk associated with the insurance operation. |
| Capital/total assets (Separately for life and non-life insurance) | Capital Adequacy | Capital/ total assets | A higher ratio indicates better capital adequacy. |
| Capital/technical reserves (Life insurance) | Capital Adequacy | Capital/ Technical reserves<br>where<br>Technical reserves are the provisions made by insurance companies for claims that are likely to arise. | In life insurance technical reserve is an approximation for the future claims that need to be paid. Premiums would be an inadequate proxy for risks faced due to the long term nature of the life insurance liability.<br>A higher ratio would imply higher capital adequacy and lower risk of insolvency of the insurance company. |
| (Real estate + unquoted equities + receivables)/total assets | Asset Quality | (Real estate + unquoted equities + receivables)/ Total Asset | A higher ratio implies poorer asset quality because the asset classes in the numerator are most likely to face credit risk. Unquoted securities and real estate assets are illiquid. Receivables are also affected by credit risks. |
| Receivables/(Gross premium + reinsurance recoveries) | Asset Quality | Receivables/(Gross premium + reinsurance recoveries) | Higher ratio implies higher credit risk. |
| Equities/total assets | Asset Quality/ Sensitivity to market risk | Equities/total assets | A higher exposure to the stock market leaves the insurer more sensitive to market risk. |
| Nonperforming loans to total gross loans (Life insurance) | Asset Quality | Nonperforming loans /total gross loans<br>Where<br>Non-performing loans include the measure for specific provisions. | A higher ratio implies higher risk |
| Risk retention ratio | Reinsurance and actuarial issues | Net premium/Gross premium<br>Where<br>Net Premium= Gross Premium less Reinsurance costs | A higher ratio indicates that the insurance sector has retained a higher proportion of risk with itself. That is, a high proportion of the burden of meeting insurance claims fall on the |

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | | insurance companies. |
| Survival ratio (non-life) | Reinsurance and actuarial issues | Net technical reserves/average of net claims paid in last three years | A low ratio would question the assumptions used in calculating the technical reserves. |
| Net technical reserves/average of net premium received in last three years (Life insurance) | Reinsurance and actuarial issues | Net technical reserves/average of net premium received in last three years | A low ratio would question the assumptions used in calculating the technical reserves. |
| Gross premium/number of employees | Management soundness | Gross premium/number of employees | A higher ratio indicates more operational efficiency. Note that Gross premium is a more accurate picture of business generated that net premium. |
| Assets per employee | Management soundness | Total assets/Number of employees | A higher ratio indicates more operational efficiency. |
| Loss ratio (General insurance) | Earnings and profitability | Net claims/Net premium Where<br><br>Net claims= Gross claims incurred-reinsurance claim recoveries associated with the Gross claims<br><br>Net premium refers to the earned premium net of reinsurance costs | A higher ratio implies lower profitability as a higher proportion of earned premiums have to go towards paying claims. It also indicates the suitability of the pricing policy. |
| Expense ratio (General insurance) | Earnings and profitability | Expense/Net premium Expense is non-claim related expense of the insurance company and Net premium is the written premium net of reinsurance costs | The expense ratio complements the Loss ratio in indicating the extent of premiums that go towards meeting operational expenses. |
| Combined ratio (General insurance) | Earnings and profitability | Loss ratio + Expense ratio | Since the denominators of the two constituent ratios of the 'Combined ratio' are different, this is not a symmetric indicator. Higher the ratio, lower is the associated profitability. If the combined ratio exceeds 1, the insurance company is considering investment income as well when setting the premium. |
| Revisions to technical reserves/technical reserves | Earnings and profitability | | Measures the extent to which profits are reduced (or increased) due to difference between actual claims and actuarial assumptions that determine the technical reserves kept. |
| Investment income/net premium (General Insurance) | Earnings and profitability | Investment income/net premium | A higher ratio implies a large share of the insurance company's income comes from investment income relative to premiums. |

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| Investment income/investment assets (Life Insurance) | Earnings and profitability | Investment income/investment assets | Higher ratio implies more profitability associated with given investments. |
| Return on equity (ROE) | Earnings and profitability | Profits/ Average value of capital | A higher ratio implies overall higher profitability |
| Liquid assets/current liabilities | Liquidity | Liquid assets/current liabilities Where Current liabilities are all liabilities with a maturity less than 1 year. This would include insurance products where the policy holder can cancel the policy and avail of a cash payment. | Higher ratio implies lower liquidity risks. |
| Net open foreign exchange position/capital | Sensitivity to market risk | (Net open position in Foreign exchange for on-balance sheet assets)/Capital Where Net Open Position of a financial institution is the difference between foreign exchange assets and liabilities (with exposure to all currencies expressed in a single value of account). For the purposes of this calculation, gold is to be treated as a foreign exchange asset[27]. The conversion to a single unit of account can be done using the mid-market spot exchange rate. Regulatory capital forms the denominator. | A higher exposure (reflected by a high value of the ratio) leaves banks more open to foreign exchange risk. |
| Duration of assets and liabilities | Sensitivity to market risk | Duration of an asset/ liability is theoretically calculated by using the following formula: $$D = \frac{\sum_{t=1}^{N} Present\ Value_t \times t}{\sum_{t=1}^{N} Present\ Value_t}$$ Where D is the duration t is the time period of the cash flows $Present\ Value_t$ is the present value of the corresponding cash flow at period t, calculated by using the following formula: $$Present\ Value = \sum_{t} C/(1+r)^{\wedge}t + \frac{F}{(1+r)^{\wedge}t}$$ | Duration can be interpreted as the interest elasticity of the value of an asset/ liability. In other words, it is the responsiveness of the asset/ liability's market value to changes in the rate of interest. Higher the duration, higher is the elasticity. Hence, a difference in the duration of assets and liabilities would make the insurance company more susceptible to interest-rate risk (if rates are set to rise causing the value of assets to fall on net). |

[27] BCBS guidance regards gold as a foreign exchange rather than a commodity position because its volatility is more in line with foreign currencies and deposit takers manage it in a similar manner to foreign currencies

| Indicator | Dimension | Measurement | Interpretation |
|---|---|---|---|
| | | Where in turn C is the regular (coupon) payment received on a coupon bond and r is the rate of interest/ discount. F is the face value of the bond paid at maturity.<br><br>More simply, the duration formula can be implemented with excel if the following information is known:<br><br>• **Settlement date** of the security is the date after the issue date when the security is transferred to the buyer. This is also the date by which a buyer must pay for the asset delivered by the seller.<br>• **Maturity** is the security's maturity date. The maturity date is the date when the security expires.<br>• **Coupon rate** is the security's annual coupon rate. It is the amount of interest income derived every year, expressed as a percentage of the bond's face value.<br>• **Yield** is the security's annual yield. This is different from the coupon rate. Yield rate is the interest earned by the buyer on the bond purchased expressed as a percentage of the **bond value.**<br>• **Frequency** is the number of bond payments per year. For annual payments, frequency is 1, for semi-annual payment, frequency is 2 and for quarterly payment, frequency is 4.<br>• **Basis** is the type of day count basis t*o use.* | |

**Table 15: Macro-economic indicators**

| Dimension | Indicator | Interpretation |
|---|---|---|
| Economic Growth/ Lending boom/ asset quality | GDP growth rate (Overall); GDP growth rate and difference from its trend value | Low or declining aggregate growth rates could contribute to credit risk by weakening repayment capacities of borrowers.<br>High growth rates could fuel optimism and may cause banks to take excessive risks in lending, which can affect financial stability in the future. |
| Economic Growth/ Lending boom/ asset quality | GDP growth rate (sectoral) Sectoral GDP growth rate and difference from its trend value | If a slump is seen in the sector that dominates the loan portfolio of the financial sector, then it may decrease the repayment capacity of the borrowers and cause credit risk. For Maldives, this is the tourism sector. |
| Vulnerability in the external sector | Current account deficit (level) | A large current account deficit means an equivalent capital account surplus. The funds flowing in may be contributing to the economy overheating and asset price booms by financing speculative asset purchases. |
| Vulnerability in the external sector | Current account deficit as % of GDP | A current account deficit also precipitates fears of a currency depreciation that can increase the domestic currency denominated size of foreign loans thus contributing to credit risks. |
| Vulnerability in the external sector (Reserve adequacy) | Import Coverage Ratio= $\dfrac{Reserves}{Imports/12}$ | This ratio reflects the months of imports that foreign exchange reserves with the MMA can cover.<br>Low reserve adequacy combined with high CAD can undermine confidence in the value of the domestic currency, thus leaving it open to speculative attacks and large capital outflows. This can subsequently affect financial stability. |
| Vulnerability in the external sector (Reserve adequacy) | Reserves as % of total debt service obligations | This ratio measures the ability of the country to meet its external obligations with existing reserves. Hence a lower ratio may be indicative of future economic distress for the country. |
| Vulnerability in the external sector (Reserve adequacy) | Reserve adequacy as measured by the ratio of M2/ Reserves | This measure of reserve adequacy captures the extent to which banking system liabilities are backed by international reserves. In the event of a currency crisis, individuals may want to convert their domestic currency deposits into foreign currency. The foreign exchange reserves would measure the extent to which this demand could be met by the Central Bank. |
| Vulnerability in the external sector | External Debt as proportion of GDP | Higher external debt, relative to repayment capacity (as measured by the GDP, Gross exports and foreign exchange reserves respectively) shows higher vulnerability for the country since it reflects lower ability to meet its obligations, hence more vulnerability to capital outflow and speculative attack on currency. |
| Vulnerability in the external sector | Short term debt(private and public debt) as percentage of Gross Exports | |
| Vulnerability in the external sector | Short term debt(private and public debt) as percentage of Foreign Exchange Reserves | |
| Vulnerability in the external sector | Short term debt (private and public debt) as percentage of Total Debt | If total debt is dominated by short term debt, then the economy would be more vulnerable to asset withdrawal. |
| Vulnerability in the external sector | Debt service ratio = Export earnings/ Annual interest and principal | A lower ratio implies that the country faces more hardship in meeting its external obligations. |

| Dimension | Indicator | Interpretation |
|---|---|---|
| | payments on a country's debt | |
| Vulnerability in the external sector | Terms of Trade = Price index of exports/ Price index of imports | Worsening terms of trade leave small export oriented economies at risk |
| Vulnerability in the external sector | Exchange rate | Exchange rate changes can cause credit risk since depreciation increases the repayment amount of foreign currency denominated loans in domestic currency. |
| Vulnerability in the external sector | Interest rate differential (Interest rate on domestic currency deposits-Interest rate in the US) | Higher international interest rates may cause investment outflow from domestic market, thus causing pressure on currency to depreciate and reserve losses in order to maintain the exchange rate peg. This in turn makes the economy more vulnerable to speculative attacks. |
| Inflation | CPI inflation (and volatility) | Generally, inflation is less of a concern than the volatility in inflation. Inflation volatility can make financial decisions more difficult as investors would want to refer to real interest rates rather than nominal ones. Moreover, a deflation may be a reflection of asset price collapse. If this asset were serving as collateral, there would also be increased credit risk. |
| Asset Quality | Interest rate | High interest rates may push borrowers to default due to the high debt burden. Moreover, high interest rates can also lead to adverse selection of borrowers for the lending institution[28]. This in turn can translate into high non-performing loans later-thus leading to vulnerabilities in the financial sector. |
| Lending boom | Credit to GDP ratio= $$Credit_t/GDP_t$$ Where $Credit_t$ is the sum of credit to the private sector and PSUs $GDP_t$ is the GDP in nominal terms | A high value (and large difference from the trend figure) can indicate overheating and excess risk taking if it's too high. A low ratio (especially if below the trend value of the Credit-GDP ratio) may be indicative of credit constraints and a possibility of credit crunch in the near future. |
| Lending boom | M2 multiplier =M2/ M0 Where M0 is base money and M2 is a measure of broad money (sum of narrow and quasi-money). | A high and increasing M2 multiplier may be indicative of over-borrowing and attendant deterioration in asset quality. |
| Government Indebtedness | Fiscal Deficit as % of GDP | A high fiscal deficit if financed by external borrowings could expose the economy to exchange rate risk. On the domestic front, high fiscal deficit raises interest |

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[28] In the context of the credit market, adverse selection is the phenomenon wherein lenders inadvertently lend to bad credit risks. This happens because lenders cannot ex-ante differentiate between credit-worthy and non-credit-worthy borrowers, and hence cannot charge differential interest rates (adjusted for risk premium) to them. At high rates of interest, credit-worthy borrowers may prefer to not take the loan if they perceive that they will be unable to repay the loan. On the other hand, a borrower who does not plan to repay anyway (and is a bad credit-risk) will not be deterred by the high interest costs. As a result, the lending institution will be left with an adverse selection of borrowers.

| Dimension | Indicator | Interpretation |
|---|---|---|
| | | rates and impacts repayment capacity if not supported by high economic growth. It could also leave the country exposed to inflation if the deficit is monetised by the Central Bank. |
| Government Indebtedness/ Inflation | MMA Credit to the Public Sector | High level of Central Bank credit to the Government may be indicative of deficit monetizing which is inflationary. By contributing to inflation, such action can make can make financial decisions more difficult as investors would want to refer to real interest rates rather than nominal ones. |
| Government Indebtedness | Government Debt/ GDP | High debt/GDP ratio reflects repayment risks from the side of the government. Additionally, debt service payments are of committed nature, and countries like Maldives where public sector plays a major role, high debt/GDP ratio may reduce development spending which can impact economic growth. This indicator can help gauge future build-up of risks if taken in conjunction with fiscal deficit/GDP. Low fiscal deficit in the current year but high accumulated debt may also moderation in risks in the future on the other hand, low debt/GDP ratio and high fiscal deficit for some period signal accretion in fiscal stability risks in the future. |
| Cost of government borrowing | Interest Payments/Revenue Receipts | This indicator measures how costly government borrowings are. High ratio reflects that majority of current revenues of the government are going towards repayment of interest on the debt accumulated. This further feeds into borrowing requirements for the current year and adds to accumulated debt. This further increases the interest payments and cycle keeps moving unless there is debt restructuring. |
| Structure of debt | Foreign currency denominated debt/ Total Government debt<br><br>Short-term debt/ Total government debt<br><br>Debt on fixed interest rate/ Total Government debt | In most countries, government debt crisis have been on liquidity crisis i.e., inability of the government to rollover the debt and collect enough revenue to pay for public spending along with the debt obligations. Countries even with low debt levels as well may be susceptible to risks if there is adverse movement in interest rate or foreign exchange rates. This is dependent on the structure of the debt (i.e., long v/s short term, fixed v/s variable, domestic v/s foreign currency denominated). |
| Vulnerability to macro-economic changes in other countries | • Current growth rates and future outlook for Europe<br>• Current growth rates and future outlook for China | Since the Maldives economy is heavily dependent on tourism, the fate of its tourism industry determines the growth of the entire economy. Europe and China form the two biggest contingents sending tourists to the Maldives. Hence, monitoring the growth prospects of these two countries (as reflected by current growth rate and future outlook as reflected by reports like the World Economic |

| Dimension | Indicator | Interpretation |
|---|---|---|
|  |  | Outlook) may give the MMA a good idea about economic distress for the Maldives. This may also translate into financial crisis since a large part of outstanding loans are to the tourism sector. |

# 5 Rationale of the Financial Stability Unit

Financial Stability Units (FSU) –across Central Banks of the World, are responsible for monitoring risks that might lead to financial instability and documenting the developments so far as Financial Stability is concerned by way of Financial Stability reports.

Before the global financial crisis, most Central Banks primarily aimed to control instability in inflation or output. While it was recognized that financial disruptions could impact the real economy adversely, crisis management in terms of limiting the build-up of risks by taking pre-emptive action was limited. Known as the "Greenspan Orthodoxy", it was believed that Central Banks should not intervene by tightening credit in the face of asset price bubbles since they may not have the relevant information to detect a bubble any sooner than market players. Moreover, tightening credit could lead to the bubble bursting sooner than it otherwise would. If an asset price bubble did burst after running its course, the Central Bank could always reduce interest rates post facto to ensure recovery[29]. The crisis however led to the realization that such a hands-off approach can have significant costs and that the Central Bank had to play a more activist role.

There are several ways that Central Banks are now expected to intervene to prevent build-up of risks. Operation of macro-prudential tools and instruments to limit build-up of excessive risk is one way. The counter-cyclical capital buffer is an example of such an instrument. This says that banks may be asked to set aside additional capital as a proportion of their risk weighted assets when there is excessive credit growth in the economy[30]. This can be brought down during 'bad times', when increasing NPAs impair existing bank capital and minimum capital requirements become binding. There are two advantages to this. One, a credit crunch is averted during bad times. Two, the tool helps to "lean against the wind" by discouraging excessive lending in the first place. However, **the use of the tool presupposes that the Central Bank is capable of measuring systemic risk and thus activating the buffer at an opportune time**.

To this end, the Financial Stability Board (FSB) and G20 recommend countries to:

"ensure authorities are able to identify and take account of macro-prudential risks across the financial system including in the case of regulated banks, shadow banks and private pools of capital to limit the build up of systemic risk".

Moreover, they should:

"ensure that national regulators possess the powers for gathering relevant information on all material financial institutions, markets and instruments in order to assess the potential for failure or severe stress to contribute to systemic risk".

Most countries have responded by setting up dedicated Financial Stability Units within the Central Banks. Their mandate varies though activities in general include:

- to develop and monitor indicators that could provide early warning signals for risk,

- drafting financial stability reports as reports cards of the health of the financial sector, to inform policy makers and banks about the risks to the financial system

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[29] Mishkin, F. s. (2010). Monetary policy strategy:Lessons from the crisis 6th ECB Central Banking Conference. Frankfurt, European Central Bank 52.

[30] Note that excessive credit growth is often symptomatic of systemic risk build up as banks may be lending to risky borrowers in the pursuit of higher returns.

- conduct stress-testing on financial institutions and the macro-economy in general,

- developing models for testing financial stability[31] and

- providing policy recommendations for addressing the possible risks to the financial system,

Following India's inclusion in the Financial Stability Board (FSB), the RBI's FSU also provides the Secretariat to the Reserve Bank's representative in the FSB.

As evident, most of these activities require subject matter knowledge and domain experience. Another major feature of FSUs is their multi-disciplinary nature-expertise is drawn from across departments including supervisory, regulatory, statistics, economics and financial markets departments in order to best assess risks to stability. This is true for the RBI's FSU. Similarly, in the South African Reserve Bank, the erstwhile Financial Stability Department was merged with the Banking Supervision Department in order to encourage information sharing between micro and macro-prudential functions.

Table 16 below contains an indicative list of Central Banks with FSUs.

**Table 16: Indicative List of Countries with FSUs**

| Country | Details |
|---------|---------|
| Reserve Bank of India | Financial Stability Unit was set up in 2009 to conduct activities such as: <br> 1. Conduct of macro-prudential surveillance of the financial system on an ongoing basis. <br> 2. Preparation of financial stability reports. <br> 3. Development of a database of key variables which could impact financial stability, in co-ordination with the supervisory wings of the Reserve Bank. <br> 4. Development of a time series of a core set of financial indicators. <br> 5. Conduct of systemic stress tests to assess resilience. <br> 6. Development of models for assessing financial stability in due course |
| Nepal Rashtra Bank | Financial Stability Unit-released the first Financial Stability Report in July 2012. |
| Russia | In 2011 the Bank of Russia established a Financial Stability Department for identifying and monitoring systemic risks[32] |
| Sri Lanka | The Financial System Stability Committee (FSSC) set up in 2002 to conduct the following tasks : <br><br> • Assess the risks and vulnerabilities that may lead to financial system instabilities or imbalances and to recommend measures and policies to mitigate them, to the Governor and the Monetary Board. <br><br> • Monitor the financial system and to submit periodic reports to the Governor and the Monetary Board, recommending policies necessary to promote financial system stability. <br><br> • Prepare the Financial System Stability Review. <br><br> Members of the FSSC span various departments of the Central Bank. There is also a |

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[31] Mohan, D. R., et al. (2009). India's financial sector an assessment, Executive Summary. C. o. F. S. Assessment. New Delhi. **I:** 110.

[32] (2012). Financial Stability Review 2011. Moscow, The Central Bank of the Russian Federation (Bank of Russia)**:** 35.

| | separate department of Financial Stability Studies. |
| --- | --- |
| South African Reserve Bank | Financial Stability Unit is a part of the Banking Supervision Department. |
| Central Bank of Lesotho | Financial Stability Unit has the mandate to: <br> 1. safeguard the entire financial sector stability focusing on both banks and nonbank financial institutions; <br> 2. informing policy makers and banks about the possible risks to the financial system; <br> 3. providing recommendations on regulatory policies that would limit risks; and <br> 4. resolving problems in the financial system in an efficient manner. |
| Croatia | Financial Stability Directorate established within the sector for Research[33] |
| Serbia | Has established a Sector for Financial Stability[33] |
| Bosnia and Herzegovina | Financial Stability Department established within the Sector for Monetary Operations, Management of Foreign Exchange Reserves and Cash[33] |
| Bulgaria | Directorate for Macro-Prudential Supervision and Financial Stability established within the Banking Supervision Department[33] |
| Central Bank of Montenegro | Sector for Financial Stability and Payment System Overview within the "Financial Stability and Payment System" [33] |
| National Bank of the Republic of the Macedonia | "Division of Supervision, Banking Regulations and Financial Stability" is the organizational unit along the lines of the FSU[33] |
| Czech Republic | Financial Stability Unit established within the Research Department of the Central Bank[34]. |
| Oman | Central Bank of Oman has a Financial Stability Unit |
| Sudan | The Central Bank of Sudan has established a Financial Stability Division within the Banking Regulation and Development Department |

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[33] Jovanic, T. (2014). Governance arrangements for financial stability – with a particular focus on CEE. ECPR Standing Group on Regulatory Governance 5th Biennial Conference. Barcelona, Draft paper**:** 23.
[34] Spicka, P. (2008-09). "Financial Stability Issues at Central Banks :The Approach of the Deutsche Bundesbank." Spicka XXXVI(1): 14.

# 6 Early Warning System

## 6.1 Background

The Terms of Reference of the project TA8284: Supporting Financial Stability in Bhutan and Maldives include 'the design of early warning systems or techniques to identify and measure systemic risk, including stress testing, following international best practices' as one of its components. We have previously shared an excel-based framework for conducting the stress-testing exercise for Maldives as well as a guidance document describing the approach followed. This document builds an aggregate financial stability index (AFSI) for Maldives that can be monitored to provide early warning signals of systemic risk. It also provides guidance on the manner in which the regulatory authorities in the Maldives can build and use this Early Warning System (EWS) in the future.

## 6.2 Understanding EWS

Post the Global Financial Crisis, there has been a concerted effort by policy makers and academicians across the world to design systems to detect potential risks to financial stability before these can develop into full-blown crisis. Due to their ability to sound signals in advance (or 'early'), in the literature, these are known as Early Warning Systems (EWS) of financial instability. A successful EWS mechanism would be able to ensure pre-emptive action from the Central Bank and the Government. This in turn would ensure that the effect of the crisis would be muted, if not completely mitigated. There are several approaches of developing Early Warning Systems.

One of the first efforts to develop an EWS was based on the indicator approach[35]. Pioneered by Kaminsky and Reinhart (1999), this uses financial and macro-economic indicators to signal an impending financial or currency crisis. Some of the indicators used are credit to GDP ratio, exports, imports, real exchange rate, and reserves. A crisis is said to be signaled if the indicator breaches a certain threshold 12 to 24 months in advance of a banking or currency crisis respectively. The appropriate threshold is one which minimizes the noise-to-signal ratio of crisis detection. Intuitively, the noise-to-signal-ratio measures the propensity of the indicator to commit 'mistakes' in crisis detection. These mistakes may be of two types-one, where a crisis occurs but no signal is issued (type I error) and two, where a signal is issued but no crisis actually occurs (type II error). The noise-to-signal ratio combines information on the number of instances when either of the two types of errors occur in the following manner[36]:

$$Noise-to-\text{signal ratio} = \frac{\text{Proportion of instances when a crisis does not occur but a signal is issued}}{\text{Proportion of instances when crisis occurs and signal is issued}}$$

An example of implementing this technique was seen in Uganda for measuring the likelihood of a currency crisis[37]. Accordingly, an index of exchange market pressure (EMP) was built using information on exchange rate and international reserves of the country. A high and increasing value of the index (due to a domestic currency depreciation or reduction in the reserves) on a sustained basis is said to be symptomatic of crisis. Since a crisis had never occurred in Uganda previously, the authors had to rely on the earlier research by Kaminsky and Reinhart (1999) to fix thresholds of the indicators, which once crossed would signal crisis.

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[35] Carmen M. Reinhart, G. L. K. (1999). "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems." American Economic Review **89**(3): 473-500.

[36] Using the terminology of type I and Type II errors, the Noise-to-signal ratio $= \frac{\text{Type - II Error}}{1 - \text{Type I Error}}$. The denominator here is equivalent to the denominator given in the formula of the main text.

[37] Heun, M. and T. Schlink (2004). "Early warning systems of financial crises - implementation of a currency crisis model for uganda." HfB - Business School of Finance & Management: 64.

An alternative approach is to model a banking crisis or fragility index and regress this on macro-economic indicators using an ordered probit model. Singh (RBI) builds a monthly banking sector fragility index using data on credit, deposits, foreign currency assets and liabilities and bank reserves[38]. This is used to identify periods of fragility. The ordered Probit model helps relate the occurrence of fragility episodes with macro-economic changes as measured by indicators like stock price index, imports, exports, output etc.

In Maldives, there are two problems with implementing either of the two methods outlined above. First, the country authorities do not have high frequency data for real sector variables for an adequately long duration[39]. Second, the country has not witnessed multiple real and financial crises. As a result, we have to look for a method that would be suitable for the country at present. This takes us to a third strand of literature which looks to construct aggregate indices of financial stability. These indices combine data from different parts of the economy-the financial sector, the external sector, the performance of the real economy etc. to reveal an overall picture of financial stress.

Cheang and Choy (2009) develop an aggregate index of Financial Stability for Macao using data of quarterly frequency between 1996 and 2010[40]. The aggregate index is a combination of three types of sub-indices-one relating to the ex-post performance of financial institutions; another measuring vulnerability for the financial sector in the future; and a third to indicate risk emanating from important economies in the region-China in the case of Macao. Nayn and Siddiqui[41] of the Bangladesh Bank largely follow the approach by Cheang and Choy. However, they use semi-annual data between 2004 and 2011 for the analysis. Morris (2010) conducts a similar exercise for Jamaica[42]. He evaluates systemic risk using four sub-indices-three of these are similar to the indices used by Cheang and Choy. An additional sub-index reflects the degree of financial development in Jamaica. Petrovska and Mihajlovska (2013) use Principal Components Analysis to construct a Financial Conditions Index for Macedonia[43]. This is a statistical technique by which a given dataset is re-represented in terms of 'principal components' that explain maximum variance in the data.

The Aggregate Financial Stability Index (AFSI) that we build for the Maldives is primarily influenced by this third strand of literature.

This note is organized as follows. In Section 6.3, we describe our methodology of computing the index. Section 6.4 carries out the exercise for Maldives's quarterly data between June 2007 and December 2013 and discusses the results obtained.

## 6.3 Technical Framework

It is possible to organize the data/ indicators used in the literature along four broad dimensions/ indices. These are financial soundness; financial vulnerability; financial development and regional economic climate (see Figure 1). **Financial soundness indicators** measure the health of financial institutions. Better the health (as reflected by capital adequacy, asset quality, soundness of management procedures, profitability, liquidity

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[38] Singh, T. R. (2011). An ordered probit model of an early warning system for predicting financial crisis in India. Proceedings of the IFC Conference on "Initiatives to address data gaps revealed by the financial crisis". Basel, IFC.

[39] Gokarn, S. (2013). Development of a Regional Surveillance Framework for the SAARC region, Asian Development Bank: 12.

Gokarn (2013) classifies Maldives as a Group 3 country in the SAARC region for which "data availability is significantly limited".

[40] Cheang, N. and I. Choy (2011). "Aggregate Financial Stability Index for an Early Warning System." Macao Monetary Research Bulletin **21**: 27-54.

[41] Nayn, M. Z. and M. S. Siddiqui "Measuring Financial Stability: The Composition of an Aggregate Financial Stability Index for Bangladesh." Bangladesh Bank Research Paper.

[42] Morris, V. C. (2010). "Measuring and Forecasting Financial Stability: The Composition of an Aggregate Financial Stability Index for Jamaica." Bank of Jamaica Research Paper: 19.

[43] Petrovska, M. and E. M. Mihajlovska (2013). "Measures of Financial Stability in Macedonia." Journal of Central Banking Theory and Practice: 26.

and sensitivity to market risk), higher is the resilience of the financial institutions to external shocks. **Financial vulnerability** is meant to measure the likelihood of these external shocks. These may come from three directions-the real sector, the external sector and the financial sector itself. In terms of the real sector for example, falling GDP growth rate can translate into economic hardship for borrowers and hence lower repayment capacities. On the external front, a very high current account deficit to GDP ratio can mean expected depreciation in the value of the domestic currency, which in turn can precipitate capital outflows. The Asian Financial Crisis of the 90s was witness to such an occurrence. Vulnerabilities can arise from the financial sector if for instance a very high credit to GDP ratio (due to lender optimism) was accompanied by lax standards for verifying borrower credit worthiness. **Financial development indicators** reflect market competition and concentration. For a country with a highly concentrated financial sector (only two or three large financial institutions), risks are higher since the failure of a single institution can spillover to the rest of the sector. Lastly, **the index for regional economic climate** measures the performance of economies critical to the country for which the index is being built. Countries can be important because they serve as important export markets or sources of the country's imports. In the latter case, growth of the export market would be important. In the former case prices of imports as reflected by inflation and exchange rate movement would be pertinent to measure. This is especially true in the case for Maldives, given the economy's dependence on service exports (tourism) as well as imports for consumption.

**Figure 1: Index for Early Warning of Risks-Dimensions**



Table 17 below lists the general indicators to use to measure the performance of the economy along these four dimensions. The ideal frequency of data is quarterly or monthly. A lag of one quarter in the data will ensure that the index is able to provide timely signals.

**Table 17: List of Indicators generally used to construct Early Warning indices**

| Dimension/Sub-Index | Aspect | Indicator |
|---|---|---|
| Financial Soundness | Capital Adequacy | Capital to Risk Weighted assets |
| | | Net NPL to capital |
| | Asset Quality | Annual growth rate of non-performing loans |
| | | NPL to total loans |
| | Profitability | Returns on assets |
| | | Interest margin to gross income ratio |
| | | Non-interest expenses to gross income ratio |
| | | Return on equity |
| | Liquidity | Liquid assets to short term liabilities |
| | | Liquid Assets to total assets |
| | Sensitivity to Market Risk | Net open position in foreign exchange to capital |
| Financial Vulnerability | External sector | Current account balance-to-GDP ratio |
| | | Ratio of M2 to foreign exchange reserves |
| | | Ratio of external assets to total assets |
| | | Ratio of foreign currency assets to foreign currency liabilities |
| | | Forex deposits to total deposits |
| | | Real effective exchange rate |
| | Financial sector | M2 multiplier |
| | | Ratio of domestic credit to GDP |
| | | Deposits to M2 |
| | | (Reserves/Deposits) / (Note & Coins/M2) |
| | | Stock exchange index return |
| | | Residential real estate prices |
| | Real sector | Fiscal balance-to-GDP ratio |
| | | CPI inflation |
| | | GDP growth of the domestic economy |
| Financial Development | Market concentration | Herfindahl-Hirschmann Index |
| | Market Depth | Market capitalization to GDP |

| | Competition | Spread between lending and deposit rate |
|---|---|---|
| **Regional Economic Climate** | Exports | GDP growth of neighbouring countries, important regional economies and trade partners |
| | Imports | World Inflation |
| | | Exchange Rate |

For Maldives, we similarly aggregate data for the economy's real and financial sector in a single variable that can be monitored for measuring risks to the financial system (and the economy)[44]. This uses ***three*** sub-indices, each measuring different aspects of the economy and financial system. These are the following:

1. **Financial Soundness Index (FSI)** as above aims to capture the health of the economy's financial institutions. The indicators used in building this index largely correspond to the IMF's Financial Soundness Indicators (IMF-FSI) like capital to risk weighted assets, non-performing loans to total loans, return on assets etc.

2. **Regional Economic Climate Index (RECI)** aims to capture the economic performance of countries that closely influence the economic performance of Maldives. We further disaggregate the RECI into two parts. We first have a Regional Economic Climate Index-Imports (RECII) that measures the exchange rate and inflation for the major countries that Maldives imports from. The second part is formed by the Regional Economic Climate Index-Exports (RECI-X) that measures the economic performance of the major export markets for Maldives (both in terms of merchandise and tourist exports). The combined RECI is then able to inform us of the economic health of Maldives' trade partners, and thus the possible implications for its own performance in the future.

3. **Financial Vulnerability Index (FVI)** aggregates indicators that could potentially pose risks for the financial sector. These are associated with the economy's external, financial and real sectors, respectively.

Note that data for some of the parameters mentioned in Table 17 are unavailable in Maldives as of now. For example, there is no quarterly data available for current account, fiscal deficit and GDP. As a result, we either have to leave out the desired aspect of risk, or at best, take proxies. For instance, credit of the Maldives Monetary Authority (MMA) and the other depository corporations to the government are taken as an approximation of fiscal deficit. The real sector is approximated by the number of bed-nights spent by tourists in the Maldives every year. Another point to note is that the same aspect may be measured by more than one indicator. For example, weighted average interest rate spread between the lending and the deposit rate and the net interest margin to gross income ratio are similar in nature and both aim to measure profitability. We use the latter in our AFSI for the Maldives. A third type of indicator may be one that has limited relevance for the case

of Maldives. For example, the limited nature of the capital markets means that the stock exchange return may not be significant for the purposes of measuring systemic risk.

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[44] Cheang, N. and I. Choy (2011). "Aggregate Financial Stability Index for an Early Warning System." Macao Monetary Research Bulletin **21**: 27-54.; Nayn, M. Z. and M. S. Siddiqui "Measuring Financial Stability: The Composition of an Aggregate Financial Stability Index for Bangladesh." Bangladesh Bank Research Paper. ;Morris, V. C. (2010). "Measuring and Forecasting Financial Stability: The Composition of an Aggregate Financial Stability Index for Jamaica." Bank of Jamaica Research Paper: 19.;Petrovska, M. and E. M. Mihajlovska (2013). "Measures of Financial Stability in Macedonia." Journal of Central Banking Theory and Practice: 26.

We discuss these indices in further detail in Section 6.4 below. The detailed list of indicators used for the three sub-indices for Maldives is given in Appendix.2. The current section mainly focuses on the general aspects of building the index. Once the list of indicators is finalized, there are four steps to be followed, in order to construct the index.
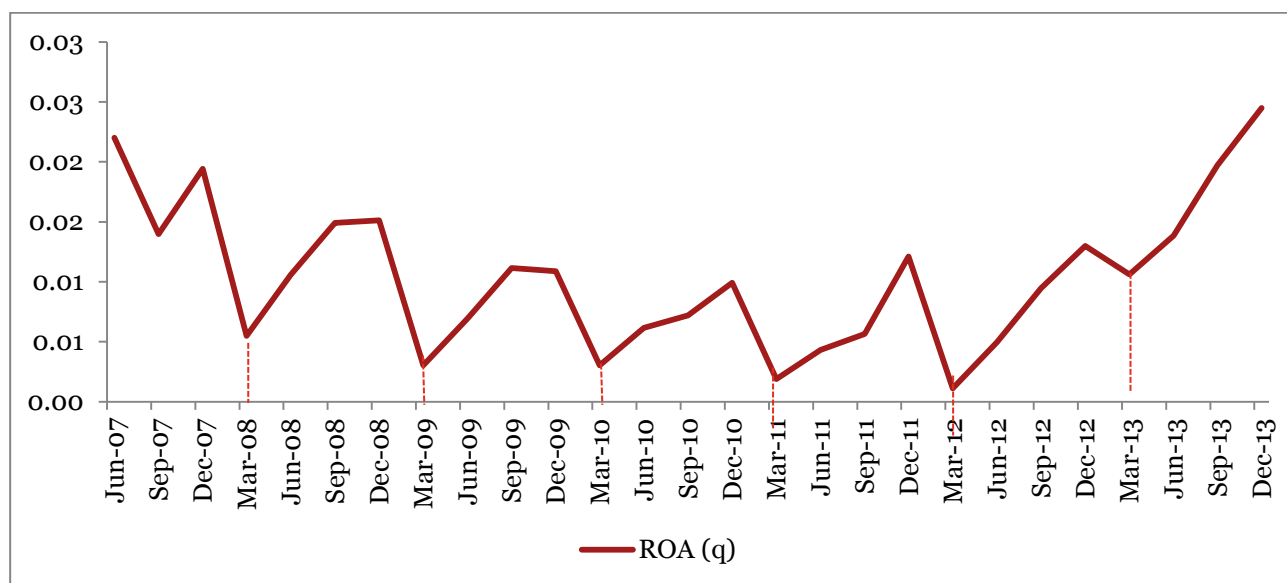
## 6.3.1 *De-seasonalising the data*

Seasonality in time series data refers to "intra-year fluctuations in data which are more or less stable year after year with respect to timing, direction and magnitude"[45]. For example, consider monthly data on retail sales. Every year, sales are likely to be higher in the months with a festival when people make more purchases. Thus, if the growth rate of sales in a festival month is calculated over the previous (regular) month, it is of limited use in terms of comparability with other month-on-month growth rates. It would be better to compare the growth rate of sales in a festival month over the corresponding month of the previous year (i.e., the annual growth rate).

Since our index-building exercise uses quarterly data, the indicators would also be subject to seasonality. Consider the case of the ratio-return on assets (that enters into the calculation of the FSI). We know that profits accrue through the year, and are likely to peak at the end of the period-i.e. in the month of December. For the quarter ending March of the next year, profits are likely to be low.  Given the capital size, it is to be expected that return on assets follow a similar trajectory. In other words, the indicator exhibits seasonality (see Figure 2).

When we say that data is de-seasonalised, the idea is to calculate a certain 'seasonality index' which measures the extent of seasonality in data. Subsequently the actual data is adjusted for this index. There are freely available software like Demetra+ that can be used to carry out this exercise. It can also be carried out in MS Excel. For simplicity, we have attached a template for deaseasonalising the data with this document. The data need only be fed into the designated cells to arrive at the seasonally adjusted series. See Appendix.1 to this document for more details. See Appendix.2 to see which variables in the index have been de-seasonalised.

**Figure 2: Seasonality in Data-Return on assets of the Banking Sector**



## 6.3.2 *Normalising the indicators*

Once the data is deseasonalised, each indicator needs to be normalized in order to allow comparison and aggregation. Normalisation can be of two types:

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[45] Foldesi, E., et al. (2007). <u>Seasonal Adjustment Methods and Practices</u>. Budapest, Hungarian Central Statistical Office.

a.  Statistical Normalisation- the value of the indicator in a particular period is subtracted from the average value of the indicator (averaging over all time periods) and then divided by the standard deviation.

Algebraically,

$$Z_t = \frac{X_t - \overline{X}}{S} \qquad (1)$$

where $X_t$ is the value of the indicator at time t

$\overline{X}$ is the average value of the indicator recorded during the given time period

S is the standard deviation of the indicator recorded during the given time period

$Z_t$ is the value of the normalised indicator. It lies between +3 and -3.

b.  Empirical Normalisation-the actual value of the variable at a given point in time is subtracted from the minimum value recorded by the variable over the relevant time period and divided by the difference between the maximum and minimum value recorded by the variable during the given time period.

Notationally,

$$I^n = \frac{I_t - \min(I)}{\max(I) - \min(I)}$$

*where* $I_t$ is the value of the indicator at time t

min (I) is the minimum value of the indicator recorded during the given time period

max(I) is the maximum value of the indicator recorded during the given time period

$I^n$ is the normalised value of the indicator.

Dependence on the maximum and minimum values makes the normalization dependent on extreme values. Moreover, since **the statistical normalization** gives a more visually clear result, we use that form of normalization in the index for financial stability.

**Another detail to note when normalizing the variables is the direction in which the indicators move when financial market situations change**. We want our aggregate index and the sub-indices to move in such a manner that a positive and increasing value of index reflects an improvement in financial sector performance. Similarly, a negative and decreasing value should reflect deterioration in financial market performance. In terms of the formula for statistical normalization given in (1), the normalised indicator will take a positive value if at a given point in time, the raw variable took a value higher than average. The normalized indicator will take a negative value if the raw variable took a value lower than the average.

This is fine if the indicator is such that a high value of the raw variable is desirable for the financial sector. For instance, higher capital adequacy as measured by the ratio of capital to risk weighted assets (total RBC ratio) is better for the financial institution's health. For this indicator, the normalized value of the indicator will be positive if the RBC ratio at a point in time is higher than average, a desirable occurrence for the financial sector. In contrast, a high raw value of the NPL to total loans ratio indicates poorer performance of financial institutions. Using (1) directly would mean that the normalized indicator would be positive/ increase when the ratio of NPL/total loans increases. This is contrary to how we want our index to behave. Hence the normalization should be done to ensure that an increase in the NPL/ total loans ratio leads to a *decrease* in the normalized value of the indicator. This will be true as long as long as the formula in (1) is multiplied by negative 1. In this case, if at a point in time the ratio of NPL/ total loans is higher than average (i.e., the financial sector performs worse) the

normalized value of the indicator will be negative. Similarly if the NPL/total loans ratio is lower than average (i.e., the financial sector fares relatively better), the value will be positive.

In sum, the normalization is done so that better performance of the financial sector (as measured by the various indicators) translates into a positive/ increasing value of the normalized variable. The reverse is true if the financial sector performs poorly. See Appendix.2 to see how different indicators have been normalized.

### 6.3.3 Aggregating the indicators into the respective sub-index

Following international best practices[44] we give equal weights to all indicators for calculation of each sub-index.

Algebraically,

$$S_{it} = \frac{\sum_{j} Z_{tj}}{n_i}$$

*where* i=$\{FSI, RECI, FVI\}$

$j$ denotes the variable entering into the calculation for sub-index i

$Z_{tj}$ is the normalised value of variable j calculated at time t.

$n_i$ is the number of variables used in calculating sub-index i.

$S_{it}$ is the value of sub-index i at time t.

### 6.3.4 Aggregating the sub-indices into an aggregate index of financial stability

Finally the three sub-indices are combined into an aggregate index by calculating a weighted average. The weights are assigned on the basis of international practice and the relative importance of the FSI in explaining financial market performance [46]. A weight of 0.6 is given to FSI and a weight of 0.4 to RECI and FVI combined.

$$AFSI = (0.6 \times FSI) + 0.4 \times (\text{RECI} + \text{FVI})$$

## 6.4 Components of the Early Warning Index for Maldives

As discussed in Section 6.3 above, there are three sub-indices in the calculation of the Aggregate index of Financial Stability (AFSI). In this section, we discuss each sub-index in detail. This involves discussing the indicators that comprise each index, showing the result of the index-building exercise carried out using the steps outlined in Section 6.3, and analyzing the performance of each sub-index. Finally, we also discuss the output of the AFSI. Note that for the entire analysis we use the quarterly data between June 2007 and December 2013.

### 6.4.1 Financial Soundness Index (FSI)

Soundness is defined as the 'the ability to withstand force or stress without being distorted, dislodged, or damaged'. For the financial sector this resilience to shock could be measured through data reflecting its health. If the financial sector health as measured by capital adequacy, profitability etc., is precarious, it is more

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[46] Cheang, N. and I. Choy (2011). "Aggregate Financial Stability Index for an Early Warning System." <u>Macao Monetary Research Bulletin</u> **21**: 27-54; Nayn, M. Z. and M. S. Siddiqui "Measuring Financial Stability: The Composition of an Aggregate Financial Stability Index for Bangladesh." <u>Bangladesh Bank Research Paper</u>.

vulnerable to risks. Table 18 below discusses the indicators entering the calculation of the Financial Soundness Index. As mentioned above, these largely correspond to the IMF indicators for measuring financial soundness. As noted earlier, the normalization ensures that the indicator performs better than average if its value is above zero and worse than average if its value is negative. As a result, for the overall FSI, higher the value better is the health of the economy's financial sector. In the Column on 'interpretation' in Table 18, the impact of the direction of the raw indicator for the financial sector performance is given. Note that the FSI uses only bank data.

**Table 18: Indicators and Interpretation for FSI**

| S.no | Indicator | Interpretation |
|------|-----------|----------------|
| 1 | Total Risk Based Capital (RBC) ratio | A higher RBC ratio implies that the financial sector is better equipped to absorb losses. This implies better health of the financial institution concerned. |
| 2 | NPL to total loans | Higher is the ratio, worse is the performance of the financial sector in terms of asset quality. |
| 3 | Liquid assets to total assets | Higher the ratio, higher is the likelihood of the financial sector being able to pay back its deposits in case the rate of withdrawal increases. Hence, better is the performance of the financial sector. |
| 4 | Loan to deposit ratio | A higher ratio implies a weaker performance for the financial sector. This is because a higher ratio means that loans are being financed through less stable sources. That is, an increase in loans without a concurrent widening in deposits (reflecting financial expansion) could be indicative of over-lending. Decline in deposits (and thus increase in the ratio) could also imply lack of confidence in the institution's solvency. |
| 5 | Return on assets | A higher ratio, by indicating higher profitability of the financial sector, implies better performance of the financial sector. |
| 6 | Interest margin to gross income ratio | A higher ratio implies greater profitability of the financial sector from its core business. Hence higher the ratio, more robust is the health of the financial sector. |

The calculated FSI for Maldives is represented in Figure 3. It is difficult to set a pre-specified threshold can be stipulated against which the performance of the indicator can be measured. Use of judgment on the part of the data analyst is imperative[47]. This is because Maldives has not experienced a banking crisis in the past-so it is difficult to conclude what would qualify as an 'appropriate threshold'. Yet for comparative purposes we make use of the two lines horizontal to the OX axis-marked as UL and LL in Figure 3. The upper bound (UL) was found by adding 0.5 times the standard deviation of the FSI to the average value of the index (i.e. zero) while the line LL was calculated by subtracting 0.5 times the standard deviation from the average. Values of the index lying below LL on a continuous basis may be a cause for action by the Central Bank.

