CHAPTER II

THEORETICAL FRAMEWORK

A. Theoretical Review

1. Systemic Risk

There is an evolving literature on systemic risk measurement covering a wide range of approaches. In the context of this paper, systemic risk is defined as risk that originates within, or spreads through, the financial sector (e.g., due to insufficient solvency or liquidity buffers in financial institutions), with the potential for severe adverse effects on financial intermediation and real output. The objective of macroprudential policy is, therefore, to limit *system-wide financial risk* (IMF, 2011a) by enabling policymakers to know better when to ―sound the alarm and implement policy responses.

Past crisis episodes show that different sources of risk and shock transmission channels can emerge at the same time or in complex sequences, including through multiple feedback effects. However, from an analytical perspective, it may be useful to distinguish between key phases in which crisis-related events unfold. At the same time, policymakers should be cognizant of macro-financial linkages during each phase. Ultimately, most systemic crises involve feedback effects between the real economy and the financial sector, including across countries.

Theoretical and empirical models dealing with interactions between the financial sector and the real economy, as well as between cross-border

transmission channels, are useful for monitoring purposes in general whereas the risk itself can be monitored by specific characteristic phases as figure out in Figure 2.1.

a. *Buildup phase.* Systemic risk builds up over time, and this could reflect several underlying reasons. The financial system may have high exposure to an overheating sector or be subject to increase risk-taking (e.g., due to competition for market-share or lax supervision), including through financial innovation. The risk buildup could also be related to grow cross-border exposures and to fund sources. During this phase, systemic risk measures could focus on assessing the likelihood of a systemic crisis (Figure 2.1), taking into account the evolving balance between potential financial losses and existing buffers designed to absorb these losses.

b. *Shock materialization.* At that point, the crisis is about to start. Mounting imbalances or excessive risk-taking make the financial system fragile and susceptible to exogenous shocks (e.g., Gross Domestic Product or fiscal shocks, exchange rate or housing price shock, failure of a systemically important financial institution). Therefore, systemic risk measurement could focus primarily on assessing potential losses in both the financial system and the real sector.

c. *Amplification and propagation.* In most crises, shocks affect the broader system, including financial institutions, markets, and other sectors (and potentially other countries' financial systems). At that point, systemic risk measurement could focus on amplification mechanisms, such as

interconnections between financial institutions, potential fire sales of financial assets, as well as crossborder exposures and the related adverse
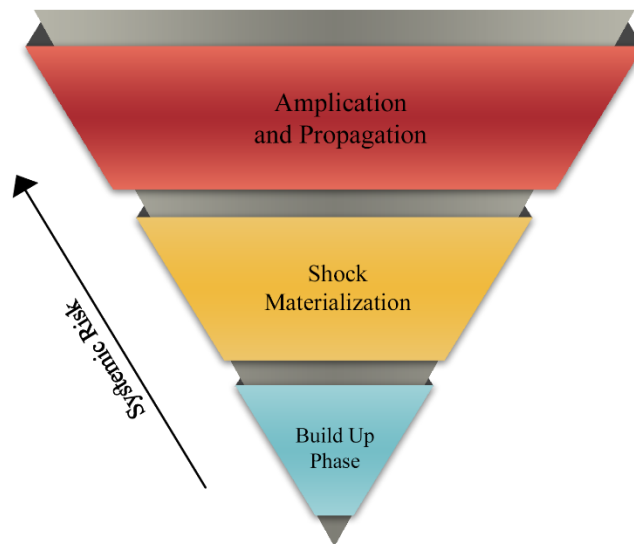
Source: Blancher *et al*. (2003)

FIGURE 2.1

Phases of Systemic Risk Transmission

feedback loops (Figure 2.1).

The important of measuring systemic risk in the financial system is an invaluable lesson that has been taught by several episodes of economic and financial crisis. Increased interconnectedness among economic agents has been accompanied by heightened interconnectivity risk through common exposure. Such condition were confirmed by the analysis of the National Financial Account and Balance Sheet (Abubakar, *et. al*, 2015), where strong interconnectedness between the corporate sector and financial sector, particularly banking industry was evidenced.

During the recent global financial crisis, various shock transmission channels reached an unprecedented level of complexity. For example, the range of potential shock transmission channels has broadened considerably, reflecting the greater integration between financial institutions and markets, countries and real sectors (e.g., linkages between public and financial; household or corporate and financial; public and external). As a result, macro-financial linkages and systemic risk are more difficult to measure, given the potential for more complex and unpredictable scenarios, greater scope for nonlinear impacts (e.g., through illiquid markets or institutions), and more unstable correlation structures and behavioral relationships.[1]

2. Systemic Risk and Financial Cycle Phase Theory

In the financial cycle, the *build up phase* is the stage of source formation interference. In this phase, market participants tend to take advantage of conditions to achieve the greatest profits even though prudential rules have been applied. This phase is illustrated in the upward or upswing cycle segment (Figure 2.2). Under these conditions systemic risk measurement needs to be focused on measurement of financial system imbalance, and measurement against a stress indicator that can show signs that the financial cycle has been approaching its peak which is interpreted as a risk-taking behavior already excessive. Drehman et al (2012) formed

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[1] Systemic Risk Monitoring Toolkit – A User Guide (Nicholas Blancher dkk), IMF Working Paper

several financial cycles developed countries and found that the financial crisis occurred about two years after the cycle reaches its peak point.

The imbalance indicator basically refers to time series indicator of relatively lower frequency (monthly to Quarterly). Imbalances detected here are related with the behavior of bank's procyclicality in lending. In establishing the financial cycle indicators, as described previously also one of the efforts to detect imbalances in the financial system because of the perception of market participants against economic conditions and behavior take its risks.

