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STRESS TESTING THE MALAYSIAN & LABUAN IBFC BANKING SECTORS—TECHNICAL NOTE

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MONETARY AND CAPITAL MARKETS DEPARTMENT

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GLOSSARY

BNM	Bank Negara Malaysia
BU	Bottom-Up
CAR	Capital adequacy ratio
CCFs	Credit Conversion Factors
CCR	Core Capital Ratio
CLP	Credit Loss Projections
DFIs	Development Financial Institutions
D-SIBs	Domestic Systemically Important Banks
EAD	Exposure at Default
EBA	European Banking Authority
EL	Expected Loss
EM	Emerging Markets
FSA	Financial Services Act
FSAP	Financial Sector Assessment Program
GDP	Gross Domestic Product
GFC	Global Financial Crisis
G-SIBs	Global Systemically Important Banks
IFSA	Islamic Financial Services Act
IMF	International Monetary Fund
LCR	Liquidity Coverage Ratio
LFSA	Labuan Financial Services Authority
LGD	Loss given default
LOLR	Lender of last resort
LTV	Loan-to-value
NPA	Non-performing asset
NPL	Non-performing loan
NSFR	Net Stable Funding Ratio
LIBFC	Labuan International Business and Financial Center
OBS	Off-Balance Sheet
PD	Probability of default
P&L	Profit and Loss
QIS	Quantitative Impact Study
RWCR	Risk Weighted Capital Ratio
SCAP	Supervisory Capital Assessment Program
SIBs	Systemically Important Banks
SIFIs	Systemically Important Financial Institutions
ST	Stress Testing
TD	Top-Down
UL	Unexpected Loss
WB	World Bank
WEO	World Economic Outlook

EXECUTIVE SUMMARY

This note summarizes the stress tests (ST) undertaken for the Malaysian banking system as part of the Financial Sector Assessment Program (FSAP).[1] The STs also cover in a minimal way the Labuan International Business and Financial Center (IBFC), located offshore of the Malaysian mainland.[2] The first component of the STs involved multi-year (2012–2016) macroeconomic stress tests performed over three scenarios: baseline, adverse S1 (V-shaped recession), and adverse S2 (L-shaped slow growth). Comparative static (single-year) sensitivity tests, covering credit, market and liquidity risks were undertaken. Separate TD liquidity and contagion risk stress tests were also undertaken. The FSAP team ran the top-down (TD) STs based on annual end-2011 and granular supervisory data, while participating banks implemented the bottom up (BU) STs using the prescribed macroeconomic scenarios assumptions and sensitivity analysis shock parameters with broad guidance by BNM. Actual credit and market risk shock parameters and balance sheet projections applied in the BU multi-year macroeconomic stress tests are derived and modeled internally by participating banks. All STs were set-up and undertaken in close cooperation with BNM. The stress tests were carried out on a solo-entity basis, to ensure Islamic banks and conventional banks could be stress tested separately and to ensure that stress testing at group consolidation level did not mask vulnerabilities in solvency, liquidity, or contagion risk at subsidiary or branch level.

All banks were subject to solvency, liquidity and contagion tests in the macroeconomic stress testing set-up. The solvency tests (TD and BU) assessed the resilience of the Malaysian banking system under three macroeconomic scenarios from 2012 to 2016. Several different measures of capital adequacy were considered (Tier 1 (CCR) and CAR (RWCR)).[3] TD Liquidity STs simulated banks' resilience against sudden withdrawal of funding as well as risk from maturity mismatch and rollover risk. TD contagion risk testing was analyzed by BNM using an internal interbank exposure model. The model sought to identify spillovers and knock-on effects (on other banks) of single and simultaneous (pair-wise) bank failures due to iterative simulations of joint credit and funding shocks in the interbank market.

Single year BU sensitivity tests for Malaysian banks covered various single-factor credit and market risk shocks. A multi-factor BU sensitivity liquidity test was also carried out by participating banks and extended to not only key onshore banks but covered some Labuan entities and overseas subsidiaries. Most of the impacts of these shocks were determined on Tier 1 (CCR) capital ratio as a comparative static change without any offsetting capital actions by

[1] Prepared by Mohamed Norat (IMF) in the context of the 2013 Malaysia FSAP (http://www.imf.org/external/pubs/ft/scr/2013/cr1352.pdf)

[2] Stress testing of Labuan-based banks as solo entities and identifying clearly Labuan-specific risks was not possible from a TD perspective as the data was not sufficiently granular for Labuan branches to undertake TD STs. Two material Labuan subsidiaries were covered in the BU STs. The mission noted that stress testing capabilities were still being developed in Labuan.

[3] Core Capital Ratio (CCR) and Risk Weighted Capital Ratio reflect Malaysian capital regulations.

banks or by the authorities. All credit and market risk shocks directly impact Tier-1 capital without consideration of impacts from other buffers (income, provisions). This results in a "clean" impact on capital.

