Enhancing the Surveillance Framework – Forward Looking Indicator of Banking System Vulnerability

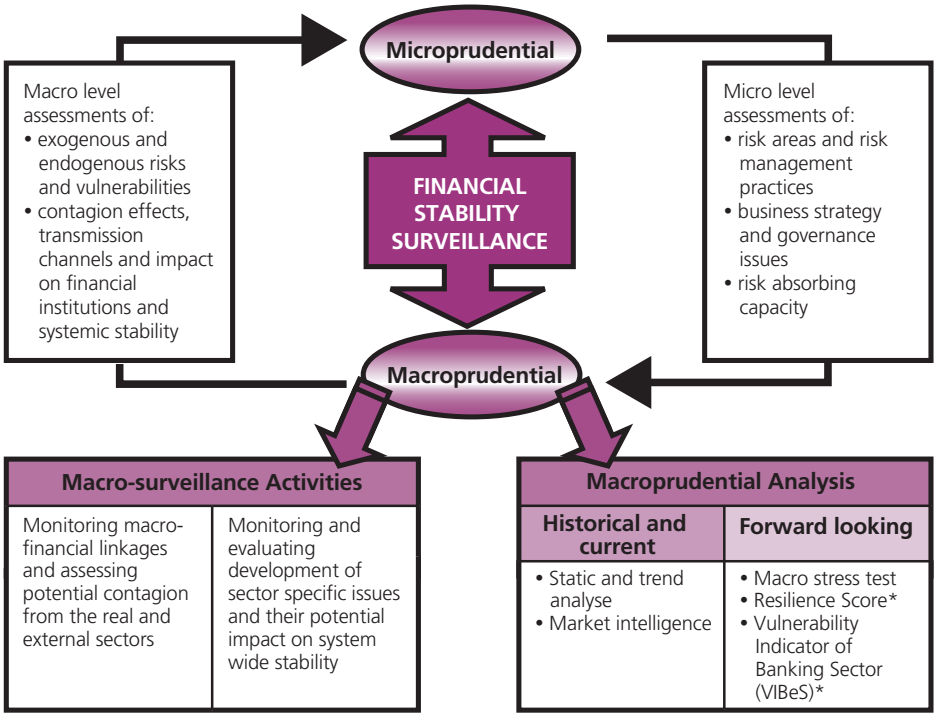
The task of preserving financial stability has become more challenging to policy makers especially in an environment of a rapidly evolving financial landscape and greater volatility in financial markets. The challenge is even greater for an open economy with increasing integration and inter-linkages with the external environment. Having in place a robust and integrated macroprudential surveillance framework is therefore critical to facilitate the early identification of emerging threats and risks to financial system stability. More importantly, it provides the lead time for appropriate policy responses and the implementation of pre-emptive measures to preserve the intermediation function and financial stability.

Macro-Surveillance Framework

Strengthening the Bank's macroprudential surveillance capabilities is a key priority of the Bank. The strategy adopted has been all-encompassing in terms of the framework and infrastructure development, capability enhancement, governance structure and communication. In formulating the macroprudential surveillance framework, the Bank takes cognisance of the potential threats that may emanate directly or indirectly from increasingly complex interlinkages between the financial system and the real sector, greater global trade and financial integration, as well as from payment and settlement systems. Essentially, the focus of the Bank's macro-surveillance activities encompasses:

- monitoring macro-financial linkages associated with developments and emerging trends in the external sector, domestic economy and financial markets, and corporate and household sectors, as well as assessing their potential contagion implications for the financial system; and
- monitoring and evaluating the development of sector specific issues within the financial sector and the potential implications for overall system wide stability.

An assessment of the extent of risk to financial stability is reached by incorporating both quantitative and qualitative information using static and trend analyses, as well as scenario and sensitivity analyses through integrated macro stress tests and market intelligence. These assessments are also integrated with the micro-surveillance oversight functions of the Bank.