Figure 3 shows that the FSI remains close to or below zero up to June 2012. It first turns negative for the quarter ending Sep-07 and deteriorates to go below the LL line between September-08 to June-09. For this period capital adequacy as reflected by the RBC ratio and liquid assets to total assets ratio is less than their respective averages for the entire period. The loan to deposit ratio at the same time is higher than average (that

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[47] Gokarn, S. (2013). Development of a Regional Surveillance Framework for the SAARC region, Asian Development Bank: 12.

is, it performs worse than usual). In the second half of 2009, capital adequacy increased on the back of the new prudential regulation on capital adequacy[48], though still remaining below the average recorded for the entire period under consideration. Capital adequacy performed better than average beginning Jun-10.This failed to positively affect the FSI however, as NPLs (as a proportion of total loans) started deteriorating from Dec-08 onward. Even though data on sector-wise NPLs is not available, it is likely that NPLs in the tourism sector were to blame for this. Note that tourism accounts for the highest proportion of loans to the private sector. Moreover, in 2009 Maldives experienced an economic contraction due to a slowdown in the tourism sector, in turn caused by the global financial crisis impairing the ability of people to spend on luxury travel. Higher NPLs and consequent provisioning adversely affected returns on asset as well.  Growth of NPLs slowed down in 2012 and the ratio of NPL to total loans fell by December 2013.  Simultaneously profitability as measured by ROA increased. This is reflected in the improved performance of the FSI after Jun-12.

 It should be noted that for the FSI, a higher value of the loan to deposit ratio is meant to signify adverse financial market performance. This is because if bank lending is not supported by deposits, then it implies that lenders are resorting to capital or borrowing to finance the same. Post Dec-10, this ratio has been lower than average implying a stronger financial system.

**Figure 3: Calculated FSI (June-07 to Dec-13)**
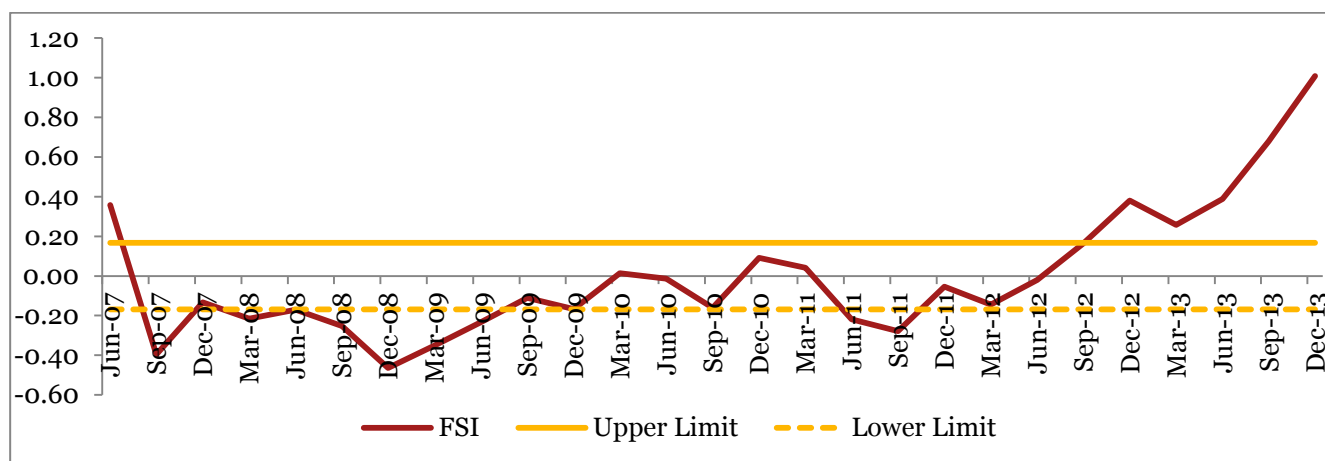


## 6.4.2 *Regional Economic Climate Index (RECI)*

The RECI is meant to provide a snapshot indicator of the performance of the important trade partners of the Maldives. It is itself a combination of two sub-parts-the RECI-Imports (RECII) and RECI-Exports (RECI-X). The indicators used in calculating it are given in Table 19 below.

**Table 19: Indicators and Interpretation for RECI**

| S.no | Indicator | Interpretation |
|------|-----------|----------------|
| **RECI-X** | | |
| 1 | Destination of Exports (merchandise and tourism):<br><br>Growth rate real GDP | A higher GDP growth rate of export partners would be better for the economic prospects of Maldives. This is because higher incomes in these countries would allow them to spend more on all goods, including merchandize imports and luxury items like travelling for leisure. Economic downturn in any of these countries would likely signify a cut back on luxury items and thus adversely impact the economy of |

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[48] (2010). Annual Economic Review 2009. Male, Maldives Monetary Authority**:** 63.

| | (year-on-year) | Maldives. |
|---|---|---|
| **RECII** | | |
| 2 | Source of Imports: Inflation rate as measured by the year on year growth rate in CPI. | Higher prices in the source countries would be likely to translate into adverse economic situation for the Maldives since it would now have to pay more for imports. Moreover, it would also mean higher domestic inflation. |
| 3 | Source of Imports: Exchange rate (measured as number of Rufiya per unit of foreign currency) | A depreciated Rufiya will translate into higher import prices for Maldives and thus add to domestic inflation. It may also reflect a worsening current account deficit[49]. |

The RECI-X is constructed to reflect the economic performance of the countries to which Maldives exports. This may be in the form of merchandise exports (fish, garments etc.) or service exports. The latter is mainly in the form of tourism exports. The sector directly contributed to roughly 28% of GDP on average between 2003 and 2012. The financial sector is also heavily dependent on the tourism sector. Between 2003 and 2012, 56.5% of the loan portfolio of banks was concentrated here. Additionally, credit classified as going to the construction sector is affected by the developments in the tourism sector since a lot of construction is resort-related. Hence, a downturn in the tourism sector may not only affect GDP, but also contribute to ballooning NPLs and to financial instability. The importance of the tourism sector means that Maldives is sharply affected by economic crises in other countries. Travel being a luxury item, faces rapid cuts in expenditure in adverse economic situations. Hence for an index trying to measure the risks faced by the financial system of Maldives, it is imperative to monitor the economic performance of the countries sending relatively large tourist contingents.

The RECI-X attempts to do that. To construct it, we took the following steps:

Step 1. Shortlisted the countries which serve as important export markets for Maldives and for which data on real GDP was available on a quarterly basis. These are Europe, Japan, India, Thailand, Sri Lanka, Malaysia and China. Together these contributed to 88% of expenditures on exports from Maldives (tourism and merchandise exports combined) between 2007 and 2012[50].

Step 2. Calculated the growth rate of real GDP for the afore-mentioned countries and normalized the indicators as explained in Section 6.3.

Step 3. Assigned weights to each export destination based on its contribution to Maldives' revenues.

a. Data for country wise revenues for merchandise exports was available. However, only the data for *overall* tourist expenditure was available for 2007 to 2012. We assumed that each country's expenditure in a particular year was proportional to its share in the total tourist arrivals in Maldives for

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[49] Economists call this the J-curve effect. When the currency of a country depreciates, its exports become cheaper. If they increase in response, the current account should improve. However it has been seen that exports respond with a lag. In the short term, prices of imports increase and the current account worsens.
[50] Note that data on country-wise contribution to tourism expenditure is not available. Total expenditure and country-wise tourist arrival data is available. We assumed that the arrivals are proportionate to spending by each country. Thus we got the year-wise break-up of tourism expenditure by country. To this we added the year wise and country wise expenditure on merchandise export. Hence we could calculate the share of a country in Maldives' export basket in a year, and the average share between 2007 and 2012.

that year. For example, if 20% of total tourist arrivals to the Maldives were from China, then 20% of total tourist expenditure in that year was assumed to be by Chinese tourists.

b.  Actual export revenues and estimated tourist expenditure were summed for each country, year-wise. The contribution of a country to the economy of Maldives in a year was calculated by dividing this number by the total (merchandise and tourism) revenues of Maldives in that year. The average share of a country in the export revenues of Maldives between 2007 and 2012 was taken as its importance to the economy of Maldives.

c.  The shares were adjusted to ensure that they summed to 1. The adjusted shares were used as weights. Table 20 shows the shares and weights for each of the countries included in the index.

Step 4. Calculated the weighted average of the normalized growth rate of each country's real GDP.

### Table 20: RECI-X-Countries and Weights

| Export Destination | Share of Exports (2007-12) | Weights |
|---|---|---|
| Europe | 0.64 | 0.72 |
| Japan | 0.05 | 0.05 |
| India | 0.03 | 0.03 |
| Thailand | 0.03 | 0.03 |
| Sri Lanka | 0.01 | 0.01 |
| Malaysia | 0.01 | 0.01 |
| China | 0.13 | 0.14 |
| Total | 0.88 | 1.00 |

RECI-I is constructed in a similar manner for countries that export to Maldives. For imports, the relevant indicators are exchange rate and inflation. A depreciated Rufiya against the currency of the import partner would mean higher import expenses for Maldives. Similarly higher domestic inflation in the source country of imports would mean higher import prices and higher domestic inflation in the Maldives. To calculate the RECI-I we took the following steps:

Step 1.  Shortlisted the main sources of Maldives' imports. These were Singapore, Japan, US, India, Sri Lanka, UK, Europe, Australia, Malaysia and Thailand. Together these countries contributed to 75% of Maldives' import basket between 2007 and 2012[51].

Step 2.  Normalized the inflation rate and the exchange rate (against the MVR) for these countries in the manner explained in Section 6.3.

Step 3.  Calculated the simple average of the normalized inflation rate and exchange rate for each country for each year.

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[51] UAE contributed to 14% of the imports during the same period. However data of quarterly frequency for the UAE could not be accessed. If this becomes available in the future, then it may be used.

Step 4.  Assigned weights to each country, where the weight to a particular country was proportionate to its share in the import basket of Maldives. The respective share of the country was adjusted to ensure that they sum to 1. The share in the import basket and the corresponding weight assigned to each country is given in

Step 5.  Table **21**.

Step 6.  Calculated the weighted average of the simple average of inflation and exchange rate (calculated in Step 3) by using the weights assigned.

**Table 21: RECI-I-Countries and Weights**

| Source of Imports | Share of Imports (2007-12) | Weights |
|---|---|---|
| US | 0.02 | 0.02 |
| Japan | 0.02 | 0.03 |
| Singapore | 0.24 | 0.33 |
| India | 0.11 | 0.14 |
| Sri Lanka | 0.10 | 0.13 |
| UK | 0.02 | 0.03 |
| Europe | 0.10 | 0.13 |
| Australia | 0.03 | 0.03 |
| Malaysia | 0.07 | 0.10 |
| Thailand | 0.04 | 0.06 |
| Total | 0.75 | 1.00 |

The combined RECI was arrived at by calculating a weighted average of the RECI-I and RECI-X. The weight given to RECI-I is equal to the share of imports in the sum of expenditure on imports, merchandise and tourism exports.

All three indices are illustrated in Figure 4 below. As before the line UL is arrived at by adding 0.5 times the standard deviation to the average value of the RECI while LL is arrived at by subtracting 0.5 times the standard deviation from the average value of the index recorded. Note that these are to be used for comparative purposes only-and not used as thresholds for benchmarking the performance of the index. The RECI-X deteriorates between Sep-08 and Dec-09. This is symptomatic of the global economic slowdown. Europe, Japan, Thailand and Malaysia experienced GDP contraction in some quarters of the period. This translated into the tourism sector GDP in Maldives contracting by 5.4% in 2009. Likewise, the overall real GDP fell by 3.6% in 2009. However, the RECI-I performs well during the same period. This means that the overall RECI, while still negative, performs relatively better. After Mar-11 the RECI-I also turns negative. Note that in Apr-11, the MMA moved to a system of horizontal exchange rate band system for the MVR. In effect, the Rufiya was allowed to fluctuate in a band of +/- 20% of the previously fixed exchange rate of 12.85 MVR per USD. Pressures on the country's gross international reserves led the exchange rate to settle at the upper end of the band, i.e., at MVR 15.41 per USD. This depreciation against the USD led the MVR to depreciate against other currencies as well.

 The RECI-X and the combined RECI both declined below zero in early 2012. This marks the slowdown in the European economy. The growth rates in China and India, though positive, fell below the average growth rates recorded by them in the current period. While the positive growth rates in China, and the increasing share of tourists sent by the country to the Maldives protected the latter from the kind of contraction seen in 2009, overall growth rate of GDP slowed down in 2012. Tourism GDP also registered small negative growth rates.

**Figure 4: Calculated RECI (Jun-07 to Dec-13)**
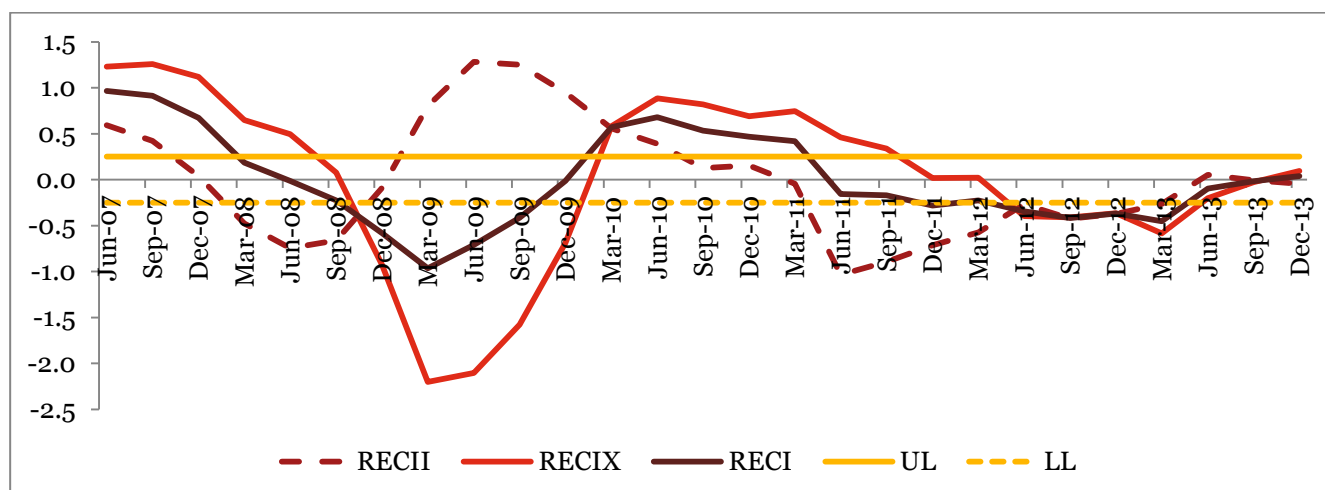


## 6.4.3 *Financial Vulnerability Index (FVI)*

As described above, the FVI aims to measure the risks to the financial sector emanating from the economy's external, financial and real sectors, respectively. Table 22 below provides the list of indicators included in the FVI for Maldives.

**Table 22: Indicators and Interpretation for FVI**

| S. no | Indicator | Interpretation |
|---|---|---|
| 1. | M2/ Total Forex reserves | This is a measure of reserve adequacy. It determines how far the Central Bank can ensure convertibility of its currency. Given M2, a lower ratio implies more reserves and thus lesser financial vulnerability. |
| 2. | Foreign currency assets to liabilities | A ratio close to 1 is seen as the ideal scenario-a mismatch between foreign currency assets and liabilities implies more vulnerability to foreign exchange risk. To deal with this issue, we find the difference between the raw data and 1, and then take its absolute value. A higher difference implies greater financial vulnerability. This is subsequently normalized through the method described in Section 2. |
| 3. | M2 multiplier calculated as the ratio of M2 to M0 (base money) | A very high ratio may indicate over-lending in the economy. This over-lending may have been on account of excessive risk taking and is likely to add to the stock of NPLs in the future. Hence, a higher ratio signifies more vulnerability of the financial sector to risk. |
| 4. | CPI inflation (variability) | High variability in inflation makes financial decisions more difficult. This is because uncertainty about inflation prevents investors from measuring the real returns from an investment. This translates into higher risk to financial stability. The variability in calculated by taking the absolute value of the quarter-on-quarter change in CPI inflation in Maldives. |
| 5. | Reserves to deposits/notes and coins to M2 | A higher ratio is better for financial stability. This means that the ratio in the numerator should be high and that in the denominator should be low. A higher denominator is better because higher the reserves, more is the confidence about the system's ability to repay deposits. As far as the denominator is concerned, a higher ratio of notes and coins to M2 implies more preference for cash and hence higher possibility of deposit |

| | | |
|---|---|---|
| | | withdrawal. |
| 6. | Year on year growth rates of tourist bed nights | This serves as a proxy for the performance of the overall real economy. This is because GDP data is not available on a quarterly frequency. Also as mentioned above, the tourism sector directly contributed to roughly 28% of GDP on average between 2003 and 2012. The construction sector is also closely linked to tourism since a lot of construction is resort-related.<br><br>Lower than average growth of bed nights are meant to indicate worsening performance of the real economy as a whole. This may not augur well for the financial sector in the future if falling incomes lead to loan defaults and increasing NPLs. This is especially true since as highlighted above a large proportion of loans go to the tourism sector. |
| 7. | Net claims on government to domestic claims | The numerator refers to the combined claims of the MMA and the other depository corporations on the Government. This is meant to serve as a proxy for the fiscal deficit of the government. If a large part of domestic claims (compared to the average for the period) goes to the government, then credit to the private sector may get crowded out. Moreover, if the Central Bank is printing more money to finance the deficit (monetization) then this may also add to inflation. |

**Figure 5: Calculated FVI (Jun-07 to Dec-13)**
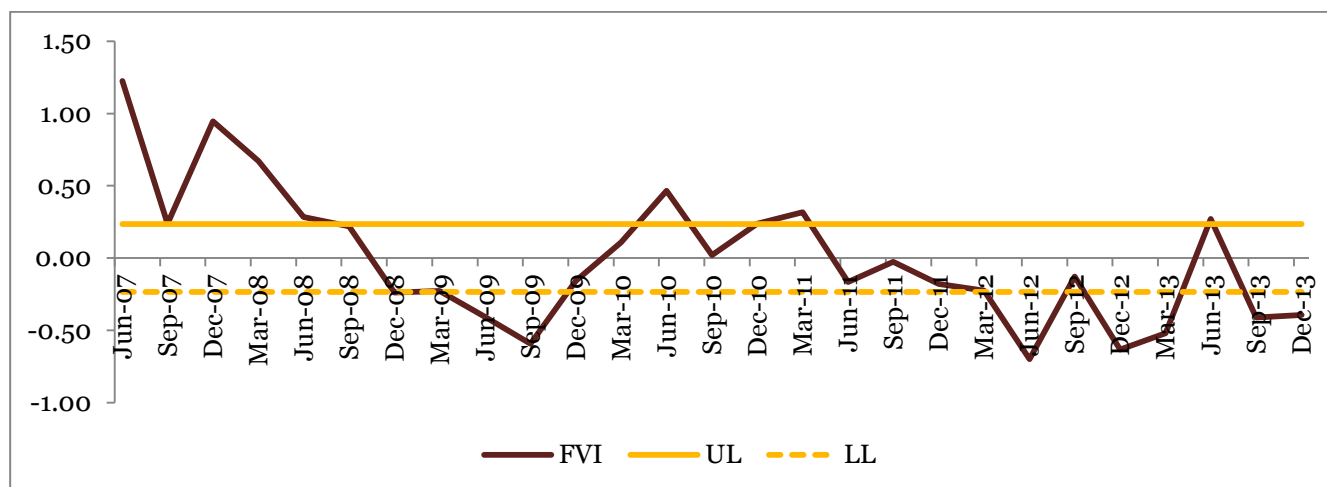


Figure 5 above represents the performance of the FVI over the given time period. For comparative purposes we make use of the two lines horizontal to the OX axis-marked as UL and LL in Figure 5. The upper bound (UL) was found by adding 0.5 times the standard deviation of the FVI to the average value of the index (i.e. zero) while the line LL was calculated by subtracting 0.5 times the standard deviation from the average. Values of the index lying below LL on a continuous basis may be a signal for potential risks to financial stability. There are two periods during which this happens. First is Dec-08 to Dec-09. This is the period when the tourism sector slowed down in response to the global financial crisis. A slow tourism sector also means that there are limited foreign exchange flows into the economy. This might lead to lower reserve adequacy than desirable. Indeed, between Jun-09 to Dec-09, M2/ Gross international reserves fared worse than average.

The second period of the dip in FVI is between Dec-11 to Mar-13. Note that this is the period when pressure of the gross international reserves led the MMA to move to a floating exchange rate regime within a fixed horizontal band. This is reflected by a worse than average performance of the M2/ reserves indicator. M2/M0 too performed worse than average in spite of a tight monetary policy stance by the MMA. 2012 saw the

European economies slowing down again and the impact of that was seen in terms of the performance of the tourism sector. Moreover, the sector was affected by advisories to tourists to desist from travelling to Maldives due to political uncertainties[52].

## 6.4.4 *Aggregate Financial Stability Index (AFSI)*

As explained in Section 6.3, the AFSI is calculated by taking the weighted average of the three indices. The FSI gets a weight of 0.6 while the sum of the RECI and the FVI gets a weight of 0.4. Figure 6 below represents the performance of AFSI in the given period. For comparative purposes we make use of the two lines horizontal to the OX axis-marked as UL and LL in Figure 6. The upper bound (UL) was found by adding 0.5 times the standard deviation of the AFSI to the average value of the index while the line LL was calculated by subtracting 0.5 times the standard deviation from the average. Values of the index lying below LL on a continuous basis may be indicative of financial instability. There are two notable periods of when the index turns negative and goes below LL. These are between Sep-08 to Dec-09 and the period between Jun-11 to Mar-13. Hence this is able to reflect the two periods of financial turbulence in the Maldives. One, during the immediate aftermath of the global financial crisis a shrinking tourism sector affected overall GDP, NPLs and profitability of the banking sector. The second period was concomitant with the currency depreciation of the MVR and the double dip recession in Europe that again adversely affected the Maldives economy.

**Figure 6: AFSI (Jun-07 to Dec-13)**
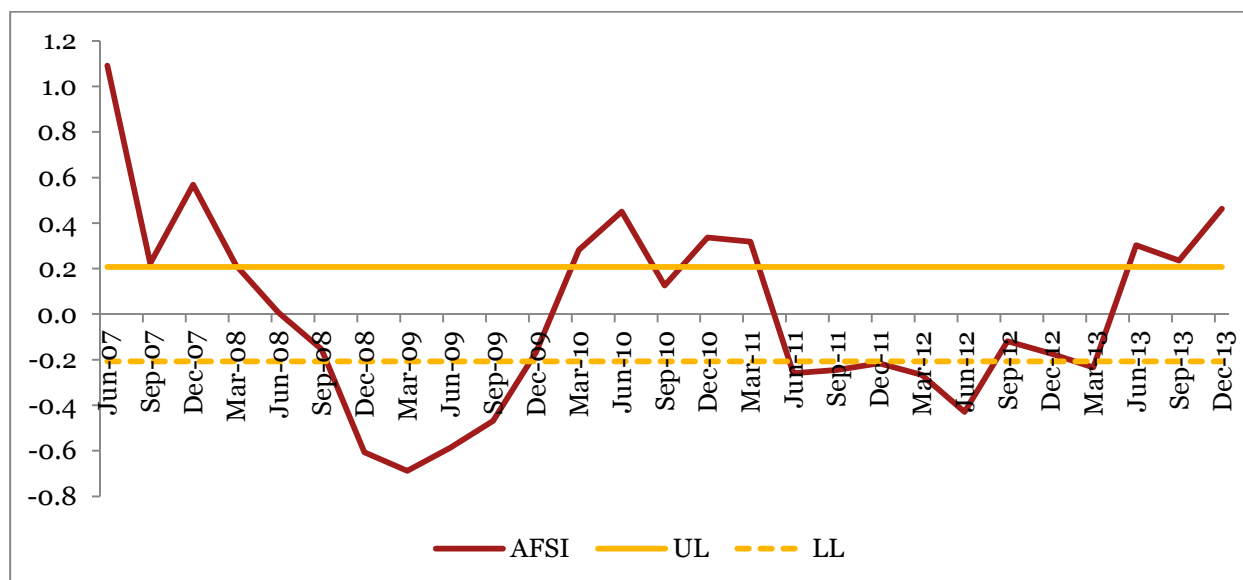


## 6.5 Summary and Conclusion

As we have seen above, the AFSI serves as a fair indicator of stress to the economy and the financial system. However, for it to serve as an effective early warning system, the data used in its calculation should be as recent as possible. The country authorities should ideally try to ensure that the data is available with a lag of a maximum of one month. This will strengthen the use of the Aggregate Financial Stability Index as an Early Warning System. Similarly if quarterly data is available on current account deficit, fiscal deficit, GDP etc., the current index may prove to function better.

To reiterate a point made earlier, no pre-specified threshold can be stipulated against which the performance of the indicator can be measured. Use of judgment on the part of the data analyst is imperative[53]. Hence, the

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[52] (2013). Annual Economic Review 2012. Male, Maldives Monetary Authority**:** 80.
[53] Gokarn, S. (2013). Development of a Regional Surveillance Framework for the SAARC region, Asian Development Bank**:** 12.

central bank will have to supplement the information forthcoming from the monitoring of this index with other relevant qualitative and supervisory information about economic and other developments.

# *Appendix.1        De-seasonalisation*

Theoretically, any time series is assumed to decompose into three components- trend, seasonal and irregular. This decomposition can be multiplicative or additive.

## *A.1        Multiplicative Decomposition*

If the original time series is assumed to be product of its components (seasonal*trend*irregular), multiplicative decomposition of the series needs to be carried out. Such a time series would be one where the difference between a seasonal peak and trough increases with time. Most series are decomposed using this methodology.

The steps to be followed in excel for the multiplicative decomposition are as below:

1    Calculate the Centred Moving Average of the original data series.

   a.    Calculate the four quarter moving average of the series.

   b.    Calculate the four-quarter moving average of the series by excluding the data for the first period

   c.    The Central Moving Average is the average of the moving averages calculated in Steps a. and b.

2    Divide the original data in each series by the corresponding period's Central Moving Average. Call this the 'Ratio'.

3    Calculate the average value of the Ratio for each quarter by taking a simple average of the ratios recorded. For example, the simple average of the ratios recorded in each quarter ending September for the years 2005 to 2013 is the average unadjusted seasonal factor for the quarter ending September.

4    Adjust the unadjusted factors to ensure that the sum of the seasonality factors for the four quarters is 4.

5    Divide the original data in a quarter by the adjusted seasonality factor for that calculated in Step 4. The resultant series is seasonally adjusted.

## *A.2        Additive Decomposition*

If the original time series is assumed to be a sum of its components (seasonal+trend+irregular), additive decomposition of the series is carried out for de-seasonalisation. Such a series is one for which the difference between the seasonal peaks and troughs remain constant through the length of the time period. Series with zero or negative values are decomposed using this method[54]

The steps to be followed in excel for the additive decomposition are as below:

1    Calculate the Centred Moving Average of the original data series.

   a.    Calculate the four quarter moving average of the series.

   b.    Calculate the four-quarter moving average of the series by excluding the data for the first period

   c.    The Centred Moving Average is the average of the moving averages calculated in Steps a. and b.

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[54] "Working Instructions for Beginning Seasonal Adjustment with Demetra+, United Nation Economic Commission for Europe, Economic Statistics section, February 2011.

2    Calculate the difference between the actual data and the Centred moving Average.

3    Calculate the unadjusted factor of seasonality for each quarter by taking the average of the difference found in Step 2 for the same quarter each year.

4    Adjust the seasonal factor of step 3 so that the sum of the seasonality factors for four quarters of a year is zero.

5    Subtract the seasonal factor of the quarter from each data point in the original series. The result is the seasonally adjusted series.

## *Appendix.2    List of Indicators Used*

**Table 23: List of indicators, construction and other details**

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/No) |
|---|---|---|---|---|
| Financial Soundness Index (all variables pertain to the banking sector in Maldives) | | | | |
| Total Risk Based Capital (RBC) ratio | Calculated as: $$\frac{\text{Tier1 capital+Tier 2 capital+Adjustments to Capital Base}}{\text{Risk weighted assets net of adjustments}}$$ | Increase | $Z_t$ | Yes |
| NPL to total loans | Calculated as: $$\frac{\text{Gross NPL}}{\text{Gross loans}}$$ Where Gross loans and Gross NPLs include specific provisions and interest-in-suspense. | Decrease | $-Z_t$ | Yes |
| Liquid assets to total assets | Calculated as: $$\frac{\text{Basic Liquidity}}{\text{Total Assets}}$$ Where Basic Liquidity is the sum of cash, balances at banks, balances at MMA, TBs and repos net of liquid assets kept as MRR. | Increase | $Z_t$ | Yes |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/No) |
|---|---|---|---|---|
| | Total assets are total balance-sheet assets. | | | |
| Loan to deposit ratio | Calculated as: $$\frac{\text{Ratio of total loans (FC and LC)}}{\text{Ratio of deposits (FC and LC)}}$$ LC and FC refer to local currency and foreign currency loans respectively. Loans refer to gross loans (i.e., inclusive of provisions kept against different loan categories). Deposits refer to the sum of all types of deposits kept with banks. | Decrease | $-Z_t$ | Yes |
| Return on assets | Calculated as: $$\frac{\text{Net Operating income}}{\text{Average assets}}$$ Where, Net operating income is after taxes before deducting extraordinary | Increase | $Z_t$ | Yes. |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/No) |
|---|---|---|---|---|
| | items,<br>Average assets the simple average of assets in the current quarter and assets in the previous quarter[55]. | | | |
| Interest margin to gross income ratio | Calculated as:<br><br>$$\frac{\text{Net interest income}}{\text{Gross Income}}$$<br><br>Where Net interest income is the difference between interest income and interest expenses<br><br>Gross income is the sum of net interest income and gross operating income. | Increase | $Z_t$ | Yes |
| Regional Economic Climate Index | | | | |

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[55] For the first quarter in the data series (Jun-07), data on assets in the previous quarter was unavailable. The denominator in that quarter was the assets in that quarter only.

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/ No) |
|---|---|---|---|---|
| Growth rate of real GDP for the trade partners of Maldives (RECI-X) | Calculated as: $$g_{q_t}^{y_i} = \frac{GDP_{q_t}^{y_i} - GDP_{q_{t-1}}^{y_{i-1}}}{GDP_{q_{t-1}}^{y_{i-1}}}$$ *where* $y_i$ denotes year i $q_t$ denotes quarter t $GDP_{q_t}^{y_i}$ is the GDP level in quarter t of year i $g_{q_t}^{y_i}$ is GDP growth rate in quarter t of year i. The measure of GDP taken differed for the respective country. Europe-GDP at market prices, millions of Euro (EU-28), base year 2005 Japan-GDP at market prices, billions of Yen, base year 2005 India-GDP at market prices, billions of Rupees, base year 2004-05 Thailand-GDP at market prices, millions of baht, base year 1998 Sri Lanka-GDP at factor cost, Rs.million, base year 2002 Malaysia-GDP at producer's prices, RM million, base year 2005 China-growth rate of GDP at factor cost (data for growth rate used directly). | Increase | $Z_t$ | No |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/ No) |
|---|---|---|---|---|
| Inflation in countries from which Maldives sources its imports (RECI-I) | $$\pi_{q_t}^{y_i} = \frac{CPI_{q_t}^{y_i} - CPI_{q_{t-1}}^{y_{i-1}}}{CPI_{q_{t-1}}^{y_{i-1}}}$$ *where* $y_i$ denotes year i<br><br>$q_t$ denotes quarter t<br><br>$CPI_{q_t}^{y_i}$ is the average of monthly price index in quarter t of year i<br><br>$\pi_{q_t}^{y_i}$ is inflation rate in quarter t of year i.<br><br>The measure of price index taken differs by country.<br><br>Euro (18)- Harmonised index of consumer prices (HICP)<br><br>UK-HICP<br><br>USA-HICP<br><br>Sri Lanka-Colombo CPI<br><br>Japan, Thailand, Australia and Malaysia-Consumer Price Index (CPI)<br><br>Singapore-Index of core inflation<br><br>India-Wholesale Price Index (WPI). | Decrease | -$Z_t$ | No |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/ No) |
|---|---|---|---|---|
| Exchange rate of the MVR against foreign currency | Expressed as the number of Rufiya per unit of foreign currency taken as the mid-rate prevailing at the end of the quarter. For currencies for which the direct exchange rate against the MVR was unavailable, the exchange rate against the USD was converted into MVR terms. | Decrease | $-Z_t$ | No. Tests showed that seasonality was absent from exchange rate data for a number of currencies. Hence no exchange rates series have been de-seasonalised. |
| Financial Vulnerability Index | | | | |
| $M_2$/ Total Forex reserves | Where $M_2$ is the sum of $M_1$ and Quasi Money. $M_1$ is the sum of currency in circulation outside of banks and demand deposits (savings and current deposits) Quasi money is the sum of time deposits and foreign currency deposits. Forex reserves refer to the sum of Convertible currency and Rupee reserves expressed in USD million. This is a gross measure of reserves. | Decrease | $-Z_t$ | Yes |
| Foreign currency assets | Foreign currency assets refer to the sum of Rupee assets and 'other assets' of deposit money banks. | Decrease | $-Z_t$ | Yes |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/No) |
|---|---|---|---|---|
| to liabilities | Foreign currency liabilities refer to the sum of foreign liabilities and foreign currency deposits.<br><br>This ratio is then further manipulated as explained in the main text. | | | |
| M2 multiplier calculated as | Calculated as:<br><br>$$\frac{M_2}{M_0}$$<br><br>Where<br><br>$M_2$ is the sum of $M_1$ and Quasi Money.<br>$M_1$ is the sum of currency in circulation outside of banks and demand deposits (savings and current deposits)<br>Quasi money is the sum of time deposits and foreign currency deposits.<br><br>$M_0$ is base money that is the sum of currency outside banks and bank reserves with the MMA. | Decrease | $-Z_t$ | Yes |
| CPI inflation (variability) | Variability in CPI inflation for quarter i is calculated as: | Decrease | $-Z_t$ | Yes |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/No) |
|---|---|---|---|---|
| | $$Var_{q_i} = \left| cpi_{q_i} - cpi_{q_{i-1}} \right|$$ *where $cpi_{q_i}$ is* the annual CPI inflation rate recorded in quarter i. *Inflation* rate in quarter i is the average of the monthly indices recorded in the months comprising the quarter. | | | |
| Reserves to deposits/notes and coins to M2 | $$\frac{Reserves / Deposits}{Notes \ \& \ Coins / M_2}$$ Where Reserves refer to balances of banks with the MMA Deposits refer to all deposits net of those kept by other commercial banks Notes and Coins is currency outside of banks $M_2$ is the sum of $M_1$ and Quasi Money. $M_1$ is the sum of currency in circulation outside of banks and demand deposits (savings and current deposits) Quasi money is the sum of time deposits and foreign currency deposits. | Increase | $Z_t$ | No |

| Indicators | Variable Construction | Movement in which direction (increase or decrease) is better for financial stability? | Normalisation Method ($Z_t$ or $-Z_t$) | Seasonally Adj. (Yes/ No) |
|---|---|---|---|---|
| Growth rate of tourist bed-nights | Calculated as the year-on-year growth rate of tourist bed-nights recorded in a quarter. | Increase | $Z_t$ | Yes |
| Net claims on government to domestic claims | $$\frac{\text{Net claims on govt.}}{\text{Total domestic claims}}$$ Where net claims on govt. is the difference between claims on the central govt. less liabilities to the central govt by the MMA and other depository corporations. | Decrease | $-Z_t$ | Yes |

# Annexure.2   Liquidity management plan and strategy (Output-2)

# 7 Discussion Paper on Liquidity Management in the Maldives

## 7.1 Liquidity Management and Forecasting

There is a strong linkage between central bank liquidity and financial stability. While liquidity shortage does not pose a bigger challenge, a surplus liquidity scenario can generate friction in the financial market and may push towards financial instability. In the following sections, we will briefly discuss about both the scenario – liquidity surplus and deficit before analyzing current liquidity management practice of Maldives Monetary Authority (MMA).

Liquidity is defined in various ways – some considers broad money as a measure of liquidity, while others focus on narrow money or High Powered Money ($M_o$). For the purpose of present discussion – we consider the reserves of depository institutions plus currency in circulation (i.e., High powered money/base money) – a subset of central bank liability as the measure of liquidity (*see,* Gray, 2008). Then the next question is – how 'liquidity' deficit/surplus impinges upon financial stability. It is argued that – shortage of liquidity does not pose a systemic risk as central bank can always intervene and provide requisite liquidity. Before the payment mechanism collapse in the event of shortfall of liquidity, the central bank through its standing facilities (or through OMO) will provide the necessary liquidity or the commercial bank will resort to borrowing the same at a higher rate from the inter-bank market. Normally banks keep sufficient reserves to clear the payment obligations. In the event of short-fall to meet the reserve requirements, commercial banks can access standing facilities or get the necessary fund from the inter-bank market. In the extreme case, the central bank may expand its balance sheet through quantitative easing to infuse the necessary liquidity. *The major challenge from 'financial stability' perspective is persistent 'surplus' liquidity' in the financial system.* While the definition of 'financial stability' in itself is quite contentious and there is no 'single' indicator approach to measure it, in common parlance it is the smooth functioning of financial market meeting the requirement of real economy. What might happen when the system is in *'surplus liquidity'* mode?

Surplus liquidity is a scenario when the depository institutions hold 'excess reserves' much above the required reserves plus precautionary/transaction purposes. It has three broad implications on – transmission mechanism of monetary policy, conduct of central bank intervention in the money market and the balance sheet of central bank (Gray, 2008). From financial stability perspectives, as argued by Gray (2008), short-term interest rate will fall in the presence of excess liquidity – close to zero sometimes. Banks in their pursuit to generate greater yield may make riskier lending which can affect the financial stability in the medium term. Also, since the cost of borrowing is low, it may lead the economy towards overheating due to excessive investments with high inflationary pressure. In the eventuality when commercial bank stops accepting domestic deposits due to low interest rate, it will have bearing on financial intermediation function of the bank. Given the propensity to save, it may lead to increasing consumption demand and further inflationary pressure on the economy. Also, the excess supply of reserves may put downward pressure on the domestic currency and in consequence may drive price levels up due to depreciation of domestic currency.[56] It is observed that persistent

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[56] Persistent surplus liquidity has also negative consequential impact on overall economy. For example – As Ms ↑, interest rate falls. It may give boost to investment and consumption expenditure which will

surplus liquidity may make the monetary policy operation ineffective as commercial banks may be less inclined to participate in the monetary policy operations. ***To sum up – excessive structural liquidity can impact the real and financial sector and can pose risk for financial stability.***

Maldives's economy is relatively smaller in size (i.e., $ 2.1 billion in 2012). Being an island country, the opportunity for domestic investment is constrained. In such scenario, the persistent surplus liquidity can adversely impact price level, currency and BoP if it is not addressed. During the inception presentation, MMA confirmed that the MVR liquidity has been in surplus mode, while there is a foreign currency liquidity issue. The team will further examine it to understand the underlying causes.

Maldives Monetary Authority is well aware of this and has a necessary 'absorption' mechanism. The first task for any central bank is to forecast the liquidity and then strategise its monetary policy operation to bring the supply under control and transmit its stance to the market. In the following sections, we will review the drivers of liquidity in Maldives post which we will discuss its monetary policy operations and subsequently analyze its liquidity forecasting method.

## 7.1.1 *Drivers of Liquidity from MMA Balance Sheet*

A stylised balance sheet of Maldives Monetary Authority (MMA) is shown in Table 24. The objective of showing this table is to highlight the major drivers of liquidity in general and factors influencing liquidity in case of Maldives.

**Table 24: Balance Sheet of Maldives Monetary Authority, 2012 (In million Rufiya)**

| | Assets | Amount | | Liabilities | Amount |
|---|---|---|---|---|---|
| 1A | Foreign Assets [Currency and Deposits, Reserve position in the fund, Holding of SDRs, other foreign assets] | 4689.5 (-9.3) | 1L | Currency in Circulation | 2475.5 (12.7%) |
| 2A | Claims on Government [Securities other than shares, advances and other claims | 5,005.9 (27.7%) | 2L | Claims to Central Government | 320.4 (-18.4%) |
| 3A | Claims on Other Depository Corporations | 0.00 | 3L | Claims to Other Depository Corporations | 5705.7 (7.8%) |
| 4A | Claims on Other Sectors [Other financial corporations, Public non-financial corporations, private sector] | 6.9 (47.5%) | 4L | Claims to Other Sectors [Public non-financial corporations, Other financial institutions, Private sector] | 10.6 (-84.9%) |
| 5A | Other Assets | 189.5 | 5L | Liabilities to Depository | 197.4 |

drive up the price level. Rising inflation will reduce export competitiveness and this may worsen the current account deficit. In the financial account side, as interest rate drops, there may be portfolio re-allocation and in the pursuit of better interest rate, capital may flow out of the country. If the outflow exceeds the inflow, then Financial Account will go into deficit. The negative current account and financial account will adversely affect the overall Balance of Payment Account.

| | Assets | Amount | | Liabilities | Amount |
|---|---|---|---|---|---|
| | | (19.7%) | | Institutions | (131.2%) |
| 6A | Non-financial Assets | 308.1 (3.2%) | 6L | Foreign Liabilities [includes SDR allocation] | 448.5 (1%) |
| A | Total Assets | 10199.9 | 7L | Other Liabilities | 413.2 (31%) |
| | | | 8L | Shares and other Equity | 628.6 (-16.4%) |
| | | | L | Total Liabilities | 10,199.9 |

*Note: a) 'Claims' represent all claims including loans and advances to and holding of securities, shares and other equity issued by the respective sector; b) 'Liabilities' represent all liabilities issued by ODCs to the respective sector; c) Figures in parenthesis shows percentage change from the previous year.*
*Source: MMA Monthly Statistics, Nov- 2013*

The main autonomous factors driving liquidity are: net foreign assets, net lending to government, currency in circulation plus changes in other items. By definition, central bank has very limited role to play in determining the supply of these reserves. It can only neutralise the effect through its monetary policy operations.

In Maldives, '**Net Foreign Asset'** is the dominant component of balance-sheet in 2012. It constituted nearly 42% of total assets. In case of a 'fixed exchange rate regime with a managed float', the central bank intervenes to maintain the exchange rate target. Maldives has moved from a conventional peg to a pegged exchange rate with a horizontal band on April 11, 2011. The govt. decided to allow the currency to fluctuate within a band of 20% from the previous selling rate of Rf12.85 suggesting the present range between Rf10.28 to Rf15.42. It makes the role of MMA critical in terms of maintaining the parity within the specified band. When there is upward pressure on the domestic currency, MMA intervenes to acquire foreign assets in exchange for local currency, resulting in an increase in the monetary base. However, in countries with freely floating exchange rate, the central bank need not intervene and changes in net foreign assets are simply due to changes in the valuation, either gains or losses on the value of the foreign assets.

'**Net lending to government'** represents the net amount of the government securities (other than shares), advances and other claims on the government. This arises due to the changes in the government's consolidated fiscal account (inflows minus the outflows) held at MMA. In the case when the government's expenditure has persistently exceeded its revenue, the government is in a situation of budget deficit and the consolidated account will move into a deficit. If govt. fails to raise the amount through market borrowing (loans or through issuance of government securities), then central bank may be asked to provide the support though it is prohibited in several parts of the world. In this process, central bank injects liquidity to the market thereby expanding the supply of reserves. In 2012, approximately 46% of total asset was constituted by net lending to government. The sum of net foreign assets and net lending to government was 88% of total asset.

From the liabilities side of the central bank balance sheet, the domestic '**currency in circulation'** is an autonomous factor in supply of reserves. With an increase in outstanding note issue by the central bank, the commercial banks' reserve account with the central bank is debited. Thus, an increase in the note issue reduces the central bank reserves hence the liquidity. For example before weekends, or holidays the commercial banks will supply increasing quantities of notes to the public thereby reducing the supply of reserves. As noted, in Maldives, seasonal factors as well as payrolls, weekends and holidays (Alha Eid, Fithr Eid etc.) affect the currency in circulation. Currency in circulation is one of

the volatile components in the balance sheet of MMA. The net of other items includes the central bank's capital and reserves. As observed, this component is generally less volatile as compared to the other autonomous components of liquidity.

## 7.1.2 *Detailed Assessment of Liquidity Scenario in Maldives*

In order to understand the structural factors that drive liquidity over a period of time, we have studied their trend over a decade (2003 to 2012). Table 25 shows the value in million Rufiya with 12 month percentage change in the parenthesis. While the first three components directly contribute to the supply of Autonomous reserves, the contribution of 'currency in circulation' can only be taken in change – a positive change means less supply of reserves and vice-versa. The first two major components in supply of Autonomous reserves are – net foreign assets and net claims on government.

**Table 25: Autonomous components of supply of reserves in Maldives (Rf. Million)\***

| Year | Net foreign assets | Net claims on govt. | Net other assets | Currency in circulation |
|------|--------------------|--------------------|-----------------|--------------------------|
| **2003** | 2035.3 (20.7%) | 1063.5 (-20.3%) | -135.0 (22.0%) | 677.2 (8.5%) |
| **2004** | 2599.6 (27.7%) | 836.1 (-21.4%) | -203.2 (50.6%) | 828.0 (22.3%) |
| **2005** | 2304.2 (-11%) | 1280.0 (53%) | -272.2 (34%) | 947.2 (14%) |
| **2006** | 2814.0 (22.1%) | 967.0 (-24.5%) | -74.2 (-72.7%) | 1160.7 (22.5%) |
| **2007** | 3857.1 (37%) | 906.1 (-6%) | -267.6 (261%) | 1322.3 (14%) |
| **2008** | 3022.0 (-21.6%) | 2640.6 (191.4%) | -196.0 (-26.8%) | 1762.2 (33.3%) |
| **2009** | 3071.7 (1.6%) | 3419.2 (29.5%) | -117.8 (-39.9%) | 1799.7 (2.1%) |
| **2010** | 4067.6 (32.4%) | 2725.0 (-20.3%) | -146.0 (23.9%) | 1871.1 (4.0%) |
| **2011** | 4725.5 (16.2%) | 3527.4 (29.4%) | -157.1 (7.6%) | 2196.7 (17.4%) |
| **2012** | 4241.1 (-10.3%) | 4685.5 (32.8%) | -223.7 (42.4%) | 2475.5 (12.7%) |

*\*Net foreign assets and net claims on government are major contributors to Autonomous Supply of Reserves (ASR). Net other assets have miniscule contribution hence erratic fluctuations do not have a significant bearing on the overall supply of reserves in Maldives. Source: MMA Monthly Statistics, Nov- 2013*

**Net foreign assets** increased from Rf. 2035.3 million in 2003 to Rf. 4241.1 million in 2012 which represents an average annual growth rate of 11.5%. There are at least 5 times in the last one decade when NFA grew at more than 20% rate. NFA series shows high fluctuations and it can be expected that the forecasting of this component to be challenging.