Furthermore, the source of the materialized disturbance becomes a risk will spread in the propagation phase or propagation mechanism. That phase happens after and between the peak of the financial cycle until the cycle reaches basically or trough (Figure 2.2). In this phase of the problem occurs in one elements of the banking system tend to be transmitted or propagated on sectors or other elements of the banking system. Therefore, the measurement of risk systemic in this phase generally use cross sectional indicator. Indicator the most needed in this case are indicators that indicate the relationship between physical exposures among financial system elements, including for every individual element of the financial system is primarily a financial institution and corporation. One method that can be used to measure the impact of the problem in one bank against another bank is the interbank stress method testing by doing contagion analysis.

The last phase is the systemic event phase or also called as materialized shock. The phase is related to the financial crisis. Although central banks and financial authorities have developed an early warning system, systemic event basically can only be detected by backward looking. Bank central and financial authorities were never able to accurately predict the occurrence of a crisis even though the financial cycle provides peak cycle information and data in the past shows that the crisis generally occurs around 2 years after the peak of the financial cycle. Thus, systemic event is a very short period in the propagation phase due to shock and vulnerability occurs and establishes systemic risk. After systemic event occurs, the downswing segment formed can be U-shaped or V-shaped. If it is U-shaped, downswing will last deeper and longer in the cycle finance and accompanied by a long recovery period. That condition which has the potential to have structural impacts. If it is V-shaped, downswing will take place in a shorter period and recovery or recovery will also take place quickly. In the financial cycle, systemic events can just does not happen because in the downswing segment market participants are already on automatically adjust its portfolio to reduce potential losses. It depends on the resilience of the elements of the financial system. On essentially downswing segment can be attempted to not fall too deep. what the central bank and the financial authorities can do is stick be on the lookout by preparing a number of instruments it has for avoiding the occurrence of financial crises that will lead to high costs for recovery. In
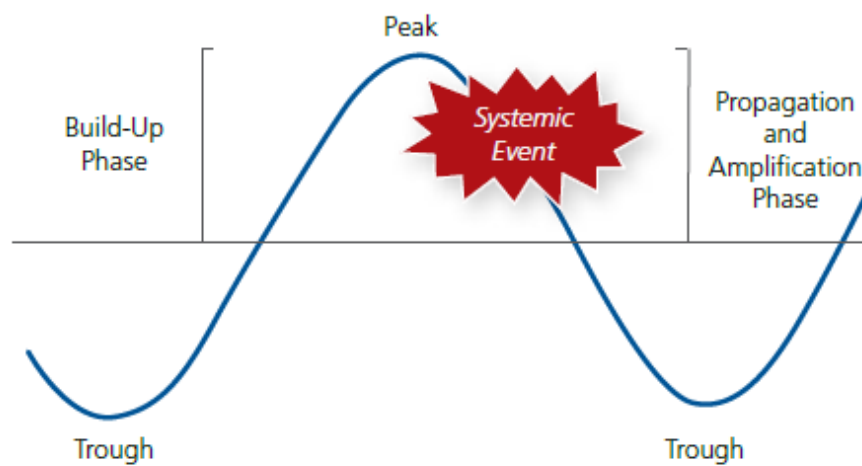
FIGURE 2.2

Financial Cycle Phase

this phase the frequency of near crisis indicators and stress indicators is very high, for example an index that describes the condition of the financial system overall or liquidity indicators of financial institutions becomes very important to continue to measure the capabilities of elements of the financial system within meet short term obligations.

3. Key Features of the Toolkit

Focusing on risks at various levels. Available tools may be used to measure systemic risk at different levels of aggregation, including:

a. *Individual financial institutions and markets.* For instance, these include (i) market valuation tools to identify price deviations from trend or from levels implied by fundamentals, focusing on assets that are relevant to

financial stability (e.g. housing, equity or bond markets); (ii) indicators of risk-taking and stress testing tools to assess the resilience of financial institutions or sovereigns.

b. *Risk transmission channels*. Models measuring interactions among financial entities have evolved rapidly in recent years. They are designed to better capture time-varying and nonlinear distress dependences (e.g., during extreme events), or the marginal contributions of individual institutions to systemic risk.

c. *The whole financial system and the economy.* Crisis prediction and stress test models aim to capture the risk that the entire financial system is impaired, as well as macro-financial linkages and feedback effects with the real economy. Also, general equilibrium models increasingly integrate financial sector and macroeconomic variables.

4. Types of Risk

There are several relevant types of risk in Financial particularly banking that should be monitored and mitigated during each systemic risk phase include credit risk, liquidity risk, and market risk.

a. *Credit risk*. This is a key source of risk in most financial systems. Stress testing methodologies, in particular, have relied on increasingly sophisticated approaches to assess probabilities of default and potential losses if default were to occur (loss-given-default or LGD), especially in relation to various macro factors.

b. *Liquidity risk.* Liquidity risk measurement tools have recently been developed to assess not only potential changes to financial institutions' liquidity ratios, but also the interactions between market liquidity (e.g., for thinly traded, illiquid assets) and financial institutions' funding conditions (e.g., through collateralization channels).

c. *Market risk.* There is greater familiarity of financial institutions and supervisory authorities with assessing such risks, including through stress testing for interest rate, exchange rate, or asset price shocks. At the systemic level, aggregate measures of market volatility can be used to assess latent vulnerabilities (e.g., to identify periods in which markets are more likely to become more volatile).

5. Historical Development of Financial Crisis Theory

Many researchers have investigated financial crises and these crises are generally divided into three types according to the background and the characteristics of the crisis.

a. The first generation of crisis-related fiscal and monetary problems commenced with a crisis in Mexico 1973-1982 (Kaminsky, 2003). Flood and Garber (1984) and Krugman (2007) further stated that in addition to fiscal and monetary issues, first generation crisis were caused by macroeconomic instability. Alongside this, a currency crisis can also be caused by a government's budget deficit and a system of fixed exchange rates.

b. Second generation crisis was first presented by Obstfeld (1994) and Cole and Keho (1996). One example of this event is the crisis that hit the European financial system in 1992 and 1993. According to Obstfeld, second-generation crisis is a crisis caused by the application of the conflict of fixed exchange rates against the government's desire for monetary expansion.

c. Third generation crisis is a combination of the first and second generation crises, as such it is also known as the twin crises. According to Krugman (2001), Cartapanis and Gilles (2002), twin crises are caused by a worsening of the banking system and a drop in the exchange rate. One example of the twin crises is crises that hit Asia in 1997. According to Kaminsky and Reinhart (1999), twin crises are caused by weak economic fundamentals of the country. In 2003, Kaminsky added that the cause of the third generation crises is also a crisis of moral 86 Bulletin of Monetary, Economics and Banking, January 2013 hazard and asymmetric information. This type of crisis is characterized by anincrease total credit and a sudden rise in asset prices.