** These forward looking surveillance tools are currently being developed for use by Bank Negara Malaysia*

Assessments of the potential risks to financial stability are conducted in a holistic manner, internally within the Bank and with other domestic regulators. The key potential risks to financial system stability once identified, assessed and ranked in the order of importance, are used as inputs to achieve coherent policy formulation and coordinated pre-emptive actions among key stakeholders including financial institutions, other domestic regulatory and supervisory authorities as well as with regulators from other jurisdictions. The outcome also ultimately forms the basis for communication of risks to financial system stability to the general public.

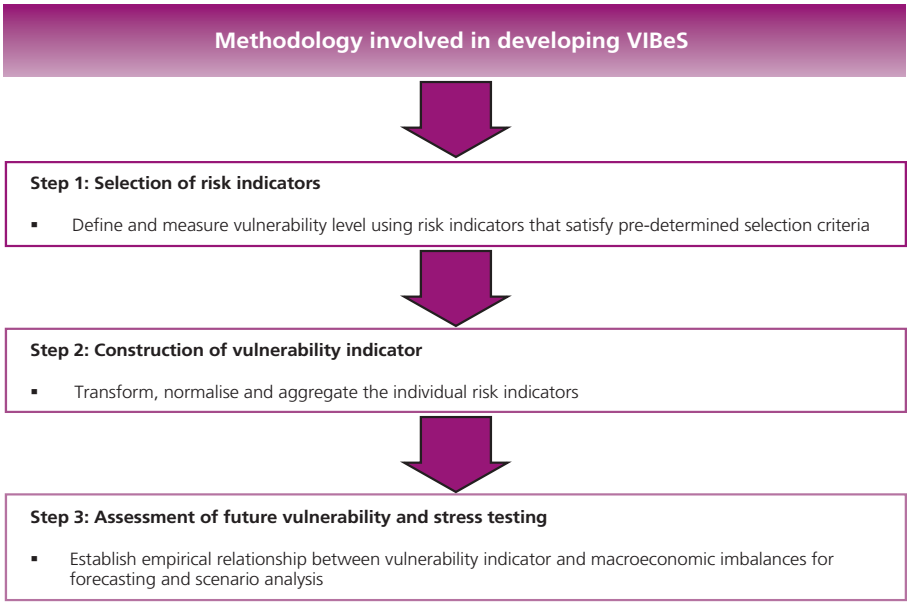
There is recognition that forward looking quantitative tools form a key component of a robust macro-surveillance framework. Accordingly, the continuous development of these tools to aid coherent and integrated analysis is given importance. The following describes the development of one of these surveillance tools which measures the level of vulnerability of the banking sector, the methodology and underlying assumptions adopted, as well as present efforts being undertaken to ensure the robustness of the tool.

Vulnerability Indicator for Banking Sector

The vulnerability indicator for the banking sector, or VIBeS, is a composite of risk indicators that measures the intensity of systemic distress at a particular point in time. Recognising the limitations of the previously developed binary variable Early Warning System in elucidating intensities of various distress symptoms and capturing the complexities of banking crises, a more robust composite indicator is being developed to quantify systemic vulnerability that may emerge from different sources. This measure of banking sector conditions aims to enable early prognosis of distress build-up prior to the occurrence of a crisis. Using information derived from macroeconomic and financial imbalances, VIBeS will assist in forecasting future conditions in the banking sector. The general approach used in developing the VIBeS framework is adapted from a Bank for International Settlements research paper[1], with modifications to enable its applicability in the context of the Malaysian banking sector.

Methodology and assumptions

The development of VIBeS involves a three-step approach as outlined below:



[1] See Monnin, P and E Hanschel (2004), "Measuring and forecasting stress in the banking sector: evidence from Switzerland", *BIS Paper No 22*.