**Figure 7: Growth of Net Foreign Assets (%)**

Source: MMA Monthly Statistics, Nov- 2013
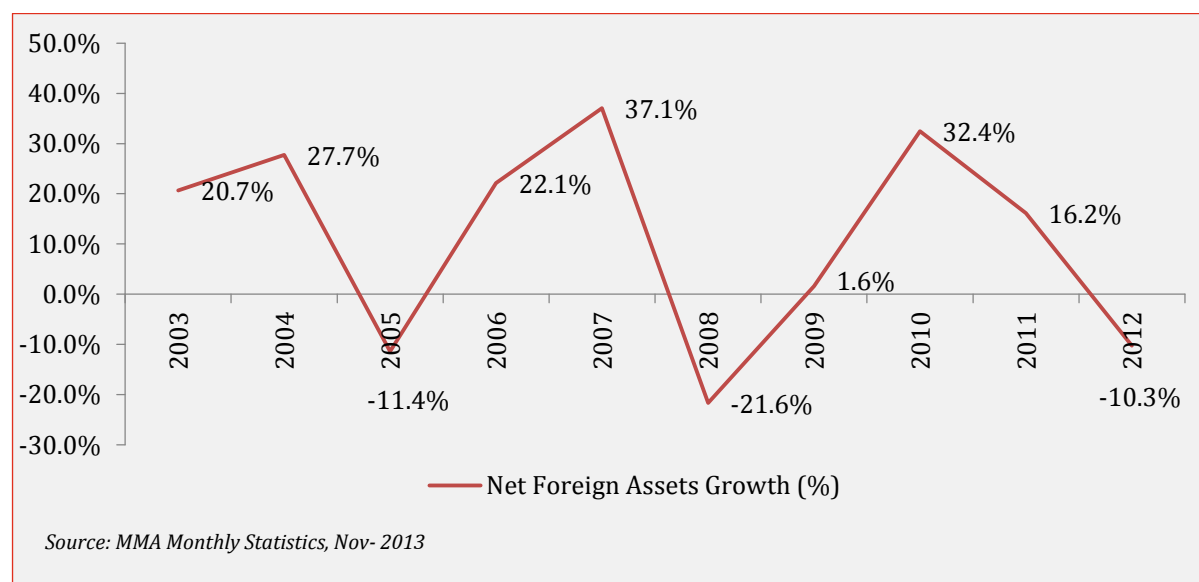
An increase in NFAs reflects an increase in the foreign assets of central bank as compared to its foreign liabilities. In the foreign assets side of the central bank, the gross reserves of the central bank increased from Rf. 2041.5 million to Rf. 5656.0 million which was due to high growth in central bank's foreign currency and deposits (increased from Rf. 2006.2 in 2003 to Rf. 4470.2 million).

As we understand, in Maldives, the Government and State Owned Enterprises (SOE) are the main supplier of foreign exchange to MMA. Government agencies accumulate foreign exchange reserves through trade in merchandise, services, aid/grant from donor agencies, taxes. Presumably, this is one of the reasons why MMA takes the forecast provided by MIRA though we have not seen the projections methodology of MIRA. The annual forecast of MIRA is then broken down into weekly and certain adjustment is done at MMA on the basis of additional information such as due dates on receipts and payments. The historical data helps in capturing certain trend though one could expect high volatility given the nature of service industry.

It is to be noted that – this autonomous side of reserve supply is highly volatile and difficult to do an accurate projections. For example – the growth in NFA was 1.6% in 2009 which increased to 32.4% in 2010 and fallen by 10.3% in 2010. Since NFA contributes close to 50% of autonomous reserves, such erratic fluctuations poses greater risk for monetary management. Moreover, while it is less difficult to project the annual NFA, it is far more challenging and tricky to break-it down to weekly and daily basis. The Central bank can do a little about this component of autonomous supply factors. If it leaves it to the free will of the market, it will be difficult to maintain the peg band. Therefore, MMA conducts OMO's (Forex Swap facility) to manage the short-term liquidity.[57]

We have observed that 'Other Depository Corporations (ODCs)' have large forex transactions in their balance sheet. The Forex liabilities which was Rf. 384.2 million in 2002 has increased to Rf. 5,499 million in 2008 before moderating to Rf. 1,667 million in 2012. The ratio of gross forex liabilities of depository corporations to total liabilities was more than 45% on an average basis in the last one decade (2002-2012). In the assets side, Forex assets has increased from Rf. 399 million in 2002 to Rf. 2,684 million in 2012. Figure 8 shows the extent of dollarization (DR1) in Maldives – measured in

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[57] However, following the initial invitation, no further auctions were announced by the MMA, due to low demand for the facility (principally owing to its shorter maturity) (Source: MMA Annual Report,2011).

terms of foreign currency deposits (MMA+Commercial Bank excluding government) in percent of broad money. The average approximate dollarization over the past decade is 49%.

**Figure 8: Dollarization in Maldives: 2002 to 2012**



Source: MMA Monthly Statistics, Nov-2013
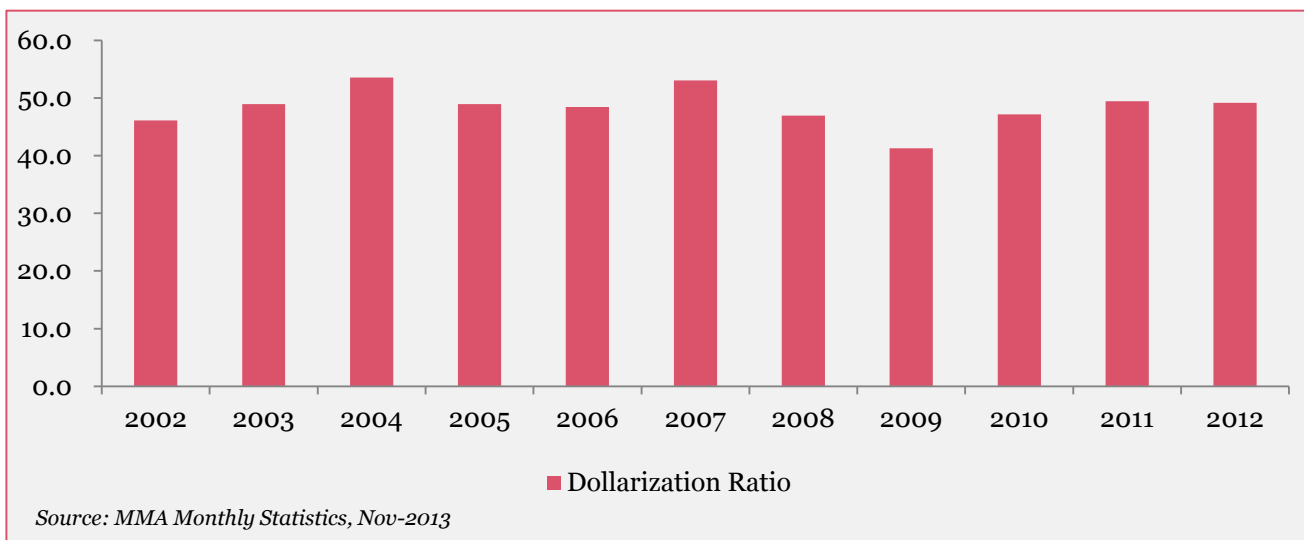
As shown in Figure 8, it has gone beyond 50% in several of the months of 2013.

**Figure 9: Dollarisation in the Maldives, monthly**



Source: MMA Monthly Statistics, Nov-2013
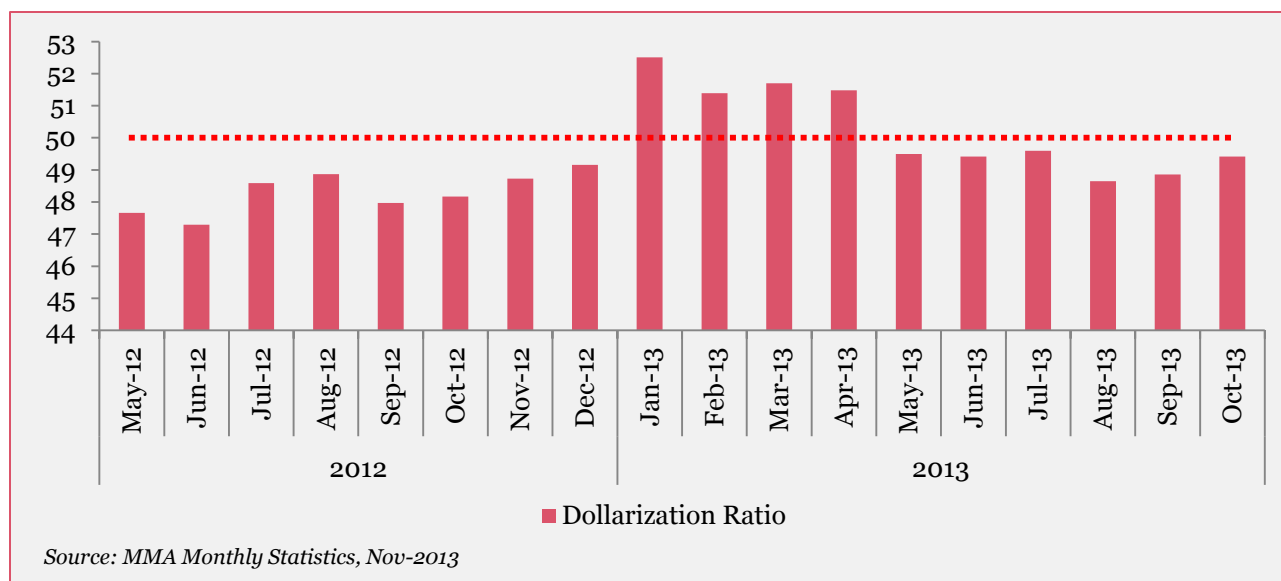
The implication of this dollarized economy is that – unless the central bank sterilises the dollar flow, the money supply in the economy will increase with inflationary consequences. As MMA observes (Pg. 3, MMA Annual Report, 2011) "Broad money recorded an annual growth of 20 per cent in 2011, owing to the increase in net foreign assets (NFA) of the banking system". Since NFA is an autonomous component in the supply side of reserves and MMA has a little control over its inflows, it has to actively manage it (i.e., excess reserve management) for the sake of price stability (i.e., ultimate objective) and exchange rate peg (i.e., intermediate goal). It is often argued that – whatever dollar comes into Maldives goes out – hence it has no long-term impact on Money Supply. While this benign argument seems logical but from the Central Bank perspective, the short-term management of liquidity is quite important. MMA has introduced a Forex Swap facility to undertake this short-term operation though participation was limited due to very short-term nature of the instrument.

We have understood from our interaction with ODCs that they do not provide unlimited convertibility of Rufiya to foreign currency. However, given the nature of island economy with dependency on import plus repartition of wages, salaries and dividends in foreign currency, the Rufiya is traded at a discount rate in the market. This undervalued currency leads to further imported inflation. Inflation may feed into wage expectations and this inflation-wage spiral in the factor market can put additional pressure on currency.

'Net claims on government' has increased from Rf. 1063.5 million in 2003 to Rf. 4685.5 million in 2012, which represents an average annual growth rate of 24.4%. The year 2011 and 2012 witnessed a sharp rise in net claims on government by 29.4% and 32.8% respectively. Such fiscal accommodation to the central government pumps enormous liquidity into the market. As shown in Figure 10, post 2007, the net claims of central bank to government as a percentage of GDP has increased consistently except a mild moderation in 2010. This highlights the fact that such accommodation may pose serious challenge both from monetary as well as fiscal management side. In the face of low nominal GDP growth, expanding government expenditure via increasing the balance sheet of the central bank may endanger the financial stability. As of November 2012, the net claim of central bank on government is approximately Rf. 6 billion.

**Figure 10: Net claims of Central Bank on Government (as % of Nominal GDP)**



*Source: MMA Monthly Statistics, Nov-2013*
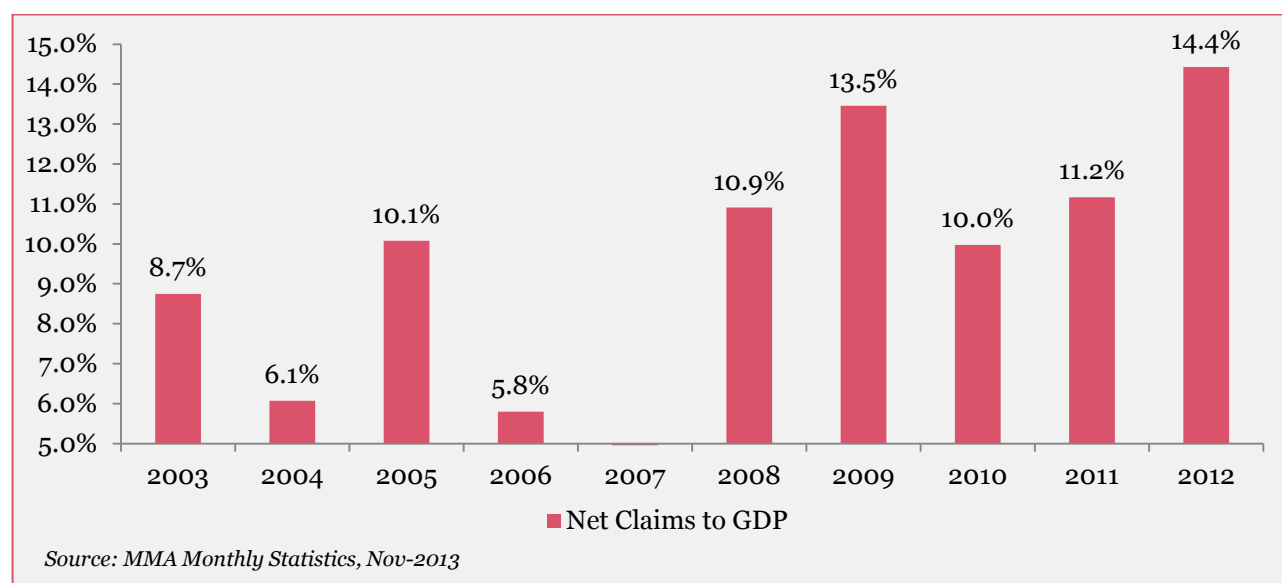
Yearly financial support to Central Government (reflected by change in gross claims on Central Government) has gone up in the last decade. In 2002, MMA's gross claims to Central Government was Rf. 1.72 billion which increased to Rf. 6.3 billion as on October 2013. Figure 11 shows yearly additional support to central government. On an average in the last decade, Central Bank supported Rf. 418 million (yearly) to Central Government.

**Figure 11: Yearly MMA Support to Central Government (In Rf. Million)**



*Source: MMA Monthly Statistics, Nov-2013*
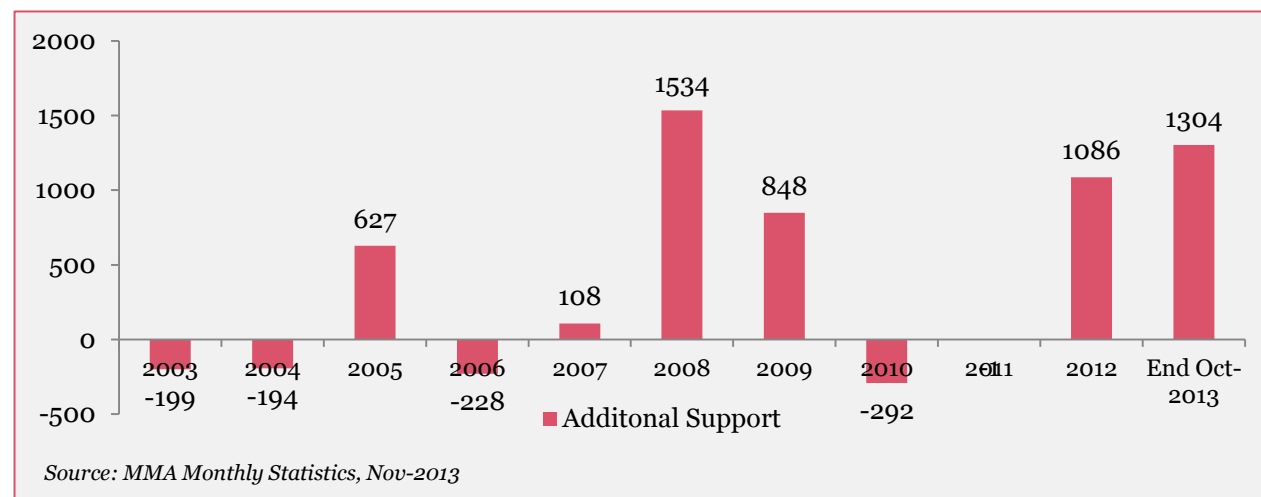
The government's budget deficit worsened from the start of the financial crisis in 2008. It rose from 3.6% of GDP in 2007 to 11.2% in 2008, reached a peak of 20.5% in 2009, before declining to 9.2% in 2012. Table 25 reveals that rising government deficit has been met by an increase in net claims on government by MMA. Claims on central government which constitutes of securities other than shares and advances & other claims on the government increased more during this period. Advances and other claims to the government increased from Rf. 1824.7 million in 2007 to Rf. 3365 million in 2008 to Rf. 4,617 million in 2012.

Presumably, concerns over sustained budget deficits have made ODCs reluctant to increase their exposure to government to finance the government deficit. This is evident from the T-bills auctions which have been under-subscribed especially for longer term maturities. Figure 12 reveals the difference between amounts received against amount offered. A positive sign indicates it is over scribed and vice-versa. It is quite apparent from the figure that – the market appetite for short-term instruments is quite high in Maldives. As shown in Table 26 the demand for 28-days Treasury bills are much more than what is being offered. Also, the under-subscription percentage is very low (15%). As we move from T28 days bills to T91 days bills, treasury bills' performance is still better than the other greater maturity bills. There are some appetites for it in the market as it is over-subscribed for 37% of days. However, in case of T182 days and T364 days, it is primarily under-subscribed and shows the risk averseness of the market. While it requires a further study for the specific reason of under-subscription, at the face value it appears that market has not developed for long term instruments and Government's higher budget deficit could be one of the reasons.

**Table 26: T Bill Subscription Distribution (%)**

| | Treasury Bill Auction | | | |
|---|---|---|---|---|
| | T28 TB | T91 TB | T182 TB | T364 TB |

| Under-subscribed | 15.1% | 62.4% | 94.4% | 95.1% |
|---|---|---|---|---|
| Over-Subscribed | 84.9% | 37.6% | 5.6% | 4.9% |
| Total Sample | 205 Days | 205 Days | 178 Days | 61 days |

*Note: We have received T-bill data for the period of 27-Dec-09 to 11-Aut-2013 from MMA. However, 182 days T-bill is data is available from 4-Jul-2010 and 364 days T-bill data from 12-Aug-2012. Source: Maldives Monetary Authority*

**Figure 12: T-bill Auctions Difference between Offered and Received (Rf. Million)**
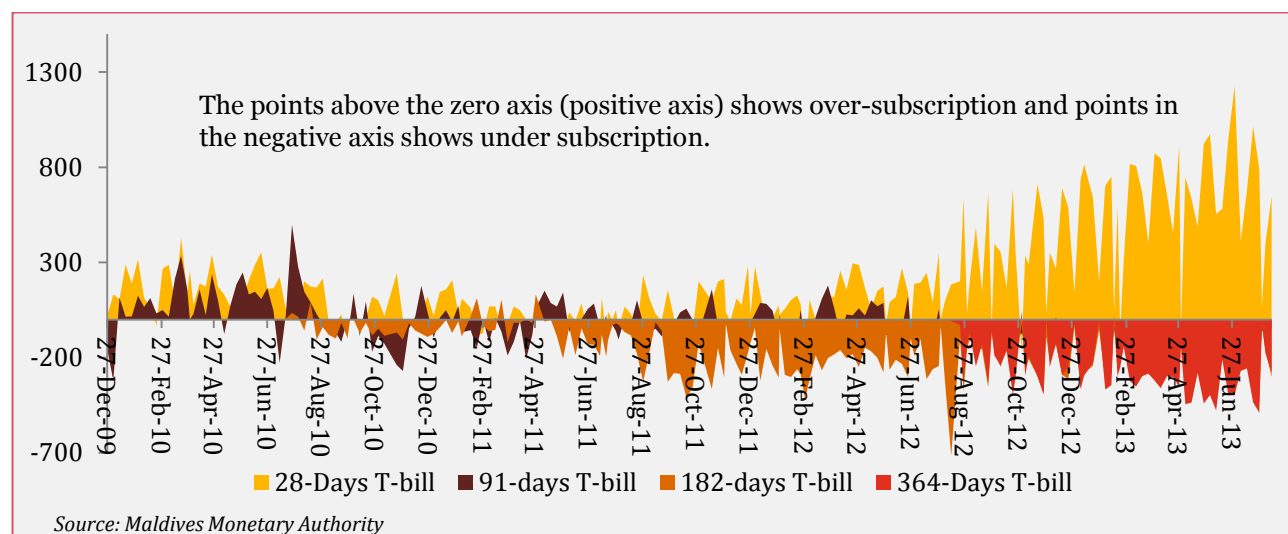


Source: Maldives Monetary Authority

Figure 12 further points towards the fact that with an increase in the maturity duration of the T-bill, the divergence between the amounts offered and amounts received increases – T364 days bills are perpetually below the axis.

An increase in net claims on government has been the result of persistent problem of government budget deficit and the reluctance of banks to subscribe to government securities to fund the deficit. This eventually leads to the MMA monetising the budget deficit and injecting liquidity into the system.

During September 2009, taking cognisance of the problem of increasing budget deficit, the Government of Maldives and Maldives Monetary Authority entered into an agency agreement to:

- Enable the government to manage its domestic debt and cash more efficiently,

- Develop instruments to enable the Government to borrow funds from the public for the purpose of financing deficits of the budget when necessary

- Coordinate and effectively manage public debt and cash

As part of the ***cash management agreement***, the Maldives Monetary Authority shall provide an overdraft facility, the Ways and Means Advances which shall be operated as the Government's settlement account. The agreement stipulates that the total outstanding balance in the WMA shall not exceed Rf. 100 million at the end of any month.

In general, the monthly advances from central bank remained within the agreed target post the implementation of the agency agreement up until September, 2012. However, starting with October,

2012, the advances from central bank exceeded the limit. By October 2013, outstanding advances under WMA to the central government was Rf. 1.7 billion which is 17 times the limit.

**Figure 13: MMA's Advances and Other Claims to Govt. (in millions of Rufiya)**



*Source: MMA Monthly Statistics, Nov-2013*
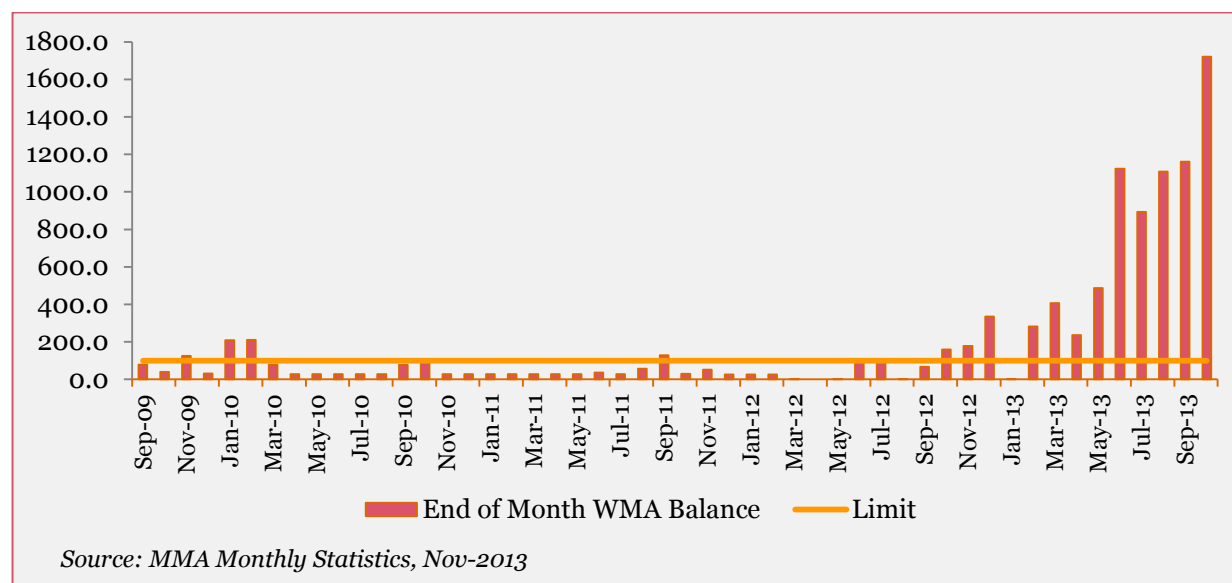
However, during the inception presentation, MMA informed the TA team that the Fiscal Responsibility Act is going to be effective next year which will address issues related to government borrowing/excess overdraft etc. This is in light of the 1.7 billion rufiyaa over draft against the current ceiling of the 100 million rufiyaa. In addition, it is observed that there is a need to develop the capital market in Maldives to provide more avenues to private sector and public sector to raise resources from the market rather than relying only on the banking channels.

Besides commercial banks' reluctance to invest their excess reserves in long-term government securities, there are two other problems which inhibit participation of Maldives Islamic Bank and HSBC bank in government borrowing programme.

The reasons of non-participation are the following:

- The Maldives Islamic Bank (MIB) conducts its banking activities consistent with the principles of Sharia and hence do not invest in any interest bearing conventional instruments. A high proportion of excess reserves of the total Maldives banking system are parked with the MIB since there are no Shariah compliant instruments to invest.

- HSBC a private sector bank in Maldives is unable to participate in Open Market Operations since it has not signed the Master Repurchase Agreement, a necessary pre-condition to participate in OMOs. Thus the excess reserves parked with HSBC cannot be used for investment in T bills.

The Figure 14 reveals that the reserves maintained with HSBC and MIB constitute around 80% of the total excess reserves in the banking system.

**Figure 14: MVR Excess reserves (Average)**

The increase is mainly because banks hold precausionary reserves at the end / begining of the year

*Source: Maldives Monetary Authority*
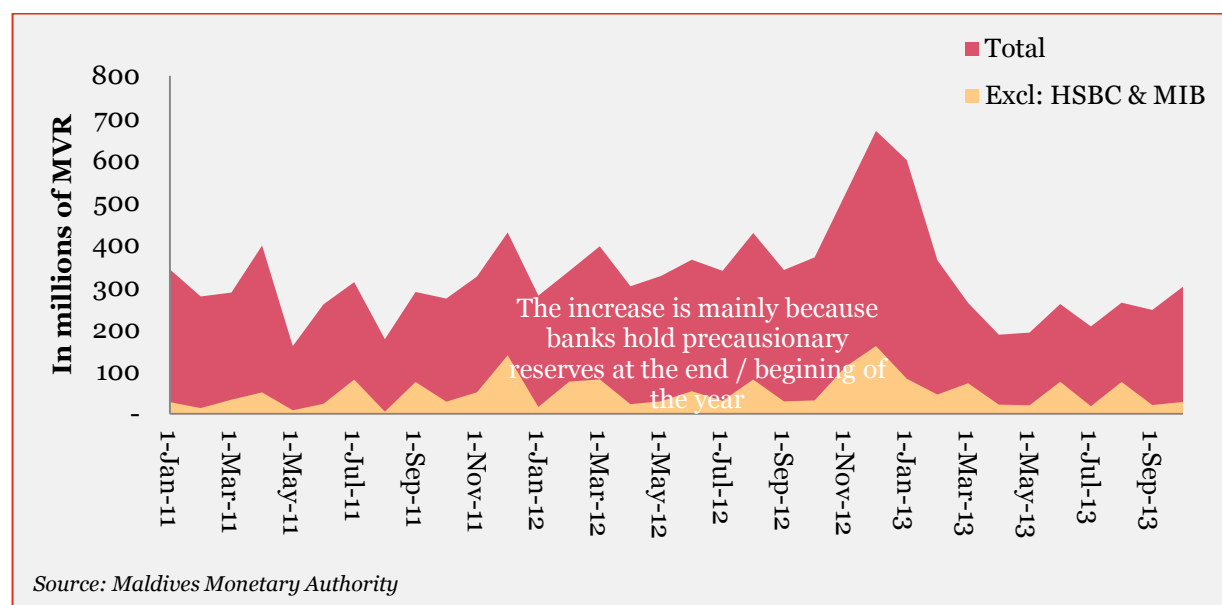
In addition to the changes in the net foreign assets and the net claims on government, changes in net other items and currency in circulation have an impact on the supply of reserves.

Currency in circulation increased from Rf. 677.2 million in 2002 to Rf. 2476 million in 2012, which represents an average annual growth of 15.1% over the period. An increase in currency in circulation represents withdrawal from the total supply of reserves. An increase in currency in circulation in absolute terms is inevitable given that there is moderate rise in prices and growth in the economy over time. However, since currency in circulation does not contribute as significantly as net foreign assets and net claims on government to total supply of reserves, the downward pressure it puts on supply of reserves doesn't offset the increase in supply.

The change in total supply of autonomous reserves in the system increased from Rf. 1.1 million in 2003 to Rf. 328.3 million in 2012. This has been driven mainly by changes in 'net foreign assets' and changes in 'net claims on government' as shown in Table 27 . As one could observe from the last column of the table that the change in autonomous supply of reserves is highly volatile.

**Table 27: Supply of Reserves prior to Central Bank's policy position (Rf. Millions)[58]**

| Year | Δ NFA | Δ Net Claims on Govt. | Δ Net Other Assets | Δ Currency in Circulation | Δ Supply of Reserves* |
|------|-------|----------------------|--------------------|---------------------------|-----------------------|
|      |       |                      |                    |                           |                       |
| 2003 | 348.8 | -270.5               | -24.4              | 52.8                      | 1.1                   |
| 2004 | 564.3 | -227.3               | -68.2              | 150.9                     | 117.9                 |
| 2005 | -295.5| 443.9                | -69.0              | 119.2                     | -39.8                 |

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[58]

Δ Supply of reserves =

Δ Net Foreign Assets + ΔNet Claims Govt. + Δ Net other assets − Δ Currency in Circulation

| Year | Δ NFA | Δ Net Claims on Govt. | Δ Net Other Assets | Δ Currency in Circulation | Δ Supply of Reserves* |
|---|---|---|---|---|---|
| 2006 | 509.9 | -313.0 | 198.0 | 213.5 | 181.3 |
| 2007 | 1043.1 | -60.9 | -193.4 | 161.6 | 627.2 |
| 2008 | -835.0 | 1734.5 | 71.6 | 439.9 | 531.2 |
| 2009 | 49.7 | 778.6 | 78.2 | 37.5 | 868.9 |
| 2010 | 995.9 | -694.2 | -28.2 | 71.4 | 202.1 |
| 2011 | 657.9 | 802.4 | -11.2 | 325.5 | 1123.6 |
| 2012 | -484.5 | 1158.2 | -66.6 | 278.9 | 328.3 |
| Average Change (2003-12) | 255.5 | 335.2 | -11.3 | 185.1 | 394.2 |

Source: PwC calculations based Monthly Statistics, November, 2013; (+) increase, (-) decrease

Note: Change for a component has been calculated as the Closing balance of the component for Year T- Closing balance of the component for Year T-1

The supply (+) or withdrawal (-) of liquidity from the system is done by MMA through its monetary policy operation and it is reflected in part IV of the liquidity forecasting template.

### 7.1.3 *Monetary Policy and Liquidity management*

Before we discuss the *'Current liquidity management practice'* in Maldives, we will briefly discuss the monetary policy framework and tools which are currently used by MMA to conduct its monetary policy operation. Monetary policy framework provides the basis to conduct the liquidity management. If the central bank targets to achieve a desired short-term rate (say, interbank rate or any other short-term rate which signals the stance of monetary policy), then that provides the basis for liquidity management operation. As we discussed earlier, if the economy is on a sustained surplus liquidity mode, then it complicates the situation for the central bank as depository institutions have no compulsion to participate in the monetary management operation.

The monetary policy framework of MMA is represented in Figure 15. As one could see, it is the 'management of the excess reserves' which is the key to achieve the end objective of price stability via exchange rate targeting.

**Figure 15: Monetary Policy Framework of Maldives**
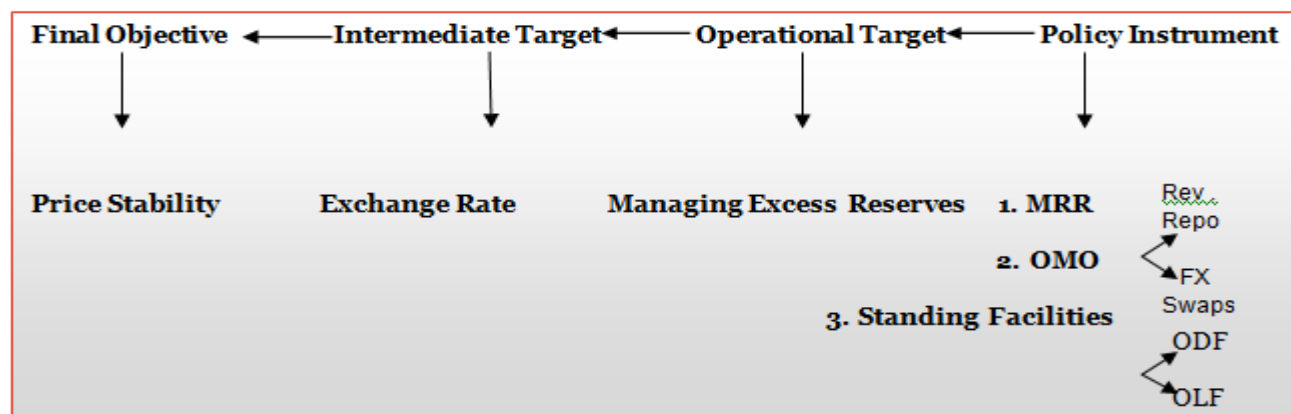
The following equation shows the way MMA influences the 'Excess Reserves' in the system to maintain the currency peg and hence price stability through its monetary policy operation:

$$\Delta Excess\ Reserves$$
$$= \Delta\ Net\ Foreign\ Assets + \Delta Net\ Claims\ Govt. + \Delta\ Net\ other\ assets$$
$$- \Delta\ Currency\ in\ Circulation + \Delta OMO + \Delta\ SF - \Delta\ Required\ Reserves$$

The items such as 'OMO and Standing Facilities' are the policy instruments which MMA uses to impact the excess liquidity in the system. While theoretically there is an operational corridor, MMA confirmed that there is only reverse repo operation going on due to excess liquidity in the system.

We will briefly describe the monetary policy operations of MMA to manage liquidity in Table 28.

**Table 28: Monetary Policy Operation Instruments**

| Policy Instrument | Description |
|---|---|
| Minimum Reserve Requirement | • MRR of 25% of all local and foreign currency demand and time liabilities, excluding interbank liabilities and L/C margin.<br>• MRR for foreign currency liabilities has to be held in dollar out of which 3% can be held in terms of Rufiya.<br>• Rufiya MRR balances are remunerated at 1% per annum while US dollar MRR balances are remunerated at 0.01% per annum.<br>• A penalty rate of 18% per annum is imposed in case of reserve short-fall.<br>• The Reserve maintenance period is increased to two weeks (Wednesday to Thursday) and maintained on a lag basis. |
| Open Market Operations | |
| -Reverse Repo Facility (7% is the current rate) | • MMA introduced OMO facility during August, 2009. It conducts weekly reverse Repo with the commercial bank.<br>• Auctions with one week maturity are conducted every week on Monday, one day after the government conducts its T-bill auctions.<br>• On the basis of weekly liquidity conditions assessment by Monetary Policy and Research division (MPRD), the Market Operations committee (MOC) of the MMA decides whether to absorb or inject the liquidity to the market. |

| Policy Instrument | Description |
|---|---|
| | • While Market operations committee decides the amount and type of transactions, MMA does not announce the targeted amount or the interest rate.<br>• The reverse Repo operations are now conducted at a rate of 7%. During the last 91 weeks, the reverse repo rate varied between 6.9% to 7%.<br>• Since the reverse repo rate has become a fixed rate at 7%, it is acting as a floor for any short-term instruments. It is evident from the T-bill rate that – market has to pay a premium over the reverse repo rate if they want the participation of banks. As on 24$^{th}$ November, 2013 – the 28 days, 91 days, 182 days and 364 days t-bill rate was 9.68%, 9.66%, 10.5% and 10.5% respectively.<br>• Since the system is always in the surplus liquidity mode, Repo Auction has not been conducted. |
| -Indicative Policy Rate<br>(7% is the Indicative rate) | • An indicative policy rate (IPR) of 7 per cent per annum was introduced on 29 May 2011 to signal the tight monetary policy stance.<br>• This policy rate was proposed to be used as ceiling when absorbing and as a floor when injecting rufiyaa liquidity under OMOs.<br>• MMA redefined the IPR stating – this will be used only as an indicative policy rate for OMO and not as a cut-off rate.<br>• However, IPR has become the *de-facto* reverse repo rate and the auction is conducted only to settle the quantity leaving the short-term rate unchanged.<br>• Despite the varying market conditions, IPR remained fixed at 7% and has not moved with the market. |
| -Foreign Exchange Swaps<br>(FX Swap) | • The FX swap is intended to be used as an instrument to manage forex liquidity by purchasing or selling Rufiya against a foreign currency with an agreement to reverse the transaction after a week at a specific forward rate via an auction system.<br>• Due to very short-term nature of the instrument, it didn't take off as mentioned in the Annual report of MMA. |
| Standing Facilities | |
| Overnight Deposit Facility<br>(The current rate is 3%) | The central bank makes use of both the Overnight Deposit and Overnight Lombard Facility as monetary policy instrument to provide or withdraw overnight liquidity.<br>The Overnight Deposit facility was introduced in March 2010, to allow banks to place their excess funds with the MMA on an overnight basis at a rate of 0.25% per annum. This has been subsequently increased to 3% per annum in April 2013 to reduce the corridor. A minimum transaction amount of MVR 1 million is required to avail this facility and the commercial bank can increase the deposits in multiples of the same. The Central Bank has not mandated any maximum limit on this facility. |
| Overnight Lombard Facility<br>(The current rate is 12%) | The Overnight Lombard Facility was introduced two months later to enable banks to be able to borrow overnight funds against eligible collateral at a rate of 16% per annum. However. in April 2013 the MMA decreased the OLF rate from 16% to 12% p.a. This facility is |

| Policy Instrument | Description |
|---|---|
|  | available to commercial banks who have signed the Master Repurchase Agreement. Again, like the ODF this has no maximum limit, as long as the commercial banks are able to provide the required collateral. If a commercial bank wants to avail this facility, a collateral worth 110% of the required facility in the form of government securities is required as collateral. |

---

**Box 1: Changes in the Monetary Policy Framework (Extract from the Annual Report of MMA, 2011)***

Indicative Monetary Policy Rate

An indicative monetary policy rate of 7 per cent per annum was introduced on 29 May 2011 to Signal the tight monetary policy stance. This policy rate will be used as a ceiling when absorbing and as a floor when injecting rufiyaa liquidity under OMOs.

Minimum Reserve Requirement

Both local and foreign currency Minimum Reserve Requirements (MRR) remained at 25 per cent of the average demand and time liabilities of the respective currency, excluding interbank liabilities and L/C margin deposits of the reference period. However, from 19 May 2011, all banks were required to maintain 3 per cent of their foreign currency MRR in local currency.

Rufiyaa MRR balances continue to be remunerated at 1 per cent per annum, while the remuneration rate of 0.05 per cent per annum for US dollar MRR balances was changed to 0.01 per cent per annum, with effect from 29 September 2011.

With effect from 6 October 2011, the maintenance period and the reference period of MRR was changed from a period of seven days to one of 14 days. The reference period starts from Thursday and ends on the following second Wednesday. Thus, the MRR is calculated based on the average deposits of the reference period and is maintained on a lag basis during the subsequent 14-day period (maintenance period).

Open Market Operations

Two-week Reverse Repurchase Facility

The MMA commenced its OMOs on 27 August 2009, with the introduction of one-week Repurchase and Reverse Repurchase facilities. To make monetary policy more effective and with the aim of providing the banks with a longer-term monetary policy instrument, a Reverse Repurchase facility of two-weeks maturity was introduced on 14 February 2011. However, since banks continue to prefer one-week Reverse Repurchases to those of two weeks, the two-week Reverse Repurchase was abolished with the introduction of an Indicative Monetary Policy Rate on 29 May 2011.

Introduction of Foreign Currency Swap

The Foreign Exchange Swap (FX Swap) facility, with a maturity of one week, was introduced to the commercial banks on 3 July 2011. FX Swap is a monetary policy instrument used to manage liquidity in the banking system. It involves the purchase or sale of rufiyaa against another currency at an initial date, along with an agreement to reverse the transaction at a future date at a specific forward rate determined via an auction system. However, following the initial invitation, no further auctions were announced by the MMA, due to low demand for the facility (principally owing to its shorter maturity).

Overnight Deposit Facility

Following the introduction of the Overnight Deposits Facility (ODF) on 23 March 2010, a revision to the ODF interest rate was made for the first time on 20 November 2011. The interest rate was reduced from 1.50 per cent per annum to 0.50 per cent per annum. It was subsequently further reduced to 0.25 per cent per annum, with effect from 01 December 2011.

*Source: Page Number. 22-23, Annual Report, 2011 (Maldives Monetary Authority); * several rates stand changed as of today.*

## 7.1.4 *Liquidity Forecasting by MMA*

The Technical Staff of MMA under IMF TA has developed a liquidity forecasting excel based framework which provides the 'excess liquidity' estimates on a weekly basis which is further broken

down to daily basis. MMA requested further capacity building of concerned MMA staff in use of the framework using econometric methods. The capacity improvement needs will be further examined once the new experts comes on board.

The framework is used by Market Operations Committee (MOC) to determine the quantum of intervention on a weekly basis. Before we describe the template and projection methods, the following paragraphs outline the *rationale* behind the forecasting.

The autonomous supply of reserves may not balance the demand for reserves leading to a situation of *ex-ante* imbalance. Ex-ante imbalance is the imbalance in the market for reserves prior to the intervention of MMA. The following equation represents the ex-ante imbalance in the market for reserves:

$$\text{Ex-Ante Imbalance} = \text{Autonomous Supply} + \text{Demand for Reserves}$$
$$\text{Ex-Ante Imbalnace} = \Delta NFA + \Delta \text{ Net Claims Govt.} + \Delta \text{ Net Other Assets}$$
$$-\Delta \text{CiC} - \Delta \text{Required Reserves} - \Delta \text{ Surplus Bank Reserves}$$
$$\neq 0$$

Ex-ante imbalance could be positive or negative. In Maldives, the market is in a perpetual state of autonomous excess supply of reserves or 'surplus liquidity' due to high net foreign assets and net claims on government. On the demand side, due to static MRR since 2006, change in required reserves is zero or insignificant. MMA intervenes in the market to absorb the excess reserves so that the flow of liquidity into the market is matched with the flows of liquidity outside the market and the ex-post-balance is close to a number decided by MMA (though MMA does not announce its comfort level of liquidity).

The Ex-post Balance of reserves represents the ex-ante balance of reserves plus the central bank's policy position.

$$Ex-Post \text{ Balance} = \text{Ex-Ante Balance} + \text{MMA Policy Position}$$

MMA has set up an active internal group those who carry out the exercises to come out with excess liquidity figures. The Statistics Division has the task of compiling the commercial banks' excess reserves on a day-to-day basis. The Modelling and Forecasting Section of the MPRD undertakes forecasts of the overall liquidity position of the banking system on a weekly basis and monitors the liquidity position *(the method of projections of each of the components is provided in the subsequent section)*. On the basis of the forecast and assessment of the liquidity position by the MPRD, the Market Operations Committee of the MMA decides whether to inject or absorb liquidity and the amount. Since the introduction of OMO, the MMA only makes use of the reverse repo to absorb excess liquidity from the system. The repo facility has never been used. Similarly, the commercial banks make use of the Overnight Deposit Facility to deposit additional funds with the MMA. The Lombard facility is not used as the interest rate corridor is excessively wide.

 Table 29 shows the forecasting template used by MMA to forecast liquidity. The first column shows the name of the component and the second column provides the description.