6. Complex Adaptive Theory

a. Complex Adaptive System Theory

Complexity results from the inter-relationship, inter-action and inter-connectivity of indicators within a system and between a system and its environment. Many natural systems (e.g., brains, immune systems,

ecologies, societies) and increasingly, many artificial systems (parallel and distributed computing systems, artificial intelligence systems, artificial neural networks, evolutionary programs) are characterized by apparently complex behaviors that emerge as a result of often nonlinear spatio-temporal interactions among a large number of component systems at different levels of organization. These systems have recently become known as Complex Adaptive Systems (CAS).

The theoretical framework is based on work in the natural sciences studying CAS, e.g., physics, chemistry, biology). The analysis of CAS is done by a combination of applied, theoretical and experimental methods (e.g., mathematics and computer simulation). CAS are dynamic systems able to adapt in and evolve with a changing environment. It is important to realize that there is no separation between a system and its environment in the idea that a system always adapts to a changing environment. Rather, the concept to be examined is that of a system closely linked with all other related systems making up an ecosystem. Within such a context, change needs to be seen in terms of co-evolution with all other related systems, rather than as adaptation to a separate and distinct environment.

The definition for complex adaptive systems seems to change with the different attempts at application. In order to make a good match between a hard-to-solve problem and a complexity approach, it is important to consider whether and how the problem exhibits attributes of a complex adaptive system. Research is indicating that CAS have a

number of characteristics supposed distributed control, connectivity, co-evolution, sensitivity dependence on initial conditions, emergent order, far from equilibrium, and state of paradox.

b. Tools for CAS : Aggregation of Model

Aggregation of models of complex systems is one of useful tool for studying CAS. Aggregation simplifies the model without introducing significant error. Aggregation method is vary, the well-known ones are linear and geometric aggregations. The linear aggegation method is useful when all individual indicators have the same measurement unit, provided that some mathematical properties are respected. Geometric aggregation are better suited if the modeller wants some degree of non compensability between individual indicator and dimensions. Moreover, linear aggegation reward proportional base-indicator to the weights, while geometrics aggregation reward those countries with high scores (OECD, 2008).

B. Conceptual Review

1. Financial Stability

Financial stability determined as a condition when financial system is able to function prudently, efficiently and uninterrupted, even in the face of shocks (Alawode, 2008). However, it is pertinent to point out that financial stability does not mean that the financial system shows absolutely no vulnerabilities. It describes a state where the financial system is able to perform its normal functions even if endogenous vulnerabilities exist or if

shocks are experienced. It is inevitable that parts of the system will be functioning below par at different times. The only requirement is that any vulnerabilities (or shocks) are not serious enough to cause a disruption to the normal functioning of the financial system (or are absorbed and managed by the financial system).

This approach views financial crises as extreme cases or the culmination of instability. The lack of financial stability could be seen along a range of possibilities, including:

a. *Financial fragility*, where vulnerabilities are evident but the financial system is somehow managing to carry out its functions.

b. *Financial instability,* where vulnerabilities are beginning to impede the delivery of financial services.

c. *Financial crisis,* where the normal functions of the system cease. This is the most serious form of instability (see Chant, 2003).

2. The Meaning of Economic Resilience

Most dictionaries define resilience in terms of the ability to recover quickly from the effect of an adverse incident. This definition originates from the Latin *resilire* 'to leap back'. In economic literature, the term has been used in at least three senses relating to the ability (a) to recover quickly from a shock; (b) to withstand the effect of a shock; and (c) to avoid the shock altogether.

a. Ability of an economy to recover quickly. This is associated with the flexibility of an economy enabling it to bounce back after being adversely affected by a shock. This ability will be severely limited if, for example, there is a chronic tendency for large fiscal deficits or high rates of unemployment. On the other hand, this ability will be enhanced when the economy possesses discretionary policy tools which it can utilize to counteract the effects of negative shocks, such as a strong fiscal position, which would entail that policy-makers can utilize discretionary expenditure or tax cuts to contrast the effects of negative shocks. This type of resilience is therefore associated with "**shock-counteraction**".

b. Ability to withstand shocks. This suggests that the adverse effect of a shock could be absorbed or neutered, so that the end effect is zero or negligible. This type of resilience occurs when the economy has in place mechanisms to endogenously react to negative shocks to reduce their effects, which we can refer to as "**shock-absorption".** For example, the existence of a flexible, multi-skilled labor force could act as an instrument of shock absorption, as negative external demand shocks affecting a particular sector of economic activity can be relatively easily met by shifting resources to another sector enjoying stronger demand.

c. Ability of an economy to avoid shocks. This means that the economy could absolutely survive without vulnerabilities.

This study focuses on the risk and resilience as capability of Islamic Bank to recover quickly after being adversely afftected by a shock. Triggered

by shock is considered to be, and can be considered as the obverse of economic vulnerability.

3. Period of Law Number 21 Year 2008

To support and to strengthen the existence of Islamic banks, then on July 18, 2008, promulgated Law Number 21 Year 2008 about Sharia Banking. This law specifically covers the regulation of sharia banking comprehensively; 1) principles, objectives and functions, 2) licensing, legal entities, articles of association and ownership, 3) types and business activities, feasibility of fund disbursement, and prohibition For Sharia Bank and Sharia Business Unit, 4) Holders of controlling controllers, boards of commissioners, sharia supervisory board, directors and foreign workers, 5) governance, prudential principles and risk management of sharia banking, 6) bank secrets, 7) supervision and supervision, to settlement of banking disputes.