Selection of risk indicators

The risk indicators are selected mainly based on their ability to explain symptoms of instability during identified systemic distress periods. Other selection criteria include the availability of a long time series with quarterly frequency and widely used financial stability indicators. In our preliminary analysis, the various dimensions of banking vulnerability and risk indicators cover capitalisation, profitability, credit quality, liquidity and market-based information.

Based on historical trend analyses of various measures of capitalisation, annual growth in Tier-1 capital provides a more sensitive indication of change in capital levels during past distress periods. For example, the relatively stable risk-weighted capital ratio (RWCR) of banking institutions observed during the Asian financial crisis as a result of recapitalisation efforts by Danamodal Nasional Berhad did not adequately reflect the decline in the core capital positions of banking institutions. In terms of credit quality, the gross non-performing loans (NPL) ratio, after adjusting for loans sold to, and recovered by, Danaharta, was found to be more reflective of the occurrence of higher delinquencies during the same crisis. While accumulation in provisions has been widely used in some banking crisis literature to indicate banks' early detection of credit deterioration, it is also subject to potential biased signals of vulnerability due to reduced provisioning capacity in distressed periods, and differing provisioning behaviour in good times through the adoption of income smoothing or stricter provisioning policies.

In relation to liquidity risk, net interbank deposits of banking institutions is currently used to gauge possible liquidity shortages and funding problems in the system. Meanwhile, the sensitivity and applicability of other indicators such as weighted averages of interbank rates and spreads, liquid assets ratios and liquidity buffers as a percentage of deposits, are also being explored. As a measure of profitability and efficiency, return on assets is adopted as it takes into account regulatory and structural changes in the banking sector, for example, the rationalisation or emergence of new players. Market-based indicators of financial distress, such as the spread of debt securities issued by banking institutions or index of banks' share prices are also being considered to capture investors' evaluations of banks' idiosyncratic risks and their intrinsic value.

Construction of VIBeS

VIBeS is in essence a composite indicator. The construction of VIBeS involved the following process:

- transforming all components of the composite indicator to reflect higher vulnerability when symptoms of distress intensify;
- normalising all indicators with respect to their averages and standard deviations into comparable units; and
- aggregating normalised components using equal weights.

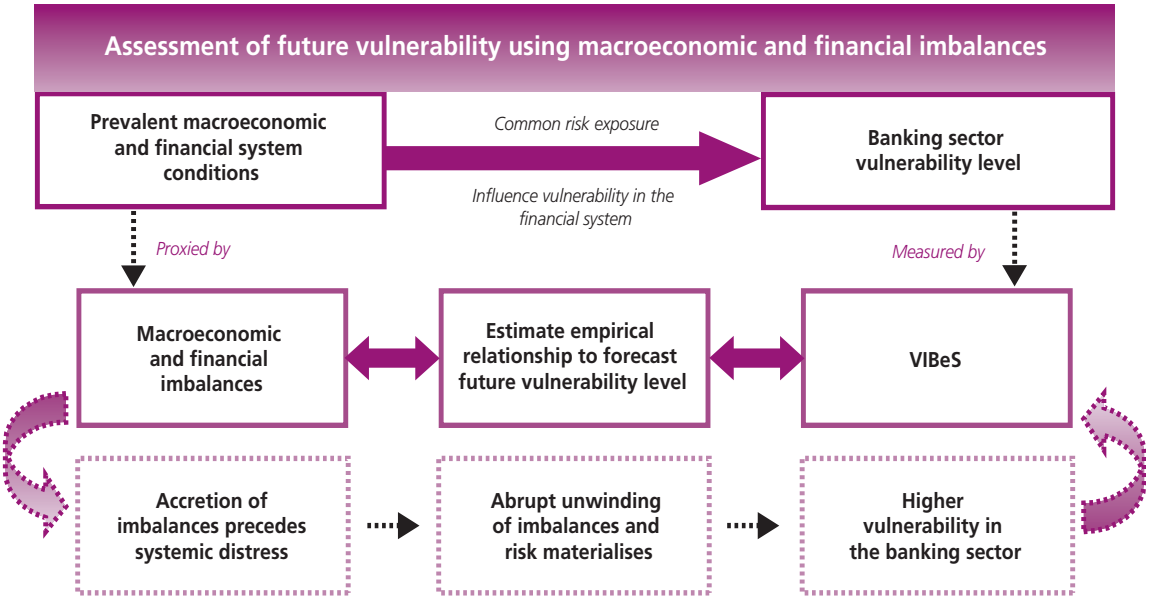
Assessment of future vulnerability and stress testing