**Table 29: MMA Liquidity Forecasting Framework - Description**

| Components | Impact on supply of reserves and brief  definition |
|---|---|
| I.  Autonomous Supply of Reserves | Sum of Changes in NFA, Changes in Net position of the Public Sector, changes in currency in circulation, changes in net other items and changes in cheque for collection |

| Components | Impact on supply of reserves and brief definition |
|---|---|
| a. Changes in Net Foreign Assets | Changes in Net foreign assets comprise of purchase and sale of assets |
| ✓ Purchase | Purchase adds to the liquidity/supply of reserves in the market |
| ✓ Sale | Sale of assets absorbs liquidity from the market |
| b. Changes in Net position of the Public Sector | Changes in net position of the public sector comprise of the changes in net revenue/expenditure plus government market operations |
| Net Revenue/Expenditure | This represents the net of the revenue and expenditure figures for the government. If Exp. > Rev, then it adds to the supply of reserves. |
| ✓ Revenue (-) | An increase in government revenue reduces autonomous liquidity supply |
| ✓ Expenditure (+) | An increase in expenditure increases the supply of autonomous reserves |
| Government Market Operations | Government market operations comprise of the balance of issuance and maturity of T bills in both MVR and USD |
| ✓ Issuing T-bills MVR (-) | An increase in Issuance of T-bills reduces supply of reserves |
| ✓ Maturing T-bills MVR (+) | Maturing of T-bills increases supply of reserves |
| ✓ Issuing T bills USD (-) | An increase in Issuance of T-bills reduces supply of reserves |
| ✓ Maturing T bills USD (+) | Maturing of T-bills increases supply of reserves |
| c. Changes in currency in circulation | An increase in currency in circulation reduces supply of Autonomous reserves |
| d. Changes in other items net | An increase in net other items leads to addition to Autonomous supply of reserves |
| II. Demand for Bank Reserves | Sum of Changes in required reserves and Excess Reserves |
| a. Changes in required reserves | This component has remained 0 since there has been no change in the MRR |
| b. Excess reserves | Other things remaining constant decrease/increase in demand for excess reserves impacts the ex-ante imbalance. |
| III. Excess supply (+) or demand(-) | This is the net of the supply of reserves and demand for reserves. As discussed above, this also reflects the *ex-ante* Imbalance |
| IV. Supply (+) or withdrawal (-) of Liquidity by the MMA (Policy Position) | MMA intervenes in the market to correct the *ex-ante* imbalance using Policy instruments |
| a. Overnight Deposit Facilities | This shows the net position of the maturing deposits and new deposits |
| ✓ Maturing deposits (+) | Maturing deposits has a positive impact on the supply of reserves |
| ✓ New deposits (-) | New deposits taken by the central bank results in withdrawal of reserves |
| b. Overnight Lombard Facilities | This shows the net position of the maturing deposits and new deposits |
| ✓ Maturing deposits (-) | Maturing deposits has a negative impact on the supply of reserves. When the deposit matures, the commercial bank has to repay the central bank |
| ✓ New deposits (+) | New deposits has a positive influence on the supply of reserves |

| Components | Impact on supply of reserves and brief definition |
|---|---|
| c. Reverse Repos | This represents the net position of the new reverse repos issued and the maturing reverse-repos. |
| ✓ Maturing reverse repos (+) | Liquidity is injected into the system when the central bank pays the commercial banks for the maturing securities |
| ✓ New reverse repos (-) | Central bank absorbs liquidity by issuing securities to the commercial banks |
| V. Final position (Ex-post balance) | This is the sum of III and IV. It reflects the liquidity condition post central bank intervention. |
| ✓ Other Adjustments | This is the sum of excess reserves of HSBC and MIB and the value set aside for settlement purposes |
| ✓ Excess reserves of MIB | This represents the excess reserves of MIB |
| ✓ Excess reserves of HSBC | This represents the excess reserves of HSBC |
| ✓ Value set aside for settlement purpose | This is a proportion of the total excess reserves which are set aside for settlement purpose |
| VI. Final position after adjustment | This is the value of excess supply/demand for reserves remaining after other adjustments (V – Excess Reserves of MIB/HSBC – Set aside for settlement) |

Source: Liquidity forecasting template of Maldives Monetary Authority

As we saw in Table 29, the excess supply/demand for reserves is obtained by the MMA, by deducting the demand for bank reserves from the autonomous supply of reserves. This is the ex-ante imbalance. The Ex-post balance which is termed as "Final Liquidity position" is obtained by adding the central bank's policy position to the ex-ante balance. This balance is further adjusted by deducting the excess reserves with HSBC and MIB and an amount set aside for settlement purposes.

During the inception presentation discussions, MMA mentioned that the liquidity forecasting only takes into account the Rufiya liquidity. Dollar liquidity is only important for BoP estimation. Therefore, the focus of the current TA should be on the Rufiya liquidity. However, the TA will explore on mechanisms to capture the dollar liquidity in the system. In the following paragraphs, we discuss How MMA projects each of these components.

## Method of projection:

Autonomous Supply of Reserves

Net foreign Assets: The Reserve and Management Section of the MMA forecasts the values for the Net foreign assets based on yearly forecasts provided by the Maldives Inland Revenue and Authority (MIRA). The weekly forecasts are made on the basis of certain due dates which are known to the staff. For the daily estimates of the purchase and sale of net foreign assets, the RMS computes percentages based on historical data. The percentage is applied to the weekly forecast to arrive at the daily figures.

```
                      NFA Forecast Variance
        _____
        Percentiles       Smallest
  1%      -42.5             -44.3
  5%      -3.55             -42.5
 10%      -1.08            -20.68      Obs                     175
 25%       -.1              -8.24      Sum of Wgt.             175

 50%        0                          Mean               .3230857
                           Largest     Std. Dev.          8.144486
 75%        .23             13.12
 90%       3.04             15.26      Variance           66.33265
 95%       5.91             35.96      Skewness            2.39375
 99%      35.96             70.82      Kurtosis           44.57422
```

Forecast Variance is calculated as:

 (Actual-Forecasted)/ABS (Forecasted)

A negative number denotes forecasted was higher than Actual and vice-versa.

Source: PwC Calculations

We have observed from 175 days daily data that – the average forecast variance is 32%. In case of 50% of observations, the forecast variance lies between -10% (forecast value higher) to +20% (forecast value lower).However, in case other 50% observation, the forecast variance is significantly higher. Such high level of variance may come down over a period of time as the forecasting improves with a tolerable error margin

Some of our preliminary observations related to NFA projections are stated below:

The major source of foreign exchange reserves in Maldives is Tourism and activities associated with Tourism. Tourism is affected by several global developments including domestic factors. Besides Tourism, the other major item of export is Fishery. In the financial accounts, Maldives receive FDI and FIIs. The beginning of the year outlook of MIRA can undergo significant changes as the year progresses. Therefore, instead of taking the Annual projections of MIRA as base, if a quarterly projections can be obtained from MIRA, that might reduce some of the fluctuations as mentioned above. Similarly, MIRA can be requested to provide a more granular outlook on developments which will help MMA to clean the NFA projection sheet. Also, a systematic study can be undertaken to understand the source of error which could help in identifying the variations. The daily break down which is done on the basis of historical data could be strengthened if MMA could analyse its past projections of daily data on the basis of historical data. The trend could provide clue to get an error correction margin. A structural model could be developed to forecast the Forex inflow. However, given the nature of Maldivian economy, the structural coefficients can undergo sudden changes which will make the forecasting exercise futile.

Changes in net position of the Government: The forecasting for this item is carried out by the Public Debt Unit, taking cue from the weekly projections given by the MoFT. For the daily projections of the sub components, percentages are arrived based on historical data. The percentage is applied to the weekly forecast to arrive at the daily figures. The forecast variance in this case is higher than NFA as the mean forecast variance is -66.7. It may be the case that – daily projections shows higher variance while the weekly projection may reflect lower variance. We have examined this phenomenon and observed that while in some of the weeks – variance is lower; it is significantly higher in other weeks. This is one component which should reflect lower variance as government provides the number. However, the prevalence of such variation reflects govt.'s inability to do accurate cash management planning and projections.

```
           Claims on Govt. Forecast Variance
_____

     Percentiles      Smallest
 1%   -2570.674      -4337.633
 5%    -160.222      -2570.674
10%      -7.356      -2289.441      Obs                  175
25%       -.919      -1524.209      Sum of Wgt.          175

50%           0                     Mean           -66.68305
                      Largest       Std. Dev.       487.4516
75%        .376       504.367
90%       3.279       999.543       Variance        237609.1
95%       8.529       1016.94       Skewness       -5.335668
99%      1016.94      1311.396      Kurtosis        42.25168
```

Forecast Variance is calculated as:

 (Actual-Forecasted)/ABS(Forecasted)

A negative number denotes forecasted was higher than Actual and vice-versa.

Source: PwC Calculations

**Changes in Currency in Circulation:** In carrying out the forecasts, the current period for which the projection is to be made is compared to the same periods in the previous months.  The average currency in circulation for the past three months is considered as the forecast total for the projection week. For the daily forecasts, the daily values for Thursday and Sunday which are known, is deduced from the weekly projected figure. The remaining amount is equally divided amongst the days to obtain the daily forecasts. The accuracy of CIC projection is better than any other component. In case of 40% of the observations, there is no forecast variance and 50% of the observations are projected with +/- 30% variance. This may be due to use of actual numbers for 2 days in a week.

```
               CIC Forecast Variance
_____

     Percentiles      Smallest
 1%       -5.41        -242.15
 5%       -2.45          -5.41
10%       -1.52          -5.29      Obs                  173
25%        -.36          -4.84      Sum of Wgt.          173

50%           0                     Mean          -.9710404
                      Largest       Std. Dev.       18.78274
75%         .28           7.5
90%        1.81          10.43      Variance        352.7912
95%        3.27          26.34      Skewness      -12.29533
99%       26.34          30.75      Kurtosis       159.0438
```

Forecast Variance is calculated as:

 (Actual-Forecasted)/ABS(Forecasted)

A negative number denotes forecasted was higher than Actual and vice-versa.

Source: PwC Calculations

As MMA reports, while doing the forecasting of CIC, if a seasonal pattern is observed – such as payment of salaries, this factor is taken into account by adding this amount to the given day and adjusting the forecasted value on that basis. It needs to be explored whether a time-series or structural model would be more appropriate than this eclectic model as the former may take into account the economic growth inflation, seasonal and cyclical factors.

**Changes in other net items and cheques for collection :** The central bank assumes that the average amount of other net items will remain unchanged and this will have no impact on the supply of reserves

Demand for reserves

Required Reserves: The central bank does not forecast this variable because at the start of the forecasting period, the Central bank is aware of the actual reserve required for this period.

Excess Reserves are calculated based on the formula for the reserve balance which is:

Reserve Balance = Reserve balance of the previous day+ Reverse Repo Maturity for the day+ net ODF for the day+ autonomous supply of reserves[59]

Policy position of the central bank

The Overnight Deposit Facility is calculated on the basis of the average for the last 2 days. The actual value of the ODF for Monday is taken till 1:15 pm. Thus the pattern of ODF keeps changing depending on how much banks are investing in a particular week.

The projections for overnight Lombard Facility is not undertaken, since the banks have surplus reserves and thus the need to use this facility does not arise.

Reverse Repos:

The value of the Issuance of reverse repos is not included in the forecasts, since this value is unknown before the forecast is undertaken. Once the actual reverse repo takes place, the values are included in the forecasting table.

However, the maturity day of the reverse repos are known with certainty. Thus the maturing reverse repos for the week are considered in the forecast on its maturity date

We have studied the trend of the monthly mean absolute error of the autonomous components of supply of reserves over the period 21st Feb to 13th November 2013.

Forecast Variance at Aggregate level

We have observed that the accuracy of forecast is increasing over the period of time for which we are made available the data.

Mean absolute Error is a statistical tool for measuring how close the forecasts are to the actual outcomes. In our case, we study how close the forecasts of the autonomous components as compared to their actual outcomes.  Taking the sum of the absolute deviations of the daily forecasts for a particular month we divide this by the number of observations to obtain the mean absolute error for a particular month.

$$MAE = (\sum_{i=1}^{n} |A_t - F_t|) / n$$

We have plotted our results below to see the trend. We observe that for Net foreign assets and net claims on government, there is a declining trend of MAE over the 9 month period. The component of currency in circulation shows a fluctuating trend over the period.

**Overall, the Monthly Mean Absolute Error, for the autonomous supply of reserves has declined over the period as shown in Figure 16.**

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[59] USD-T-bills are excluded from the calculation of the supply of reserves

**Figure 16: Monthly Mean Absolute Error of Forecasted Autonomous Supply (Rf. Thousands)**



Source: PwC calculations based on data from Liquidity Forecasts of MMA
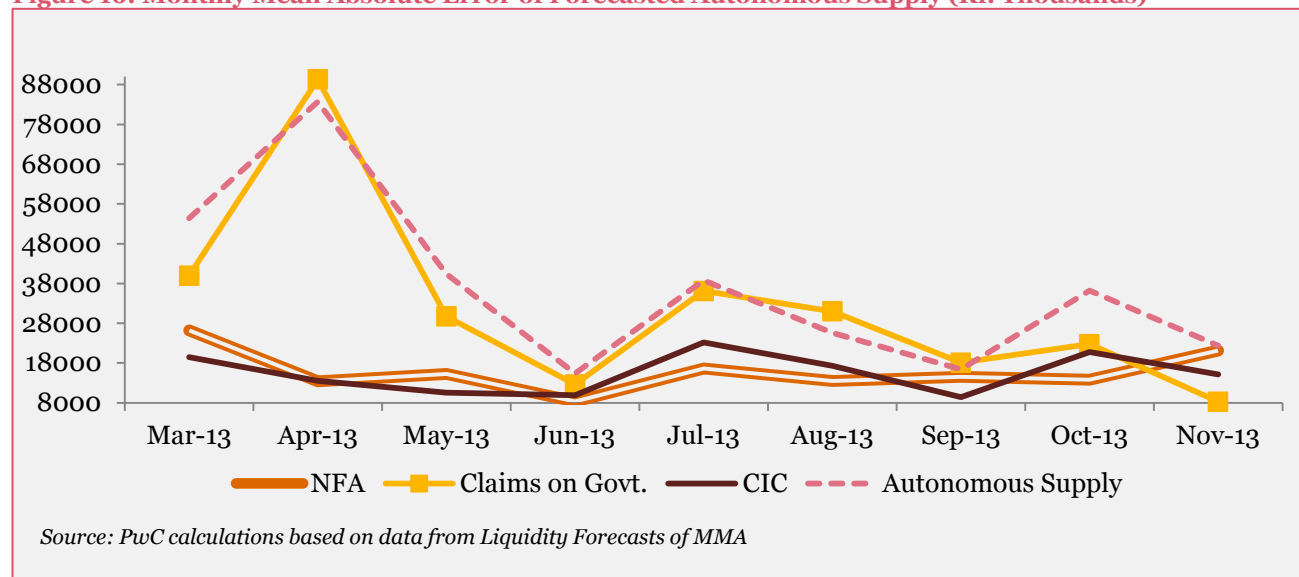
## 7.1.5 Previous TA Recommendations on Liquidity Management

IMF has recently provided two TA support *inter-alia* to strengthen the monetary policy framework and liquidity management in Maldives. In 'Improving Crisis Preparedness, Bank Restructuring and Monetary Operations Framework, 2010', the TA team has given certain recommendations which have been fully or partially implemented as given in Appendix-1 of 'TA support to strengthen the operations of framework for implementing monetary policy (March, 2013)'. The 2013 TA has provided certain recommendations related to liquidity management after taking stock of implementation of previous TA recommendations. This has been summarised in Table 30.

**Table 30: IMF TA recommendations related to liquidity management**

| Sl No. | Recommendations | Status |
|---|---|---|
| IMF TA 2010: Improving Crisis Preparedness, Bank Restructuring and Monetary Operations Framework | | |
| 1 | Redesign the liquidity forecasting table to reflect the current monetary operational framework | Partially done |
| 2 | Extend weekly forecasting period to correspond to the reserve maintenance period | Not done. No information is received from the banks as they are unable to predict the customer demand for reserves for a longer horizon, not even for 1 week, difficulty with government forecast. |
| 3 | Forecast cheques for collection | Not done |
| 4 | Ensure that all factors that have impact on Rufiya liquidity are into account properly | Not fully incorporate but working towards full coverage. |
| 5 | Regularly review demand for excess reserves, particularly when there are changes that could affect bank's behaviour. | Done |

| Sl No. | Recommendations | Status |
|---|---|---|
| 6 | Coordinate closely with the MoFT to obtain better information for improvement of government's cash flow projections. | Partially done. Cash-flow projections provided by MoFT for the T-bill auction are revised by the PDU/MMA for the liquidity forecasting. Still need to get cash flow projections that coincide with the forecasting period. |
| 7 | Systematically analyze forecast errors to strengthen staff knowledge and improve the quality of the forecasts. | Done. Actual and Forecasts are compared at the end of the forecast period and the main reason for the deviations are analysed. Needs improvement. |
| 8 | Be prepared to produce higher frequency forecasts (e.g., daily) | Not done. MoFT and MIRA provide weekly/monthly projections only. Further, the ERP systems need to be established fully to get daily data on a timely manner, essential item for daily forecasting. |
| 8 | Lengthen the maintenance period for the MRR to two weeks to facilitate bank's liquidity management and consider adopting partial averaging to address the prudential concern with a longer maintenance period. | Done |
| 10 | Ensure legal transfer of ownership of collateral used in OMO (Repo and Reverse Repo transactions) | HSBC has yet to sign the MRA. |
| 11 | Considering reducing the Lombard rate when conditions permit to enable better control of liquidity | Not done. [Comment: In April, 2013 this has been reduced to 12%] |
| 12 | Revise the operational notice on OMO to allow for increased operational flexibility, including conducting operations on different days with various maturities. | Not done. |
| 13 | Communicate regularly with market participants to promote understandings of the MMA actions/operations and thus enhance liquidity management. | Not done |
| 14 | Establish an emergency liquidity assistance framework and publish the guideline governing the key feature of the support. | Not done. |
| 15 | Ensure that loans can be transferred and assigned as collateral. | Not done. |
| 16 | Strengthen supervision to ensure sound liquidity risk management by individual banks. | Not done |
| 17 | Explore the possibility of swap arrangements with large central banks in the region. | The MMA has reached an agreement with Reserve Bank of |

| Sl No. | Recommendations | Status |
|---|---|---|
| | | India to provide $ swap facility. |

IMF TA 2013: TA support to strengthen the operations of framework for implementing monetary policy

| Sl No. | Recommendations | Status |
|---|---|---|
| 1 | Make adjustments in liquidity forecasts and use the concept of usable reserves to set actual OMO target based on the usable reserves instead of total excess reserves. | |
| 2 | Continuously update the adjustment with changes in bank's behaviour after the interest corridor for standing facilities is reduced. | |
| 3 | Start a systematic analysis of the forecast errors to help improve the liquidity forecasting. | |
| 4 | Expand the forecasting period from one week to two weeks. | |
| 5 | Further expand the forecast period to full month (proposed to become maintenance period for MRR), once the forecasting is improved. | |
| 6 | Communicate regularly with important market participants including commercial bank treasurers. | |
| 7 | Use more effectively the recently launched Real Time Gross Settlement (RTGS) for liquidity calculations to help improve the forecasts. | |
| 8 | Co-ordinate with the Ministry of Finance and Treasury (MoFT) to improve government's cash flow projections and data improvement to help the MMA's liquidity forecasting exercise. | |
| 9 | Issue Shariah compliant debt instrument to facilitate the MIB to participate in government T-bill auctions. | |
| 10 | Introduce Shariah compliant instruments that can be used to conduct monetary policy operations and accepted in the interbank market. | |
| 11 | Devise Shariah compliant instruments for private/corporate sector. | |

## 7.1.6 *Key observations*

Maldives faces a situation of persistent surplus liquidity which can adversely impact price level, currency and BoP if it is not addressed, thereby impacting financial stability. It is observed that persistent surplus liquidity may make the monetary policy operation ineffective as commercial banks may be less inclined to participate in the monetary policy operations.

The main autonomous factors driving liquidity in Maldives are: net foreign assets and net lending to government. The sum of net foreign assets and net lending to government was approximately $4/5$th of total asset of the central bank's balance sheet in 2012. We observe that this autonomous side of reserve supply is highly volatile and difficult to do accurate projections. This volatility poses a great risk for monetary management in Maldives. We also observed an increase in net claims on government over the last decade which has been the result of persistent problem of government budget deficit and the reluctance of banks to subscribe to government securities to fund the deficit. This eventually leads to the MMA monetising the budget deficit and injecting liquidity into the system. In the face of low nominal GDP growth, expanding government expenditure via increasing the balance sheet of the central bank may endanger the financial stability.

From the liquidity forecasting perspective, we calculated average forecast variance for each of the autonomous factors to assess the accuracy of forecasts undertaken by MMA. In case of the major drivers of liquidity, i.e. net foreign assets, and net claims on government, we observed that the average forecast variance was on the higher side. This might reduce the effectiveness of monetary policy operations as quantum of interventions cannot be assessed with reasonable certainty. This TA will examine this factor carefully and come out with suggestions to improve forecasting accuracy.

# 8 Liquidity Management Plan and Strategy

## Introduction

1. This document provides a proposed liquidity management strategy and plan for adoption by the Monetary Authority of Maldives (MMA). It comprises three parts.

2. The first part describes, in general terms, the role of the central bank in maintaining monetary stability. This spans the role of the central bank in managing the **supply of its own liabilities** to the **banking system** (macro-liquidity management) and in **supervising the liquidity** of the **individual commercial banks** (micro-liquidity supervision). Taken together, these provide a strategic framework for MMA's role as it relates to liquidity management.

3. Parts two and three provide proposed plans for the actual conduct of each of these – macro-liquidity and micro-liquidity – roles by MMA in the Maldives. These plans build on MMA's current arrangements and also take account of recent developments internationally in these areas of monetary management. The latter include the emergence, in the wake of the Global Financial Crisis (GFC), of more integrated approaches to the macro- and micro- aspects of liquidity management, and the development by the Basel Committee on Banking Supervision of a new framework for the supervision of the liquidity of commercial banks.

## Part 1.    Role of the central bank in maintaining monetary stability

4. A country's monetary system comprises its central bank and its commercial banks.

5. The liabilities issued by the central bank, comprising the notes/coin it issues and the deposits held by commercial banks at the central bank, are often referred to as base money. These define the national currency. Macro-liquidity management – which overlaps substantially with and is often referred to as 'monetary policy' – is concerned with the policies and practices of the central bank in managing the terms on, and/or amounts in, which it issues its liabilities to the commercial banking system.

6. Commercial bank money comprises the deposits issued by commercial banks. These are issued as being payable – at par, and with a high degree of certainty – in central bank money. Moreover, a sizeable proportion of these deposits typically are payable on demand. Given these attributes, commercial bank deposits are widely regarded, and used, as a substitute for central bank money. Typically they can be transferred from one account holder to another (by cheque, EFTPOS, or internet banking) and, in this way, used as a means of payment. In modern monetary economies, bank deposits, rather than central bank-issued notes and coin, are the predominantly used monetary means of payment and store of value. However, central bank money still defines the base unit of the currency.

### 8.1.1  Central bank liquidity as base money

7. This base role for central bank money means that the central bank remains very much at the centre of the monetary system. **Ultimately** it is the policies and practices of the central bank in determining the terms on, and/or amounts in, which it issues its liabilities (to the commercial banking system) that determine how effectively the monetary system is 'anchored'.

8. Central banks can be broadly categorised according to whether they:

- seek to anchor the external or internal value of their currency (as measured, respectively, by the foreign exchange rate or by the rate of inflation in the prices of domestically-purchased goods and services);
- calibrate the operations by which they issue their liabilities in terms of the quantity or price (interest or exchange rate) at which they are issued.[60]

Those are the key policy and operational **choices**, or **trade-offs**, facing any central bank. Generally it is not possible, sustainably, to achieve **both** internal and external objectives, nor simultaneously to set financial prices and quantities.

9. Neither, however, are these trade-offs, between internal and external objectives, and between price and quantity operations, mechanical or precise in the short-run. A more medium-term approach generally is required; and even then the relationships between the quantity of central bank liquidity on issue and medium-term macro objectives can be unstable and difficult to pin down.

10. This short-run instability in the relationship between liquidity aggregates and liquidity management objectives has seen many central banks in recent decades assign a greater role to financial prices (interest rates and/or the exchange rate) in implementing their macro-liquidity management policy. Many central banks, nowadays, calibrate **the interest rate** at which they issue their liabilities with reference to the medium-term policy objective (dialing the interest rate up or down depending on whether more or less monetary 'tightness' is called for). In the cases of central banks where their interest rate plays a more central policy role, quantitative management of the amount of central bank liquidity on issue plays a correspondingly lesser policy role. The objective of quantitative liquidity management by these central banks has shifted more to smoothing fluctuations in liquidity that otherwise would result in market volatility and associated market uncertainty; for the purpose of supporting the functioning of the inter-bank market rather than to implement a shift in the stance of macro-liquidity policy.

11. However, for countries with less developed financial markets, and hence in which interest rates are less effectively transmitted to the wider economy, quantitative management of central bank liquidity continues to play an important macro-liquidity policy role. In these economies, anchoring of the monetary system still relies more on managing the **availability** of the central bank liquidity required to support the supply of commercial bank credit, than on influencing the interest rate for, and hence the demand for, credit. Central bank liquidity management in these countries plays more of a combined role. It is used both to give effect to macro-liquidity policy aimed at preserving the value of the currency over the medium term, and to maintain stability in the availability of liquidity to the market in the short run, so as to support the functioning – and development – of short-term financial markets, particularly of the inter-bank market.

12. Irrespective of whether a central bank's macro-liquidity policy framework is quantitatively or interest rate based, for central banks that seek to anchor the value of their liabilities to those of another central bank, i.e., that seek to maintain a fixed exchange rate, there is a further, important, consideration. This is the so-called 'impossible trinity' – the impossibility of (sustainably) maintaining a fixed exchange rate and also a macro-liquidity policy stance that materially differs from that of the central bank that issues the anchor currency, whilst also remaining open to

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[60] Irrespective of whether central banks calibrate the issuance of their liabilities in terms of price (interest rate or exchange rate) or quantity, they generally adopt consistently conservative credit terms, i.e., issue their liabilities only in exchange for high quality 'collateral'. Varying (tightening or easing) their credit terms to give effect to their macro-liquidity policy (like commercial banks vary their credit terms over the 'credit cycle') generally is <u>not</u> part of central banks' macro-liquidity policy tool-kit. A notable exception was the 'credit easing' by the Federal Reserve during the GFC when it relaxed its collateral requirements to include residential mortgage-backed securities and some categories of commercial paper as collateral it would except in exchange for issuing its own liabilities.

international capital flows. In other words, central banks seeking to maintain a fixed exchange rate are subject to the constraint that their macro-liquidity policy has to be equivalent to that of that central bank that issues the anchor currency; they cannot adopt an 'independent' macro-liquidity policy.

13. In practice, this means that injections of central bank liquidity as the result of central bank lending to the government (i.e., central bank financing of fiscal deficits) need to be neutralised, at least to an extent that contains macro-liquidity expansion to a rate no greater than in the country of the anchor currency. Conversely, a tightening of liquidity consequent upon central bank sales of foreign exchange generally needs to be accepted, so as to stem further loss of foreign exchange reserves and to shore up the fixed exchange rate.[61] Policy actions to offset tightening of liquidity in this circumstance, such as by relaxing reserve requirements, or through central bank operations to inject liquidity, may undermine the sustainability of the fixed exchange rate. Central banks that conduct their operations within an interest rate framework and which seek to maintain a pegged exchange rate, equivalently, are constrained to maintaining an interest rate for their currency that is consistent with that for the anchor currency.

## 8.1.2 *Anchoring the commercial banks*

14. How stably this all works also depends on how effectively the liabilities issued by the commercial banks, through their lending operations, are tied to the base money issued by the central bank. Consistent adherence by commercial banks to **prudential standards** is necessary if they are consistently to maintain an ability to pay their deposits in central bank money as they fall due.

15. There are two key prudential standards that bind commercial bank liabilities to the central bank's liabilities – one that requires banks always to have **sufficient assets** to pay their liabilities, and the other that requires them to maintain a structure of assets in relation to their liabilities consistent with being able always to pay their **liabilities on time**. These are often referred to, respectively, as **solvency** and **liquidity** requirements.[62]

16. Prudential laxity typically results in rates of credit growth by commercial banks inconsistent with maintenance of monetary stability. Although these expansions are arrested once the prudential standards re-assert themselves, the process of re-anchoring the system can be disruptive.[63] Expansion gives way to contraction, both as the result of the liabilities of insolvent banks being written down to the amounts in which they can be exchanged for central bank money, and prudential laxity usually turns, abruptly, into heightened risk aversion and a 'credit crunch'. The run up to, and the adjustment following, the GFC provides a clear and recent illustration of the process by which banking systems can become unanchored and of the highly disruptive nature of the re-anchoring process.[64]

17. The plan set out in Part 2 and Part 3 below addresses the liquidity management aspects of maintaining monetary stability. Part 2 provides a framework for MMA to monitor and manage the

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[61] Although if liquidity conditions become so tight as no longer to be credible, that can lead to a 'speculative attack on the currency.

[62] Typically, other prudential requirements are also applied, for example limits on concentrations of loan asset exposure and on funding concentrations. But these can be understood as additional measures to buttress the core solvency and liquidity requirements, rather than as additional requirements in their own right.

[63] This assumes that central banks do not 'bail out' insolvent commercial banks by extending central bank credit to insolvent banks. That would amount to an easing in the credit terms on which they issue their own liabilities and to de-basing their own currency. This is the reason why bail-outs of commercial banks, if they are to occur, need to funded by the fiscal authorities, not the central bank.

[64] As do the Asian Financial Crisis in 1997/8, the periods of financial instability in Australasia in the late 1980s/early 1990s, and in Japan and Scandinavia in the early 1990s.

amounts in which (and terms on which) it issues its own liabilities (base money) to the commercial banks. Part 3 provides a framework for supervising commercial banks' compliance with the prudential liquidity standards required for commercial banks to maintain demonstrable capacity to pay their obligations on time.

18. To be emphasised is that these plans **do not** include the supervision of commercial banks' solvency, except in one respect where prudent liquidity management and prudent lending practice overlap. Prudent lending is characterized by loans that are backed, first and foremost, by the cash flow that is required to service them, that is, to cover regular debt servicing (interest and amortization) payments. Collateral, in prudent lending, serves as a second, not the primary line of protection. Its role is to cover eventualities that are unforeseeable at the time a loan is made.

19. Lending based mainly on collateral, rather than on the borrower's ability regularly pay interest and to amortise the debt can be problematic. This is because such lending is not subject to the discipline that comes with the borrower having to meet regular servicing obligations – without which it there is no on-going test of the borrower's capacity to repay. Without that test, there is a heightened risk that loans to borrowers whose repayment capacity has deteriorated continue to be recorded as a fully performing even though they are vulnerable to default and loss. In other words, problem loans may not be identified as 'non-performing' because of the absence, during the life of the loan, of requirements to perform.

20. Hence, the structuring of lending contracts to include regular servicing (interest and amortisation payment) obligations enables problem loans to be identified and addressed early, as contributes to the lending bank's cash flow and hence to its liquidity. In this respect, sound lending and sound liquidity management overlap.

## 8.1.3 Post-GFC re-engineering of 'macro' and 'micro' liquidity management

21. In the two-three decades preceding the GFC, macro-liquidity management and micro-prudential supervision increasingly came to be regarded as separate and became disconnected. Macro-liquidity policy frameworks narrowed in their focus, to stabilsing the price level in terms of consumer goods and services, and prudential supervision to anchor the commercial banks became a secondary consideration: commercial banks increasingly were considered to be anchored by market disciplines.

22. The GFC exposed gaps in the resulting policy frameworks. These related both to a lack, or ineffectiveness, of constraints on risk-taking by commercial banks, resulting in diminution in the quality of banks' assets, and insufficiency of capital to absorb the resulting losses. A growing prevalence of collateral rather than cash flow-based lending (e.g., in the United States, sub-prime mortgage lending that was reliant on increasing value of houses as collateral) resulted in unsustainable credit expansion, escalation of asset prices, and mis-allocation of investment, e.g., over-investment in residential real estate. The subsequent collapse in asset prices resulted in correspondingly sizeable losses for banking systems.

23. The GFC also exposed many banks to illiquidity strains that undermined public confidence and exposed banks to risks of having to realise assets in 'fire sales' that, if they had occurred, would have further undermined their solvency. This was largely averted only by massive lender-of-last-resort operations by central banks and provision by governments of comprehensive bank guarantees (in some countries at a sizeable cost to taxpayers).

24. The period since the GFC has seen some re-engineering of macro- and micro- liquidity policy frameworks to addresses these weaknesses. Macro- and micro-liquidity management have been re-integrated in one respect (the emergence of 'macro-prudential policy), and separated in another (the development of a prudential standard for liquidity adequacy, separate from reserve requirements that hitherto had played principally a macro-liquidity function).

25. Macro-prudential policy is primarily concerned with the role of prudential supervision in anchoring credit expansion by commercial banks to a rate that respects the solvency constraint (to avoid credit 'booms and busts'). It involves bringing the supervision of the solvency of banks back within the macro policy frame. As such it is beyond the scope of this document (but is addressed in the macro-prudential regulation component of the TA program of which this liquidity management plan is one component).

26. With respect to prudential supervision of liquidity, central banks, historically, have prescribed liquidity requirements for commercial banks as a ratio of central bank deposits, or high quality liquid assets, to total deposits (or total assets), similar to MMA's minimum reserve requirement (MRR). However, these have been used mainly as quantitative constraint on banks' ability to expand their lending, rather than as a framework for prudent management of liquidity. And in many countries their application fell away as macro-liquidity management became based more on the central bank setting the interest rate at which it issued, rather than the quantity, of its liabilities.

27. The GFC, exposed resulting weaknesses in the prudential supervision of banks' liquidity and the Basel Committee on Banking Supervision has developed a new standard tailored specifically for the prudential supervision of commercial banks' liquidity (separate from the role of reserve requirements as an instrument of macro-liquidity management).

## 8.1.4 *The Maldives context*

28. The key strategic objective of macro-liquidity management in Maldives is maintenance of the fixed exchange rate between the Maldives Rufiyaa and the United States dollar (USD), in conjunction with maintenance of the foreign exchange reserves needed for that.

29. Given the small size of the financial system, Rufiyaa financial markets are comparatively shallow. Hence, central bank (macro) liquidity management needs to remain, at least for the time being, partly if not mainly quantitatively based. Part 2 below proposes possible enhancements to MMA's already well-developed framework for monitoring and forecasting the quantity of central bank liquidity available to the banking system.

30. Nonetheless, the interest rate at which MMA conducts operations also need to support rather than undermine its quantitative operations. That means that the interest rates at which it injects or withdraws liquidity (through its various repo, lending and deposit facilities) need to be capable of being judged consistent with delivering market-clearing outcomes consistent with the policy objective. Given the fixed exchange rate, USD interest rates provide a base, but the large element of risk premium embedded in Rufiyaa interest rates means that they are no more than that. Currently MMA's operations are undertaken around an indicative rate of 7%, between overnight deposit and loan facility rates of 3% and 12% (compared with USD interbank rates close to the zero bound).

31. Strategic choices relating to prudential supervision of commercial banks' liquidity are of a different nature. These relate to the extent to which MMA wishes to prescribe and enforce prudential liquidity standards for commercial banks. Although MMA currently applies a reserve ratio requirement (primarily as a macro liquidity instrument), and requires commercial banks to report information that enables prudential monitoring of banks' liquidity, it does not have or apply **prudential standards** that define minimum standards of liquidity adequacy. Part 3 below sets out a practical approach by which MMA's existing framework for prudential monitoring of banks' liquidity can be used as the basis, if considered appropriate, for setting minimum prudential standards, based on the recently developed Basel III standard of liquidity adequacy.

32. An additional feature of the Maldives monetary arrangements is the extent to which the economy and banking system is 'dollarised'. The balance sheets of the banks in the Maldives comprise at

least 50% USD assets and liabilities.[65] MMA, not being the issuer of the USD, does not determine and – other than through use of exchange controls – cannot influence USD macro-liquidity in the Maldives. However, in the context of its supervisory role, MMA does need to be satisfied that banks in Maldives are appropriately managing their USD liquidity risks, i.e., that they maintain sufficient USD liquidity to be able to pay their USD obligations on time, similar to how they need to maintain sufficient Rufiyaa liquidity to pay their Rufiyaa obligations on time.

# Part 2.   A macro-liquidity monitoring, forecasting and management plan for MMA

33.  A prerequisite for effective quantitative management of macro-liquidity is regular monitoring of the amount of central bank liquidity available to the banking system. That entails monitoring both the level of, and changes in, the banking system's holdings of central bank cash reserves, and the factors that have caused those changes. For this purpose liquidity is taken to comprise banks' balances at MMA. A broader measure of banking system liquidity includes banks' holdings of assets that are convertible into cash balances under MMA's standing facilities, i.e., assets that can be sold to MMA as of right at a pre-announced price.[66]

34.  Fluctuations in banking system liquidity arise from transactions between commercial banks and the MMA, and between their respective customers. The main categories of those transactions are:

- banks' sales/purchases of Rufiyaa currency to/from MMA;
- banks' sales/purchases of foreign exchange to/from MMA;
- government receipts/payments from/to customers of commercial banks, i.e., government receipts from/payments to the private sector;
- MMA's operations (open market operations in reverse repos and use by banks of MMA's overnight deposit and overnight lending facilities).

## 8.2.1 Monitoring liquidity

35.  There are two approaches to monitoring these influences on banking system liquidity. One is based on the central bank balance sheet identity. Under this approach, changes in the banks deposit balances with MMA are explained in terms of the change in each of the items on its balance sheet. The other is to explain those changes by way of the transactions that actually go across those deposit accounts.

36.  Currently MMA uses the **balance sheet identity** approach; in summary:

$\triangle$Banks' rufiyaa current account balances  = $\triangle$MMA net foreign assets + $\triangle$MMA net advance to Govt. + $\triangle$ MMA net lending to banks - $\triangle$Currency on issue

37.  Note, however, that transactions can take place whose effects on MMA's balance sheet are confined to the right hand side (RHS) of this identity i.e., they result in a shift in the composition amongst those elements but do not affect banks' rufiyaa balances at MMA. An example is a payment by firms to the government in USD (e.g., resort lease rentals), the proceeds from which are lodged to the Government's rufiyaa account at MMA. On MMA's balance sheet, this results in an increase in NFA, offset by a decrease in net advances to the Government. This implies a positive balance of payments influence, offset by a negative government influence, on banking system liquidity,

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[65] Source:  Azeema Adam, Dollarization in a Small Open Economy – The Case of Maldives, World Review of Business Research  Vol. 3. No. 3. July 2013 Issue. Pp. 1 – 15
[66] MMA's current facilities comprise an overnight deposit and an overnight loan facility.

whereas there has been no affect from either source as there have been no transactions between MMA and the banks.

38. There may also be transactions that do affect banks' rufiyaa balances at MMA but where the counterpart effect on the RHS in the above identity is not straight-forward. For example, if the Government finances rufiyaa spending in the Maldives by borrowing foreign currency, the counterpart to the increase in banks' rufiyaa balances will be an increase in MMA's NFA (the proceeds from the government's foreign currency borrowing). This is technically correct in that the counterpart to the increase in MMA's liabilities (deposits held by the banks) is an increase in net foreign assets, but this masks the underlying fiscal influence.

39. Thus, while the balance sheet identity approach 'works' in arithmetic terms, care is needed when interpreting the RHS influences on liquidity. There can be more behind those influences than 'meets the eye'. This can be important when forecasting liquidity. Good forecasts require a good understanding of the drivers that lie behind the data, not just of the data themselves.

40. The alternative approach is to extract data on the influences on the banks' deposit accounts with MMA directly (from the ledger accounts). The transactions posted to these accounts can be categorised according to the underlying influence. They can be captured daily (along the lines in Table 31), and aggregated up over longer periods (monthly, quarterly and annually) which are more relevant to discerning underlying trends (daily and weekly data tends to be dominated by day-to-day fluctuations).

**Table 31: Daily liquidity monitoring framework, date [      ] (Rufiyaa million)**

| | BOC | BML | HBL | HSBC | MCB | MIB | SBI | Total |
|---|---|---|---|---|---|---|---|---|
| Balance, close of business previous day | | | | | | | | |
| Foreign exchange:<br>(a) physical delivery (of foreign currency bank notes)<br>(b) wire transfers<br>(MMA sale = -ve, MMA purchase = +ve) | | | | | | | | |
| Government receipts/payments<br>(Payments to govt = -ve, from govt = +ve) | | | | | | | | |
| MVR Notes (sales to and repatriations by banks, net)<br>(Sales = -ve, repatriations = +ve) | | | | | | | | |
| Interbank clearing[67] | | | | | | | | |
| ATM/POS clearing[7] | | | | | | | | |
| Other | | | | | | | | |
| MMA operations<br>(a) Purchase/sale of T Bills (purchase = +ve, sale = -ve) | | | | | | | | |

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[67] The interbank clearing sums to zero giving that a clearing payment by one bank is a clearing receipt for another.

| | BOC | BML | HBL | HSBC | MCB | MIB | SBI | Total |
|---|---|---|---|---|---|---|---|---|
| (b) Loan/loan repayment (loan = +ve, repayment = -ve) | | | | | | | | |
| (c) Change in MRR requirement (decrease = +ve, increase = -ve) | | | | | | | | |
| Change in accessible balance with MMA | | | | | | | | |
| Closing balance with MMA | | | | | | | | |

41. There are advantages and disadvantages in each approach.  The advantage in measuring liquidity influences directly from the transactions across banks' accounts with MMA (along the lines in Table 31) is that the data is not prone to generating the kinds of 'mis-leading' pictures described in paras 38 and 39.  The disadvantage is that data on liquidity influences generated this way does not map as directly to the fiscal and balance of payments data.  For example, government spending on imports does not result in a liquidity injection to the local banking system.  To establish a nexus between the liquidity influences data derived directly from the banks' transactions with MMA with the government's accounts and with the balance of payments statistics, it is necessary to make adjustments to exclude the government's transactions from the balance of payments data, and external transactions from the governments fiscal accounts (the dark shaded square in Figure 17).

**Figure 17: Fiscal and external influences on banking system liquidity**

| | Private | Government |
|---|---|---|
| Internal | No liquidity influence | Fiscal liquidity influence |
| External (Balance of payments) | Balance of payments liquidity influence | No liquidity influence |

## 8.2.2 *Macro-liquidity forecasting*

42. Forecasting liquidity requires the building of working familiarity with the data on the underlying liquidity influences, particularly the linkages between those and the balance of payments and fiscal macro-economic aggregates.  (The other main influence to be forecast is note and coin issuance, which is more straightforward, given a reasonably stable trend rate of increase in the amount of Rufiyaa currency on issue and reasonably stable seasonality.)

43. A 'top-down', medium-term, approach to forecasting the fiscal and balance of payments influences is best undertaken using (separately developed) forecasts of the balance of payments and fiscal positions (including drawing on the government's own fiscal projections). A high-level framework for that is shown in Table 32 and Table 34.

**Table 32: Fiscal influence on banking system liquidity**

| | Budget balance | | | | Financing transactions (excl MMA) | | | | Net internal fiscal balance (after internal financing, excl MMA) | | Influence on banks' liquidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Internal | | External | | Internal | | External | | | | Bank's transactions over MMA a/cs | | MMA balance sheet (PBA) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| Quarter | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 |
| Mar | | | | | | | | | | | | | | |
| June | | | | | | | | | | | | | | |
| Sep | | | | | | | | | | | | | | |
| Dec | | | | | | | | | | | | | | |

**Table 33: Balance of payments influence on banking system liquidity[68]**

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[68] Shaded cells indicate the information base for forecasting liquidity influences on the basis of transactions that pass over banks' accounts with MMA.

| | Capital account | | | | Current account | | | | Balance of payments (total) | | | | Influence on banks' liquidity | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Private | | Govt. | | Private | | Govt | | Private | | Govt | | Bank's fx transactions with MMA (over MMA a/cs) | | MMA balance sheet (NFA) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
| Quarter | 2013 | 2014 | 2014 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 |
| Mar | | | | | | | | | | | | | | | | |
| June | | | | | | | | | | | | | | | | |
| Sep | | | | | | | | | | | | | | | | |
| Dec | | | | | | | | | | | | | | | | |

**Table 34: Summary of influences on banking system liquidity, quarterly (before MMA operations)**

| Influence | March qtr | | June qtr | | Sept qtr | | Dec qtr | |
|---|---|---|---|---|---|---|---|---|
| | 2014 (forecast) | 2013 (actual) | 2014 (forecast) | 2013 (actual) | 2014 (forecast) | 2013 (actual) | 2014 (forecast) | 2013 (actual) |
| Government balance (after domestic financing, excluding MMA financing) (from Table 32, columns 9/10) | | | | | | | | |
| Residual | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Net MMA govt. liquidity injection (columns 11/12) | | | | | | | | |
| Balance of payments influence (from Table 33, columns 9/10) | | | | | | | | |
| Balancing item | | | | | | | | |
| Net MMA FX sales to banks (from Table 33, columns 13/14) | | | | | | | | |
| Net sales of Rf Notes to banks | | | | | | | | |
| Other (net) | | | | | | | | |
| Total liquidity influence | | | | | | | | |

44. However, there are also complications to be dealt with.  Forecasting the fiscal influence is dependent on the availability of official fiscal forecasts.  Also, to prepare forecasts of the fiscal influence on the basis of the transactions that actually go across banks' accounts at MMA, it is necessary to have those on a basis that enables the government's external transactions to be stripped out.  (That is not strictly necessary, under the alternative (current) methodology, for forecasting the change in the balance of the PBA at MMA, although in practice it may be.  Meaningfully forecasting the change in the PBA requires that forecasts be made at least of the government's budget balance and of how it will be financed, as between domestic and external financing.   So the only difference may be that the former approach also requires an forecast estimate of the government's net imports.)

45. Forecasting the balance of payments influence on banking system liquidity may be more problematic, owing to the Maldives being a highly dollarised economy and also to gaps in the official balance of payments statistics.  For most small open economies there is reasonably close correspondence between the private (current and capital account) balance of payments and sales/purchases of foreign exchange by the central bank to/from the commercial banks.  That will not be the case to in Maldives: many transactions between banks/banks' customers and foreign parties (in respect of both imports/exports and investment/financing transactions) will be entirely in USD, with no exchange for Rufiyaa involved.

46. In these circumstances forecasting the balance of payments influence on banking system liquidity within a framework along the lines outlined in Table 33 may not be possible.  The best fall-back may be to simply establish and maintain the time series data in columns 13 to 16 of that table (at least monthly and quarterly time series) and develop as good an understanding as possible of the factors that have lain behind past trends and patterns in the data – as a basis for making **informed assessments** of possible forward looking scenarios.