As explained above, the presence of this law is based on thought; First, to maximize the contribution of all indicators of society in national economic development. One of them is to integrate the sharia-based economic system into the National Law system. Second, the principle of profit sharing developed by sharia banking can create a healthy and fair investment climate because all parties can share in obtaining profit and potential risks that can arise from their business. Third, sharia banking requires vital support in the

form of Act which regulates specifically for the development of the institution.

The most important implications of this law for the existence and development of sharia banks are as follows; First, the guarantee of legal certainty. Assurance of legal certainty becomes the fundamental foundation as well as important for business actors, especially those who use the services of sharia banking. Similarly, such legal certainty will help investors, both local and foreign, to contribute to invest in sharia banking.

Second, increased government support. The birth of this law will certainly increase the government's more real support in advancing Islamic banking. The level of government support can be the increase of socialization to the wider community who do not have adequate knowledge concerning sharia banking. With this law, formally, the socialization of sharia banking will enter formal institutions, especially in the curriculum in universities that contain material about sharia banking. In addition, government support can be realized in inviting investors, both from within and outside the country, to develop the banking industry in the country.

Third, the integration of the role of Bank Indonesia and *Dewan Perwakilan Syariah* (DPS). As a law that specifically regulates sharia banking, this Law also regulates the issue of Shariah compliance whose authority resides in the *Majelis Ulama Indonesia* (MUI) and is represented by DPS on each Islamic Bank and *Unit Usaha Syariah* (UUS). Therefore, to follow up the implementation of the MUI fatwa into Bank Indonesia

Regulation, internal Bank Indonesia established sharia supervisory committee. This committee consists of representatives from Bank Indonesia, the Ministry of Religious Affairs, and community indicators.

In the context of the development of sharia banks, the birth of this Law also provides an opportunity for sharia banks to expand their market share. This can be seen from the various opportunities that become the basis of sharia banking arrangement as follows;

First, sharia commercial banks and sharia financing banks can not be converted into conventional banks, while conventional banks convert themselves into syariah banks. Second, merger or acquisition between syariah bank and conventional bank must become sharia bank. Third, conventional commercial banks that have sharia business units must perform spin off if the sharia business unit has achieved assets of at least 50% of the total asset value of its parent bank, or the activity of the sharia business unit has been running for fifteen years since the enactment this law. Fourth, the acceleration of syariah bank development can be done quickly through the possibility of foreign ownership. Foreign nationals and/or foreign legal entities incorporated in partnership with Indonesian legal entities may establish and / or have sharia commercial banks.

In addition to the commercial business development potential through the various opportunities above, this law also performs social functions in the form of *baitul mal*, which receives funds derived from the funds of *zakah*, *waqf* and *sadaqah*, grants or other social funds, as well as channel funds

Through the *zakah* management organization. Similarly, Islamic banks can also collect social funds from cash *waqf* and distribute them to *waqf* (*nadzir*) management institutions according to the will of the *waqf*.

4. Composite Indicator

a. Definition:

An indicator is a quantitative or a qualitative measure derived from a series of observed facts that can reveal relative positions (*e.g.* of a country) in a given area. A composite indicator is formed when individual indicators are compiled into a single Index on the basis of an underlying model. The composite indicator should ideally measure multidimensional concepts which cannot be captured by a single indicator, such as competitiveness, industrialisation, sustainability, single market integration, knowledge-based society, etc.

Composite indicators are much like mathematical or computational models. As such, their construction owes more to the craftsmanship of the modeller than to universally accept scientific rules for encoding. With regard to models, the justification for a composite indicator lies in its fitness for the intended purpose and in peer acceptance (Rosen, 1991).

b. Status Quo Composite Indicator

Composite Indicator (CI) which compares country performance is increasingly recognized in line with increasing interest of policy makers, investors and the business community on the initial sign of recession or

economic recovery. Analysis of compositing indicators that leads to monitoring performance is based on a single indicator, e.g. Competitiveness, sustainability, single market integration, knowledge-based society, resilience, etc. (Lahiri and Moore, 1991).

Recent research on leading composite indicators has focused on developing new methods based on the development of economic theory and time series analysis, and formulating more sophisticated methods to test the reliability of forecasting indicators. The Organization for Economic Co-operation and Development (OECD) has developed a methodology for building a CI series. There are several types of leading indicators commonly used such as weekly job averages, overtime Index, new orders, seller performance, construction, stock prices, money supply, and so on. While in the development of the cycle indicator system, it is necessary to identify the behavior of the preceding cycle of the reference series, ie the series for which the future movement is predicted. For example, the OECD indicator system uses the total industry production Index as the reference series. An important goal of leading indicator analysis is to make short-term forecasts from the reference series. Knowing whether the economy is heading for a recession or boom is important for policy-making. Fluctuating conditions should be predicted and then minimized through policy interventions.

Coincident indicator is a type of economic indicator that moves in line with general economic cycle. When it is viewed from the movement

of the cycle, coincident indicators will move like the reference series movement. They move together, when the reference series cycle is at the top of the cycle of coincident is at the top, and vice versa. Lagging Indicator Lagging indicator is a type of economic indicator that changes after the economic cycle begins to follow a certain trend. 2.3 Past Research the study of the establishment of leading indicators in Indonesia has been undertaken by several economists. Kusuma, Asif., (2004) conducted a study on the establishment of leading investment indicators in Indonesia. The variables used consist of nineteen variables which are divided into four sectors such as real sector and monetary sector.

From those studies related to conventional financial system is abundant. Nevertheless, the existence of a wide range of methodological approaches to composite indicators is still limited for financial institution furthermore Islamic banking. There is still lack formal international guidelines in this domain.