The findings suggest that the on-shore banking system in Malaysia has substantial capital buffers to absorb credit losses on its credit risk exposures. Conventional banks are able to benefit from buffers provided by significant income as a first line of defense against credit losses. Some larger domestic banks benefit from income in terms of strong revenues from domestic operations as well as potential income from overseas operations. In adverse tail-risk scenarios linked to a further conflagration of the GFC it is likely that such profits and revenues would decline more significantly than banks have accounted for. For the baseline those buffers increase in line with projected growth in risk-weighted assets. Consequently, without an increase in capital, solvency ratios are unlikely to increase, and actually decrease for some banks, even in the baseline.[4]

Under the adverse scenarios banking system buffers would fall far more in the TD ST than in the BU ST. This reflects higher assumed tail-risk loss parameters across the cycle and related credit risk parameters in the TD ST than banks themselves have accounted for in the BU ST, as well as differences in income and earnings assumptions.[5] Moreover, the solvency deterioration is far more marked and rapid at individual bank-by-bank level for the TD ST than for the BU ST. The adverse scenarios should be viewed as hypothetical but plausible scenarios: they are by definition tail-risk scenarios in which banks for the BU ST should assume more conservative loss rates and related credit risk parameters such as loss given defaults (LGDs) and probability of defaults (PDs) beyond historical worse case values. Notwithstanding this key credit risk discrepancy, banking system solvency remains above the 8 percent CAR (RWCR) and 4 percent Tier 1 (CCR) minimum regulatory capital level for both the TD and BU ST. Bank-by-bank, we find Islamic banks buffers are somewhat weaker, resulting in greater solvency deterioration relative to other domestic and foreign commercial banks, driven mostly by their lower starting capital.

Sensitivity tests indicated that solvency was impacted most by credit risk shocks. They ranked well above market risk shocks. In particular, higher credit risk parameters for housing loans and higher risk weights for sovereign bonds accounted for the largest credit risk shocks. For Malaysian banks, credit risk accounts for the large proportion of risk on their balance sheets. Any material increase in the risk parameters of key loan concentrations for banks such as housing loans has a sizeable banking-system impact, while impact for some individual banks

[4] Solvency will not be strengthened if capital uplift from retained profits does not grow as fast as RWAs.

[5] The TD ST utilized higher constant through the cycle loss rates for most loan items (credit risk parameters) than banks in the BU ST (where credit risk parameters, income were varied across years). However, for some items (selected retail loan segments) and some banks in specific years, loss rates were higher in the BU ST. More conservative income projections were used in the TD ST for certain income items (interest income, fee and other income). Trading income projections were more conservative in the BU ST than that used for the TD ST.

can be far greater. The recent trend of increases in household leverage, rising house prices and prospects of further global uncertainties may result in housing market problems that could migrate to deterioration in banks' balance sheets and the wider economy.[6] Dealing with sovereign risk from both a solvency and liquidity perspective is very challenging, but the note makes clear that a practical first step in addressing the issue would be to make transparent the linkages between the sovereign and the banking sector. This should address ownership, loan exposures, or other tangible implicit or explicit support.

TD liquidity tests found that Malaysian banks were robust to medium liquidity stress events at the short-end (less than 1-month maturity). Rolling over longer-term funding and dealing with mismatches at longer maturities remains very challenging. Severe liquidity distress would be even more damaging to many Malaysian banks. The TD liquidity tests assumed a medium stress scenario (half Lehman event) assuming higher withdrawal rates of deposits—a reasonable assumption in Malaysia in severe stress scenarios (Lehman-like event) since all deposits (retail and wholesale) are de facto at call.[7] Malaysian banks would also find difficulty in such scenarios in rolling over short and longer term funding from capital markets, especially dollar funding wherein many Malaysian banks have a cumulative net short liquidity position. The TD liquidity ST show that linking solvency and liquidity risks leads to a better capture of deterioration in solvency and the revealing of wider bank vulnerabilities. Malaysian banks have yet to migrate to Basel III liquidity metrics and uncertainty exists given the preliminary data from the latest Quantitative Impact Study (QIS) about how Malaysian banks are positioned. We suspect given the results already observed on the other liquidity tests that Malaysian banks would be better positioned to meet the shorter-term Liquidity Coverage Ratio (LCR) measure; but the longer-term Net Stable Funding Ratio (NSFR) may prove to be more challenging, as it is with banks globally.

Contagion risk was deemed to be less significant either due to single or simultaneous defaults of too-big-to-fail banks, or too-interconnected banks. Larger domestic banks have significant interbank lending and borrowing exposures which are widely distributed across different types of counterparties (own subsidiaries, foreign banks, Islamic and investment subsidiaries). While individual defaults by such large domestic banks have non-trivial contagion impacts (maximum 3 induced failures, 2 of which contained within own banking group), the simultaneous default of 2 large banks can lead to a larger impact, up to a maximum of 5 induced bank failures. In particular, Islamic and investment banks which are subsidiaries of a parent commercial bank seemed more vulnerable to other bank failures, in particular the parent bank.

[6] BNM will need to ensure enhanced monitoring of household leverage and review the effectiveness of macroprudential measures to tackle such risks.

[7] Lehman-like event relates to some of the high run-off rates seen by some banks in advanced economies, run-off rates for Malaysian banks were not as high as these values during the actual Lehman episode, this may reflect the fact the financial crisis was not centered around Asia and that many Asian countries strengthened their safety net (deposit insurance) at the time to insure all deposits. Lehman-like event therefore relates to a hypothetical stress scenario at higher run-off rates for demand deposits and for other bank liabilities. The liquidity stress test is therefore a test against a standard rather than an actual event faced by the Malaysian banks.