47. Once medium-term 'base-line' forecasts of the influences on liquidity have been prepared, short-term forecasting of liquidity influences can be undertaken by additionally drawing on information sources (MOF and MIRA) on major near-term transaction flows.  For example, given fiscal balance and financing forecasts for a year ahead, short-term (monthly, weekly) projections can be compiled by taking account of the known timing of major components of revenue and expenditure e.g., government employee paydays and due dates for tax payments.  Similarly, banks' purchases/repatriations of currency from/to MMA may have a seasonal pattern.  While making short-term forecasts of foreign exchange sales/purchases by MMA to/from the banks generally will be more difficult, the small number of (mainly government connected) corporations, may mean that there is the opportunity to establish some potentially useful sources of information on major upcoming foreign exchange transactions.

48.  A third step is to review and analyse liquidity **outcomes compared with forecasts**.  Where there are sizeable discrepancies, it is a good idea to go back to the information sources to find out what they know about why outcomes were different from projected. That may uncover that there were just timing differences (some transactions happened earlier or later than expected), or that there were unusual influences.  Information on both of these can help improve forecasting over the next few weeks, or months, ahead. For example, if the liquidity injection from government was smaller than expected 'this week' because a large government outlay was deferred, that is information that is relevant to forecasting government injections in the period ahead.

## 8.2.3 *Macro-liquidity management*

49. MMA has an array of liquidity management instruments at its disposal.  These include:

- minimum reserve requirements (MRR) – whereby MMA prescribes a proportion of total customer deposits that must be held by banks on deposit with MMA.
- open market operations under which MMA undertakes reverse repo auctions to absorb liquidity.
- standing overnight deposit and lending facilities (ODF and OLF) for commercial banks.

50. Given MMA's externally-focused policy objectives (maintaining the fixed exchange rate and prescribed levels of foreign exchange reserves), the appropriate liquidity management policy response to shifts in the amount of central bank liquidity in the banking system depends on the source of those shifts. (Hence the need for analysis of the influences on liquidity outlined above.)   Essentially:

- liquidity injections attributable to fiscal policy (net domestic spending that is not financed domestically by the government itself) need to be <u>sterilised</u>, so as to avoid, or lessen the extent to which, they spill over into foreign exchange outflows (either directly, or as the result of credit expansion by banks, and by way of either imports or as private capital outflows); but
- drains on liquidity attributable to sales of foreign exchange generally should not be offset, i.e., not be sterilised, but rather allowed to result in tighter liquidity conditions.  The resulting tighter conditions help to stem the foreign exchange outflow.[69]

51. MMA can sterilise injections of liquidity from the fiscal accounts by increasing the MRR requirement, or by undertaking reverse repo operations.  The former <u>freezes</u> liquidity that otherwise would be available to support expansion of credit by banks, while market operations <u>remove</u> the liquidity from the banking system.

52. MMA has a well-established framework for determining the amounts to be offered by way of reverse repo in its weekly operation.  Possible areas for technical improvement have been identified.  These are detailed in Appendix.1.  The principal possible improvement relates to the current practice of deeming the full amount of 'excess reserves' (the estimated amount by which actual reserves exceed required reserves) as being held by banks to cover settlement requirements, and therefore do not need to be 'mopped up' by the market operation.  An alternative approach could be to exclude only required reserve holdings from the amount of liquidity available for 'mopping up'. (Questions have also been raised about the operation of the minimum reserve requirement.  These are addressed in Appendix.2)

53. In principle, in a reverse repo auction, the interest rate is market-determined, i.e., the interest rate adjusts to clear the market for the amount on offer.  However, where, as in the case of MMA (and nowadays many central banks), standing (deposit and loan) facilities are also available to commercial banks, at pre-announced rates of interest, those provide a 'corridor' within which the reverse repo rate will be determined.  In that way, the policy framework shifts from one founded on forecasting and managing the quantity of liquidity available to the banking system, to one founded on the central bank setting the interest rate at which it issues its liabilities, with the quantities becoming endogenous.

54. The width of the interest rate corridor currently set by MMA (an ODF rate of 3% and an OLF rate of 12%) means, in principle, that its policy framework remains, primarily, quantity based (the 9% point corridor is sufficiently wide to provide a lot of scope for quantitative control (before that gives way to banks being able to access the standing facilities).  That said, MMA also has an indicative policy rate (in 2013 of around 7%) at which it conducts reverse repo actions.  This results in it playing a greater role in setting the interest rate for the Rufiyaa, than the quantity of Rufiyaa liquidity on issue, than the ODF/OLF corridor alone would indicate.

55. To the extent that MMA has moved (or is moving) toward setting the interest rate at which it issues Rufiyaa liquidity, rather than managing the quantity of that liquidity, the role of its reverse repo operations correspondingly shifts.  The purpose of those operations shifts from serving as an

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[69] Similarly, <u>in principle</u>, liquidity withdrawals as the result of domestic fiscal surpluses should be sterilised and liquidity injections as the result of balance of payments surpluses should not be.  However, if the latter are judged only to be temporary, then the prudent course of macro-liquidity management would be also to sterilise those injections.  This would be to prevent the easing in liquidity conditions in the near term resulting in an upsurge of imports, and a liquidity/foreign reserves problem arising in the medium term.

instrument of macro-liquidity policy control, to 'market-smoothing' operations to support the functioning of the short-term money market, in particular the inter-bank market.

56. A practical challenge in that context is to assess how much or little of shifts in liquidity conditions merely reflect short-term volatility and how much they might represent the beginnings of an emerging trend that threatens achievement of policy objectives, and to respond accordingly. It underscores the need for effective monitoring and forecasting systems – which provide a basis for identifying when things are going 'off-track' i.e., when discrepancies from the medium-term forecast are persistently in one direction.

57. Short-term fluctuations, which reliably can be assessed will reverse in the near term, by contrast, need not undermine macro policy objectives. But they can still result in uncertainty that inhibits the functioning, and development, of the short-term money market. Banks with excess liquidity may be reluctant to lend it if there is uncertainty about subsequent near-term availability of liquidity to the market. Operations that smooth liquidity can help in this respect.

58. An alternative means by which volatility can be addressed is by providing the inter-bank market with an ample pool of liquidity. But for that not too risk undermining the key exchange rate and foreign exchange reserve objectives, it is essential both that interest rates are at a level adequately to restrain the **demand** for bank credit, and that a culture of prudent lending (based on borrowers' capacity to service debt) is well-established amongst the banks. 'High' interest rates may have little braking effect on credit expansion by commercial banks if banks are willing to add the interest due to the outstanding debt, or ease debt servicing requirements by relieving borrowers from requirements to amortise the principal.

59. That points to greater reliance than presently needing to be placed on the effectiveness of the prudential requirements that bind the commercial banking system to the policy settings laid down by MMA. In other words, less reliance would be placed on central bank generated liquidity operations to constrain the supply of commercial bank credit and more on banks' adhering to prudent lending standards. That, in turn, indicates that if, over time, there is a shift towards relying more on interest rates, than on the quantity of liquidity available, to serve as the macro-liquidity policy 'lever', there will be a corresponding need also to ensure that prudential supervision of banks is sufficiently effective to play a possibly greater anchoring role.

# *Part 3. Prudential supervision of commercial banks' liquidity*

## *8.3.1 Background*

60. The preceding section addresses the management by MMA of the issuance of its own liabilities – how much and on what terms it issues its currency to the **banking system**. This section addresses supervision by the central bank of the liquidity of each of the **individual commercial banks**.

61. Whereas in managing the issuance of its own liabilities a central bank is concerned mainly with the aggregate amount of central bank liquidity available to the banking system, supervision of commercial banks' is an individual, bank-by-bank, activity. This recognises three things. First that maintenance of monetary stability overall requires issuance of sound money by commercial banks as well as by the central bank. Second, that commercial banks are exposed to liquidity risk individually, i.e., that a single bank 'name' can face liquidity stresses even though the banking system as a whole has ample liquidity. But, third, that a sound bank 'short' of central bank liquidity can raise liquidity in the inter-bank market (and need not necessarily hold all its liquid assets directly in the form of central bank deposits, but may hold a proportion of its liquid assets in the form of tradable securities issued by, or deposits with, other banks). The inter-bank market has an important role to play in enabling efficient distribution of central bank liquidity within the commercial banking system.

62. Each commercial bank needs to manage the maturity structure of its assets and liabilities and also to maintain a buffer of liquidity to support its ability to pay its liabilities in central bank money, **at par**

(solvency) and **as they fall due** (liquidity). While preservation of **solvency remains the cornerstone**, and that mostly concerns the quality of a bank's loan assets, commercial banks also need to maintain a buffer to cover liquidity risk. Liquidity pressures can arise from an unexpected upsurge in deposit withdrawals (and in loan facility draw-downs), or difficulties/delays in refinancing maturing borrowings. Bank's need to manage the maturity structure of their assets and liabilities to mitigate these risks. They also need to hold liquid reserves to cover unexpected eventualities (essentially no different from how a central bank needs to maintain liquid foreign exchange reserves to buttress confidence in its ability to maintain convertibility of its currency). Those eventualities can occur for any manner of reason, including mere rumor about a bank.

63. Currently the minimum reserve requirement (MRR) applied by MMA to banks in the Maldives, primarily for macro-liquidity management purposes, also serve a micro-liquidity function. Since 2006 the MRR has been set at 25 per cent.

64. As a **prudential requirement**, the MRR is no particularly well designed (which stands to reason given that, primarily it has to date played a macro- rather than a micro-liquidity (i.e., prudential) role. It has been a simple 'rule of thumb', expressed as a percentage of total deposits, which takes no account of the differing types and levels of liquidity risk embedded in different funding structures and asset portfolios. The new Basel liquidity standard seeks to address these weaknesses in traditional liquid reserve ratio requirements.

## 8.3.2 *The new Basel liquidity standard*

65. The new prudential standard for bank liquidity comprises two core elements:

- a requirement that banks hold a stock of high-quality liquid assets sufficient to cover a <u>short-term</u> period of financial stress (to take effect from beginning 2015); and
- a net stable funding requirement, which requires banks to fund **their longer-term** assets with stable sources of funding (to take effect from beginning 2018). Stable funding comprises retail funding and other sources of funding with a maturity of one year or more.

The Basel Committee additionally recommends that bank supervisors should monitor a range of supplementary liquidity indicators:

- contractual maturity mis-matches;
- concentrations of funding – from single individual or related sources, or sectors (analogous to concentrations of lending exposure);
- the availability of unencumbered assets (in markets where repo financing and securities lending is prevalent);
- for banks that have a dual or multi-currency balance sheet, the liquidity coverage ratio for each currency; and
- market indicators or possible or emerging liquidity stresses, or which could give rise to liquidity stresses, e.g., banks' share prices (where the bank is publicly listed, credit default prices.

66. The Basel standard for the liquidity coverage ratio (LCR), is that banks should hold sufficient high-quality liquid assets to cover 100% of the cash-outflow that could be experienced (given certain assumptions) over 30 days **in a financial stress situation**. (See Table 36 for details of the framework within which the LCR is calculated.) However, the Basel Committee has also provided for this standard to be phased in, commencing at 60% in 2015, and increasing by 10% points each year until it reaches 100% in 2019 (although many central banks have already adopted the standard on an earlier implementation timetable).

67. The Basel standard for the net stable funding requirement (NSFR) is that a bank's longer-term and less liquid assets should be funded mostly from stable sources, i.e., retail sources or funding with a term to maturity of at least one year (see Table 35 for details). The NSFR, provides an underpinning for a **prudent underlying (long-term) structure** of a bank's balance sheet; the CFR is focused on

the liquidity needed to survive a **short-run liquidity crisis**.  They therefore go together, rather than one being a substitute for the other.

68.  This framework for the supervision of banks' liquidity places an emphasis on the prudential aspects of liquidity management.  This is reflected in:

- the explicit recognition given to the need for banks to maintain liquidity to cover **unexpected financial stress situations**, similar to the role of capital as a buffer to cover **unexpected** losses;
- measurement of the amount of liquidity required that takes account of the differing liquidity risk characteristics arising from:
  o  different sources of funding (the maturity structure and behavioural characteristics of different categories of funding);
  o  varying abilities to realise different classes of 'liquid assets' without incurring a loss of capital value;
  o  the timing of **cash flows** from the loan portfolio, with amortisation payments explicitly taken into account as a source of liquidity.  This connects with and reinforces the  role of debt servicing (interest and amortisation payments) as a foundation for prudent lending, and as an underpinning, therefore, for both the maintenance of credit quality (and hence capital adequacy) as well as liquidity.

69.  Traditional liquid asset to total deposits ratios have not addressed these aspects of liquidity management by commercial banks.  Because they have operated as simple 'rules of thumb', they have required some banks to hold too little liquidity (in the case of, for example, banks that fund long-term, non-amortising, loans from short-term wholesale sources) and others to hold too much (such as banks that fund amortising retail loans from retail sources).  The new international liquidity standard is more attuned to the different degrees of liquidity risk embedded in the balance sheets of banks doing different kinds of business; and, importantly, requires of banks more active management (and monitoring) of their liquidity positions.

**Table 35: Stable funding ratio (indicatively calibrated for the Maldives)[a]**

| | Rf Million | Recognition factor (%) | Stable funding (Rf million) |
|---|---|---|---|
| 1.  Funding with a residual maturity of > 1 year | | 100% | |
| 2.  Retail demand deposits (from individuals and private companies) | | 80% | |
| 3.  On demand retail savings deposits (from individuals and private companies) | | 90% | |
| 4.  Total stable funding (1 + 2 + 3) | | | |
| 5.  Total balance sheet liabilities | | | |
| | | | |
| 6.  Stable funding ratio (4/5) | | | % |

[a] The calibration is indicative only and does not correspond exactly with the Basel Committee calibration (which is also more detailed).

**Table 36: Liquidity Coverage ratio (indicatively calibrated for the Maldives)[a]**

**The liquidity coverage ratio is calculated as** High quality liquid assets (HQLA)/Net 30-day cash outflow, where:

The **net 30-day cash outflow** is calculated as contractual cash in-flows, less contractual cash out-flows over the 30-day period ahead, as follows:

Contractual cash outflows comprise:

A. 50% of funding withdrawable on demand or with a contractual maturity within 30 days, sourced from 'wholesale' sources (Govt. and govt. corporations, public companies, and financial institutions)

B. 10% of funding that is withdrawable on demand or contractually due for repayment in not less than 30 days, sourced from 'retail' sources (private companies and individuals)

C. 50% of other contractual outflows within 30 days or less

D. 15% of the undrawn balance of committed lines of credit, that can be drawn on within 30 days or less.

Less

Contractual cash inflows comprising

A. 100% of balances held at the Monetary Authority of Maldives

B. 100% of MVR inflows of cash contracted to be received in respect of loans, deposits, or other financial assets within 30 days, but excluding proceeds from maturing financial assets that are:

    i. also included in HQLA;

    ii. in respect of loans or financial assets that are classified as sub-standard or weaker.

[Note: Loans and advances that are on demand are also not to be included, it is only those with contractual payment dates that are included]

C.  95% of foreign currency inflows of cash contracted to be received in respect of loans, deposits, or other financial assets within 30 days, but excluding proceeds from financial assets that are:

   i.  also included in HQLA;

   ii.  in respect of loans or financial assets that are classified as sub-standard or weaker.

D.  75% of undrawn committed funding lines that are available within 30 days (subject to conditions).

**Equals:**  Net 30-day cash outflow

High quality liquid assets are:

a)  100% of gold balances

b)  100% of MVR notes and coin

c)  95% of foreign currency notes and coin,

d)  Bills and bonds issued by the Government of Maldives or MMA

   i.  < 6 mths to maturity 100%

   ii.  >6mths and <12 mths to maturity 95%

   iii.  >12 mths to maturity 90%

e)  Bills and bonds issued by foreign governments

   i.  < 6 mths to maturity 95%

   ii.  >6mths and <12 mths to maturity 90%

   iii.  >12 mths to maturity 85%

f)   90% of tradable securities guaranteed by the Government of Maldives

**Total HQLA** comprises primary liquid assets plus secondary liquid assets, subject to secondary liquid assets not to exceed 15% of total HQLA.

[a] The calibration is indicative only and does not correspond exactly with the Basel Committee calibration (which is also more detailed).

## 8.3.3 *Application in the Maldives*

70. A first step toward applying the new Basel prudential liquidity standards in Maldives is to pilot them; that is, to obtain and apply the data needed to assess what the implications would be. A framework for doing that is provided separately (by way of an excel worksheet). This worksheet is constructed from MMA's existing 'liquidity buckets' monitoring framework (prudential schedule 9) and shows how a LCR and NSFR can be calculated from that data set (by way of a worked example, based on hypothetical data). Note that loan assets have been classified according to assumed amortisation dates, rather than according to the date of the final installment.

71. MMA, therefore is already close to being in a position to apply a LCR/NSFR standards. Alternatively, it may choose, at least initially, to use those standards as monitoring benchmarks in its qualitative supervisory relationship with banks. That would provide an opportunity to assess the future role of the MRR alongside the new prudential liquidity standards and to consider possible transition paths.

72. Two key considerations bearing on what may be the most appropriate transition path are:

    - The adequacy, currently, of the liquidity of Maldives banks. Prima facie it appears adequate (given the 25% MRR). However, if some of the Maldives banks are substantially funded by short-term wholesale (corporate, state enterprise) deposits, and a sizeable proportion of their lending comprises non-amortising long-term loans, they may be significantly less liquid than a traditional MRR-type measure indicates.
    - To what extent, and over what timeframe, MMA might transition in its macro-liquidity management practices to placing greater reliance on market operations at market-determined interest rates to mop up injections of central bank liquidity, and or to use its interest directly as a macro-liquidity policy instrument. Moves in those directions could take some of the macro-liquidity policy load off the existing MRR requirement, and free it up to be recast more as prudential liquidity standard, in line with contemporary international practice.

73. Of the supplementary liquidity indicators recommended by the Basel Committee, two are of particular relevance to the Maldives:

    - the need for banks in Maldives to maintain liquidity cover for their USD as well as Rufiyaa obligations (given that the banks balance sheets comprise as much as 50% USD assets and liabilities); and
    - concentrations of funding (given what are thought to be significant concentrations in the funding of at least some of the banks).

74. These aspects can be covered as follows:

    - USD liquidity risk can be monitored by requiring banks to provide data in the LCR monitoring template for both the Rufiyaa and USD components of their balance sheets (and possibly also consolidated). In this way MMA can gauge banks exposure to liquidity exposure in both currencies. Liquidity risk in the USD balance sheet may be at least as great a cause for supervisory attention given that in a liquidity crisis the scope for MMA to provide liquidity assistance is limited (to the extent that it can lend USD from its foreign exchange reserves which, in a liquidity crisis, may already be under pressure).
    - Concentrations of funding can be monitored by requiring banks to provide data on:
        o the percentage of total funding sourced from the five largest funding counterparties (or related counterparties comprising a single group); and
        o the shares of total funding contributed by the five most significant funding products (the scope and definition of a 'product' being something to be established with each bank case-by-case having regard for the nature of the business of each bank).

# *Appendix.1      Some observations on current liquidity management practice*

1.  MMA currently:

    - projects liquidity on a weekly basis;
    - the 'liquidity week' runs from Thursday to Wednesday;
    - the forecast is done into the week, on Monday, by when 'actuals' are available for the preceding Thursday and Sunday;
    - the open market operation (reverse repurchase) amount to be offered is determined from the Monday forecast, with the operation undertaken that afternoon for settlement next day (Tuesday).

2.  Three possible technical issues have been identified.  The first two addressed below are of 'second order' level of materiality, whilst the third may be of greater significance.

## A possible double counting?

3.  The current framework adds the actual liquidity flows for Thursday and Sunday to the excess reserves balance recorded for those days.  Given MMA's RTGS system, it would appear that those flows are already included in the end of day excess reserves figure.  If that is the case, there will be a double counting. (That is not an issue for the Monday-Thursday forecasts because the excess reserves forecast for those days is the figure for Sunday carried forward.)

## What is the appropriate way to assess the level of 'excess reserves' (for liquidity forecasting)?

4.  Excess reserves for each day are calculated as the simple difference between the reserve requirement for the (two week) maintenance period and the reserves figure for the day.  Where reserves during the maintenance period to date have been well above or below the required level, this may over or understate excess reserves.  Whether that is the case will depend in part on whether one is considering just the current maintenance period or also following maintenance periods.  For the current period only, a correct calculation of excess reserves on a particular day would take into account of the 'surplus' in reserve holdings already accumulated, or the deficit to be made up.  For example, in the case of a bank that has accumulated a substantial 'credit' against its reserve requirement, holding reserves under the (average) requirement for the remainder of the maintenance period will not constitute a reserves 'shortfall'.  But if banks' in assessing the reserves available for investment in reverse repos also consider the next maintenance period, then the current practice will be more appropriate.

## Determining the amount to tender in the reverse repo

5.  Currently MMA assesses the amount to offer in its weekly reverse repo operations to 'mop up' the forecast net liquidity injection for that week.  Operations occur each Monday, for settlement on Tuesday.  These follow a government T bill tender on Sunday. [70]

6.  The amount tendered in reverse repos is determined on the basis of (a) liquidity injections for the week (actuals for Thursday and Sunday, forecasts for Monday –Wednesday), after taking account of (b) Overnight Deposit Facility (ODF) deposits lodged on Monday (which are assumed to be rolled over on each of Tuesday and Wednesday) and (c) forecast liquidity flows for each of Tuesday, Wednesday and Thursday.

7.  The objective of reverse repo tenders is to 'mop up' the liquidity injection for the week.  Excess reserves, however, are excluded.  Excess reserves held by HSBC and Maldives Islamic Bank are excluded because these banks cannot participate in the reverse repo operation (HSBC having not signed MMA's master repurchase agreement, and MIB because reverse repurchase agreements are not Sharia Law compliant).  The balance of excess reserves is regarded as being needed to cover banks settlements needs.

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[70] Although recently MMA has suspended reverse repo operations, in favour of the Government moving to fully finance its borrowing requirement by way of T bill tenders, rather than MMA 'coming along behind' to 'mop up' liquidity injected into the banking system from net government spending.

8.  An alternative approach would be to include excess reserves in the calculation of available liquidity and net off just (a) the excess reserves of the banks that cannot participate and (b) an amount determined by MMA to cover interbank settlements.  If/when HSBC is able to participate, that would bring more/most of excess reserves within the reverse repo calculation.[71]

# *Appendix.2    Reserve requirements*

**Purpose of reserve requirements**

1.  Reserve requiements 'lock liquidity away', without interest having to be paid to achieve that.  Liquidity is **removed from being available** to fund lending, rather than being made more attractive to hold than to lend.  In that sense reserve requirements are a 'tax' on the banks.  But in a financial system within which financial markets are less fully developed, and interest rates cannot be relied on as a rationing mechanism, they may be needed to achieve monetary control, i.e., given weaknesses in interest rate rationing, some quantitative rationing is required.

2.  Also, experience indicates that when banks' appetite for lending increases, they tend also to ease their credit standards – including by easing loan servicing (interest and amortisation payment) requirements.  In that case, rising interest rates may not be so effective in constraining lending growth, and a quantitative constraint may be needed.

**At all times or an average requirement over a maintenance period?**

3.  MMA in the recent past extended the reserve maintenance period from 1 to two weeks.  The advantage of a longer maintenance period is that can provide banks with more room to absorb spikes in liquidity, and help to avoid abrupt (interest rate, or loan rationing) adjustments when those occur.

4.  Note, however, that if such a spike occurs close to the end of the maintenance period when the bank is already 'behind,' the severity of the adjustment can be accentuated rather than attenuated.  An 'at all times' reserve requirement has the advantage of requiring shortfalls to be corrected in a timely manner, with less risk of a bank having to 'scramble' to achieve compliance at the very end of the maintenance period.

**A daily cap on shortfalls from the reserve requirement?**

5.  The question has been raised whether placing a cap on the amount of any daily reserves shortfall/excess (or, equivalently, shortening the maintenance period) could help to foster an inter-bank lending market.  If a bank facing a sizeable shortfall on a particular day had to cover the amount of the shortfall, say, the next day, would that result in banks more often looking to borrow from others (with surplus liquidity)?

6.  All other things being equal, that might be expected.  But whether it would actually happen would depend on the extent to which there are other impediments to the functioning of the inter-bank lending market.  If there are other material impediments, banks instead may choose to increase the size of their liquidity buffers (to lessen the likelihood of breaching the cap) and /or to bear the cost of obtaining the necessary reserves under MMA's 'Lombard' facility.  If that is the case, a prior matter for MMA to consider those constraints and what, if anything, can be done to ease them.

# *Appendix.3     (Illustrative) Draft Road map for Implementation*

This illustrative roadmap is intended to provide a framework for progressing liquidity management in Bhutan in a sequenced manner.  It is emphasised that the timelines are purely indicative – of what could be 'ambitiously feasible', but they do not take account of possible staff resource availability constraints nor of possible competing priorities.

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[71] The reasons for HSBC not agreeing to sign MMA's master repurchase agreement are to be considered further, with a view to enabling it to participate

## A    Macro-liquidity monitoring, forecasting and management

### (a)    *Monitoring and forecasting*

1.    Consider refinements to daily liquidity influences data capture/forecasting/OMO calibration as discussed during mission, in particular:

- capturing data direct from banks' ledger accounts with MMA, rather than from MMA's balance sheet
- MMA to determine the residual amount of liquidity (after allowing for reserve requirements), rather than assuming residual balances are need by banks to cover payment settlement requirements.

Indicative timeline:    Early 2015

### (b)    *Mapping of liquidity influences data to fiscal and balance of payments macro data.*

2.    Obtain and build time series of recent fiscal and balance of payments data (actual and forecast).

3.    Assess feasibility of & best approach for mapping the government and foreign exchange liquidity influences data to the fiscal and balance of payments macro data (as per 2).  In particular, establish whether the latter is available with government imports separately identified and establish whether the mapping is best done using 'net of government imports' data (actual if available, estimated if not) or using gross (private) balance of payments and gross fiscal aggregates.  This requires some empirical analysis.

4.    Map available historic (annual, quarterly) liquidity influences data to macro data – and establish the 'errors and omissions' residuals between the two data sources.  Set up fiscal and balance of payments macro data series to be maintained alongside the fx and fiscal liquidity influences data series.

Indicative timeline:    A second half 2015 project

### (c)    *Macro liquidity forecasting*

5.    Obtain (from MoF, IMF projections) or MMA prepare its own annual/quarterly projections of fiscal and balance of payments data.

6.    Use those forecasts as a base from which to undertake short-term forecasting of macro-liquidity influences:

- baseline quarterly and annual forecasts of influences on banking system liquidity for the year ahead
- splitting quarterly forecasts into shorter (monthly, weekly) intervals – taking account of:
    - seasonality & regularity in payments, eg, government paydays, tax due dates.
    - specific information available from government and market contacts (eg, on upcoming large foreign exchange large payments, etc).  MMA should seek to build a network of contacts for the purpose of obtaining this kind of market intelligence.

Indicative timeline:    2016.

### (d)    *Macro-liquidity management*

7.    (Re)establish a regular T Bill auction program, with auction amounts based on liquidity forecasts (as above).  Auction amounts should be determined so as to leave a 'target' level of liquidity in the banking system.

8.    Assess the future role of the existing reserve requirements as macro-liquidity instruments in the light of:

- experience with T Bill auctions

- the relationship between the existing reserve requirement and the CFR/SLR standards and the potential role of the latter as macro-prudential instruments.

Indicative timeline:    To be determined – is contingent on key policy decisions.

## B        Micro (prudential) liquidity management

1.        Initial pilot the LCR and NSFR standards (using the existing maturity buckets liquidity reporting framework (Report M4), and adapting that to assess where Bhutan's banks stand relative to the Basel standards for LCR and NSFR).

Indicative timeframe:  First half 2015

2.        Use the LCR and NSFR standards as monitoring benchmarks in MMA's qualitative supervision of Bhutan's banks (a basis for supervisory discussion, and direction on prudential management of liquidity).

Indicative timeline:   Second half 2015, on-going

3.        Review relationship between existing reserve requirement and CFR/NSFR standards, with a view to possible shifting to those, including as a macro-prudential instrument.

Indicative timeline:  To be determined – is contingent on key policy decisions.

# Annexure.3   Capacity building and training of central bank staff (Output-3)

# 9 Guidance Note on Stress-testing

## 9.1 Background

The recent financial crisis has pushed economies, both developed and developing, across the globe to take a relook at their reform agenda on financial stability. It has also enhanced the importance of the financial system to the economy's macro-economic performance. It is seen that an adverse impact on financial stability in the US economy had widespread economic ramifications on both emerging and other developed economies, leading to destabilization of their macro-financial systems. Such inter-dependencies between nations have increased over a period of time – both in real and financial terms. Financial regulators have responded to this challenging environment by building cooperation with other regulators and employing more sophisticated approaches to financial sector risk management. This includes identification of the vulnerabilities in the financial system that could have significant macroeconomic consequences. Stress testing is one such tool that can be employed to assess the vulnerability of the financial system to abnormal shocks and market conditions.[72]

The term stress testing can be described as a range of techniques that is used to assess the vulnerability of financial system to major changes in the macro-economic environment or to exceptional, but plausible events. It is pertinent to note that stress testing only provides a *rough estimate* of the effect of the shocks. It is not a precise tool that can be used with scientific accuracy. ***The stress test is only an analytical technique that can be used to produce numerical estimate of sensitivity to a particular risk.*** For example, stress tests can only provide an estimate of the exposure to a specific event, but not the probability of the event occurring. Hence, it can provide an estimate of how much could be lost under a given scenario but not how much is likely to be lost.

Stress tests not only involves data analysis using various financial sector data but also involve a series of judgments and assumptions that can be as critical to producing meaningful results as the actual data analysis may yield. ***In other words, assumptions do matter.***

## 9.2 Rationale for stress testing

Stress testing is a resource intensive process, hence it is pertinent to address the question *'Why do stress test'?* Some of the key reasons to conduct stress testing is outlined below:

- Stress testing of the financial system can **support policymakers to understand the behavior of the system** under exceptional but plausible shocks and gauge the significance of the system's vulnerabilities.

- System stress tests can also help **identify weaknesses in data collection**, reporting systems, and risk management practices at the central bank level as well as at the individual institution level.

- Stress testing can also provide support in **effective monetary policy** since it contributes to better understanding of the links between the financial sector and the macro-economy.

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[72]2001 Blaschke, Jones, Majnoni and Peria,Stress Testing of Financial Systems: An Overview of Issues, Methodologies and FSAP Experiences, IMF

Any financial institution faces various kinds of risks. These, inter-alia, include credit risk, interest rate risk, foreign exchange risk, liquidity risk, equity price risk etc. In the subsequent paragraphs we will explain the process through which we will conduct stress test capturing five kinds of risk (i) interest rate risk (ii) credit risk (iii) foreign exchange risk (iv) inter-bank contagion risk (v) liquidity risk. Under this stress testing exercise, we will conduct sensitivity analysis and scenario analysis. Sensitivity analysis includes assessment of financial system to various risks on a standalone basis. On the other hand, scenario analysis allows assessing the vulnerability of the financial system when various risks emerge together.

# 9.3 Explaining Risks

## 9.3.1 Interest rate risk

Interest rate risk is the risk faced by a financial institution when the interest rate sensitivity of its assets and liabilities are mismatched. When interest rates change there may be two types of impacts on a bank. First, its net interest income (i.e. the difference between interest income earned on assets and interest expended on liabilities) may change. Second, the price of its fixed-interest rate assets may change with a change in the market interest rate.

### Interest income impact

It should be noted that interest income (expense) may not be subject to change for all assets (liabilities) for a given change in interest rate. Interest rates on issued securities/bonds are rigid and subject to change only after a particular period or maturity. For example, a financial institution holds a ten year 10% bond with a face value of MVR 1000. The bond matures only after ten years. There shall not be any re-negotiation of the interest rate during the maturing period. Market interest rate decreases by 100 basis points at the end of year 2. In this case, the interest rate on the bond held by financial institution shall remain 10% even after year 2 till year 10 and interest income will also remain same. (However, a fall in interest rate can result in increase in prices of assets in this case-more on this is discussed below.)

However, suppose a financial institution has an asset (loan) worth MVR 1000 with an interest rate of 10%. However, interest rates are subject to re-negotiation with a frequency of one year. A fall in market interest rate at the end of year 2 will cause the interest rate on the loan to fall to 9% and annual interest income will fall by MVR 10 (1% × principal amount).

In the following paragraphs, we explain the steps to measure impact on the net interest income due to change in interest rate.

### Step 1: Calculation of the rate sensitive assets and rate sensitive liabilities

Rate sensitive assets can be measured as assets which are expected to mature or subject to re-negotiation within a certain time period generally within a financial year. This is known as the gapping period, i.e. the time period for which the central bank intends to assess the impact on interest income and expenses.

A financial institution may be interested to understand the impact of an x% increase in interest rate today on the interest income and interest expenses in the financial year. The impact on the interest income and interest expenses depends on the time by which the rates will be renegotiated or the date of maturity (in other words, 'time to re-pricing'). Suppose a bank holds a deposit of MVR 20,000 at a rate of 8.5% today with a time to re-pricing of 3 months (when its interest rate can be re-negotiated in line with the prevailing market rate of interest). A 100 basis points change in market interest rate *today* will cause deposit rate i.e. interest expenses to change after 3 months. For an assumed gapping period of 12 months, this deposit is interest-rate sensitive. Please note that if market interest rate is expected to change after 4 months instead of today (and there is no scope for the deposit to be re-priced subsequently), then the deposit of MVR 20000 will not be rate sensitive.

### Step 2: Bucketing of rate sensitive assets and liabilities (in MVR million)

Time to re-pricing is different in different class of assets and liabilities. For a given change in interest rate, the impact on interest income or expense shall be calculated taking into the consideration the time left in the gapping period. This is because the new interest rates will be applicable only for the months *after* the asset/ liability have been re-priced. The table below provides an example:

**Table 37: Example for interest rate risk for Bank A (MVR Million)**

| Time to repricing (in months) | Assets | Liabilities | Applicable time period (in months) | GAP | Change in interest income | Change in interest expense | ΔNet Interest Income |
|---|---|---|---|---|---|---|---|
| A | B | C | D= (12 months- A) | E= (B-C) | F | G | H |
| 1 | 100 | 300 | 11 | -200 | 0.92 | 2.75 | -1.83 |
| 3 | 200 | 300 | 9 | -100 | 1.50 | 2.25 | -0.75 |
| 6 | 300 | 400 | 6 | -100 | 1.50 | 2.00 | -0.50 |
| 8 | 400 | 300 | 4 | 100 | 1.33 | 1.00 | 0.33 |
| 10 | 500 | 200 | 2 | 300 | 0.83 | 0.33 | 0.50 |

Note: Applicable time period is the period left after the asset/ liability has been re-priced. For example, if time to re-pricing for a security is 3 months, i.e. the security is subject to re-negotiation in 3 months then the 'applicable time period' is 9 months (12 months- time to re-pricing), where 12 months is the assumed gapping period.

In the example presented above, gapping period is assumed to be one year. Bank A holds different assets and liabilities with different time to re-pricing during the financial year (one, three, six, eight and ten months). The revised interest rates will be applicable for the time period remaining in the gapping period after the re-pricing, i.e. after the rates have been renegotiated. For example, let market interest rate rise by 100 basis points. An asset worth MVR 100 million to be renegotiated after 1 month will earn the higher interest rate only after its rates adjust to reflect the new market interest rate. This will happen after 1 month. Hence the higher interest income will be earned for the residual months in the gapping period, i.e., 11 months. Similarly, as asset that will be repriced after 3 months, will earn the higher interest rate for 9 months of the gapping period. Column D calculates the applicable number of months for different assets and liabilities.

It is ideal to collate all assets and liabilities as per the time to re-pricing. Detailed classification of assets and liabilities will provide accurate estimate of interest rate risk exposure, however, this may be expensive as well. To keep a balance between the accuracy and the cost, we may classify assets in *buckets* which appropriately reflect the distribution of assets and liabilities by time to repricing. We will assume below that an asset or liability in a particular bucket will be re-priced only at the end of the bucketing period. For instance, if an asset is in the bucket for 3 month time-to-repricing, we will assume that it will be repriced only at the end of the 3 months. An illustrative bucketing is given below in Table 38. This is also the manner in which the MMA collects data from the banks.

**Table 38: Bucketing for assets and liabilities**

| S. No. | Bucket | Assets | Liabilities | Gap |
|---|---|---|---|---|
| 1 | Less than 3 months | | | |
| 2 | 3 months but less than 6 months | | | |

| 3 | 6 months but less than 12 months | | | |
|---|---|---|---|---|

**Step 3: Calculation of change in interest income and interest expense**

The next step is to calculate the impact on interest income and expenses for each class of assets and liabilities. In Table 37, column F calculates the change in interest income due to increase in interest rate by by 100 basis points today. Change in interest income is calculated by using the following formula:

$$= \Delta i \times Aj \times \left(1 - \frac{M}{12}\right)$$

Where,

$\Delta i$ = Change in interest rate

Aj= Value of asset in bucket j

M= Time to repricing of the asset, as given by Column A in Table 37.

The formula reiterates the concept explained earlier. Essentially, the additional interest income earned on the asset will be in line with the residual period in the gapping period, after the asset has been repriced. So an asset that has a time-to-repricing of 3 months will earn the higher interest income ($\Delta i \times Aj$ ) for 9 months (i.e. $\left(1 - \frac{M}{12}\right)$ th part of the year).

Similarly, change in interest expense can be calculated using the following formula:

$$= \Delta i \times Lj \times \left(1 - \frac{M}{12}\right)$$

Where,

$\Delta i$ = Change in interest rate

Lj= Value of liability in bucket j

M= Time to repricing, that is Column A in Table 37.

The formula takes into consideration the fact that the revised interest rate will be applicable only after the asset or liability matures or is subject to renegotiation. Since for an increase (decrease) in interest rate, interest income on assets increases (decreases) and interest expenses on liabilities increases (decreases), net impact is calculated by deducting change in interest expense from change in interest income. Cumulative impact of change in interest rate is obtained by adding net impacts in each of the bucket.

### *Pricing impact*

There may be fixed-rate assets whose prices change in response to change in interest rates. Change in interest rates can affect the market value of assets and liabilities of the institution, since the present value of future cash flows is sensitive to changes in interest rates. For example, a financial institution holds a ten year bond with face value MVR 1000 and 10% interest rate. Assume this yields fixed MVR 100 cash on a yearly basis. Market interest rate, which is also the discount rate increases by 100 basis points. Discount rate is the rate by which future cash flow can be replaced with present cash flow. Higher is the discount rate for a given cash flow, higher is the preference to present cash flows relative to future cash flows. Present value of future cash flows (assume a fixed C) spanning across N time period with discount rate r is calculated as:

$$Present\ Value\ (PV) = \frac{C}{(1+r)} + \frac{C}{(1+r)^2} + \frac{C}{(1+r)^3} + \cdots + \frac{C}{(1+r)^{N-1}} + \frac{C}{(1+r)^N} + \frac{FV}{(1+r)^N}$$

Where

'C' is the annual coupon on the bond

FV is the face value of the bond available at maturity

In this case, the bond yield a fixed yearly cash of MVR 100 for 10 years and at the end of 10th year the owner of the bond also receives the face value of the bond, i.e. MVR 1000. This implies the owner receives yearly cash of MVR 100 for 10 years and MVR 1000 at the end of the 10th Year.

Present value of the bond, yielding cash flows as mentioned above, can be calculated as follows:

$$Present\ Value\ (PV) = \frac{100}{(1+r)} + \frac{100}{(1+r)^2} + \frac{100}{(1+r)^3} + \cdots + \frac{100}{(1+r)^9} + \frac{100}{(1+r)^{10}}$$
$$+ \frac{1000}{(1+r)^{10}}$$

It is clear from the equation above that the present value of the bond is sensitive to changes in interest rate. An increase in interest rate results in fall in present value of the bond. Intuitively, an increase in the market interest rate means that bonds with a similar face value will yield a higher yearly income (at the rate of 11% of face value) than the bond owned by the bank. As a result, its demand and price will fall in the market.

Hence, financial institutions are subject to risks associated with change in the value of assets with a change in interest rate. Through stress testing, the expected impact on the value of assets held can be measured.

In order to measure the capital gains/losses due to changes in interest rates, we discuss the duration model or weighted average time to maturity in the subsequent paragraphs.

### Duration model

Duration (or effective maturity) is the effective time to recover the price of the asset. For example, a ten year bond of MVR 1000 with an interest rate of 10% yields MVR 100 annually and MVR 1000 at the end of ten years. Since the buyer gets MVR 100 annually, she would be able to recover the cost of the bond before the maturity date (i.e. ten years). In this case, effective maturity will be less than ten years. Now suppose, a buyer holds a 10 year zero coupon bond of MVR 1000 with an interest rate of 10%. The bond will yield the face value MVR 1000 and the interest amount only at maturity. In this case, the buyer does not receive any return before ten years. Hence, she will be able to recover the cost of the bond only after ten years. Hence, effective maturity is the same as actual maturity.

Duration takes into account timing of the cash flows as well as the maturity. For example, consider a ten year bond with face value of MVR 1000 yielding 10% interest rate. The maturity is ten years. However, the investor is also earning an annual cash amount of MVR 100 as shown below. The investor will be able to recover the price before ten years.

Table 39: Cash flow on a bond

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash Payment (MVR) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 1000 |

One way to calculate the effective maturity could be to estimate the average maturity of various cash flows which is 5.5[73]. However, it might be the case that intermediate cash flows are tilted towards the end of the maturity time period. Hence, the investor will require more time than indicated by the average maturity to recover the cost of the asset. To account for this, the duration model takes the weighted average of the various maturities where weights are proportion of total cash received at each maturity point in present value terms.

**Table 40: Example for duration model**

| Year | Interest received | Present Value | Weight | Weighted maturity |
|---|---|---|---|---|
| | (MVR) | (MVR) | (%) | (Years) |
| A | B | C= B/ (1+ r)^No. of years | D= $(C_i)/ \sum_i$ (C ) | E= (A) × (D) |
| 1 | 100 | 90.9 | 9.1% | 0.09 |
| 2 | 100 | 82.6 | 8.3% | 0.17 |
| 3 | 100 | 75.1 | 7.5% | 0.23 |
| 4 | 100 | 68.3 | 6.8% | 0.27 |
| 5 | 100 | 62.1 | 6.2% | 0.31 |
| 6 | 100 | 56.4 | 5.6% | 0.34 |
| 7 | 100 | 51.3 | 5.1% | 0.36 |
| 8 | 100 | 46.7 | 4.7% | 0.37 |
| 9 | 100 | 42.4 | 4.2% | 0.38 |
| 10 | 100 | 38.6 | 3.9% | 0.39 |
| 10 | 1000 | 385.5 | 38.6% | 3.86 |
| Total | | 1000 | 100% | 6.76 (Duration) |

Note: r is assumed as 10%.

Table 40 provides an example for duration model. Column A shows the timing of cash flows. The asset provides bond payment on an annual basis till year 10. Column B lists the amount of cash flow each year. The asset provides a fixed MVR 100 cash annually and face value at the end of 10 years. Column C calculates the present value of cash flow coming at different point in time taking the market interest rate of 10% as the discount rate. Column D estimates the share of cash flows at each point in total cash flows in present value terms. These are used as weights to calculate weighted maturity in column E. In this case, duration of the asset is estimated as 6.76 years which is also the effective maturity. In other words, it

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[73] It is calculated as the simple average maturity of various cash flows during the life of the security [(1+ 2+ 3+ 4+ 5+ 6+ 7+ 8+ 9+10)/10= 5.5].

requires nearly 6.76 years to recover the cost of the asset. *Hence, duration can be termed as weighted-average time to maturity using the relative present values of the cash flows as the weights.* The formula for duration is

$$D = \frac{\sum_{t=1}^{N} Present\ Value_t \times t}{\sum_{t=1}^{N} Present\ Value_t}$$

Where,

t= different time period of cash flows

The economic meaning of duration is the interest rate elasticity of an asset's value to changes in the interest rate. The mathematical derivation is provided in Appendix.1. Duration can be written as:

$$D \approx -[\frac{\partial pv}{\partial r} \times \frac{(r)}{p}]$$

Where

D is the duration

$\frac{\partial pv}{\partial r}$ represents the change in the present value of the asset (or its price) due to a change in the interest rate

r is the rate of interest

p is price of the asset.

Duration is approximately equal to price elasticity of the bond. As price elasticity of a commodity reflects the percentage change in quantity demanded with a given percentage change in prices, the duration measures the percentage change in the value of the bond in response to a given percentage change in interest rate.

Market value does not change in same proportion for all types of bonds. Longer term maturity securities are subject to higher fluctuation in prices for a given change in interest rate as compared with short term bonds. For example, a financial institution holds two bonds (i) a ten year bond with a face value of MVR 1000 yielding interest rate of 10% (ii) a two year bond with a face value of MVR 1000 yielding interest rate of 10%. Market interest rate falls by 100 basis point. Fall in interest rate makes the bond more attractive and increases the demand. This causes increase in market value of both bonds. However, a ten year bond provides more cash flows to the investor as compared with a two year bond. Thus, demand for a ten year bond will be higher than the two year bond. Consequently, market price for a ten year bond will increase at a higher rate than a two year bond. *Hence, higher is the maturity higher is the price sensitivity to change in market interest rate.* As mentioned before, duration can also be referred as the effective maturity. *That implies higher is the duration higher is the price sensitivity to change in interest rates.*

The suggested excel based stress testing framework uses an in-built formula to calculate the duration. The information required to estimate the duration includes (i) settlement date (ii) maturity (iii) bond rate (iv) yield rate (v) frequency and (vi) basis.

- **Settlement date** of the security is the date after the issue date when the security is transferred to the buyer. This is also the date by which a buyer must pay for the asset delivered by the seller. Since the 'duration' is the time by which investor can recover the cost of the asset, it is prudent to consider the period between the date on which payment is made and the date by which investor receives returns.

- **Maturity** is the security's maturity date. The maturity date is the date when the security expires.

- **Coupon rate** is the security's annual coupon rate. It is the amount of interest income derived every year, expressed as a percentage of the bond's face value.

- **Yield** is the security's annual yield. This is different from the coupon rate. Yield rate is the interest earned by the buyer on the bond purchased expressed as a percentage of the **bond value.**

- **Frequency** is the number of bond payments per year. For annual payments, frequency is 1, for semi-annual payment, frequency is 2 and for quarterly payment, frequency is 4.

- **Basis** is the type of day count basis t*o use*.