5. **Advantages**
   a. Useful tool in benchmarking or monitoring country performance, setting policy priorities and progress at the centre of the policy arena.
   b. Facilitate communication with general public (i.e. citizens, media, etc.) and promote accountability.
   c. It is easier to interpret composite indicators than to interpret a battery of many separate indicators.

d. An indicator can point out the direction of change across different units (progress) and through time (When evaluated at regular intervals). Indicators are useful in identifying trends and drawing attention to particular issues (see Brand *et al.*, 2007, for a case study on alcohol control policies n the OECD countries)

e. provide simple and effective comparisons (of countries) that can be used to illustrate complex and sometimes elusive issues in wide-ranging fields, *e.g.*, environment, economy, society or technological development

f. Reduce the visible size of a set of indicators without dropping the underlying information base.

g. Help to construct/underpin narratives for lay and literate audiences.

6. Disadvantages

a. Send misleading policy messages (if they are poorly constructed or misinterpreted)

b. May invite simplistic policy conclusions.

c. May be misused, e.g. to support a desired policy, if the construction process is not transparent and/or lacks sound statistical or conceptual principles.

d. The selection of indicators and weights could be the subject of political dispute.

e. May disguise serious failings in some dimensions and increase the difficulty of identifying proper remedial action, if the construction process is not transparent.

f. May lead to inappropriate policies if dimensions of performance that are difficult to measure are ignored.

7. Parties Pro and Cons Using Composite Indicators

The aggegators is temptation of stakeholders and practitioners to summarise complex and sometime elusive processes (e.g. sustainability, single market policy, etc.) into a single figure to benchmark country performance for policy consumption seems likewise irresistible (Saisana et al., 2005a).

The aggregators believe there are two major reasons that there is value in combining indicators in some manner to produce a bottom line. They believe that such a summary statistic can indeed capture reality and is meaningful, and that stressing the bottom line is extremely useful in garnering media interest and hence the attention of policy makers.

The non-aggregators, believe one should stop once an appropriate set of indicators has been created and not go the further step of producing a composite Index. Their key objection to aggregation is what they see as the arbitrary nature of the weighting process by which the variables are combined. (Sharpe, 2004)

8. **Financial Stability Index (*Indeks Stabilitas Keuangan*)**

Financial stability Index is used to monitor the condition of the financial system of a country. This Index is also used so that policy makers can take appropriate decisions to deal with if indicated there will be a crisis of the financial system. The index are constructed to predict the condition of the financial system at least within one year (Dare and Butters in Angelopoulou et al., 2013).

Some European countries have built an Index, such as the Financial Stress Index (FSI), which has been built by some European countries such as Canada, Germany, Finland and several other European countries. They built FSI with several purposes like to know how relevant they take monetary policy (Goodhart and Hofmann in Angelopoulou et al., 2013). The Swiss Central Bank has made a composite pressure on the banking Index which is used for swiss country's financial system, where each year always makes the latest Index to know how big the pressure experienced by the banking (Nan and Siddiqui, 2012).

Petrovska and Mihajlovska (2013) have built two indices for Macedonia, namely financial stability Index and the Index of the banking system. The methods they use in constructing the Index is a method of principal component analysis and weighting of each variable.

Countries Indonesia since 2007 has been building and using financial stability Index or FSI for monitoring the condition of the financial sector (Nan and Asiddiqui, 2012). In addition, Indonesia through the Danareksa Research

Institute (DRI) also has built Banking Pressure Index (BPI), which is useful to know when crisis happened in the banking sector (Gunadi et al., 2013).

9. **Trinity of Financial System Stability**
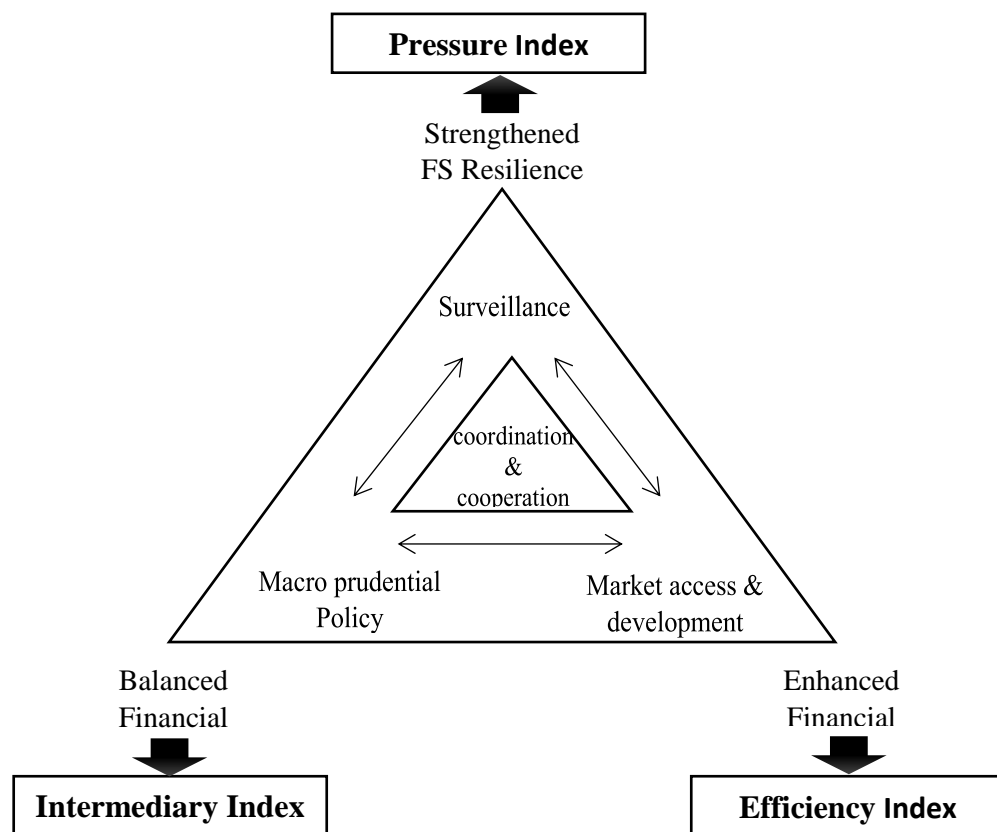
Source: Gunadi, 2013