While VIBeS is constructed to provide a snapshot of the current level of banking system vulnerability, it also aims to facilitate forward looking assessments of potential stress within the system. For this, the relationship between macroeconomic and financial imbalances, and the distress level of the banking system is currently being empirically modelled and tested. Any weakening of economic conditions, coupled with the accretion of macro imbalances and abrupt adjustments are often associated with destabilising consequences on financial stability. By focusing on early signals of potential instability amassing in macro imbalances which normally precede systemic distress, the empirical model will be able to identify the potential source of vulnerability.

The empirical relationship is established by regressing VIBeS on selected macroeconomic and financial indicators[2] that are robust determinants of past systemic distress episodes. These indicators are

[2] Indicators of macroeconomic and financial imbalances considered, inter alia, include (1) Gross domestic product (GDP), (2) ratio of domestic credit to GDP, (3) Kuala Lumpur Composite Index, (4) Malaysian House Price Index and (5) ratio of private investment to GDP.

computed to measure potential macroeconomic and financial imbalances by taking the deviation of selected macroeconomic and financial variables from their respective long term trends[3]. Subsequently, forecasts of the future vulnerability level are generated based on the regression model that satisfies the predetermined "best model" criteria[4]. The following diagram summarises the framework adopted to assess the future vulnerability level in the banking sector using these measures of imbalances.



To complement other variants of macro stress tests, additional scenario analysis is conducted via this framework to assess the impact of adverse macroeconomic developments on VIBeS. Regression coefficients from the best estimate model are used in simulating specific macroeconomic shocks and the results are compared with historical vulnerability levels to assess the current degree of resilience of the banking system.

Future Refinements to the Framework

Efforts are currently focused at further improving the robustness of the forecast capability of VIBeS by leveraging on higher frequency macroeconomic variables, for example, data on monthly portfolio flows and the consumer price index. Refinements are also being made to the regression model to adequately capture the non-linear interactions of macroeconomic and financial imbalances with that of systemic vulnerability. In addition, the framework's applicability in supervisory assessments of individual banking institutions is being explored to facilitate further integration of the Bank's macro- and micro-surveillance activities. Mindful of the transformation of the financial sector and constantly changing financial environment, attempts are also being made to broaden the scope of coverage by incorporating non-financial indicators including measures of structural changes and financial liberalisation, into VIBeS.

No tool, regardless of its sophistication, may predict the future with absolute precision. Given an increasingly complex financial landscape, the use of forward looking indicators such as VIBeS, serves only as a means to assess the level of vulnerability within the banking system in an unbiased and objective manner, and as a supplement to other surveillance tools within the Bank's framework. The ultimate aim is to achieve an in-depth and informed macroprudential as well as microprudential analysis of each component of the financial system and the interactions and feedback effects to ensure that emerging threats and risks are well anticipated and pre-emptively acted upon.

[3] The long run fundamental trend of each macroeconomic and financial variable considered is determined using the rolling Hodrick-Prescott filter. See Borio, C and P Lowe (2002), "Asset prices, financial and monetary stability: exploring the nexus", *BIS Working Paper* No 114, for full details.
[4] These include: (1) Minimum significance level of 10% for all regression coefficients, (2) Maximum lags of 16 quarters, (3) Minimum of four regressors, (4) Highest adjusted R-squared and (5) Comparable estimates between post-crisis and entire period samples.