For Maldives, since the secondary market in bonds is not very well developed, this test may be of limited applicability at the moment.

## 9.3.2 *Credit risk*

Credit risk is the risk that a counter-party will default on their contractual obligations i.e., the risk that the cash flows of an asset may not be paid in full according to contractual agreements.

In our stress-testing template, vulnerability of the financial sector to credit risk shall be quantified through the impact on post-shock capital, i.e., the 'economic value (net worth)' of the bank. We simulate four kinds of credit shocks as given below:

1. Bank corrects for insufficient provisioning for loan losses as required under existing prudential regulations

2. Non-performing loans increases by x percentage points

3. X% of loans in specific sectors become non-performing

4. X number of large exposures become non-performing

### 9.3.2.1   Credit Shock 1

This test measures the impact on the banking sector's capital stock when a certain proportion of doubtful assets turn into loss assets. As can be seen from table 42 below, the degree of provisioning required for loss assets is higher than for doubtful assets. For loss assets, 100% of the value of the non-performing loan has to set aside as a specific provision. For doubtful assets, except for the sector with the highest exposure to doubtful loans, banks have to keep 50% of the value of the non-performing loan as specific provision. For the sector which has the highest exposure to doubtful loans, the corresponding requirement is 60%.

In sum, when loans move from the doubtful to the loss category, there is higher provisioning pressure on the banking system. This is assumed to be met through the capital stock of banks-that is, the capital stock decreases by the extent of the additional provisioning required. The decrease in the RWA is based on an RMA assumption. The banking sector is assumed to be resilient if the post-shock CAR remains above the minimum prudential requirement.

**Table 41: Loan loss provisioning requirements**

|  | Pass or Acceptable | Special Mention | Sub-standard | Doubtful | Loss |
|---|---|---|---|---|---|
| Existing Provisioning Requirements | 1% | 5% | 25% | 50% | 100% |

### 9.3.2.2   Credit shock 2

The second shock is a scenario when asset quality declines, affecting all banks proportionately. An increase in non-performing loans leads to higher provisioning requirements. We assume as before that

the increased provisioning comes from bank capital. Table 42 presents an example of this type of credit shock. As shown in This test measures the impact on the banking sector's capital stock when a certain proportion of doubtful assets turn into loss assets. As can be seen from table 42 below, the degree of provisioning required for loss assets is higher than for doubtful assets. For loss assets, 100% of the value of the non-performing loan has to set aside as a specific provision. For doubtful assets, except for the sector with the highest exposure to doubtful loans, banks have to keep 50% of the value of the non-performing loan as specific provision. For the sector which has the highest exposure to doubtful loans, the corresponding requirement is 60%.

In sum, when loans move from the doubtful to the loss category, there is higher provisioning pressure on the banking system. This is assumed to be met through the capital stock of banks-that is, the capital stock decreases by the extent of the additional provisioning required. The decrease in the RWA is based on an RMA assumption. The banking sector is assumed to be resilient if the post-shock CAR remains above the minimum prudential requirement., assume non-performing loans increase by 10%.

**Table 42: Example for fall in asset quality, (MVR Million)**

| S. No. | Banks | Additional non-performing Loans (10% increase over NPL given in This test measures the impact on the banking sector's capital stock when a certain proportion of doubtful assets turn into loss assets. As can be seen from table 42 below, the degree of provisioning required for loss assets is higher than for doubtful assets. For loss assets, 100% of the value of the non-performing loan has to set aside as a specific provision. For doubtful assets, except for the sector with the highest exposure to doubtful loans, banks have to keep 50% of the value of the non-performing loan as specific provision. For the sector which has the highest exposure to doubtful loans, the corresponding requirement is 60%. In sum, when loans move from the doubtful to the loss category, there is higher provisioning pressure on the banking system. This is assumed to be met through the capital stock of banks-that is, the capital stock decreases by the extent of the additional provisioning required. The decrease in the RWA is based on an RMA assumption. The banking sector is assumed to be resilient if the post-shock CAR remains above the minimum prudential requirement.) | Total additional NPL | Additional Provisioning Required |
|---|---|---|---|---|

| 1 | 2 | Sub-standard 3 | Doubtful 4 | Loss 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 1 | Bank 1 | 25 | 20 | 15 | 60 | 31 |
| 2 | Bank 2 | 75 | 70 | 45 | 190 | 99 |
| 3 | Bank 3 | 100 | 90 | 60 | 250 | 130 |
| 4 | Bank 4 | 40 | 60 | 30 | 130 | 70 |
| 5 | Bank 5 | 150 | 120 | 60 | 330 | 158 |

Columns 3 to 5 in Table 42 show the resultant increase in non-performing loans. Column 6 shows total increase in non-performing loans. Using the provisioning requirements as given in Table 41, additional provisioning requirements are estimated in column 7. For example, non-performing loans of Bank 1 increases by MVR 25 million, MVR 20 million and MVR 15 million under sub-standard, doubtful and loss category. Based on the assumed rate of provisioning requirements, additional provisions for Bank 1 comes out to MVR 31 million.

Increased provisioning requirements impact the capital of banks. Table 43 shows the impact on capital due to fall in asset quality i.e. when non-performing loans increase by 10%.

**Table 43: Impact of credit shock 2 (fall in asset quality) on capital (MVR Million)**

| S. No. | Banks | Pre-Shock Capital | Additional Provisions required [Col 9 of Table 9] | Post-Shock Capital | Pre-Shock RWA | Post-Shock RWA | Pre - shock total RBC ratio | Post-shock total RBC ratio |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | Bank 1 | 144 | 31 | 113 | 1200 | 1169 | 12% | 9.6% |
| 2 | Bank 2 | 540 | 99 | 441.25 | 3600 | 3501 | 15% | 12.6% |
| 3 | Bank 3 | 720 | 130 | 590 | 4500 | 4370 | 16% | 13.5% |
| 4 | Bank 4 | 399 | 70 | 329 | 2100 | 2030 | 19% | 16.2% |
| 5 | Bank 5 | 765 | 158 | 607.5 | 6400 | 6243 | 12% | 9.7% |

Bank 1 had a pre-shock total RBC ratio of 12%. An increasing in provisioning requirement to the tune of 31 million causes capital and risk-weighted assets to fall by the same amount. The post-shock total RBC ratio is 9.7%, below the 12% minimum total RBC ratio requirement. The same is true for Bank 5-whose post-shock total RBC ratio is lower than the minimum requirement. This is caused by a fall in the asset quality.

### 9.3.2.3  Credit shock 3

Apart from overall decline in the asset quality, shocks in specific sectors may also have a bearing on the banks' economic value. For example, due to an asset price crash, the housing and construction sector experience higher NPLs. Sector-specific increases in NPLs may have different implications for different banks depending on the relative size of the banks' credit exposures to these sectors. The third type of credit shock simulates this risk.

**Table 44: RAW data for credit shock 3 (MVR Million)**

| S. No. | Banks | Total Loans | Performing | | | | | | | Non-performing |
| | | | Total | Housing/Building & Construction | Personal | Manufacturing /Industry | Trade & Commerce | Service & Tourism | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bank 1 | 1000 | 400 | 100 (25%) | 60 (15%) | 80 (20%) | 72 (18%) | 48 (12%) | 40 (10%) | 600 |
| 2 | Bank 2 | 3000 | 1100 | 220 (20%) | 330 (30%) | 165 (15%) | 132 (12%) | 110 (10%) | 143 (13%) | 1900 |
| 3 | Bank 3 | 4000 | 1500 | 225 (15%) | 525 (35%) | 225 (15%) | 150 (10%) | 225 (15%) | 150 (10%) | 2500 |
| 4 | Bank 4 | 2000 | 700 | 70 (10%) | 140 (20%) | 70 (10%) | 175 (25%) | 210 (30%) | 35 (5%) | 1300 |
| 5 | Bank 5 | 6000 | 2700 | 1080 (40%) | 270 (10%) | 405 (15%) | 270 (10%) | 270 (10%) | 405 (15%) | 3300 |

Note: In parenthesis, share of sectoral performing loans as percentage of total performing loans is shown.

Table 44 shows sector wise performing loans and total non-performing loans for five banks. Bank 1 and Bank 5 have the largest exposure to housing/ building & construction-measured as the proportion of sector-specific loans to total performing loans- 25% and 40% respectively.  Bank 2 and Bank 3 have the largest credit exposure to personal loans i.e. 30% and 35% respectively. Bank 4 has the largest exposure to service & tourism sector, i.e. 30% of Bank 4's total performing loans. The assumed sector-specific rate of performing loans becoming non-performing are as follows:

**Table 45: Magnitude of sectoral shocks**

| Sector | Assumed % of performing loans becoming NPL |
|---|---|

| Housing/Building & Construction | 10% |
|---|---|
| Personal | 20% |
| Manufacturing /Industry | 0% |
| Trade & Commerce | 0% |
| Service & Tourism | 0% |
| Others | 0% |

This results in an increase in non-performing loans for each bank in line with its sectoral exposures. Non-performing loans for the entire banking system increase by MVR 435 million as given in Table 46 . Assuming an overall provisioning requirement of 50%, the additional provisions required for increase in NPL is MVR 217.25 million. Bank wise additional provisions are given in Table 46.

**Table 46: Additional NPL and provisioning requirements (in MVR Million)**

| S. No. | Banks | New NPL | Additional provisioning requirements |
|---|---|---|---|
| 1 | Bank 1 | 22 | 11 |
| 2 | Bank 2 | 88 | 44 |
| 3 | Bank 3 | 128 | 63.75 |
| 4 | Bank 4 | 35 | 17.5 |
| 5 | Bank 5 | 162 | 81 |
| Total | | 435 | 217.25 |

Bank 5 faces the largest increase in non-performing loans of MVR 162 million. This also translates into highest provisioning requirement of MVR 81 million. These additional provisions impact the economic value of the bank, i.e. capital. As given in Table 47, prior to the shock bank 5 had a capital of MVR 765 mn and RBC ratio of more than 12%. However, with the additional provisioning requirements due to sector-specific shocks, the capital stock falls by 81 million to MVR 684 mn. Consequently, RBC ratio goes down below the 12% minimum requirement to 10.8%.

**Table 47: Impact on the capital of credit shock 3, (MVR Million)**

| S. No. | Banks | Pre-Shock Capital | Additional Provisions required | Post-Shock Capital | Pre-Shock RWA | Post-Shock RWA | Pre -shock total RBC ratio | Post-shock total RBC ratio |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | Bank 1 | 144 | 11 | 133 | 1200 | 1189 | 12% | 11.2% |

| 2 | Bank 2 | 540 | 44 | 496 | 3600 | 3556 | 15% | 13.9% |
| 3 | Bank 3 | 720 | 63.75 | 656.25 | 4500 | 4436 | 16% | 14.8% |
| 4 | Bank 4 | 399 | 17.5 | 381.5 | 2100 | 2083 | 19% | 18.3% |
| 5 | Bank 5 | 765 | 81 | 684 | 6400 | 6319 | 12% | 10.8% |
| Total | | 2568 | 217.25 | 2350.75 | 17800 | 17582.75 | 14% | 13.4% |

#### 9.3.2.4   Credit shock 4

A financial institution may be exposed to 'concentration risk' as well. It refers to the situation where a bank's exposures are unevenly distributed among borrowers, sectors or regions. Credit shock 4 allows us to measure concentration risk by testing for the failure of the largest counterparties of individual banks.

**Table 48: Example for concentration risk, (In MVR Million)**

| Largest exposure | Total Outstanding Loan (mn MVR) | | | | |
| --- | --- | --- | --- | --- | --- |
| | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
| 1# | 20 | 60 | 80 | 40 | 120 |
| 2# | 15 | 45 | 60 | 30 | 90 |
| 3# | 11.5 | 34.5 | 46 | 23 | 69 |
| 4# | 11 | 33 | 44 | 22 | 66 |
| 5# | 8 | 24 | 32 | 16 | 48 |
| Additional NPL | 65.5 | 196.5 | 262 | 131 | 393 |
| Additional Provisions | 65.5 | 196.5 | 262 | 131 | 393 |

Table 48 shows the bank wise top five credit exposures. If the top five largest credit assets become non-performing assets, banks' non-performing loans increase by the total amount of lending to the top five borrowers. For example, bank 5' total non-performing loans increases by MVR 393 mn with top five credit exposures becoming non-performing. This results in high provisioning requirements which will impact the capital held by bank. Assuming 100% provisioning requirement, additional provisions shall be same as the total exposure.

**Table 49: Impact of concentration risk on capital, (MVR Million)**

| S. No. | Banks | Pre-Shock Capital | Additional Provisions required | Post-Shock Capital | Pre-Shock RWA | Post-Shock RWA | Pre - shock total RBC ratio | Post-shock total RBC ratio |
|---|---|---|---|---|---|---|---|---|
| 1 | Bank 1 | 144 | 65.5 | 78.5 | 1200 | 1135 | 12% | 6.9% |
| 2 | Bank 2 | 540 | 196.5 | 343.5 | 3600 | 3404 | 15% | 10.1% |
| 3 | Bank 3 | 720 | 262 | 458 | 4500 | 4238 | 16% | 10.8% |
| 4 | Bank 4 | 399 | 131 | 268 | 2100 | 1969 | 19% | 13.6% |
| 5 | Bank 5 | 765 | 393 | 372 | 6400 | 6007 | 12% | 6.2% |

Table 49 shows the impact of concentration risk on capital. Prior to the shock, all five banks were meeting the capital norms (i.e. total RBC ratio of 12%). However, post concentration shock, the total RBC ratio for Bank 1 and Bank 5 has gone below the minimum benchmark.

Capital for Bank 5 experiencing largest increase in NPL falls from MVR 765 mn to MVR 372 mn. This also results in its RBC ratio to go down from 12% to 6.2% for Bank 5.

## 9.3.3 *Foreign Exchange risk*

The foreign exchange risk can be interpreted as the risk that exchange rate changes affect the local currency value of financial institutions' assets, liabilities, and off-balance sheet items. There can be three types of foreign exchange risks: the direct solvency risk (resulting from banks' net open positions in foreign currency); the indirect solvency risk (resulting from the impact of foreign exchange positions taken by borrowers on their creditworthiness and ability to repay, and thereby on financial institutions); and the foreign exchange liquidity risk (resulting from liquidity mismatches in foreign currency). The third type of risk is assessed in the section on liquidity risk discussed later.

### 9.3.3.1 Direct foreign exchange risk

Table 50 shows an illustration of asset and liability held by Bank 1 in various currencies. Bank 1 has higher foreign currency liabilities relative to foreign currency assets (negative net open position) for all five currencies except Euro.

**Table 50: Direct foreign exchange risk and impact on capital for Bank 1 (MVR Million)**

| Currency | Asset | Liabilities | Net Open Position | Expected change in Exchange rate | Impact on Capital |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4= (2-3) | 5 | 6= (5*4) |
| SING | 200 | 230 | -30 | 10% | -3 |
| Yen | 300 | 400 | -100 | 10% | -10 |
| GBP | 500 | 600 | -100 | 10% | -10 |
| EUR | 600 | 500 | 100 | 10% | 10 |

| Currency | Asset | Liabilities | Net Open Position | Expected change in Exchange rate | Impact on Capital |
|---|---|---|---|---|---|
| USD | 800 | 900 | -100 | 0% | 0 |
| Total Impact on Capital | | | | | -13 |

A depreciation (fall) in the exchange rate will lead to a proportional decline in the domestic currency value of the net open position if negative otherwise it will lead to proportional increase in domestic currency value of the net open positions. This can also be termed as Δ Exchange Rate/Exchange rate = ΔFX position/FX position (for FX position≠0). It is assumed that the decline in net open foreign exchange position translates directly into a decline in the commercial bank's capital. The impact on capital due to change in exchange rate can be calculated by multiplying the change in exchange rate with the net open position with the respective currency. It is calculated in column 6 of the Table 50.

### 9.3.3.2   Indirect foreign exchange risks

Apart from direct foreign exchange risk, the commercial bank may face indirect foreign exchange risk through its impact on the credit worthiness of the borrowers. A depreciation in the exchange rate can positively impact the competitiveness of the domestic corporate sector relative its foreign competitor. It can also influence the balance sheet of the corporate sector via firms' net open positions in foreign currencies. Thus, depreciation in exchange rate may result in increase in non-performing loans if the domestic corporate sector has large forex exposure in its balance sheet and net trade impact is not large enough to offset the balance sheet effect due to forex exposure.

Table 51 shows an example for indirect foreign exchange risk. In column 2, bank wise foreign exchange loans are given. A depreciation in exchange rate (assumed 30%) impacts the ability of borrower to repay and causes a specific percentage of foreign loans to become non-performing. An increase in NPL forces banks to make additional provision (assumed 55%). Additional provisions impact capital for banks as given in Table 52. Bank 5 which has maximum size of total forex loans amounting to MVR 800 million experiences the largest increase in non-performing loans for a given depreciation in the foreign currency. Non-performing loans for bank 5 increase by MVR 144 million. Since the data by category of NPL is not available, and provisioning requirements vary by the class of NPL, we have assumed average provisioning rate of 55%. Therefore, with an increase in NPL by MVR 144 million, the provisioning requirements increase by MVR 79 million.

**Table 51: Example for indirect foreign exchange risk, (MVR Million)**

| Bank | Forex Loans | Depreciation | % of loans becoming NPL | Additional NPL | Additional Provisions |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5= (2*3*4) | 6 |
| Bank 1 | 200 | 30% | 60% | 36 | 20 |
| Bank 2 | 300 | 30% | 60% | 54 | 30 |
| Bank 3 | 500 | 30% | 60% | 90 | 50 |
| Bank 4 | 600 | 30% | 60% | 108 | 59 |
| Bank 5 | 800 | 30% | 60% | 144 | 79 |

| Bank | Forex Loans | Depreciation | % of loans becoming NPL | Additional NPL | Additional Provisions |
|------|-------------|--------------|-------------------------|----------------|-----------------------|
| Total Impact on Capital | | | | 238 | |

Prior to the shock, all commercial banks had capital above than the prudential norms. As shown in Table 52, Bank 5 which experienced largest increase in NPL due to foreign currency depreciation also faced substantial fall in capital. The capital of Bank 5 falls from MVR 765 mn to MVR 685.8 mn. The RBC ratio declines from 12% to 10.8% which is marginally lower than the minimum total RBC ratio requirements of 12%.

**Table 52: Impact of indirect foreign exchange risk on capital, (MVR Million)**

| S. No. | Banks | Pre-Shock Capital | Additional Provisions required | Post-Shock Capital | Pre-Shock RWA | Post-Shock RWA | Pre-shock total RBC ratio | Post-shock total RBC ratio |
|--------|-------|-------------------|--------------------------------|--------------------|---------------|----------------|---------------------------|----------------------------|
| 1 | Bank 1 | 144 | 20 | 124.2 | 1200 | 1180 | 12% | 11% |
| 2 | Bank 2 | 540 | 30 | 510.3 | 3600 | 3570 | 15% | 14% |
| 3 | Bank 3 | 720 | 50 | 670.5 | 4500 | 4451 | 16% | 15.1% |
| 4 | Bank 4 | 399 | 59 | 339.6 | 2100 | 2041 | 19% | 16.6% |
| 5 | Bank 5 | 765 | 79 | 685.8 | 6400 | 6321 | 12% | 10.8% |

## 9.3.4 *Inter-Bank contagion risk*

If a particular bank defaults due to exogenous or endogenous factors, it might be have implications for other banks in the financial system depending on the exposure of other banks to the defaulting bank. In the stress testing exercise, we also assess the inter-bank contagion risk. Under this risk, default by one bank impacts the economic value of the other banks and may result in default by other banks. Other banks' defaults further transmit the risk to more banks.

In the subsequent paragraphs, we discuss two types of inter-bank contagion risk, i.e. (i) pure inter-bank contagion risk and (ii) Macro inter-bank contagion risk. In case of pure inter-bank contagion risk, risk emerges endogenously e.g. bank failure may be due to inefficient risk management. In case of macro-inter-bank contagion risk, it is assumed that macro-economic developments are responsible for bank failures.

### 9.3.4.1 Pure inter-bank contagion risk

Table 53 shows the inter-bank credit for five banks. The table shall be interpreted from column to row. Positive value indicate net creditor and negative indicates net borrower. For example, Bank 1 is net borrower from Bank 2 by MVR 40 million. Similarly, Bank 3 is net creditor to Bank 1 by MVR 30 million or Bank 4 is net creditor to Bank 2 by MVR 25 million.

**Table 53: Inter-bank credit, MVR million**

| | | | Creditor | |
|--|--|--|----------|--|

| Bank | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|------|--------|--------|--------|--------|--------|
| Bank 1 | - | 40 | -30 | 60 | 10 |
| Bank 2 | -40 | - | 20 | -25 | 5 |
| Bank 3 | 30 | -20 | - | 10 | -10 |
| Bank 4 | -60 | 25 | -10 | - | 20 |
| Bank 5 | -10 | -5 | 10 | -20 | - |

(Borrower label on left side spanning rows)

A bank is affected by the failure of another bank only if it has lent to the failing bank. Therefore, Table 54 shows the net inter-bank credit for each bank. Net inter bank credit of a particular bank is the total lending to other banks minus the total borrowing from other banks.

**Table 54: Inter-bank exposure, MVR million**

| | Creditor | | | | |
|------|--------|--------|--------|--------|--------|
| Bank | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
| Bank 1 | - | 40 | - | 60 | 10 |
| Bank 2 | - | - | 20 | - | 5 |
| Bank 3 | 30 | 5 | - | 10 | - |
| Bank 4 | - | 25 | - | - | 20 |
| Bank 5 | - | - | 10 | - | - |

(Borrower label on left side spanning rows)

From the table, it is clear that bank 2 is net creditor of Bank 1 , Bank 3 and Bank 4 amounting MVR 40 mn, MVR 5 mn, and MVR 25 mn respectively. Assume prior to shock, capital held by banks are as follows:

**Table 55: Bank wise pre-shock capital (MVR million)**

| Banks | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|-------|--------|--------|--------|--------|--------|
| Pre-Shock Capital | 60 | 100 | 2 | 50 | 40 |

To assess the impact of failure of one bank on the other, we will assess the status of capital of each bank in the column (of Table 54) if the bank in the row (of Table 54) fails. We assume that the capital of a bank reduces by the extent of its exposure to the failing bank. We assume that if capital of any bank after first shock becomes negative then the bank fails. Table 56 shows the bank wise capital after first iteration. For example, Bank 1 had MVR 60 mn capital before the shock. Since Bank 1 does not have any exposure to Bank 2, if Bank 2 fails then capital for Bank 1 remains MVR 60 mn. However, Bank 1 has exposure to Bank 3 worth MVR 30 mn. If Bank 3 fails then bank 1 capital will go down by MVR 30 mn (as shown in the table below).

**Table 56: Bank wise capital after first iteration, (MVR Million)**

| Borrower | | Creditor |
|----------|--|----------|

| Bank | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|------|--------|--------|--------|--------|--------|
| Bank 1 | - | 60 | 2 | -10 | 30 |
| Bank 2 | 60 | - | -18 | 50 | 35 |
| Bank 3 | 30 | 95 | - | 40 | 40 |
| Bank 4 | 60 | 75 | 2 | - | 20 |
| Bank 5 | 60 | 100 | -8 | 50 | - |

Bank 3 held capital amounting MVR 2 million before first shock. After first iteration, bank 3 capital becomes negative assuming bank 2 and bank 5 fail. Similarly, bank 4 capital also becomes negative if bank 1 fails. This implies that after iteration 1, bank 3 fails assuming bank 2 or bank 5 fail. Also, bank 4 fails if bank 1 fails.

**Table 57: Inter-bank failure**

| | | Creditor | | | | |
|---|------|--------|--------|--------|--------|--------|
| | Bank | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
| Borrower | Bank 1 | - | - | - | 1 | - |
| | Bank 2 | - | - | 1 | - | - |
| | Bank 3 | - | - | - | - | - |
| | Bank 4 | - | - | - | - | - |
| | Bank 5 | - | - | 1 | - | - |

Table 57 shows the impact on the bank in column if bank in row fails. Value '1' indicates failure of the bank. In the first iteration, we include failure of all banks and assess the impact of capital of other banks. It was found that due to inter-bank effect, bank 3 and bank 4 fails. In the second iteration, we assess what happens if bank 3 and bank 4 fails. The iterations will continue as long as there are new banks which fail after each iteration. After the second iteration there are no new banks which have failed and thus the iteration stops.

**Table 58: Bank capital after second iteration, (MVR Million)**

| | | Creditor | | | | |
|---|------|--------|--------|--------|--------|--------|
| | Bank | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
| Borrower | Bank 1 | 60 | 60 | 2 | -10 | 30 |
| | Bank 2 | 55 | 95 | -23 | 45 | 30 |

| Bank 3 | 30 | 95 | 2 | 40 | 40 |
| Bank 4 | 60 | 75 | 2 | 50 | 20 |
| Bank 5 | 60 | 100 | -8 | 50 | 40 |

### 9.3.4.2 Macro inter-bank contagion risk

In the assessment of macro-interbank contagion risk we will assume that macro-economic developments are responsible for bank failures. The key difference between the pure contagion and the macro-contagion stress test is that the pure contagion test assumes that the source of the failure in a bank is due to some internal reason, e.g. it could be due to a large fraud in the bank, etc. However, it ignores the likelihood of failure of all banks together. The macro-contagion test considers the scenario when all banks are weakened together by some external shock (macro-economic or some other shock), which would have differing impacts on each of the banks depending on their exposure to risk factors and could make one or two banks more susceptible to fail. Thus, as stated above, the starting point of this exercise is the post-shock values of capital and risk-weighted assets for each bank. We then run the iterations in the similar fashion as we did in the pure interbank contagion exercise till the time no new bank fails. We will also assume a certain % for Impact on RWA/Impact on capital. This percentage is used to calculate the RWA due to change in the capital after the 1st iteration. The revised RWA and revised Capital after the 1st iteration will then be used to calculate the revised RBC ratio after 1st iteration. This process will continue till the last iteration.

## 9.3.5 Liquidity risk

Liquidity risk can be of two types, i.e. asset liquidity risk and funding liquidity risk. Asset liquidity risk is the risk when the bank is unable to conduct the transaction at current market prices because of the size of the transaction. This type of liquidity risk normally comes into existence when certain assets need to be liquidated at a very short notice. Funding liquidity risk refers to the inability of the commercial bank to access sufficient funds to meet payment obligations in a timely manner.

Bank faces liquidity pressures due to the nature of the business. Banks fund longer term loans with short-term liabilities. Therefore, on a regular basis, banks are required to manage the gap between cash inflow and cash outflow. There are various factors which can affect the level of mismatch borne by the bank. For example, interest rate changes incentivize deposit holders to switch to other forms of investment and increase withdrawal. Change in interest rate can also impact the value of assets held by banks which may pose problems if banks are planning to liquidate the same asset. In this stress testing exercise, we will assess the ability of the commercial banks to withstand a run on a bank consecutively for five days. In the first exercise we will assumed the rate of withdrawal as given while in the later exercise we will model the rate of daily withdrawal based on various parameters.

Exercise 1

Assume there are five banks holding demand deposits and time deposits in both domestic and foreign currency as given below. Liquid assets and non-liquid assets are provided for each bank. Bank 5 is the largest deposit taking institution with demand deposit amounting MVR 1800 in domestic currency and MVR 600 in foreign currency, time deposits MVR 500 mn in domestic currency and MVR 200 time deposits in foreign currency. However, bank 4 is the largest bank in terms of liquid and non-liquid assets. Bank 4 has liquid assets of MVR 800 mn and MVR 2500 worth of non-liquid assets.

**Table 59: Financial data for liquidity risk (In MVR Million)**

| Indicator | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
| --- | --- | --- | --- | --- | --- |

| | | | | | |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 500 | 900 | 1200 | 1400 | 1800 |
| Demand Deposits (Foreign Currency) | 50 | 100 | 150 | 200 | 600 |
| Time deposits (MVR) | 150 | 300 | 400 | 400 | 500 |
| Time deposits (Foreign Currency) | 10 | 20 | 30 | 40 | 200 |
| Liquid Assets | 200 | 600 | 700 | 800 | 600 |
| Non-liquid assets | 800 | 1200 | 2000 | 2500 | 2000 |

As mentioned before, in the first exercise, we *assume* the daily withdrawal in case of a run on banks as given. It is assumed that daily 15% of demand deposits in domestic currency will be withdrawn. The assumption can be modified in the stress testing. Since foreign currency deposits are relatively stable and subject to lesser volatility, daily withdrawal for each bank is assumed at 10%. Daily withdrawal rate for time deposits in domestic currency and foreign currency are 3% and 1% respectively since there are restrictions on number of transactions. Since not all liquid assets may be available on a particular day, it is assumed that 95% of the liquid assets can be immediately used to meet obligations. In case of non-liquid assets, it is assumed that only 1% can be liquidated to meet obligations.

**Table 60: Withdrawal per day**

| Withdrawal per day | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 15% | 15% | 15% | 15% | 15% |
| Demand Deposits (Foreign Currency) | 10% | 10% | 10% | 10% | 10% |
| Time deposits (MVR) | 3% | 3% | 3% | 3% | 3% |
| Time deposits (Foreign Currency) | 1% | 1% | 1% | 1% | 1% |
| Liquid Assets (Available per day) | 95% | 95% | 95% | 95% | 95% |
| Non-liquid assets (Available per day) | 1% | 1% | 1% | 1% | 1% |

Given the daily withdrawal rate for different liabilities and cash available, we can calculate the total cash inflow and cash outflow on first day of run. We assume that if net cash inflow with any bank is positive then the bank remains liquid otherwise the bank can be considered as illiquid.

**Table 61: Withdrawal on day 1, (MVR Million)**

| Day 1 | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 75 | 135 | 180 | 210 | 270 |
| Demand Deposits (Foreign Currency) | 5 | 10 | 15 | 20 | 60 |
| Time deposits (MVR) | 4.5 | 9 | 12 | 12 | 15 |
| Time deposits (Foreign Currency) | 0.1 | 0.2 | 0.3 | 0.4 | 2 |

| Day 1 | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| New cash outflow | 84.6 | 154.2 | 207.3 | 242.4 | 347 |
| Liquid assets available | 190 | 570 | 665 | 760 | 570 |
| Non-liquid assets available | 8 | 12 | 20 | 25 | 20 |
| New Cash inflow | 198 | 582 | 685 | 785 | 590 |
| Net cash inflow since beginning of run | 113.4 | 427.8 | 477.7 | 542.6 | 243 |
| Liquid? (1=yes, 0=no) | 1 | 1 | 1 | 1 | 1 |

Table 61 shows the withdrawal on day 1. New cash outflow is summation of total withdrawal on day 1 for demand deposits and time deposits in domestic as well as foreign currency. New cash inflow is sum of liquid assets available (95% of total liquid assets) and non-liquid assets (1% of pre-shock non-liquid assets). Net cash flow is positive for all banks. Hence, none of bank was illiquid after first day of withdrawal.

It can be seen that Bank 5 (largest deposit taking institution) also experiences high withdrawal (MVR 347 million) on day 1 in absolute terms. But the asset size of bank 5 is not the largest. Bank 5 is outpaced by bank 4 in terms of asset size. Bank 4 has liquid asset of MVR 800 million and non-liquid assets of MVR 2500 million. This impacts the new cash inflow for bank 4 and bank 5. New Cash inflow for Bank 5 is MVR 590 million as compared with MVR 785 million for bank 4 on day 1. High new cash inflow for bank 4 relative to bank 5 but low withdrawal on day 1 is reflected in high net cash inflow on day 1 at MVR 542.6 million (MVR 243 million for bank 5).

Table 62 shows withdrawal on day 2. At the given the daily withdrawal rate, bank 5 receives withdrawal of MVR 230 of demand deposits in domestic currency, MVR 54 million of foreign currency and MVR 15 million of time deposits in domestic currency and MVR 2 million in foreign currency. Summing up the total withdrawal gives us total new cash outflow for day 2 at MVR 300 million. At a given rate of liquidation (Table 60) , nearly MVR 29 million of liquid assets can be additional liquidated and MVR 48 million of non-liquid assets can be liquidated. This gives us total new cash inflow on day 1 at MVR 48 million.  This implies that at day 2 new cash outflow is significantly higher than the new cash inflow for bank 5. Post day 1 bank 5 had net cash flow of MVR 243 million which can be used to meet the gap on day 2. The gap on day 2 is (MVR 300 million (cash outflow) – MVR 48 million (inflow)) is MVR 252 million. This implies on day 2 , bank 5 using all its net cash position on stock basis, can't finance gap. Thus, bank 5 has a negative cash balance in day 2 or the bank 4 becomes illiquid.  This implies Bank 5 is not able to handle cash withdrawal for more than 1 day from internal sources. The bank shall have to resort to other means to finance the obligations. It should be noted that net cash inflow on day 2 includes net cash inflow on day 1.

**Table 62: Withdrawal on day 2, (MVR Million)**

| Day 2 | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 64 | 115 | 153 | 179 | 230 |
| Demand Deposits (Foreign Currency) | 5 | 9 | 14 | 18 | 54 |
| Time deposits (MVR) | 4 | 9 | 12 | 12 | 15 |

| Time deposits (Foreign Currency) | 0 | 0 | 0 | 0 | 2 |
|---|---|---|---|---|---|
| New cash outflow | 73 | 133 | 178 | 209 | 300 |
| Liquid assets available | 10 | 29 | 33 | 38 | 29 |
| Non-liquid assets available | 8 | 12 | 20 | 25 | 20 |
| New Cash inflow | 17 | 40 | 53 | 63 | 48 |
| Net cash inflow since beginning of run | 58 | 336 | 352 | 397 | -9 |
| Liquid? (1=yes, 0=no) | 1 | 1 | 1 | 1 | 0 |

After conducting the similar exercise for day 3, day 4 and day 5, stress testing exercise reveals the ability of the banks to withstand cash withdrawals. Table 63 shows withdrawal on day 5. It is clear that bank 1 along with bank 5 experience a negative net cash inflow. This implies that bank 1 will also have to resort to external sources of funding.

**Table 63: Withdrawal on day 5, (MVR Million)**

| Day 5 | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 39 | 70 | 94 | 110 | 141 |
| Demand Deposits (Foreign Currency) | 3 | 7 | 10 | 13 | 39 |
| Time deposits (MVR) | 4 | 8 | 11 | 11 | 13 |
| Time deposits (Foreign Currency) | 0 | 0 | 0 | 0 | 2 |
| New cash outflow | 47 | 85 | 115 | 134 | 196 |
| Liquid assets available | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-liquid assets available | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| New Cash inflow | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| Net cash inflow since beginning of run | -81 | 74 | 11 | 3 | -629 |
| Liquid? (1=yes, 0=no) | 0 | 1 | 1 | 1 | 0 |

Exercise 2:

As of now we assumed the rate of daily withdrawal fixed for all banks. However, different banks may be subject to different level of cash withdrawal depending on their financial , ownership characteristics. In this exercise, we will model the daily withdrawal determined individually by three parameters (i) size of the bank approximated by the total assets (ii) Ownership of the bank (iii) financial performance of the bank.

Generally large banks (reflected by large asset size) are less prone to insolvency relative to small banks, other things being equal. Therefore, in case of a run on a bank, large banks may attract lesser withdrawals

relative to small banks. We determine the daily withdrawal rate for each of the bank taking into consideration the size of the bank which is approximated by the total assets. Table 64 shows the bank wise assets before the shock. Bank 4 has the largest asset size of MVR 3300 million followed by Bank 5 MVR 2600 million.

**Table 64: Bank wise assets and index of safety (in MVR Mn)**

|  | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Pre-shock Assets | 1000 | 1800 | 2700 | 3300 | 2600 |
| Index of safety | 0 | 35 | 74 | 100 | 70 |

Based on the given asset size, index of safety is calculated. Index takes values between 0 to 100. Higher is the index values, higher is the safety. For example, bank 4 has the largest total asset size hence; it has the highest index value.

We have also assumed the range of daily withdrawal for each category of liabilities as shown in Table 65. Index values show the extent of safety in a particular bank.

**Table 65: Range of daily withdrawal**

|  | Maximum | Minimum |
|---|---|---|
| Demand (domestic c.) deposits withdrawn per day (%) | 25% | 0 |
| Demand (foreign c.) deposits withdrawn per day (%) | 15% | 0 |
| Time (domestic c.) deposits withdrawn per day (%) | 10% | 0 |
| Time (foreign c.) deposits withdrawn per day (%) | 5% | 0 |

The extent of safety is mapped with range of the daily withdrawal to estimate the daily withdrawal for each bank as shown below.
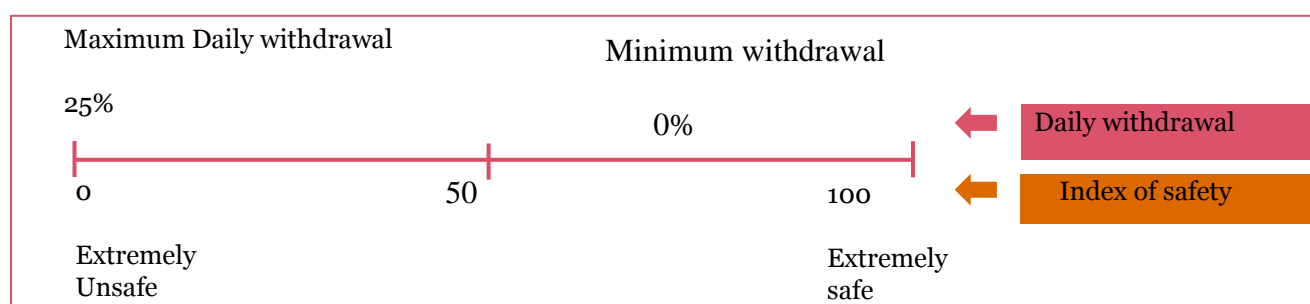


The daily withdrawal rate as modelled using the size of bank is shown in Table 66. It can be seen that banks with high assets base such as bank 4 and bank 3 also have low daily withdrawal on demand deposits as well as time deposits.

**Table 66: Daily withdrawal rate**

|  | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 25% | 16% | 7% | 0% | 8% |

| | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (Foreign Currency) | 15% | 10% | 4% | 0% | 5% |
| Time deposits (MVR) | 10% | 7% | 3% | 0% | 3% |
| Time deposits (Foreign Currency) | 10% | 7% | 3% | 0% | 3% |
| Liquid Assets (Available per day) | 95% | 95% | 95% | 95% | 95% |
| Non-liquid assets (Available per day) | 1% | 1% | 1% | 1% | 1% |

It should be noted that liquid assets and non-liquid assets available per day are not dependent on the size of the banks. Hence, these are assumed to be given. Using the estimated daily withdrawal rate, we can assess the liquidity of banks after each day of withdrawal. Table 67 shows withdrawal on day 5 and the liquidity position of various banks. It can be seen that bank 1, bank 2 and bank 5 becomes illiquid after the 5th day of consecutive withdrawals. Please note that in exercise 1, only two banks were illiquid, i.e. bank 1 and bank 5. However, after modelling the daily withdrawal rate based on the size of the bank, bank 2 also becomes illiquid. This is primarily because of increase in the daily withdrawal for bank 2. It has increased from 15% to 16% for domestic currency demand deposits, 3% to 7% for domestic currency time deposits and 1% to 7% for foreign currency time deposits.

**Table 67: Withdrawal on day 5, (MVR Million)**

| Day 5 | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 40 | 72 | 60 | 0 | 100 |
| Demand Deposits (Foreign Currency) | 4 | 6 | 5 | 0 | 23 |
| Time deposits (MVR) | 10 | 15 | 9 | 0 | 13 |
| Time deposits (Foreign Currency) | 1 | 1 | 1 | 0 | 5 |
| New cash outflow | 54 | 94 | 75 | 0 | 141 |
| Liquid assets available | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-liquid assets available | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| New Cash inflow | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| Net cash inflow since beginning of run | -235 | -3 | 374 | 923 | -115 |
| Liquid? (1=yes, 0=no) | 0 | 0 | 1 | 1 | 0 |

Similarly, bank withdrawal rate can be modelled based on the ownership of the banks. A state owned bank, due to implicit government guarantees in case of insolvency, may attract a lower withdrawal rate as compared with private sector bank.

**Table 68: Bank wise assets, MVR mn**

| | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|

| Pre-shock Assets | 1000 | 1800 | 2700 | 3300 | 2600 |
|---|---|---|---|---|---|
| Pre-shock Assets adjusted for state ownership | 2000 | 3600 | 2700 | 3300 | 2600 |
| Index of safety | 0% | 100% | 44% | 81% | 38% |

Table 68 shows bank wise pre-shock assets. Bank 4 has the largest asset size. In the given example, bank 1 and bank 2 are state owned banks. Since state ownership provides an implicit sovereign guarantee but it is not explicitly captured in the financial sector variables. In order to model the additional comfort provided by state ownership, we have adjusted total assets for state owned banks with a premium of 100%. Hence, total assets of bank 1 and bank 2 after adjustment are twice the original values. Assets of bank 1 and bank 2 have been revised from MVR 1000 million and MVR 1800 million to MVR 2000 million and MVR 3600 million respectively. For given assets size of different banks, the index of safety is calculated using the following formula:

$$Index\ of\ safety = 1 - \frac{(Actual\ assets - Lowest\ assets\ among\ five\ banks)}{(Largest\ assets\ amoung\ five\ banks - Lowest\ assets\ among\ five\ banks)}$$

Please note that after adjusting for state ownership, the index of safety has improved significantly for bank 2. Bank 2 attains the maximum value of index of safety.

The level of safety is also reflected in the withdrawal rate of bank 2. Bank 2 attains the minimum daily withdrawal rate (i.e. 0%).

**Table 69: Withdrawal rate**

|  | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 25% | 0% | 14% | 5% | 16% |
| Demand Deposits (Foreign Currency) | 15% | 0% | 8% | 3% | 9% |
| Time deposits (MVR) | 10% | 0% | 6% | 2% | 6% |
| Time deposits (Foreign Currency) | 10% | 0% | 6% | 2% | 6% |
| Liquid Assets (Available per day) | 95% | 95% | 95% | 95% | 95% |
| Non-liquid assets (Available per day) | 1% | 1% | 1% | 1% | 1% |

After iterating the withdrawal for five days, the liquidity position of five banks is shown below. In comparison with previous exercise, bank 2 remains liquid even after day 5 of consecutive withdrawal. This can be attributed to high safety value attached to state owned bank, i.e. Bank 2.

**Table 70: Liquidity position after Day 5 of consecutive withdrawal, (MVR Million)**

|  | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 40 | 0 | 92 | 54 | 143 |
| Demand Deposits (Foreign Currency) | 4 | 0 | 9 | 5 | 38 |

| | | | | | |
|---|---|---|---|---|---|
| Time deposits (MVR) | 10 | 0 | 18 | 7 | 24 |
| Time deposits (Foreign Currency) | 1 | 0 | 1 | 1 | 10 |
| New cash outflow | 54 | 0 | 120 | 67 | 214 |
| Liquid assets available | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-liquid assets available | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| New Cash inflow | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| Net cash inflow since beginning of run | -235 | 659 | -1 | 557 | -759 |
| Liquid? (1=yes, 0=no) | 0 | 1 | 0 | 1 | 0 |

Apart from size of the bank or ownership structure of the bank, the financial performance of the bank may also impact the safety perception among the deposit holders. We will first evaluate each bank against a set of financial indicators and provide ratings to each of the bank. For given ratings of each of the bank , index of safety will be estimated using the following formula:

$$Index\ of\ safety = 1 - \frac{(Actual\ rating - Minimum\ rating\ among\ five\ banks)}{(Maximum\ rating\ amoung\ five\ banks - Minimum\ rating\ among\ five\ banks)}$$

Table 71 shows the financial indicators highlighting the performance of five commercial banks.

**Table 71: Financial Indicators**

| | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Capital Adequacy | | | | | |
| Total capital / RWA (RBC ratio) * | 12% | 15% | 16% | 19% | 11% |
| Asset Quality | | | | | |
| NPLs (gross)/ total loans * | 2.10% | 3.10% | 1.80% | 4% | 3.50% |
| Provisions/NPLs | 51.4% | 49.7% | 60.5% | 23.2% | 81.9% |
| (NPLs-provisions)/capital * | 7.1% | 8.7% | 4.0% | 15.4% | 5.4% |
| FX loans/total loans | 20.0% | 10.0% | 12.5% | 30.0% | 13.3% |
| RWA/total assets | 43.3% | 29.4% | 65.3% | 47.2% | 38.5% |
| Profitability | | | | | |
| ROA (after-tax) * | -1.3% | -1.8% | 0.2% | -1.3% | 1.7% |

| | | | | | |
|---|---|---|---|---|---|
| ROE (after-tax) * | -36.9% | -73.6% | 7.9% | -11.7% | 1005.2% |
| Liquidity | | | | | |
| Liquid assets/total assets | 20.0% | 33.3% | 25.9% | 24.2% | 23.1% |
| Liquid assets/short-term liabilities* | 33.9% | 26.8% | 22.6% | 19.0% | 41.1% |
| Sensitivity to Market Risk | | | | | |
| Net FX exposure / capital * | 14.1% | -12.4% | -25.8% | 0.0% | 491.7% |

The rating structure for banks for different financial indicators is given in Table 72. At this point, we have provided the threshold as provided under the IMF document.