FIGURE 2.3

Trinity of Financial System Stability

a. Pressure Index

Banking institutions pressure Index reflects the resilience of Islamic banking in the face of various pressures / risks such as credit risk, capitalization, profitability, and liquidity. The indicators forming ressure index namely NPF, CAR, ROA, and delta (Δ) liquidity. Selection weights

for each Index Pressure building indicators will be done with the calibration statistic is based on event analysis (Turning Point Analysis). Indicators of these indicators will be processed in accordance with the level value for the NPL, CAR, and ROA. Meanwhile, Islamic banking liquidity processed using the change (y-o-y) ratio. It is based on a graph of the four variables that reflects the crisis in the financial system in Indonesia.

b. Intermdiary index of Islamic Banking

To the side of intermediation, banking intermdiary index is formed by two aspects. First, the idiosyncratic aspects namely the aspects relating to the behavior of individual banks in intermediating, namely in fund distribution and fund-raising as a form of banking business. While the second aspect is the horizontal aspects, namely the banking intermediation function associated with the overall national economy. Two indicators represent banking aspects of idiosyncratic selected as the spread between interest rates on loans with interest rates in deposits and the difference between FDR with disincentives limit conditions of statutory Reserve (*Giro Wajib Minimum*) to depository ratio (Financing to Deposit Ratio) or further it called GWM-FDR ratio. Indicators reflect vertical gap between the credit/GDP with the long term trend. The third variable is credit/GDP with the long term trend. This indicator shows the condition of credit growth compare with national economic growth.

c. Efficiency Index of Islamic Banking

      The efficiency Index is formed of two main indicators shows how banks function in a for-profit business and make adjustments between revenue and costs to be incurred in achieving "the maximum profit with the smallest expenditure."

d. Indicators Constructing FSI

1) Non Performing Financing

      Non Performing Financing (NPF) is the ratio of the troubled financing consists of loans classified as substandard (KL), doubtful (D), and jam (M). NPF is the most dominant indicator in measuring the ability of IIFS refute the risk of default by a counterparty to fulfill its obligations due to various reasons so that the debtor cannot meet its obligations to the bank suffered a loss with no receipt of acceptance should be accepted (Mawardi, 2004). The higher the number of problem loans, the more likely the bank to not be able to function as a financial intermediary that is good, so the higher its imbalances.

2) Islamic Banking liquidity

      Banking liquidity is processed by using the ratio between the liquid tools that has been reduced to the primary reserve requirement to total assets. Tools used liquid consist of cash, demand deposits with Bank, SBI, investment in securities, placements in BI and other bank, The more positive changes in the ratio (ΔAL-primary GWM / TA), the

better the liquidity banks. The formula for the Islamic banking liquidity as follows:

$$\Delta\text{Liquidity} = \Delta\left(\frac{\text{liquidity instruments}-GWM\ Primer}{\text{Total Assets}}\right) \tag{1}$$

3) Capital Adequacy Ratio

Capital Adequacy Ratio (CAR) is the ratio of capital to gauge the health of banks. With the increase in equity capital, the health-related capital ratios. Increasingly CAR, the pressure on the Islamic banking so persistence decreasing bank refute the higher risks.

4) Return On Asset

Return on Assets (ROA) is a measure of the effectiveness of the bank in generating profits by exploiting its assets. The higher the ROA shows the better performance of banks.

a) Spread between interest rates on loans with interest rates in **deposits**, used the interest rate on deposits of one month, as interest rates on deposits of one month is still the highest in Indonesia, the higher the spread between interest rates on loans with deposits indicates that the high banks to disburse funds. This indicator is idiosyncratic indicator.

b) GWM-FDR is second idyosyncratic indicator. This indicator is seen by looking at the difference between FDR Islamic banking to limit disincentive GWM-FDR. Details of this indicator calculation is as follows:

$$\text{FDR} > 90\% = \text{FDR} - 90\%$$

$$90\% < \text{FDR} < 78\% = 0\%$$

$$\text{FDR} < 78\% = \text{FDR} - 78\%$$

FDR below the lower limit GWM-FDR will be given in the form of primary reserve requirement, it is expected to encourage banks to extend credit. While FDR more than 92% will be subject to additional statutory reserves to maintain liquidity reserves. The upper limit used in the calculation of the indicators used 90% as warning to the stability of the banking industry that credit needs to be addressed (Muljawan, 2013). GWM-LDR is limit based on at PBI No.12/19/2010.

5) Credit growth compare with national economic growth.

This indicator shows the condition of high credit growth if not supported by appropriate economic growth can cause problems in the future, improving the quality of credit collection in the future could lead to pressure on banks (indicated by an increase in Pressure Index) and lead to an increase in RWA and caused a decline in CAR. In contrast, economic growth conditions that are not supported by credit growth will end in a condition called "disintermediation".

The gap credit/GDP against the long term trend chosen as a reflection of the macroeconomic conditions of intermediation. The higher the gap GDP be early indicator to see the direction of development credit, whether in a state of boom overheating or leading to crisis.

6) Net Operating Margin

Net Operating Margin (NOM) was chosen as an indicator to show how big profit can be collected by the bank in its business. In other

words, NOM describes the performance of banks in implementing investment decisions compared with debt conditions, the condition of the banking intermediation efficiency.

7) Operating Expenses to Operating Income

Operating Expenses to Operating Income (*BOPO*) shows the efficiency of Islamic banking in terms of operational management of the banking system. The higher *BOPO*, the more banking efficiency will decrease, and vice versa.