**Table 72: Thresholds and weights for the rating**

| Thresholds and Weights | Threshold 1 (4&3) | Threshold 2 (3&2) | Threshold 3 (2&1) | Weight |
|---|---|---|---|---|
| Capital Adequacy | | | | |
| Total capital / RWA * | 5.0%** <br><br> (4 if <, 3 if >=) | 8.0% <br><br> (3 if <, 2 if >=) | 15.0% <br><br> (2 if <, 1 if >=) | 20.0% |
| Asset Quality | | | | |
| NPLs (gross)/ total loans * | 25.0% <br><br> (4 if >, 3 if <=) | 15.0% <br><br> (3 if >, 2 if >=) | 5.0% <br><br> (2 if >, 1 if<=) | 5.0% |
| Provisions/NPLs | 25.0% <br><br> (4 if <, 3 if >=) | 50.0% <br><br> (3 if <, 2 if >=) | 75.0% <br><br> (2 if <, 1 if >=) | 0.0% |
| (NPLs-provisions)/capital * | 100.0% <br><br> (4 if >, 3 if <=) | 50.0% <br><br> (3 if >, 2 if >=) | 25.0% <br><br> (2 if >, 1 if<=) | 10.0% |
| FX loans/total loans | 60.0% <br><br> (4 if >, 3 if <=) | 40.0% <br><br> (3 if >, 2 if >=) | 20.0% <br><br> (2 if >, 1 if<=) | 10.0% |
| RWA/total assets | 75.0% <br><br> (4 if >, 3 if <=) | 50.0% <br><br> (3 if > 2 if >=) | 25.0% <br><br> (2 if >, 1 if<=) | 0.0% |
| Profitability | | | | |
| ROA (after-tax) * | 0.0% | 1.0% | 2.0% | 15.0% |

| Thresholds and Weights | Threshold 1 (4&3) | Threshold 2 (3&2) | Threshold 3 (2&1) | Weight |
|---|---|---|---|---|
| | (4 if <, 3 if >=) | (3 if <, 2 if >=) | (2 if <, 1 if >=) | |
| ROE (after-tax) * | 0.0%<br>(4 if <, 3 if >=) | 10.0%<br>(3 if <, 2 if >=) | 20.0%<br>(2 if <, 1 if >=) | 15.0% |
| Liquidity | | | | |
| Liquid assets/total assets | 10.0%<br>(4 if <, 3 if >=) | 20.0%<br>(3 if <, 2 if >=) | 30.0%<br>(2 if <, 1 if >=) | 10.0% |
| Liquid assets/short-term liabilities | 30.0%<br>(4 if <, 3 if >=) | 40.0%<br>(3 if <, 2 if >=) | 50.0%<br>(2 if <, 1 if >=) | 10.0% |
| Sensitivity to Market Risk | | | | |
| Net FX exposure / capital * (abs.) | 25.0%<br>(4 if >, 3 if <=) | 15.0%<br>(3 if > 2 if >=) | 5.0%<br>(2 if >, 1 if<=) | 5.0% |

** The rating structure can be interpreted as follows. A bank will be assigned rating 4 if the RBC ratio is 5% and rating 3 if the RBC ratio is more than or equal to 5%. Similarly, the rating will also be 3 if RBC ratio is less than 8% and 2 if RBC ratio is more than or equal to 8%. The bank will get rating 2 if RBC ratio is less than 15% and rating 1 if RBC ratio is more than or equal to 15%.

As it can be seen from Table 72, rating varies from 1 to 4, with 4 being the lowest and 1 being the highest rating. There are three thresholds (i) Threshold 1 (rating 4 &3) (ii) Threshold 2 (rating 3&2) (iii) Threshold 3 (1&2). For example, in case of capital adequacy if a commercial bank has capital adequacy ratio of less than 15% but more than 8% then the rating shall be 2. Similarly, if the RBC ratio is more than or equal to 15% then the rating shall be 1.

Using the financial performance in Table 71, and rating structure, Table 73 shows the pre-shock rating and index of safety for five banks. It should be noted that lower the value of rating, the better the financial performance. Similarly, better financial performance also implies higher safety reflected by high index of safety for bank 5.

**Table 73: Pre-shock rating and index of safety**

| | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Pre-shock rating | 2.45 | 2.2 | 2 | 2.4 | 1.7 |
| Index of safety | 0 | 33 | 60 | 7 | 100 |

Using the index of safety and range of daily withdrawal rate as given in Table 65, the daily withdrawal for different kinds of deposits products is calculated for each bank. It can be seen in Table 74 that bank 5 has the lowest withdrawal rate (i.e. 0%) due to better financial performance. Daily withdrawal rate for all kinds of deposits for bank 5 is zero percentage only. Similarly, bank 3 has low withdrawal rate due to

better pre-shock rating or index of safety. Low withdrawal rate for bank 5 and bank 3 also enhances the strength of these banks to remain liquid for longer period.

**Table 74: Daily withdrawal rate**

|  | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 25% | 17% | 10% | 23% | 0% |
| Demand Deposits (Foreign Currency) | 15% | 10% | 6% | 14% | 0% |
| Time deposits (MVR) | 10% | 7% | 4% | 9% | 0% |
| Time deposits (Foreign Currency) | 10% | 7% | 4% | 9% | 0% |
| Liquid Assets (Available per day) | 95% | 95% | 95% | 95% | 95% |
| Non-liquid assets (Available per day) | 1% | 1% | 1% | 1% | 1% |

Since daily withdrawal for bank 5 is zero percentage, new cash flow till day 5 of consecutive withdrawal is zero. On day 5, new liquid assets available for liquidation become negligible. This is due to liquidation of the liquid assets at the rate of 95% consecutively for 5 days. Since there is no withdrawal of funds at bank 5, bank 5 remains liquid as also bank 4.

**Table 75: Liquidity position after five days of consecutive withdrawal, (MVR Million)**

|  | Bank 1 | Bank 2 | Bank 3 | Bank 4 | Bank 5 |
|---|---|---|---|---|---|
| Demand Deposits (MVR) | 40 | 72 | 79 | 113 | 0 |
| Demand Deposits (Foreign Currency) | 4 | 7 | 7 | 15 | 0 |
| Time deposits (MVR) | 10 | 15 | 14 | 25 | 0 |
| Time deposits (Foreign Currency) | 1 | 1 | 1 | 3 | 0 |
| New cash outflow | 54 | 95 | 100 | 156 | 0 |
| Liquid assets available | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-liquid assets available | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| New Cash inflow | 7.7 | 11.5 | 19.2 | 24.0 | 19.2 |
| Net cash inflow since beginning of run | -235 | -14 | 187 | -383 | 698 |
| Liquid? (1=yes, 0=no) | 0 | 0 | 1 | 0 | 1 |

# *9.4 Scenarios*

As of now we have assessed five kinds of different risks 'individually' that commercial banks may be subject to due to macroeconomic or financial sector developments. However, a macro-economic shock,

for example interest rate increase, may not only expose commercial banks to the interest rate risk but also to credit risk due to increase in non-performing loans. Hence, it is imperative to construct 'scenarios' which provides combinations of various risks impacting the economic value of the commercial banks.

Scenario include five kinds of risks , i.e. credit risk, interest risk, foreign exchange risk, inter-bank liquidity risk, and liquidity risk. Since each kind of risk itself takes various forms, we allow for different combinations of risk to assess its impact on the banking ratios of five banks.

**Table 76: Input into the scenarios**

| Which of the credit shocks is considered for the scenario? |
|---|
| 1. Under-provisioning<br><br>2. Fall in asset quality (Overall)<br><br>3. Fall in asset quality in specific sectors<br><br>4. Concentration risk |
| What is the expected rate of depreciation in the foreign currency? |
| What is the expected rate of change in interest rate (%) |
| Which of the liquidity shocks is considered (1=simple,2=complex) |
| What is the number of consecutive days of withdrawal for which banks' liquidity is to be checked? |
| Is daily withdrawal rate to be taken as given or to be determined endogenously? If endogenously, then on what basis , i.e. total assets, state ownership, pre-shock rating |
| Which is average provisioning rate assumed for non-performing loans arising due to change in exchange rate? |

The stress testing exercise assesses the impact of the various combinations of risk on the various banking indicators as given in Table 71 and Table 77.

**Table 77: Indicators to be assessed under scenarios**

| **Items** | | **Items** | |
|---|---|---|---|
| | Solvency | | Liquidity |
| 1 | Pre-shock RBC ratio | 1 | Liquid assets/total assets |
| 2 | Impact of (percentage points of the original RWA) | a | Pre-shock |
| a | Increase in provisioning | b | Post-shock |
| b | Increase in NPLs | 2 | Liquid assets/short-term liabilities |
| c | Increase in interest rates | a | Pre-shock |

| Items | | | Items | |
|---|---|---|---|---|
| d | Exchange rate change (+ depreciation, - appreciation) | | b | Post-shock |
| 3 | Post-shock RBC ratio | | | |
| 4 | Change in RBC ratio (all fundamental shocks) | | | |
| 5 | Impact of interbank contagion | | | |
| 6 | Post-contagion RBC ratio | | | |

Based on assumed values for inputs given in Table 75, different risks will be clubbed together and the impact of different risks on the economic value of the bank, i.e. capital will be assessed. If the capital post modelling all the risks for any banks comes below the minimum requirement of 10%, then the bank shall require more capital injection to strengthen its resilience to the unforeseen risks.

## 9.5 Conclusion

In this guidance note, we have attempted to provide methodology through which various potential risks to the financial system can be assessed individually as well as in different combinations.

The risks modelled in this note are credit risk, interest rate risk, foreign exchange risk , inter-bank contagion risk and liquidity risk. Across all risks, we have assessed the impact on the economic value of the bank, i.e. capital of the commercial bank. Within credit risk, we have modelled four scenarios (i) What happens to capital when there is a fall in the collateral value of the loan? A decline in the collateral value of loan results in decline in realizable value of credit assets in case of insolvency. This increases the size of non-performing loans net of realizable value of collateral. High NPL requires higher provisions which need to be met through capital. Hence, capital gets impacted. (ii) What happens to capital when x percentage of performing loans becomes non-performing? (iii) What happens to capital when x percentage of performing loans in specific sectors becomes non-performing (iv) What happens to capital when some of the largest credit exposures of the bank becomes non-performing?

In case of interest rate risk, we have provided a methodology wherein we can assess "What happens to capital if market interest rate changes by x%?" A change in market interest rate impacts the interest income as well as interest expense of the bank. Net impact of the change in interest rate may either augment the capital stock or deplete the capital stock depending on the sign of net change. Although banks in Maldives face limited foreign exchange risk because of fixed exchange rate system (within a band) with the USD, but risks from other currencies persists in general. Banks can also face risks from their peer banks if the internal risk management of other banks are not robust. Through inter-bank contagion risk, we have provided the methodology to assess inter-bank lending risk. Since banking business involves financing long term assets with short term liabilities, banks on a day to day basis faces liquidity risk. In the note, we have provided a methodology through which we can assess the number of days different banks can withstand the cash withdrawal. The daily withdrawal rate can be assumed as given based on prior experience of central bank or it can be endogenously determined based on the size of the bank or ownership structure or the financial performance of the bank.

Until now, each risk was considered in isolation. However, banks can face multiple risks at the same time. In the scenario section, we have provided methodology through which various risks with different magnitude can be modelled together to assess the impact of capital of the banks.

As mentioned before, stress testing only provides a rough estimate of the effect of the shocks. It is not a precise tool that can be used with scientific accuracy. The stress test is only an analytical technique that can be used to produce numerical estimate of a sensitivity to particular risk. For example, stress tests can

only provide an estimate of the exposure to a specific event, but not the probability of the event occurring. Hence, it can provide an estimate of how much could be lost under a given scenario but not how much is likely to be lost.

# *Appendix.1*

Suppose an asset has a face value F and yields annual cash flow of C. The asset matures after N years. Present value of the asset can be calculated as follow:

$$Present\ Value = PV = \frac{C}{(1+r)} + \frac{C}{(1+r)2} + \frac{C}{(1+r)3} + \cdots + \frac{C}{(1+r)N} + \frac{F}{(1+r)N}$$

Differentiating PV with respect to r gives us:

$$\frac{\partial pv}{\partial r} = \frac{-C}{(1+r)^2} + \frac{-2C}{(1+r)^3} + \cdots + \frac{-N\ (C)}{(1+r)^{N+1}} + \frac{-N\ (F)}{(1+r)^{N+1}}$$

Rearranging terms gives us:

$$\frac{\partial pv}{\partial r} = -\frac{1}{(1+r)} \left[ \frac{C}{(1+r)^1} + \frac{2C}{(1+r)^2} + \cdots + \frac{N\ (C)}{(1+r)^N} + \frac{N\ (F)}{(1+r)^N} \right] \qquad \text{...Equation (1)}$$

$$\frac{\partial pv}{\partial r} \times (1+r)(-1) = \left[ \frac{C}{(1+r)^1} + \frac{2C}{(1+r)^2} + \cdots + \frac{N\ (C)}{(1+r)^N} + \frac{N\ (F)}{(1+r)^N} \right]$$

And duration is also defined as:

$$D = \frac{\sum_{t=1}^{N} Present\ Value_t\ \times t}{\sum_{t=1}^{N} Present\ Value_t}$$

Or

$$D = \frac{\dfrac{C}{(1+r)^1} + \dfrac{2 \times C}{(1+r)^2} + \cdots + \dfrac{N \times (C)}{(1+r)^N} + \dfrac{N \times (F)}{(1+r)^N}}{\dfrac{C}{(1+r)^1} + \dfrac{C}{(1+r)^2} + \cdots + \dfrac{(C)}{(1+r)^N} + \dfrac{(F)}{(1+r)^N}}$$

Using equation (1)

$$D = \frac{\dfrac{C}{(1+r)^1} + \dfrac{2 \times C}{(1+r)^2} + \cdots + \dfrac{N \times (C)}{(1+r)^N} + \dfrac{N \times (F)}{(1+r)^N}}{PV}$$

$$D = \frac{\dfrac{\partial pv}{\partial r} \times (1+r)(-1)}{PV}$$

$$D = -\left[ \frac{\partial pv}{\partial r} \times \left( \frac{(1+r)}{p} \right) \right]$$

Or

$$D \approx -\left[ \frac{\partial pv}{\partial r} \times \left( \frac{(r)}{p} \right) \right]$$

# 10 Discussion Paper on Macro-prudential rules and regulations

## 10.1 Country Context: Maldives

**The financial sector of an economy consists of a set of financial institutions, financial instruments and financial markets.** The sector also includes the legal and regulatory framework under the aegis of which institutions and markets undertake financial transactions by making use of the available financial instruments. A supervisory cum oversight authority is usually responsible for ensuring unfettered operations of the financial markets and institutions so that key financial risks are monitored on an ongoing basis and corrective actions are undertaken as and when the need arises.

**In Maldives, the financial sector can be encapsulated by Figure 18 below.** As shown, there are seven banks, which dominate the financial sector with a share of 84% of total financial sector assets (Figure 19). Of these, the Bank of Maldives and the Maldives Islamic Bank are domestically incorporated. State Bank of India, Habib Commercial Bank, HSBC and Bank of Ceylon have bank branches in the country while Mauritius Commercial Bank is a subsidiary[74]. Housing Development and Finance Corporation (HDFC) provides housing loans, and as evident from its name, the Maldives Finance Leasing Company provides lease finance services. The insurance sector in the country functions through four institutions. Lastly, local agents of three international companies provide money transfer services. All these financial institutions come under the regulatory purview of the Maldives Monetary Authority (MMA). The other regulator in the Maldives financial market is the Capital Markets Development Authority (CMDA). It is responsible for regulating the Maldives Stock Exchange Company and the Maldives Securities Depository.

Figure 18: Overview of the Financial Sector in Maldives

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[74] See Financial Stability in the Maldives, Country Paper, SAARC Finance Governor's Symposium on Financial Stability held in Kurkoram, Kerala during June 10-11 2011, Page 4.

| Financial Sector | | | | |
|---|---|---|---|---|
| **Banking Sector** | **Insurance** | **Finance Leasing** | **Finance** | **Money Transfer** |
| Bank of Maldives | Allied Insurance Co. of Maldives | Maldives Finance Leasing Company | Housing Development Finance Corporation | 3 local agents of international money transfer companies |
| Maldives Islamic Bank | The Calico Insurance Co. | | | |
| HSBC | Sri Lanka Insurance Corporation | | | |
| State Bank of India | Amana Takaful | | | |
| Bank of Ceylon | | | | |
| Habib Bank Limited | | | | |
| Mauritius Commercial Bank | | | | |

**Figure 19: Share of Other Depository Corporations and Other Financial Corporations in total assets, Dec 2013**



OFC 16.38%

ODC 83.62%
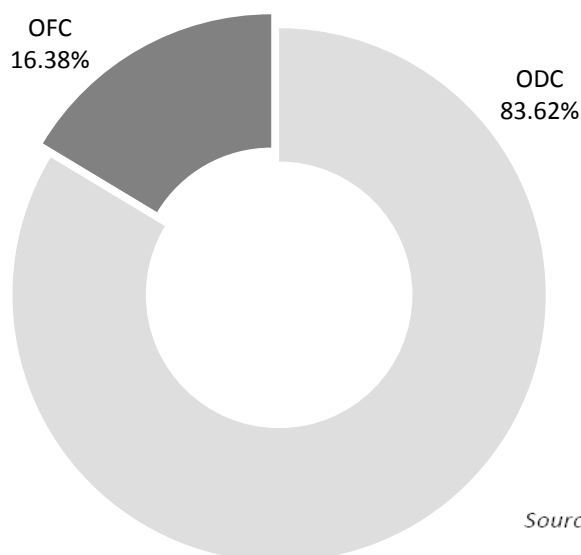
*Source: Monthly Statistics, April 2014, Volume 15 Issue 4*

**The current regulatory framework in Maldives is mostly micro-prudential in nature.** The Maldives Banking Act covers licensing requirements for general and Islamic banks, sets principles for management of banks and rules governing their practices. Additionally, there are 11 Prudential Regulations that cover the following aspects:

        (i)      Capital adequacy requirements;

(ii)      Single borrower and large exposure limits;

(iii)      Limits on loans to related persons;

(iv)      Transactions with related persons;

(v)      Asset classification, provisioning and suspension of interest;

(vi)      Limits on inter-bank exposures;

(vii)      External audits;

(viii)      Publication and disclosure;

(ix)      Fit and proper requirements;

(x)      Corporate governance; and

(xi)      Foreign currency exposure limits.

These are largely micro-prudential, aiming to preserve the health of individual financial institutions.

**Elements of macro-prudential policy do exist in the present regulations that MMA requires the financial institutions to follow.** For example, the regulation on foreign currency exposure limits mandates that a bank's overall foreign currency exposure does not exceed 40% of its capital base and exposure to a single currency does not exceed 15% of its capital base. This may be used as a macro-prudential measure by tightening the limits in line with macro-financial developments. Similarly, by limiting interbank exposures[75], the MMA may limit contagion risk between banks (more on this discussed below). Nevertheless, a comprehensive approach to macro-prudential regulation is currently missing. The Asian Development Bank TA-8284, 'Supporting Financial Stability in Bhutan and the Maldives', aims to plug this gap. In the subsequent sections, this policy paper will set out the rationale for introducing macro-prudential rules and regulations (hereafter MPR 2014) in Maldives and the mode of implementation of each of the proposed policies.

## 10.2 Rationale for Macro-prudential regulations

**Macro-prudential regulation aims to contain systemic risk**. The IMF describes systemic risk as the "risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy"[76]. It has two aspects: (a) pro-cyclicality and (b) contagion risk among financial institutions at any given point of time.

Pro-cyclicality is defined as "the magnification of swings in the economic cycles, by financial sector activities, most notably bank lending"[77]. Essentially, during periods of economic expansion, lenders are optimistic about future prospects which lead them to underestimate and under-price risks. Hence, not only more credit is available during an economic boom, it is also available at easy terms. This further fuels the economic expansion. Moreover, if increased credit leads to more demand and purchase of assets that serve as collateral, the resultant increase in their value encourages the disbursement of credit even more. Conversely, during "bad times", as asset values fall, and loans turn non-performing, the financial system reins in credit. This causes economic

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[75] Prudential Regulation No. 06, Limits on Inter-bank exposures, Part 3, Section 1(a) states that "Any inter-bank exposure having a term or settlement period more than 7 calendar days shall not exceed 30% of a bank's capital base. Further, any amount of such exposure that exceeds 15% of a bank's capital base must be fully secured at all times…"

[76] Guidance to assess the systemic importance of financial institutions, markets and instruments: initial considerations, International Monetary Fund, October 2009.

[77] Gersl A. and Petr Jakubik, "Pro-cyclicality of the Financial System and Simulation of the Feedback Effect, Czech National Bank, Financial Stability Report, 2009/10.

activity to be affected adversely, showing up in low rates of growth of the economy, for instance. The consequent weakening in credit-worthiness of prospective borrowers causes the financial system to tighten the supply of credit further, which in turn has an impact on real sectors of the economy. Macro-prudential instruments like dynamic provisioning, counter-cyclical capital buffers can address this kind of risk.

Contagion risk is the risk of the failure of one institution causing related institutions to fail-in turn causing more collapses and overall financial instability. This may be due to inter-connectedness among institutions-for instance, when one financial institution has lent excessively to another financial institution that fails. Often, this interconnectedness exists between a few big FIs in the economy that control the majority portion of the economy's assets. A failure of only one institution in scenario such as this, can translate into economy wide financial distress. Note, that even perceived inter-connectedness among institutions may cause a loss of confidence in the entire system, result in runs on banks. Lack of information and complexity of intra-financial system activity can often contribute to this[78]. Macro-prudential regulations aimed at addressing public disclosure can tackle this type of risk.

**Macro-prudential policy instruments broadly have two aims**.  The first is to strengthen the financial system's resilience to economic downturns and other adverse aggregate shocks. For example a policy instrument (like the counter-cyclical capital buffer) can mandate banks to increase capital in good times which can be drawn down during bad times. Availability of the buffer could provide a financial institution with the leeway to maintain the flow of credit even during downturns of the economic cycle. Second, macro-prudential policy instruments can help "lean against the wind" by pro-actively limiting the build-up of financial risks. The same instrument, i.e., the counter-cyclical capital buffer, requires banks to build up additional capital during good times which can modulate the hitherto excessive flow of credit.

**Table 78 below gives a brief introduction to the policy instruments being proposed for Maldives.** Some instruments may only be applicable at specific times, i.e., when there is build-up of risks. This is true for the Sectoral Capital Requirement (SCR) and the Counter-cyclical capital buffer (CCyB). The other instruments are meant to be operationalised on an ongoing basis, with specific thresholds and limits being allowed to vary with the MMA's assessment of macro-financial risks. Moreover, two or more policy instruments may go towards addressing the same type of risk. For example, the CCyB and the time varying capital provisioning (TVCP) both aim to address pro-cyclicality. However, while the CCyB looks to address pro-cyclicality associated with the need to maintain minimum capital adequacy ratio requirements, the TVCP addresses pro-cyclicality in required loan loss provisioning. The SCR and the CCyB perform similar functions-mandating that FIs build a capital buffer during credit booms that can be drawn down during bad times. However, while the SCR addresses excessive credit flow to specific sectors, the CCyB addresses economy-wide credit booms. For this reason, the SCR and the CCyB need not be applicable at the same time.

**Table 78:  Macro-prudential policy instruments**

| Instrument | Issue addressed | Description |
|---|---|---|
| a)  Disclosure requirement | Risks associated with informational asymmetry | Allow for information availability in the financial market to be more symmetric. This can have multiple advantages: One, during good times, the approximate risk associated with particular institutions/ instruments can be estimated, and mispricing of risk can be prevented. Two, it can act as a confidence-building measure in assuring market players of the viability of certain institutions. Hence situations of "unnecessary" runs on banks during periods of uncertainty can be avoided. |
| **Status in Maldives:** A prudential regulation on Publication and disclosure (Prudential Regulation No. 08-2009) is currently in operation. Requires banks to publicly disclose (by publication in a newspaper and display in their bank premises) a balance sheet and statement of income annually. The information has to be declared within 1st May following the closing of a financial year (on 31st December). | | |

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[78] Instruments of Macro-prudential policy, A Discussion Paper, Bank of England, Dec 2011.

| Instrument | Issue addressed | Description |
|---|---|---|
| b) Counter-cyclical capital buffer (CCyB) | Systemic risk associated with excessive overall credit growth in the economy. | CCyB is based on the recognition that lending is pro-cyclical. That is, financial institutions (FIs) lend excessively during good times. However, when times turn bad and their capital is threatened, FIs find it easier to reduce lending than increase the magnitude of capital, when trying to meet minimum capital requirements.<br>Basel III recommends the use of a Counter-cyclical capital buffer that can be built during good times (reflected by the credit-GDP ratio exceeding its long term trend value by a certain threshold value), when risks are building up. These can be drawn down when times are bad to deal with capital losses. Thus minimum capital requirements can be met without adversely impacting the credit availability in the economy, which could otherwise exacerbate the economic crisis.<br>Note that increasing the capital requirement against risk-weighted assets during credit booms may also work to modulate the credit flow. |
| Status in Maldives: No policy on this yet || |
| c) Sectoral Capital Requirements (SCR) | Risk to economy/ financial sector arising due to excessive flow of credit to one or more sectors. | SCR requires capital buffers to be maintained against risk-weighted assets in certain sectors-specifically, those sectors that are witnessing excess flow of credit (and hence, risks). For example, the housing sector with a large share in the outstanding portfolio of credit may be experiencing high growth in credit flow in comparison with the economy as a whole. Easy credit may be fuelling an asset price boom by contributing to rising demand of housing units. Therefore, to avoid build-up of system wide risks, MMA may require FIs to hold capital buffers against loans given to finance housing properties.<br> In sum, SCR directly targets the sector that is contributing to the build-up of risks. |
| Status in Maldives: No policy on this yet || |
| d) Time varying capital provisioning (TVCP) | Systemic risk associated with pro-cyclicality in (specific) loan loss provisioning | Generally, FIs make specific provisions out of their earnings as a fixed proportion of existing non-performing loans. Provisioning requirements are likely to be higher during times of economic distress since the quantum of non-performing loans is likely to be higher during the same period. This accentuates pro-cyclicality by adversely affecting profits (and thus capital) when FIs need it the most. TVCP requires FIs to make dynamic provisions against expected losses such that these are higher during good times and lower during bad times. The higher provisioning during the good times can be used to compensate for loan losses that materialise during the bad times. |
| **Status in Maldives:** Prudential Regulation No. 5: Asset Classification, Provisioning and Suspension of Interest, fixes general and specific loan loss provisions. However it states that "if reliable data suggests that loss potential is higher and that larger provisions are warranted, or if applicable IAS or IFRS rules require a higher level of provisions, then the higher provisions shall be maintained". || |
| e) Margin requirements | Funding risk for borrowers for loans against securities | Securities can act as collateral for loans. The term 'margin' is used to describe the level of over-collateralisation required[79]. For instance, a 5% margin requirement means that securities worth MVR 105 have to be kept as collateral against a loan |

[79] The Financial Policy Committee's Powers to Supplement Capital Requirements, a draft policy statement, Bank of England, January 2013.

| Instrument | Issue addressed | Description |
|---|---|---|
| | | amount of MVR 100. These requirements, as imposed by individual financial institutions, can be pro-cyclical. During good times, risk management concerns may be on the backburner and FIs compete amongst themselves to attract borrowers. Reducing the margin requirement on collateral for prospective borrowers may be one way of doing this. During bad times however, as defaults materialise and confidence falters, FIs may require existing borrowers to increase collateral kept with the FI, and demand securities of higher value from prospective borrowers. Since crises are also often concomitant with fall in value of securities, this increases the possibility of a credit crunch during bad times. A static or varying minimum margin requirement imposed by the regulator can prevent this pro-cyclicality. |
| **Status in Maldives:** No macro-prudential requirement imposed by the MMA. | | |
| f) Cap on Loan to Value ratio | Credit risk attached with fall in prices of collateral (particularly of real estate collateral) | The loan to value ratio (LTV ratio) refers to the value of the loan advanced, relative to the value of the underlying collateral asset. If the loan amount, relative to the value of the underlying asset is high, then this may translate into loan defaults in case of falling asset values. Given a certain fall in the price of the underlying asset, a higher loan-to-value increases the risk of non-repayment. This is simply because the borrower has less to lose if she defaults in this case, compared to a situation where she received a lower loan amount and had to furnish the difference between the value of the asset and the value of the loan advanced (down-payment), through her own resources. In the former case, the borrowers may be better off by defaulting on the loan and losing the asset, rather than repaying and retaining an asset losing its value. A cap on the maximum amount of the loan as a proportion of the value of the underlying collateral can partially mitigate this risk. While LTV limits are usually applied by individual financial institutions as part of their credit-risk management policies, an economy-wide cap ensures uniformity in practice. |
| **Status in Maldives:** Practised internally by FIs as part of their internal credit risk management. No macro-prudential requirement imposed by the MMA. | | |
| g) Cap on loan to income/ debt to income | Credit risk due to excessive leveraging of the borrowers | LTI limits are used to assess and ensure the borrower's repayment capacity. If after meeting all her debt obligations (including the one arising out of the loan applied for), the remaining income of the borrower is too little too meet other necessary/ committed expenditures, there is a higher risk of default attached. A cap on the total allowable debt to income can ensure that financial institutions do not lend to individuals with poor repayment capacities. While LTI limits are usually applied by individual financial institutions as part of their credit-risk management policies, an economy-wide cap ensures uniformity in practice. |
| **Status in Maldives:** Practised internally by FIs as part of their internal credit risk management. No macro-prudential requirement imposed by the MMA | | |
| h) Cap on debt-to-equity for project financing | Credit risk | A cap on the debt-equity ratio mandates that a certain proportion of a project loan must come from the borrower's resources (equity). This creates a financial interest in the project on the part of the borrower. |

| Instrument | Issue addressed | Description |
|---|---|---|
| **Status in Maldives:** Practised internally by FIs as part of their internal credit risk management. No macro-prudential requirement imposed by the MMA | | |
| i)    Restrictions on distribution of profit | Balancing the interests of small deposit holders and the financial institutions' shareholders | Rationalizing distribution of profits can help promote banking sector health, as the retained profits may be used to prop up capital for bad times. Simultaneously, it is important to protect shareholder interest, as it contributes to FI capital over the longer term. |
| **Status in Maldives:** Prudential Regulation no. 1: Capital Adequacy imposes restrictions on distribution of cash dividend in case a bank fails to meet the minimum capital requirements. Specifically, " a bank shall not declare or pay a cash dividend, or redeem any of its capital shares or other capital instruments, or make any other distribution of its profits if the resulting capital ratios will be below the minimum capital ratios" set by the regulator.<br><br>Apart from this, Section 12(d) of the Maldives Banking Act states that 50% of a bank's net distributable profits must go towards a capital reserve fund, until the time that such fund is 50% of the paid up capital. Subsequent to this, 25% of net distributable profits must go towards the reserve fund till the time that the reserve equals the size of the paid up capital. | | |

## 10.3 Macro-prudential regulations in Maldives: Key Features

This section of the policy paper will take a close look at each proposed macro-prudential regulation. In particular, it shall cover the objective and rationale of each regulation, delineate its key features, look at the relevant data of Maldives's financial institutions and explain the mode of implementation with the help of an example. The discussion of each regulation will end with an implementation plan for the same.

### 10.3.1    Disclosure Requirements

**The objective of the regulation on disclosure requirements is to ensure transparency in banking activities**. This would in turn enable the public to be more aware of the riskiness of the bank, in terms of its investments, loans, non performing assets, capital etc., and thus make educated decisions about their choice of banking service provider. Moreover, more transparency can also help reduce instances of runs on banks arising due to opacity and misinformation regarding banking activities. Disclosure requirements on capital are also emphasized by Basel II, Pillar III on 'Market Discipline'. These would be pertinent if in future banks begin to follow internal risk-weighting methodologies as are allowed under Basel II. Moreover, a common framework of disclosures allows for comparability of the relative positions of financial institutions.

**The current regulation places *minimum* informational requirements on banks.** The Board of the bank may choose to disclose additional information as per its disclosure policy, if it believes that such information is material in influencing clients' economic decisions. Moreover, the MMA's Prudential Regulation No. 11 on Disclosure and Publication shall be applicable simultaneously. Similarly, any reporting mandated by the accounting standards shall continue.

**MPR 2014 requires disclosures** to be made **on a quarterly basis**. These are to be made available on the bank's website within 30 days of the end of the quarter. The disclosure requirements are on four fronts-namely, capital adequacy, credit exposures (including data on sectoral and geographic distributions of loans as well as extent of NPAs and provisioning made) and concentration of deposits and credit.

In discussion with the MMA, it is possible for the quarterly disclosure requirements to be integrated with the existing regulation on disclosures in Maldives. This will ensure ease of implementation, as also a comprehensive regulation.

### 10.3.2    Counter-cyclical Capital Buffer (CCyB)

The CCyB aims to safeguard the intermediation activities of financial institutions by ensuring they have adequate capital in hand during the downward phase of the economic cycle. This is done by building buffers when the economy is in good shape and experiencing a credit boom. As discussed above, the flow of credit exhibits strong pro-cyclical tendencies i.e., credit is likely to experience rapid growth during economic boom and deceleration during economic slowdown/stagnation. In particular, periods of economic boom witness excessive credit growth, generally associated with irrational exuberance and dilution of underwriting standards. The realistic risk position becomes evident with deterioration of asset quality during economic downswings. The consequent constrained capital position, relative to the minimum capital requirement, may lead FIs to decrease their lending (assets) instead of increasing the magnitude of capital[80]. The decrease in lending and the resultant stagnation in economic activity exacerbate the economic crisis, in turn worsening the financial crisis. The CCyB can alleviate this situation.

The CCyB operates by building capital buffers during 'good times', which can be drawn down during adverse macro-financial situations. When the regulator judges the macro-economic situation to be one where credit is booming (and risks are building), it asks all FIs to build up additional capital over and above the existing prudential capital requirements. When the regulator assesses that the economy is in a downturn phase, it may call for the buffer to be released. In this case, the buffer capital may be used by the FI to cover its unexpected loan losses, so that it is not strained to meet its minimum capital adequacy requirements during downturns. This in turn decreases the likelihood of a disruption in credit flow.

The regulation suggests that the MMA use the gap of the credit-GDP ratio from its trend value (henceforth, 'Gap') as the primary indicator to operationalize the CCyB in Maldives. It may also use other qualitative and quantitative indicators to strengthen its decision on this account. This echoes Basel III's prescription of the regulator operationalizing the buffer "after using the best information available to gauge the build-up of system-wide risk"[81]. The following steps are to be taken in using the Gap as the indicator of measuring the build-up of systemic risk.

Step1:

Calculate the Credit-GDP ratio for period t.

Credit-GDP Ratio = $Credit_t/GDP\_nominal_t$

Where $Credit_t$ is the broad measure of nominal credit to the non-government sector (i.e. credit to the private sector and public sector undertakings) in period t and $GDP\_nominal_t$ is the nominal GDP of the country in period t.

Step 2:

Calculate the trend value of the GDP ratio (Any kind of statistical filter could be used such as Hodrick Prescott).

Step 3:

Calculate the difference between the actual credit-GDP ratio and the trend value, i.e. the "Gap".

The regulation suggests that the threshold 'Gap' for activating the buffer be 500 basis points. According to the Basel Committee, if the Gap exceeds 200 basis points, the regulator may operationalize the buffer. Note that the 'trend' value may be understood as the value that the credit-GDP ratio would take in normal circumstances, i.e. during the times when there is neither a credit boom nor a crunch. If the observed credit-GDP ratio at a point in

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[80] Counter-cyclical capital buffers as a macro-prudential instrument, December 2012, Riksbank studies, Sveriges Riksbank.
[81] Guidance for national authorities operating the countercyclical capital buffer, Basel Committee on Banking Supervision, December 2010.

time is higher than this value, it may be indicative of overheating. The 200 basis point difference is a cut-off that the Basel Committee finds as the most suitable threshold for operationalisation of the buffer. However, for developing countries like Maldives the threshold of 200 basis points may be too low. This is because the financial systems in such countries are still in the evolutionary stage- a 200 basis point Gap between observed and trend values of the credit-GDP ratio may be reflective of financial deepening, rather than temporary overheating. Hence, a higher threshold seems desirable for these countries. Accordingly, the threshold for Maldives is kept at 500 basis points.

**Table 79: The Gap and Corresponding size of the buffer**

| Gap measured in basis points (bps) | Size of the buffer (as % of RWA) |
|---|---|
| 500 bps and above but below 600 bps | 0.5 |
| 600 bps and above but below 700  bps | 1 |
| 700 bps and above but below 800  bps | 1.5 |
| 800 bps and above but below 900  bps | 2 |
| 900 bps and above but below 1000  bps | 2.25 |
| 1000 bps and above | 2.5 |

**The size of the buffer to be built up depends on the observed Gap**. As given by Table 79 above, a Gap greater than or equal to 500 basis points (A-T≥500bps in Figure 20) will lead to operationalisation of the buffer. The maximum size of the buffer is 2.5% of a financial institution's risk-weighted assets and will be applicable when the Gap exceeds 1000 basis points or more. The period when financial institutions build up their capital in accordance with the size of the observed Gap, is known as the **Contribution phase**. Note that no contribution will be required if the financial institution already has enough capital to meet the minimum prudential requirements and the requirement imposed by way of the CCyB. In case, it has less capital than that required to meet both these requirements, additional infusion shall be required.

When the Gap falls below 500 basis points (0 bps<A-T<500 bps in Figure 20), the MMA shall ask FIs to continue to maintain the additional capital that was accumulated on account of the CCyB during the contribution phase. This is known as the **maintenance phase.** Even though the risk-weighted assets of the financial institutions may increase during the maintenance period, they will not be asked to infuse more capital than was done during the time that the buffer was built.

When the Gap falls to zero or below (A≤T in Figure 20), the MMA shall ask the financial institutions to release the buffer. Hence this is known as the **release phase**. The release of capital simply means that the tier 1 RBC requirement is now 6% of risk-weighted assets, as prescribed by the Prudential Regulation No. 01-2009, Capital Adequacy. The released capital may be used to meet unexpected losses during the bad phase or to increase lending.

**Figure 20: The three phases of the Counter-cyclical Buffer**

Credit-GDP ratio

**T**
(Trend)

**A**
(Actual)

Maintenance Phase
0 bps<A-T<500 bps

Contribution
phase

Release Phase
A≤T

t

—————  Actual Credit-GDP          - - - - -  Trend value of credit-GDP
ratio (A)                                             ratio (T)
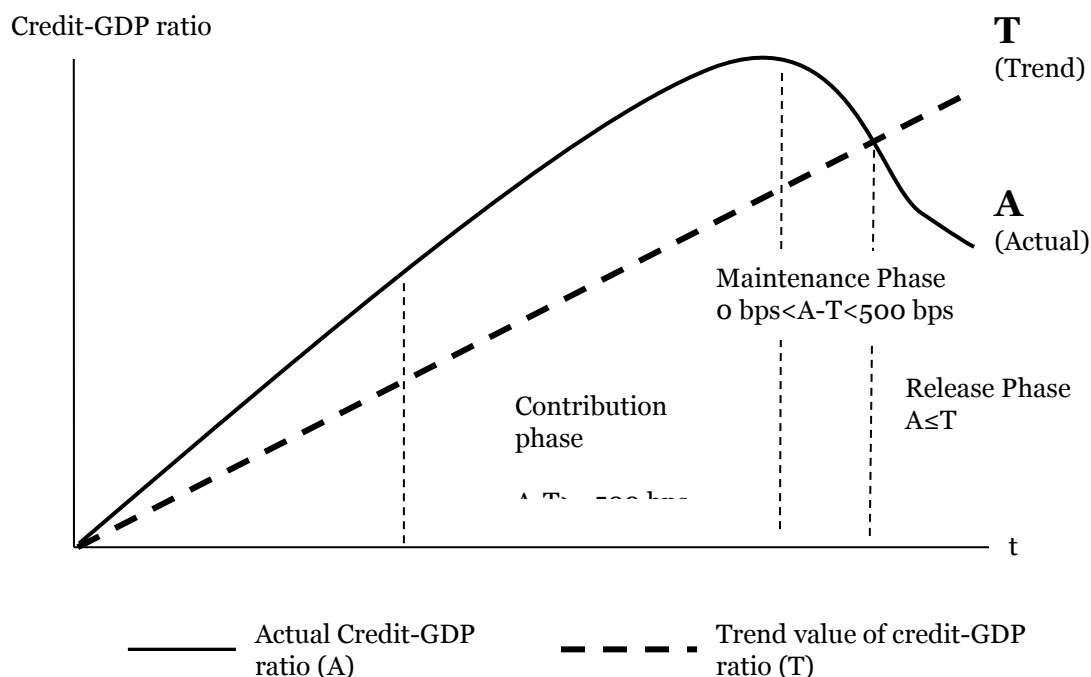
**The CCyB has to be met with Tier 1 Capital**. This means that the reported Tier 1 capital should be adequate to meet the minimum capital requirements and the counter-cyclical capital buffer imposed. The buffer does not have to set apart in a separate account. However, financial institutions will be required to report the buffer capital as a memo item in sheet 6 (Capital Adequacy) of the financial returns they currently submit to the MMA.

**The regulation requires that the rationale of the buffer decision be communicated to all concerned financial institutions**. Such a practice is also encouraged by Basel III. An explanation of why the buffer is being implemented is seen to be important in order to promote transparency. Moreover if FIs have a clear understanding of the situation in which the buffer is to be applicable, they may be encouraged to take pre-emptive action of their own volition. The MMA could choose to periodically carry out an assessment of macro-financial conditions, publicly disclosing whether there is any possibility of a macro-prudential instrument being applied in the near future. The release of the Financial Stability Report may provide this opportunity.

**The implementation of the CCyB should overlap with a sectoral approach**. The CCyB is said to be a crude instrument since it does not address the source of the build-up of risk. That is, the excess build-up of credit may be due to lending to a particular sector. Yet, the CCyB imposes a blanket increase in capital for all exposures, thus failing to provide sharp incentives to FIs to decrease lending to the specific sector. The macro-prudential regulation on sectoral capital requirements would be important in this respect. It would be advisable for the MMA to judge if one or few sectors are responsible for the increase in credit, and then use that regulation, first to augment capital as well as to prevent the risk build up. If the build-up of credit and attendant risks spans across the sectors, imposition of the general CCyB would be the logical step. In essence, the MMA must use its judgment whether to apply the CCyB or the sectoral approach. Ideally the CCyB should not be deployed when the SCR is operational.

**Data analysis for Maldives reveals that the period between 2005 and 2008 was a period of high credit growth.** The buffer size operational in the corresponding period (2010) would have been about 0.5% of the risk-weighted assets. All data was taken from the monthly statistics of the MMA that are available in the public domain. Credit data is the sum of loans and advances of the ODCs and OFCs. Credit by ODCs is arrived

by adding the credit to the private sector and the public non-financial sector. Credit by OFCs to the non-financial sector is approximated by subtracting loans and advances to the Government from its total loans advanced. Data for OFCs was available only 2008 onward. Note that the measure of credit thus calculated excludes lending to the government. The reason for this is that credit to the government is itself likely to be low during good times and high during bad times, in line with the operation of fiscal policy. The trend value of the Credit-GDP ratio was calculated using the HP filter. The actual credit to GDP ratio and its trend is shown below in Figure 21.

**Figure 21: Credit-GDP ratio and its HP trend**
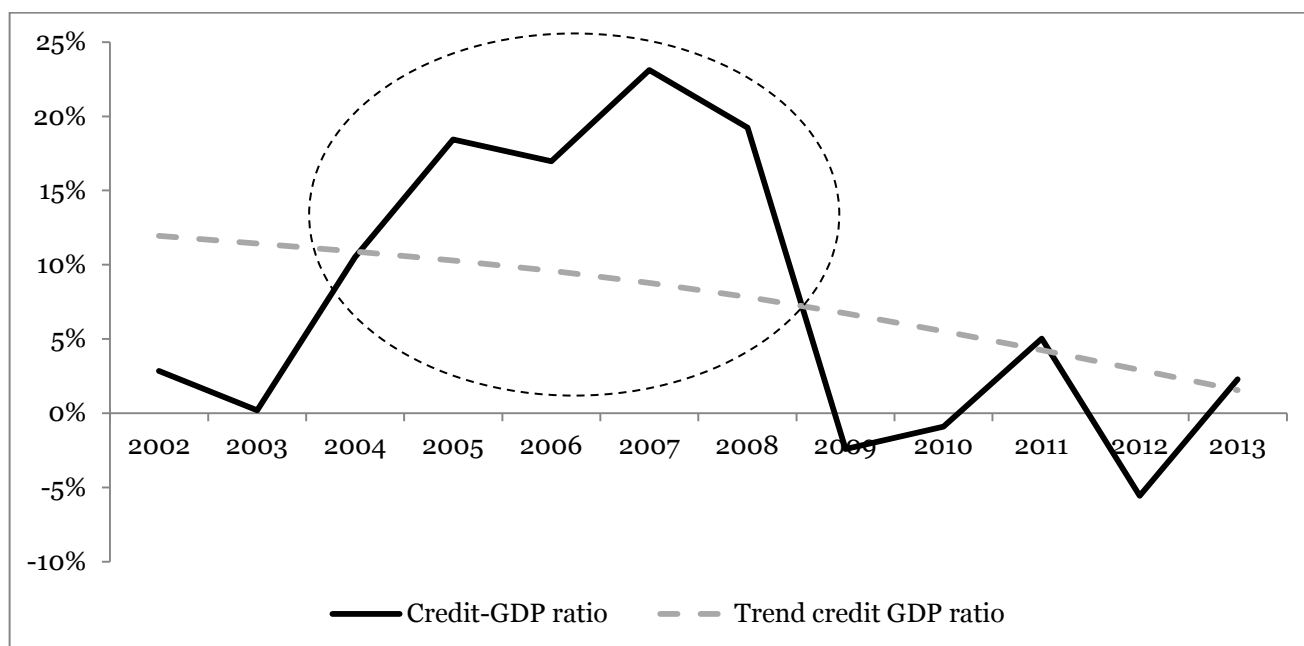


**The MMA may use other indicators to supplement its decision to operationalize the buffer**. As noted above, a high credit-GDP ratio may be a result of desirable financial deepening rather than excessive credit build-up. Moreover in 2005, GDP in Maldives contracted, on the back of the Tsunami in 2004. The credit to GDP ratio was also high on this account. Hence the MMA may have to consider all qualitative information available to take a decision on operationalising the buffer or adjusting the size of the buffer. It may look at other supplementary indicators as well to make a decision. This is allowed by section 3.1.1(b) of the draft regulation.

**Going forward, for better judgment of risk build-up, the MMA should consider strengthening its monitoring database**. For example, qualitative surveys on quality of underwriting (on the lines of the Senior Loan Officer Survey in the US), an index of asset prices will go some way in revealing a more accurate picture of potential risks. The MMA would also likely gain from international lessons in policy implementation that will emerge as more and more countries employ macro-prudential policies.