8) Cost-to-Income Ratio

Cost-to-Income Ratio (CIR) showed efficiency of Islamic banking as a business entity. The higher CIR, the more banking efficiency will decrease, and vice versa. The formula for the CIR as follows:

$$CIR = \frac{(OEOM+NOE)-PL}{\pi_i+NOI+OIOI} \qquad (2)$$

Where:

CIR   : Cost-to-Income Ratio

OEOM   : Operational Expenses other than profit margin

NOE   : Non-Operational Expenses

PL   : Provision Loss

π_i : Net Operating Margin Income

NOI   : Non-Operational Income

OIOI   : Operational income other than interest

9) Overhead Cost to operating income

Overhead Cost to operating income (OHC/PO) shows the efficiency of Islamic banking as a business entity. The higher OHC/PO, banking efficiency decreases, and vice versa. By calculation, OHC/PO can be obtained by the following equation:

$$\frac{OHC}{OR} = \frac{Ip+Edd+R\&D+Pr+Tx+Rt+NOE+Mn+GS+Lc}{PO} \tag{3}$$

Notes:

OHC	: Overhead Cost	Tx	: Tax
OR	: Operational Revenue	Rt	: Rent Expenses
IP	: Insurance premium	NOE	: Non-operational
Edd	: Education		Expenses
R&D	: Research &	Mn	: Maintenance
	Development	GS	: Goods &
Pr	: Promotion		Services
		Lc	: Labor costs

10) Establishment of Composite Index Based Financial System Literature

The discussion about Composite Index so far always limited at macro level not micro or internal financial institutions level. However, analysis of the scope of the internal Financial Stability Sistem (FSS) remain relevant financial institution to do given regional autonomy has given increasingly broad space for each regional governments to make decisions that affect the allocation of resources, both financial and non-financial. To internal financial institution, local FSS can be observed

through the development of several economic variables, each of which grouped as; (I) Microprudential indicators, and, (ii) Regional macroprudential indicators. Grouping variables defined as summarized in specific issues of Islamic bank requiring particular assessment.

Before identifying gaps in the existing framework in regard to monitoring and assessment tool for IIFS in Indonesia, it is necessary to understand the uniqueness of Islamic finance in banking industry. The unique features of an IIFS calls for special treatment (i.e. customization in building and developing resilience Index) due to its diverse composition (i.e. different types of risk exposures) of the balance sheet in different jurisdictions. The underlying unique features of Islamic finance for IIFS are explained below:
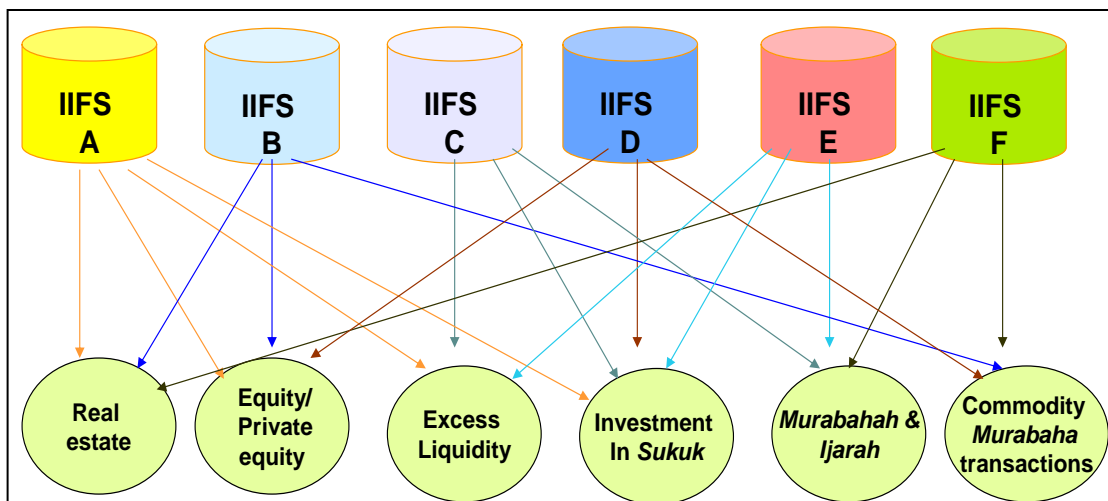
Source: Chatta J.A. (2015), Bloomsburry Qatar Foundation (compiled)

FIGURE 2.4

Different Composition of Balance Sheet of IIFS in Different Jurisdiction
(Customize resilient Index consistent is required)

11) Specificities of Islamic Finance

The underlying unique features of Islamic finance for Islamic bank include, among others: (Chattha, 2015)

a) Basis of Sharia: Sharia (Islamic law) forms the basis of the framework of Islamic finance. The Sharia is derived from primary and secondary sources.[2]

b) Prohibitions: The following are specifically prohibited such as *Riba* - interest, *Gharar* – uncertainty (about the subject-matter and terms of contracts; this includes a prohibition on selling something not owned), *Maysir* - gambling, hoarding, and dealing in unlawful goods or services. Followed by these prohibitions, IIFS structure their products and processes according to Sharia rules and principles.

c) No re-pricing of Sale Contracts (*Murabahah)*: Under Islamic finance, once the sale price is fixed for financing in *Murabahah*, the IIFS cannot claim more than the pre-fixed sale price, even if the assets were to become 'non-performing' or the benchmark has been changed either upward or downward.