**Banks and the MMA may need time to adjust to the provisions of this regulation**. In particular, the MMA may need time to set up monitoring of relevant indicators, enhance staff capacity for monitoring and forecasting data etc. Moreover, Basel III advocates that countries implement the CCyB post 2016, operationalising the buffer as and when risks emerge, post that. Accordingly, the MMA may wait till 2016 before including the CCyB in their policy toolkit.

## *10.3.3      Sectoral Capital Requirement*

SCR plays a dual role of mitigating emerging risks to the financial system during economic boom and enabling expansion of credit growth to revive the economy during economic slowdown/ stagnation. It is envisaged as an additional capital requirement imposed against exposures to sectors which are perceived as contributing towards build-up of significant risks to overall financial stability during economic booms. The availability of this additional capital during periods of economic downturn may allow FIs to meet their minimum capital requirements without decreasing their lending. This in turn would lead to smoother credit flows than would be observed otherwise. Apart from this, the imposition of higher capital requirements on sector-specific exposures also facilitates moderation of credit to the risky sectors by making it more expensive for them to lend to the

Box 2: Illustration of CCyB

Consider a situation where the Gap is a little above 500 basis points. This would lead the MMA to set a buffer equalling a size of 0.5% of risk weighted assets. Further, consider three banks in the economy whose capital position is given by the Table 80 below. As is evident, Banks A and B have more capital than the minimum Tier 1 RBC requirement imposed by Prudential Regulation No. 01-2009. Moreover, when the CCyB is imposed, the capital required on that count (Column 7) is less than the excess capital held by the two banks (Column 5). On the other hand, Bank C initially has just enough capital to meet the 6% minimum requirement on the Tier 1 RBC. As a result, when the CCyB requirement equalling 0.5% of risk-weighted assets is imposed, it shows a shortfall of MVR 21 million worth capital. This has to be infused by the bank.

Table 80: Illustrative impact of CCyB on banks

| Banks | RWA (MVR Mn) | Tier 1 Capital held (MVR Mn) | Tier-1 capital Reqd. (MVR Mn) | Tier 1 RBC ratio | Excess Tier-1 capital | CCyB Requirement (MVR Mn) | Need for additional capital accumulation (Yes/No) |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4= (2*6%) | 5= (3/2) | 6= 3-4 | 7= (0.5% *2) | 8= (7-6) |
| A | 2400 | 192 | 144 | 8.0% | 48 | 12 | No |
| B | 2160 | 194 | 129.6 | 9.0% | 65 | 10.8 | No |
| C | 4200 | 210 | 252 | 6.0% | 0 | 21 | Yes |

sectors in question.

The criteria for selection of the sectors requiring the imposition of SCR is as follows:

The sector(s)/sub-sector(s) shall be subject to sectoral capital requirements if the sector in the last 12 quarters:

i. has an average share of 15% or more in the aggregate outstanding credit of the economy. This shall be calculated by taking the share of a sector in the total outstanding credit at the end of each quarter and averaging the same over the last 12 quarters i.e., $\frac{\sum_{j=1}^{12} s_{ij}}{12}$, where $S_{ij}$ is the share of the $i^{th}$ sector in aggregate credit $j^{th}$ quarter.

ii. exhibits a higher growth of at least 500 basis points over the growth rate of outstanding credit in the economy. This shall be calculated as follows:

   a. calculate the Year-On-Year (Y-O-Y) growth rate of outstanding credit of the economy and of the sector at the end of each quarter for past 12 quarters;
   b. Take the average of the Y-O-Y growth rate of the outstanding credit of the economy (X) and the sector (Y);
   c. Take the difference of Y and X.

Note that the measure of outstanding credit in the economy is essentially private sector loans and advances, i.e., it excludes lending to the government. This is for the same reason that credit to the government is excluded from the calculation of the credit-GDP ratio under the counter-cyclical capital buffer.

The MMA may exempt certain sectors which it deems are critical to the social and economic development of Maldives. For example, if in the backdrop of a natural disaster, loans to the real estate or construction sector increase at an unprecedented rate, the MMA may consider the mitigating circumstances before deciding to impose SCR on loans given to the sector.

Applying the same criteria to current data for Maldives reveals that if the MMA were to implement the regulation at the present time, there would be no sector requiring the imposition of the SCR. We carry out the necessary calculation in 2 steps.

Step 1:

Identify the sectors accounting for more than 15% of the overall loan portfolio

Based on the data for the 12 quarters preceding (and including the quarter ending December 2013), only the tourism sector has a share greater than 15% of the entire loan stock.

This can be seen from Figure 22 below. Share of each sector is obtained by first calculating the share of credit outstanding to a particular sector as a percentage of total credit outstanding at the end of each quarter. Then the average of this ratio for the past 12 quarters (preceding and including the ratio for the quarter ending December 2013) is calculated.

**Figure 22: Average share of sectors in overall credit outstanding (Mar-11 to Dec-13)**
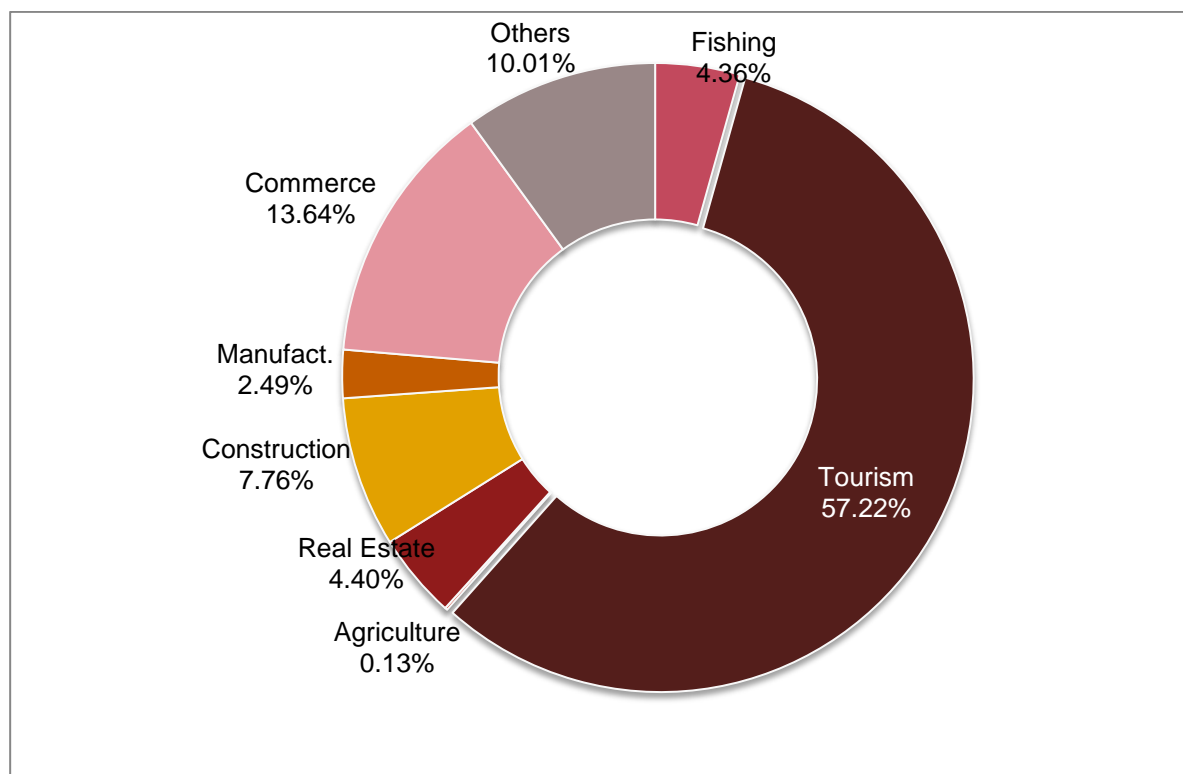


Step 2:

Examine the average growth rates of credit to each of the sectors identified in Step 1 and compare with the average growth rate of total outstanding credit.

The average growth rate of outstanding credit to a particular sector is arrived at by first calculating the year-on year growth rate of credit for every quarter.

Y-O-Y growth rate of Quarter $_i$

$$= [\frac{\text{Credit Outstanding at the end of Quarter}_i \text{ of Year}_t}{\text{Credit Outstanding at the end of Quarter}_i \text{ of Year}_{t-1}} - 1]$$

Subsequently, this growth rate is averaged over the past 12 quarters, preceding and including the growth rate for the quarter ending December 2013. This calculation is carried out for credit outstanding in each sector and overall. The difference of these two must be greater than 500 basis points to invite imposition of the SCR.

The tourism sector does not satisfy the listed criteria for imposition of SCR for the period studied (quarter ending March 2011 to December 2013). Its average growth rate is -0.9 compared to the 0.7% average growth rate of total private sector loans. This means that the credit to the tourism sector is growing at a rate lower than the growth rate of total credit.

Note that when the second criterion is not met by a sector any longer, the MMA may direct financial institutions to stop contributing to the SCR. In other words, the difference between the average growth rate of outstanding credit to a particular sector and the average growth rate of total outstanding credit falling below 500 basis points should mean no additional capital is built up on account of the SCR. Subsequently, financial institutions can utilize the capital accumulated on account of this regulation in a manner they deem fit, as long as all stipulations of the relevant regulations are met. However, the draw-down of capital in a quarter must not exceed 25% of the amount accumulated. This is to ensure that the released capital is not immediately pumped to extend credit to the risky sectors.

Box 3: Illustration of SCR

Suppose that out of six sectors in Maldives, the MMA (on the basis of the criteria outlined above) decides to impose SCR for four sectors. The assumed size of the SCR imposed, as a percentage of risk-weighted assets in that sector is given by Column E of Table 81 below. As can be seen, two sectors (Sector 5 and Sector 6) require no SCR. Column C of the table shows a bank's hypothetical outstanding credit in the sectors. Column B shows the outstanding credit by sector. Column C shows the corresponding risk weighted asset in the sector. Since private sector loans get a risk weight of 100% in Maldives, we have assumed that the risk weight is applicable across sectors. As a result, columns B and C report the same numbers. The amount of additional capital that the bank is required to keep against its specific exposures to Sectors 1 to 4 is given by Column E of the table. It is computed by multiplying the sector-specific risk weighted assets of the bank with the imposed sectoral capital requirement. Adding up the entries of Column E shows that the total additional capital that the bank is now required to hold on account of the proposed regulation is MVR 50 million. Expressed as a percentage of total risk weighted assets (irrespective of sector), this comes to 1.4%. This in turn is lower than the maximum allowable size of the overall SCR-2.5% of total risk weighted assets.

**Table 81: Example of impact of imposed SCR on Bank XYZ**

| A | B | C= (B*100%) where 100% is the Risk Weight | D | E= (D*C) |
|---|---|---|---|---|
| Sector | Outstanding credit in the sector (MVR Mn) | RWA | Assumed SCR (% of RWA) | SCR (MVR Mn)* |
| 1 | 876 | 876 | 1.5% | 13 |
| 2 | 321 | 321 | 2.0% | 6 |
| 3 | 573 | 573 | 3.0% | 17 |
| 4 | 738 | 738 | 1.8% | 13 |
| 5 | 426 | 426 | 0.0% | 0 |
| 6 | 631 | 631 | 0.0% | 0 |
| | Total RWA= | 3566 | Total SCR | 50 |
| Total SCR (as % of total risk weighted assets)= | | | | 1.4% |
| Maximum Limit | | | | 2.5% |

**Like the CCyB, any SCR imposed shall be met with Tier 1 capital.** This means that the reported Tier 1 capital should be adequate to meet the minimum capital requirements and the SCR imposed. The Sectoral Capital Requirement does not have to be set apart in a separate account. However, financial institutions will be required to report the SCR as a memo item in Sheet 6 (Capital Adequacy) financial returns which is currently submitted by banks to the MMA.

The SCR imposed by the MMA at any particular time must be less than or equal to 2.5% of a financial institution's total risk-weighted assets.

**Banks and the MMA may need time to adjust to the provisions of this regulation.** In particular, the regulation above requires the MMA to judge the extent of risk build-up in a particular sector and the possible losses that are likely to ensue if the exposures to that sector turn non-performing. Accordingly, like the CCyB, the SCR may be implemented post 2016.

## 10.3.4     *Time varying capital provisioning and margin requirements*

Time varying capital provisioning helps ease the burden on financial institutions exerted on them while maintaining specific provisions against non-performing loans. As per Prudential Regulations No. 05-2009, financial institutions are required to keep specific provisions as a proportion of various categories of non-performing loans (i.e. substandard, doubtful and loss). During economic booms, repayment capacity is better. Hence, the yearly increase in non-performing loans is low. As a result, the provisioning requirement is low as well. However, during downturns, when economic distress is reflected in non-repayment of loans, the provisioning requirements increase. Since provisions are to be adjusted from profits, this may pose risks to financial institutions' sustainability. The regulation on TVCP requires FIs to maintain a buffer of provisions during the good times, which could be used to augment the specific provisions during bad times.

**MPR 2014 uses the concept of a Provisioning Coverage Ratio (PCR) to operationalize the above principle.** The idea behind it is to ensure that FIs maintain a PCR of 70% of additional gross NPLs on a yearly basis. This is represented by the horizontal line in Figure 23.The PCR would subsume within it the increase in mandatory specific provisions, and interest in suspense (IIS), plus certain excess provisions. However this excess provisioning is only expected to be present during good times. Note that during good times (represented by an economic and credit boom), NPLs and the incremental change to it are low. Hence, the corresponding additional specific provisioning (and IIS) required is also low-presumably lower than the stipulated PCR of 70% of additional gross NPLs. The amount of excess provisioning can be depicted by 'A' in the figure below. These excess provisions will add to a 'counter-cyclical provisioning buffer'.

In bad times, the additional NPLs and hence the required provisioning against it will be relatively high. The specific provisioning required is likely to be higher than the mandated PCR ratio of 70%. In those times, maintaining the PCR itself will be a redundant exercise. However, the provisioning buffer accumulated during the good times may be now drawn down to meet the high specific provisioning requirement (B in figure below). This in turn ensures that financial institutions face less pressure on their profit during times of overall economic distress.

The PCR has to be calculated on a yearly basis in the following manner:

$$\frac{\text{Specific Provisions owing to additional NPLs in year i + addition to interest-in-suspense account in year i + accretion to counter-cyclical provisioning buffer in year i}}{\text{Additional gross NPLs in year i}} \times 100$$

**Figure 23: The working of the Counter-cyclical Provisioning Buffer**
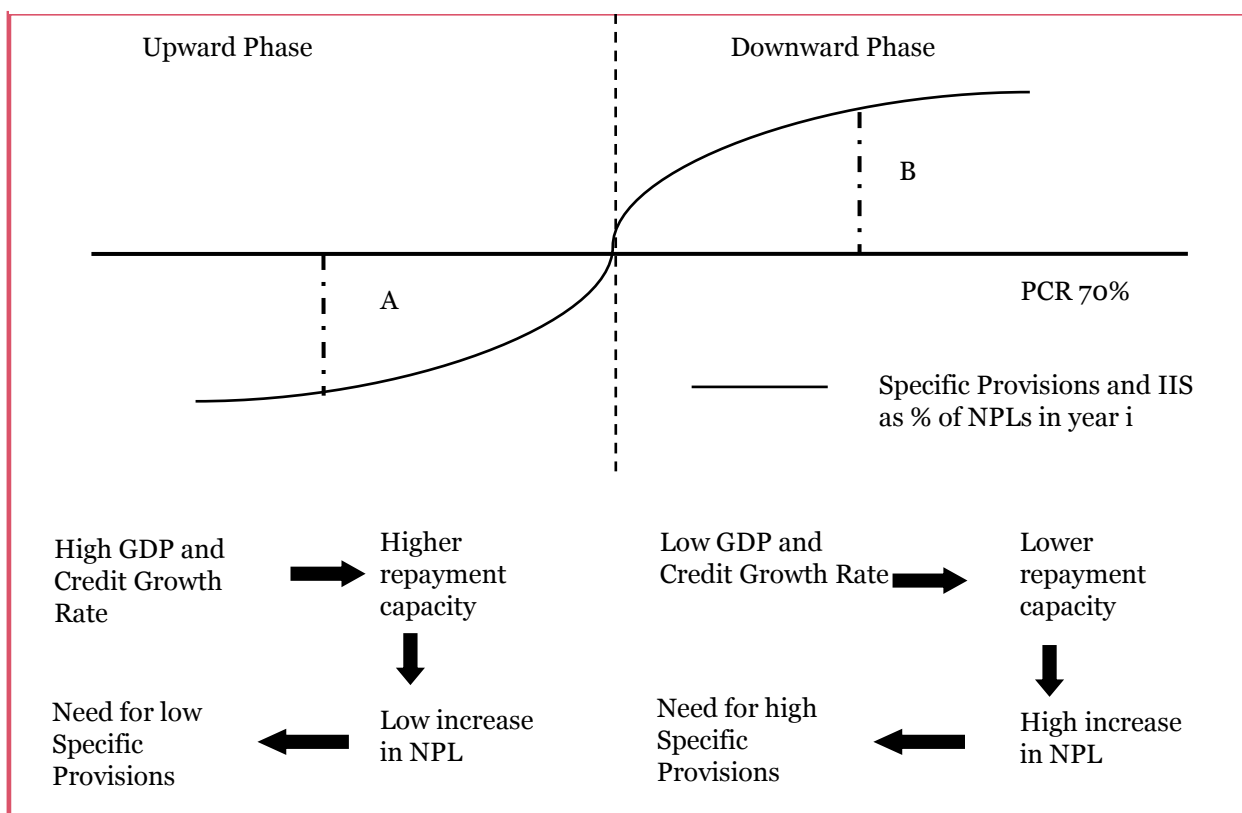


**It is possible that NPLs do not increase every year.** It may also decrease. In that case, financial institutions shall have to keep a PCR equal to 50% PCR provisioning made in the preceding year. Since there is no additional specific provisions required in that year, the entire PCR will add to the counter-cyclical provisioning buffer. Note that the philosophy of time-varying capital provisioning requires buffers to be built when times are good. This is certainly the case when a financial institution experiences decrease in NPLs. At the same time, imposing very high provisioning requirements on an institution that has managed to reduce its NPLs may distort incentives for financial institutions. In other words, if such financial institutions are systematically asked to keep higher provisioning than FIs experiencing a yearly increase in NPLs, this may discourage banking practices aimed at ensuring sound asset quality. The current provision in the regulation balances both of these concerns.

Box 4: Illustration of Time varying capital provisioning

Table 82: Example of Counter-cyclical Provisioning Buffer

| | Year | Gross NPL in Year i | Additional NPL in year i | Additional specific provisions in year i | Additional Interest-in-suspense A/C in year i | Required PCR (70% of Additional NPL in year i) | Accretion to the buffer year i | Countercyclical provisioning buffer (Stock) | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F= (70%* C) | G= (F-D-E) | H | |
| Upward Phase | 1 | 100 | 100 | 50 | 4 | 70 | 16 | 16 | Accumulation Period |
| | 2 | 205 | 105 | 52 | 4 | 74 | 17 | 33 | |
| | 3 | 315 | 110 | 54 | 4 | 77 | 19 | 52 | |
| | 4 | 431 | 116 | 56 | 4 | 81 | 20 | 72 | |
| | 5 | 553 | 122 | 58 | 5 | 85 | 22 | 94 | |
| | 6 | 680 | 128 | 61 | 5 | 89 | 24 | 118 | |
| | 7 | 814 | 134 | 63 | 5 | 94 | 25 | 143 | |
| Moderate Phase | 8 | 959 | 145 | 72 | 6 | 101 | 23 | 167 | |
| | 9 | 1115 | 156 | 82 | 7 | 109 | 21 | 187 | |
| | 10 | 1284 | 169 | 94 | 7 | 118 | 17 | 204 | |
| | 11 | 1466 | 182 | 107 | 9 | 128 | 12 | 217 | |
| | 12 | 1663 | 197 | 122 | 10 | 138 | 6 | 223 | |
| Downward Phase | 13 | 1884 | 221 | 146 | 12 | 154 | -3 | 219 | Utilization period |
| | 14 | 2131 | 247 | 175 | 14 | 173 | -17 | 203 | |
| | 15 | 2407 | 277 | 210 | 17 | 194 | -34 | 169 | |
| | 16 | 2717 | 310 | 253 | 20 | 217 | -56 | 113 | |

In Table 82 above, till year 7, the economic cycle is in an upward phase. This is approximated by a relatively low growth rate of NPL (5%) and attendant specific provisions (see Table 83 for assumptions). During this period, the PCR requirement is binding in the sense that the sum of additional specific provisions required and interest in suspense account is lower than 70% of additional NPLs. The excess provisioning on account of the PCR is then 'accretion to the counter-cyclical provisioning buffer' shown in Column G of Table 82. The size of the buffer stock in the corresponding year is shown in Column H of the same table.

**Box 4 (continued)**

**Table 83: Assumed year-to-year growth rates**

|  | Growth in NPL | Growth in specific Provisions | Additional Interest-in Suspense A/C |
|---|---|---|---|
| Upward Phase | 5.0% | 4.0% | 4.0% |
| Moderate Phase | 8.0% | 14.0% | 14.0% |
| Downward Phase | 12.0% | 20.0% | 20.0% |

Year 8 marks the beginning of the economy's moderate phase. The increase in NPLs in this phase is higher than before (8%, seen in Table 83), but the extent of specific provisions required against the additional NPLs still allows for a positive accretion to the buffer. The increase in the size of the buffer however slows down. The economic cycle enters its downward phase in Year 13. The NPLs increase at a high rate of 12% (Table 83) every year. It is likely that this increase is accompanied by a shift of the distribution of NPLs-where a disproportionate share of NPLs is loss assets. This in turn means that the specific provisioning requirement increases at a higher rate. In fact, the additional specific provisions and interest in suspense now exceed 70% of additional NPLs. Consequently, the financial institution in discussion can reduce its buffer to meet this high requirement. The reduction in the buffer can be seen from Column G. The size of the buffer decreases (Column H), though still remaining positive.

**By imposing margin requirements, the proposed regulation aims to mitigate funding risks in loan against securities**. It is often seen that financial institutions' underwriting standards are largely pro-cyclical. When times are good, FIs may be willing to compete amongst themselves in order to lend and risk management concerns are placed on the back-burner. This may lead to lower rates of interests or lower margins. On the other hand, when times turn bad, FIs may adopt caution and ask for higher margin against securities kept as collateral. This may be also necessitated by a fall in the value of securities-likely in an adverse economic scenario. Such demands increase the uncertainty attached with funding. A minimum margin requirement at all times can mitigate this risk.

**Table 84 lists minimum margins against different securities.** The minimum margin to be kept against shares and corporate bonds is 50% of the market or face value of the security, whichever is lower. The minimum margin to be kept against government securities is lower at 20% of book value to reflect the risk characteristics of the instrument. If individuals borrow against corporate bonds, then the maximum size of loan that can be advanced is MVR 2 million. Once a rating agency is set up in Maldives that can attest to the safety or riskiness of different corporate bonds, this ceiling may be dispensed. A similar ceiling is not applicable for loans against government securities or shares. This is to encourage the development of capital markets in Maldives.

**Table 84: Minimum Margin Requirements and Ceilings**

| Type of Security | Minimum Margin required | Ceiling on Loans Given to Individuals (in Nu) |
|---|---|---|
| Government Securities | 20% | None |
| Corporate bond | 50% | Up to 2 million |
| Shares | 50% | None |

Box 6: Illustration of Margin Requirements

Consider 100 Government securities each with a face value of MVR 10 and an overall worth of MVR 1000. If a borrower applies for a loan of MVR 800 against this, the relevant margin may be calculated by the following formula:

$$\text{Margin (in \%)} = \frac{(Value\ of\ security\ used\ as\ collateral - loan\ value) * 100}{Loan\ value}$$

$$= \frac{(1000 - 800) * 100}{800}$$

$$= 25\%$$

This is higher than the minimum mandated margin of 20%. Hence, this loan could be approved if the financial institution's other internal conditions are satisfied.

**The implementation date for the two sub-parts of the regulation may be different**. The technical nature of the regulation on time varying capital provisioning and the demands it makes of the financial institution's profits necessitates that adequate time be given to institutions to adjust to its provisions. Accordingly, this regulation may be implemented post 2016. On the other hand, the provisions regarding margin requirements may be implemented sooner.

## *10.3.5*     *Loan to Value and Loan to Income restrictions*

The objective of this regulation is to mitigate risks of default arising from fall in collateral values or inadequate repayment capacity of borrowers. The loan to value (LTV) ratio addresses the former while the Loan to Income (LTI) limit is imposed to tackle the latter. Sub-prime lending where loans were advanced to borrowers with inadequate capacity to repay led to many loan defaults during the global financial crisis of 2008. A regulatory requirement mandating that the value of the loan could not exceed a certain proportion of the borrower's income (LTI limit) would have helped impose discipline on financial institutions. Another proximate reason for the global financial crisis was the asset price bubble. The bursting of the real estate price bubble in the US led to voluntary foreclosures where borrowers preferred to not repay the loan and lose the underlying house that the loan had helped purchase. This was mainly because the value of the remaining instalments on the loan exceeded the value of the asset at stake. A cap on LTV, i.e., the ratio of the loan value to the value of the underlying housing collateral purchased with the loan, could have stemmed these voluntary foreclosures.

**Consider an example of how a cap on the loan to value ratio would work**. Suppose the underlying asset has a value of MVR 100. If no cap on loan to value exists, then the FI may provide loan up to the entire value of this asset. Later, if the asset value falls to MVR 80, when MVR 90 of the loan still remains unpaid, the borrower may choose to default. In case a LTV ratio of 70% applies, the maximum allowable loan amount is MVR 70. The remaining MVR 30 has to come from the borrower's own resources as down-payment. In this case, even if the asset price falls to MVR 80, the borrower would prefer repaying the loan amount than lose the asset which worth more. Hence, given a certain fall in the price of the underlying asset, a lower LTV ratio decreases the risk of non-repayment.

**The proposed LTV-LTI regulation for Maldives is applicable only for loans taken for acquiring residential property.** Residential property refers to property meant for self-occupation or tenancy. In particular MPR 2014 defines it as is that property of which at least one-half of the property is occupied by the owner and used by him/her as living space, and at least 75% of all lease income received from the remainder of the property derives from tenant-occupied living space. For a loan intended to acquire residential property, both the LTV and LTI limits shall be applicable at the same time.

**Table 85 below gives the maximum LTV limits applicable, differing by the size of the loan.** The 90% LTV limit on small loans (up to MVR 5 million) is to ensure that macro-prudential regulations do not prove a hindrance to home ownership for low income borrowers. Moreover, this is in line with the understanding that a larger loan would affect the FI more severely if it turned non-performing. Note that if two or more borrowers (who are not married to each other) were to apply for a loan for residential property, an LTV limit of 70% would apply to them, regardless of the loan size (Section 3.1.11 of the draft regulation). Moreover if the loan were being taken to purchase a second or subsequent residential property, the loan size cannot exceed 70% of the value of the loan. This is to account for the fact that a second property is more likely to be purchased for speculative purposes (a source of the asset price bubble), than for self-occupation. To ensure financial interest in the property on the part of the borrower, the down-payment must be made first by the borrower, and must come out of his/ her own resources.

**The MMA may also choose to make the LTV regulation dynamic.** Section 3.1.8 of the draft regulation states that the MMA may vary risk weights attached to assets of financial institutions where the loan size relative to the value of the underlying housing collateral is high. This is an indirect way of modulating credit to the housing sector. Higher capital requirements against high-LTV loans would incentivize FIs to decrease such lending. The timing for such a decision would be based on MMA's subjective judgment of macro-financial developments. In particular, if the regulator fears a rising asset-price bubble (reflected by for example high price to rent ratio) it may use this provision to arrest such a development.

**Table 85: Maximum LTV limits by size of loan**

| Loan Amount | Maximum LTV |
|---|---|
| Residential property (Individual or Joint application in case of husband & wife) | |
| Up to MVR. 5.0 Million | 90% |
| Above MVR 5.0 million | 80% |

Loan to income ratio, as defined in the regulation, refers to the ratio of all outstanding monthly debt obligations to the monthly disposable income of the borrower. The outstanding debt obligations include all existing obligations as well as the additional debt obligation created if the current loan were to be passed. The monthly disposable income is to be calculated by each financial institution as the average income (net of taxes) earned by the borrower in the past six months. If the individual were to earn a fixed income (by way of a salary for example), up to 100% of the average of this income could be considered as the denominator of the LTI ratio. Notably, future rental income expected from a housing unit could be treated as fixed income. The exact proportion of such income to be included in the measure for total income is left to the financial institutions. For a loan applicant earning a variable income (say, through business profits), up to 70% of his/ her average income of the last six months could be considered as the denominator for the LTI ratio.

**The maximum allowable LTI ratio increases with increase in monthly disposable income of the loan applicants** (see Table 86). This is based on the fact that as income goes up, the proportion of income going towards necessary or committed expenditures decreases. In other words, a larger proportion of income is available to the borrower to make loan repayments-essentially implying higher repayment capacity.

**Table 86: Maximum allowable loan to income by type of borrower and monthly disposable income**

| Monthly disposable Income | Maximum LTI |
|---|---|
| Single Application or Joint Application (Husband and Wife) | |
| Up to MVR 50,000 | 50% |
| Above MVR 50,000 but below MVR 100,000 | 60% |
| Nu 100,000 and above | 70% |

| Monthly disposable Income | Maximum LTI |
|---|---|
| Joint Application (Two or more borrowers other than husband and wife) | |
| Any amount | 50% |

**FIs should be given at least six months to adjust to all provisions of this regulation.** Since all financial institutions already follow internal LTV and LTI limits as part of their credit management policy, such a transition period should be adequate. All loans meant for the acquisition of residential property, sanctioned after such time should be subject to the provisions of this regulation.

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Box 7: Illustration of LTV-LTI restrictions

Consider the loan application of 28 year old Mr. X who is the head of a five-member household and the only bread-winner. His total monthly disposable income is MVR 62,000. He wants to avail a loan from Bank ABC to purchase a property worth MVR 1,000,000. He is prepared to pay a down payment of MVR 125,000. Assume that the monthly instalment to be paid for the current loan is MVR 15000. He is also paying another EMI of MVR 15000.

The loan amount sought by Mr. X is MVR 875,000 (1,000,000 -125,000) which is 87.5 per cent of the value of the property. This is below the LTV limit of 90% applicable to a loan of the given size.

To check if the LTI limit is being met, we must calculate the monthly debt obligation. For this, we sum the existing obligation of MVR 15,000 and the monthly obligation of MVR 15,000 that the current loan would create. This comes to MVR 30,000. This is 48.4% of the monthly disposable income, well below the LTI limit applicable for individuals in X's income bracket-60 per cent. Hence, the LTI condition is also satisfied. If the bank is satisfied with the other aspects of its internal credit risk management policy, the current loan can be sanctioned.

Consider now the case of Mrs. and Mr. K who are applying for a housing loan of MVR 3,500,000. They are prepared to make a down payment of MVR 275,000. They jointly earn a monthly income of MVR 130,000. This income comes from their monthly salary. The monthly installment for loan repayment is fixed by the bank at MVR 70,000. The couple is currently repaying another loan with a monthly instalment of MVR 20,000. The total monthly debt obligation in this case is MVR 90,000. This is 69.2% of the couple's total monthly income, below the 70% limit imposed by the regulation for monthly incomes higher than MVR 100,000. However, the loan amount sought (3,225,000=3,500,000-275,000) is 92.1% of the value of the underlying property. The maximum allowable LTV for loans of such size is 90%. Hence, the LTV ratio is not satisfied. In spite of the LTI limit being met, this loan cannot be satisfied.

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## 10.3.6    *Debt to Equity Ratio for Project Financing*

**This regulation aims to ensure that the borrower has a financial stake in the project being developed**. The equity portion of the value of the project essentially reflects this interest. This financial interest means that the lending institution faces a lower credit risk. Moreover, in case a project loan turns non-performing, the lower exposure of the financial institution to a given project (owing to the provisions of this regulation) helps limit losses.

**Debt, according to the proposed regulation, should finance no more than 75% of the total cost of the project.** At least 25% of the project cost should be financed by equity. Moreover, the equity portion of the project must come from the borrower's own resources. Note that the regulation covers all projects including residential complexes developed by builders. However, the MMA may exempt certain types of loans which it believes are important for the social and economic development of the Maldives. For example, the MSME loan

scheme is an initiative by Ministry of Economic Development to provide concessional loans for "growth and expansion of a healthy Small and Medium Enterprises sector in the economy". Bank of Maldives acts as the implementing agency for the execution of the loan scheme. The loan amount varies between MVR 50,000 – to 1 MVR Million and borrowers are expected to bring 15% of the project cost as equity. This scheme may be exempted by the MMA from following the provisions of the current regulation.

Section 3.1.5 of the draft regulation asserts that project financing be routed through a single financial institution or a loan syndicate (i.e., when two or more borrowers make extended credit to one borrower under a common loan facility). Part-financing or multiple-bank lending in this domain is discouraged at the present time though the MMA may regulate this type of lending, should the need arise. The reason the current regulation forbids part financing is because of the riskiness associated with informational asymmetry that this type of financing creates.  In particular, there are two issues-legality and divisibility. The project in question may get stuck if any lending institution seeks any sort of legal recourse against the borrower. This would affect other associated financial institutions adversely. Such an eventuality is unlikely to result when the financing is conducted through a consortium of FIs. The issue of divisibility arises due to the scale of the project. If different lenders stake claim to different parts of the project, liquidation in the event of non-repayment of loan would be problematic.

**The loan amount has to be supported by collateral- primary and additional**. Primary collateral is closely related to the project. It may be the underlying asset on which the project is being constructed, or the project asset itself. The size of loan advanced against the primary collateral must not exceed a certain specified percentage of the value of the collateral. This is known as the loan-to-collateral value ratio and varies with the size of the total loan component of the project. The maximum allowable loan to collateral value ratios corresponding to different loan sizes is given by Table 87 below.  If the primary collateral is inadequate to back the remaining loan amount, the borrower will have to bring in additional collateral to meet the funding gap. The extent of the additional collateral required will be decided by using the same slab of loan-to-collateral value ratios.

**Table 87: Maximum Loan to Collateral Value ratio by size of the total loan amount**

| Loan Amount | Maximum Loan to collateral value |
| --- | --- |
| Up to MVR. 10.0 Million | 90% |
| Above MVR 10 million and below MVR 20 million | 80% |
| MVR 20 million and above | 70% |

Box 8: Illustration of Debt to Equity Ratio

Assume a particular project cost is MVR 100 million and that the bank is willing to furnish a loan equalling 75% of the cost (i.e., the maximum allowable debt-equity ratio). This implies the borrower shall have to bring minimum equity of MVR 25 million. Assume that this is by way of cash. Let the value of the associated primary collateral be MVR 60 million. To determine the value of loan to be given against the value of the primary collateral-loan to collateral value ratios specified by this regulation will apply. Since the value of the loan is MVR 75 million, Table 87 clearly shows the applicable loan to collateral value to be 70%. MVR 42 million could be extended as loan against the primary collateral.

However, the applied loan amount is MVR 75 million. This leaves a funding gap of MVR 33 million. In this case, the borrower shall have to provide additional collateral consistent with the loan to collateral value ratio. Using the loan to collateral value of 70%, the borrower shall have to bring minimum additional collateral of roughly MVR 47 million (MVR 33 million/70%).

**Table 88: Example of Debt-to-equity ratio for project financing**

| S. No. | Item | Amount (MVR million) |
|--------|------|----------------------|
| a. | Project Cost | 100 |
| b. | Debt-Equity Criteria | 75:25 |
| c. | Minimum Equity required | 25 |
| d. | Loan Required | 75 |
| e | Primary Collateral Value (assumed) | 60 |
| f | Loan to Collateral Value ratio | 70% |
| g | Loan eligibility on the basis of Primary collateral (e*f) | 42 |
| h | Amount for which additional collateral is required (d-g) | 33 |
| i | Additional collateral required (h/f) | 47.14 |

**FIs should be given at least six months to adjust to all provisions of this regulation.** Since all financial institutions already follow internal debt-equity limits, such a transition period should be adequate. All project loans sanctioned after such time (after the regulation has been notified should be subject to the provisions of this regulation.

## 10.3.7    *Restrictions on Distribution of Profits*

**Rationalizing distribution of profits helps attain two objectives**. First, it balances the interests of small deposit holders and shareholders. Distributing less profit at a point in time helps add to capital and protect the FI against unexpected losses. This is in the interest of deposit-holders. On the other hand, interests of shareholders also need to be protected to encourage more wide-spread participation in public ownership of banks. These interests can be balanced by introducing a mechanism of dividend distribution where the maximum allowable dividend payout ratio (Ratio of Proposed Dividend to Net profit after tax) is linked to performance indicators of the FI. This ensures that when times are bad (i.e. the FI fares poorly on the chosen performance indicators), an FI is able to distribute only a small (or zero) proportion of its profits to shareholders. Second, introducing a standard regulation determining the quantum of dividend payable introduces discipline and uniformity to the practice of dividend distribution across the financial sector.

**Next, it is important to consider the banking performance indicators on which the dividend distribution practice will be based**. The proposed regulation uses the total Risk Based Capital (RBC) ratio and the net Non-Performing Loan (NPL) ratio to this effect. In particular, to be eligible to distribute dividends, a FI must have a minimum total RBC ratio of 12% in the two previous years and the year for which it proposes to distribute dividends. The quantum of dividends payable will depend on the net NPL ratio of the FI. If this ratio is 7% or more, a FI shall not distribute any profits. A FI will be able to distribute up to 50% (the maximum possible payout ratio)of its net profit after tax as dividend if in addition to meeting the capital norm, it has a net NPL ratio of less than or equal to 3% for the year in which it proposes to declare the dividend. This can be seen in Table 89 below.

**Table 89: Maximum Dividend Payout ratio by net NPL ratio**

| | Net NPL Ratio | | | |
|---|---|---|---|---|
| | **Up to 3%** | **More than 3% but less than 5%** | **5% and above but less than 7%** | **7% and above** |
| | Total Risk-Based Capital Ratio of 12% or more in past 3 years | | | |
| Maximum Dividend Payout Ratio | 50% | 40% | 30% | Nil |

**A leeway is also available to financial institutions**. That is, if the financial institution was unable to meet the total RBC norm in the two previous years, but has a total RBC ratio higher than 12% in the current year (for which it proposes to declare dividends), it may still distribute dividends up to 15% of the profit after tax. However, this would be contingent on the financial institution having a net NPL ratio of less than 5%.

**The total RBC ratio and the net NPL ratio together are able to capture the performance of the banking sector well.** Note that the RBC ratio acts as the first benchmark for measuring the performance of a financial institution in many instances including for credit rating purposes. However, RBC does not deteriorate overnight. Economic distress first translates into increasing non-performing loans. Only later, when the NPL is written off from profit and loss account, does the profit and consequently the capital deteriorate by the full extent of the loss. From this perspective then, the parameter that can supplement the RBC ratio is the non-performing loan ratio.

Notably, the proposed regulation mandates that all financial institutions adhere to the existing norms on profit appropriation that the MMA imposes. For instance, Part 3, Section 3 of the Prudential Regulation No. 01-2009 Capital Adequacy prohibits distribution of profits if the resulting capital ratios on account of the distribution (i.e., the total RBC ratio, the tier 1 RBC ratio and the leverage capital ratio) are less than the prescribed minimum. Section 12(d) of the Maldives Banking Act requires banks with capital reserve as proportion of paid-up capital between 50% and 100% to transfer 25% of their profit-after tax to their reserve fund. Financial institutions with lower reserve fund must transfer at least 50% of their profit after tax to the reserve fund. Moreover, though Section 3.1.4 of the MPR requires dividend to be declared from current year's profits, banks may, with the permission of the MMA, use profits from prior years' operations (Section 12 (c)) of the Maldives Banking Act). However the bank shall be required to fulfill the conditions for distributing dividends for the last completed accounting year for which the dividends are being declared.

# 10.4 Summary and Conclusions

In the preceding sections, it was pointed out that Maldives already has micro-prudential and structural regulations in place, to govern its financial sector. However, macro-prudential policy is missing from the MMA's regulatory toolkit. Macro-prudential regulations are needed in order to meet systemic risks that the financial sector faces. These may be in terms of contagion risks (arising due to inter-linkages between various financial institutions) or pro-cyclicality. The pro-cyclical nature of the financial system can itself engender a situation where economic distress translates into a credit crunch which further causes the real sector scenario to worsen. Micro-prudential regulations like minimum capital adequacy requirements can itself exacerbate these tendencies. Macro-prudential instruments on the other hand can help temper the same. The subsequent section of the policy paper discussed each macro-prudential regulation in detail, explaining the rationale behind all provisions according to the requirement.

# *Appendix 1.   List of Indicators*

Possible Indicators to monitor and corresponding signalling properties

| Indicator | Signaling Properties |
| --- | --- |
| Output gap (Aggregate and Sector-specific) | A higher positive deviation from trend may be a signal of the economy overheating. |
| Credit growth as reflected by<br><br>• Credit-GDP ratio gap from its trend value<br>• Overall credit growth<br>• Sector-specific growth rates of credit | A fast pace of credit growth may reflect build-up of potential risks. However, for an economy like Maldives, it is possible that desirable financial deepening may be itself contributing to a shifting the trend. Lack of long time seri6s data also makes it difficult to conclusively prove the utility of this indicator.<br>The sectoral growth rates of credit, combined with the absolute levels of credit in each sector may be useful in identifying the need for macro-prudential instruments in general, and sectoral capital requirements in particular. |
| Interest rates charged on different classes of loans | Lower interest rates (in conjunction with the other indicators) may imply buildup of risks as banks and insurance companies bid down the interest rate in order to compete with each other. |
| Tier 1 capital ratio and Overall capital adequacy ratios | Declining capital adequacy ratios, on account of rising assets (expressed in the denominator) may signal overheating. However, in case all other indicators signal build-up of potential risks, and capital adequacy ratios are still high, increasing capital requirements may not help the MMA to achieve its objective of limiting exposures to a certain sector. |
| Leverage ratio | It is possible that the capital adequacy ratios do not exhibit a decline due to the nature of risk-weighting. In such a scenario, capital adequacy as measured by a depleting leverage ratio will be more indicative of risks building up. |
| Ratio of risk weighted assets to total assets | A higher ratio indicates more riskiness attached with a given asset portfolio. |
| Inter-Financial Institutional lending growth | Reflects a measure of credit in the economy, not entirely captured by the final credit data. A high and increasing number reflects increasing inter-connectedness among financial institutions that may translate into contagion risk. |
| Household debt to GDP ratio | Higher indebtedness indicates higher risk of borrowers being unable to repay their debt obligations in the backdrop of an economic downturn, which may translate into a financial crisis. |
| Real estate price index to rent index | A higher ratio indicates potential asset price bubble in the real estate sector. |
| LTV in residential mortgages | A higher LTV implies poorer underwriting standards that are generally seen to be present during a credit boom. Lending institutions engage in these practices in order to compete with each other to offer loans and earn the resultant interest payments. |
| LTI in residential mortgage/ automobile | A higher LTI implies poorer underwriting standards that |

| Indicator | Signaling Properties |
|---|---|
| loans | are generally seen to be present during a credit boom. Lending institutions engage in these practices in order to compete with each other in to offer loans and earn the resultant interest payments. |
| Spread on new mortgage lending | A lower spread reflects potential underpricing of risk that is likely to be true during credit booms. |
| Spread on new corporate lending | A lower spread reflects potential underpricing of risk that is likely to be true during credit booms. |

**Box 9: Illustration of the Restrictions on Distribution of Profits**

Table 90 below shows the total RBC ratio and net NPL ratios recorded by 4 hypothetical banks. Bank A in the table below can distribute up to 50% of its profit after tax since it meets the capital norm in the past three years, and records a less than 3% net NPL ratio in the current year. Bank B meets the capital norm only in the current year. However, since its net NPL ratio is low enough, it can distribute up to 15% of its profit after tax as dividend. While Bank D is similar to Bank B in terms of meeting the capital norm, it is not allowed to distribute any dividend since its net NPL ratio is higher than 7%. The impact of these restrictions on a bank (Bank A in this case), can be seen from Table 90 below.

**Table 90: Example of Maximum Dividend Payout ratio applicable to banks**

| Bank | Total RBC ratio (%) | | | Net NPL (%) | Maximum permissible dividend payout ratio |
|------|----------|----------|--------|----------|---|
|      | Year t-2 | Year t-1 | Year t | Year t | |
| A | 11% | 21% | 25% | 2.40% | 50% |
| B | 8% | 9% | 12% | 2% | 15% |
| C | 11% | 13% | 11% | 5.20% | 30% |
| D | 12% | 10% | 14% | 9% | Nil |

**Table 91: Impact of Restrictions on Distribution of Profit on Bank A**

| Item | Criteria | Value (in MVR Million) |
|------|----------|------------------------|
| Net Profit After Tax | | 400.0 |
| Transfer to Capital Reserve | 25% of Net profit after tax* | 100.0 |
| Provision for Dividend | 50% of net profit after tax | 200.0 |
| Transfer to Retained Earnings | Residual | 100.0 |

\* Assuming the bank's capital reserve is greater than 50% of paid-up capital

As can be seen from Table 91 above, Bank A has MVR 400 million worth of net profit after tax. Assuming that the bank's capital reserve is greater than 50% but less than 100% of paid-up capital, it has to transfer 25% of its net profit after tax to its reserve fund. Suppose it chooses to distribute dividends equal to the maximum allowable dividend payout ratio (50% of net profit after tax). This equals MVR 200 million. The residual amount of profits

The primary purpose of this Interim Report is to summarize the tasks undertaken in the various outputs of the assignment and present an update on the progress achieved against the outputs' deliverable agreed upon.

The contents of this report are based on the facts, assumptions and representations stated herein. Our assessment and opinions are based on the facts and circumstances provided/collected during our meetings with the officials of the Maldives Monetary Authority and research from sources in public domain held to be reliable. If any of these facts, assumptions or representations is not entirely complete or accurate, the conclusions drawn therein could undergo material change and the incompleteness or inaccuracy could cause us to change our opinions. The assertions and conclusions are based on the information available at the time of writing this report and PwC will not be responsible to rework any such assertion or conclusion if new or updated information is made available.