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[2]   The jurists state that the primary sources of Islamic finance laws are the *Holy Qur'an* and the *Sunnah* (the traditions of the Prophet Muhammad (pbuh). These two sources are classified as sources being agreed upon among the majority of jurists. Some of the other sources are agreed upon by the majority of the schools are *Ijma'* (consensus) and *Qiyas* (analogy). The secondary sources are techniques of legal reasoning that the mujtahid employs during his *Ijtihad*. The secondary sources include Juristic preference (*al-istihsan*), Consideration of public interest (*al-istislah*) *Maslahah Mursalah*, Presumption of continuity (*al-istishab*), *Saad Al-dariah* (Blocking the lawful means to an unlawful end), Companion's opinion (*qawl al-sahabi*), *Shar' Man Qablana* (earlier scriptures and general customary practices (*al-'adah*).

d) Asset Backed nature of Structures: Typically all Islamic structures followed by an Islamic bank have an underlying assets backing the deal.

e) Adherences to procedures align with *Sharia* rules and principles: Each *Sharia*-compliant financial contract is required to adhere to certain procedures. When a transaction misses certain stage, the transaction will be rendered invalid in accordance to *Sharia* rules and principles. For example, in a *Murabahah* transaction, an IIFS is permitted to earn profit only as a reward for risk undertaken as evidenced by the IIFS taking prior possession of the asset. If the IIFS does not have prior possession, the transaction will be considered invalid. In this scenario, the IIFS need to carefully structure their transactions and adhere to procedures and steps to ensure that the profits earned are according to *Sharia* rules and principles.

f) Risk Transformation: Another unique feature is the existence of transformation of risk on the balance sheet of an Islamic bank. At different contract stages, transformation of risk takes place in *Sharia*-compliant financial contracts. For instance, in *Murabahah* transaction, **the market risk transforms into the credit risk (i.e. market risk is applicable before selling the** *Sharia*-compliant **commodities to the counterparty and after selling to counterparty market risk converts into credit risk when the payment is on deferred terms) – see Table 2.1 below.**

TABLE 2.1

The Transformation of Risk on IB's Balance Sheet

Applicable stage of the contract	Market Risk	Credit Risk
Asset Available for sale	Applicable	**N.A**
Asset sold to customer	**N.A**	**Applicable**

Source: IFSB-1 (2005)

Based on the above explanation, the unique features of Islamic finance give rise to specific risks and issues as the balance sheet structure of an Islamic bank is different compared to the conventional institutions and, thus they require additional work on stability assessment, measurement and management. Notably, the following specificities should be taken into consideration, as addressed by the International Financial Service Board (IFSB):

(1) Unique risk characteristics of Islamic financial transactions and contracts have called for guidance on risk management controls from the perspective of an Islamic bank (addressed in IFSB-1)[3];

(2) In the capital adequacy of the Islamic bank, the calculation of risk weighted assets in each contract requires the recognition of various stages and requires special attention to Investment Account Holders (IAHs) (addressed in IFSB-2);

(3) The presence of IAHs in the Islamic bank needs governance committee to protect the rights of IAHs (see IFSB-3)[4];

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[3] IFSB-1(Guiding Principles on Risk Management), Dec 2005.
[4] IFSB-3 (Guiding Principles on Corporate Governance), Dec 2006.

Above all, the *Sharia*-compliance requirements in all aspects of the Islamic bank operation also need adequate *Sharia* governance system (see IFSB-10)[5].

C. Previous Studies

1. Financial System Stability Index in Indonesia (FSSI)

Establishment of Financial System Stability Index (FSSI) in Indonesia was conducted by Gunadi (2013) by comparing the current financial system stability with the average condition of the stability of the financial system during the last 2 years of the actual time (Normalization rolling two years). Gunadi uses banking and market sector as crucial indikator to build FSSI. The result of this study could explain general level resilience in Indonesian economy.

However, things that should be noted in from previous study is that state banking system in Indonesia as one unite. Whereas, Islamic banking has specific characeristic call for spesific monitoring process. Hence, this study is conducted to bridge the gap by providing method that is proper fror specificity of Islamic Banking.

TABLE 2.2

Previous Studies

No	Author	Time Span	Variables	Aggregation Metode	Area Covered
1.	Iman Gunadi, *et al.*	Jan 2001-Oct 2013	Banking sector	Statistical Normalization & Empirical	Indonesia

[5] IFSB-10 (Guiding Principles on *Sharī'ah* Governance Systems), Dec 2009.

	(2013)		1. Indeks Tekanan {Delta (AL-GWM)/TA yoy, NPL, ROA, CAR} 2. Indeks Intermediasi (spread sb kredit dg DPK, gap LDR, gap kredit/GDP) 3. Indeks effisiensi (NIM, BOPO, CIR, OHC/PO) Financial Market (PUAB-DF Rate, IHSG, obligasi Negara, IDR/USD, CDS)	Normalization Min-Max	
2.	Difa Dini Asfari	2006-2012	Banking Sector (NPL, LDR, BOPO, ROA, NIM, CAR) IHSG, CMAX$, Rasio manfaat dana pension , Yield government, Yield corporation	Factor Analysis	Indonesia
3.	Illing & Liu (2006)	1980-2006	1. Banking sector beta, 2. Liquidity spread, 3. Corporate bond spread, 4. Covered interest rate spread, 5. Inverted yield curve, 6. Weighted dollar crashes, 7. Stock market crashes, 8. Sovered bond-T-bill spread 1980	Credit Weight	Canada
4.	Islami & Kurz-Kim (2013)	2007-2013	1. CDS spread on iTraxx Europe Crossover, 2. CDS spread on iTraxx Non-financials, 3. EUR/USD exchange rate volatility, 4. Volatility of the future oil price, 5. Earning price ratio minus 10-year euro interest rate, 6. Euribor/EONIA spread	Variance-Equal Weighting	Europe Area
5.	Hakkio & Keeton (2009)	1990-2009	1. TED-Spread, 2. 2-year swap spread, 3. Off-the-run/on-the-run 10-year Treasury spread, 4. Aaa/10-year Treasury spread,	Principal Component Analysis	United States of America

			5. Baa/Aaa spread, HY/Baa spread, 6. Consumer ABS/5-year Treasury spread, 7. Stock and Tresury bond correlation, 8. VIX-Index, 9. Bank stock idiosyncratic		

D. Research Framework

Research framework examine the conceptual of systematic framework about construcing Sharia Banking resilience (SHABAR) Index which is based on the following:

Source: OECD (2008) and adjustment

FIGURE 2.5

Steps in Constructing Sharia Banking Resilience (SHABAR) Index

The following steps on the construction of composite indicators are as below:

Step 1. Theoretical/Conceptual framework

Provides the basis for the selection and combination of variables into a meaningful composite indicator under a fitness-for-purpose principle (involvement of experts and stakeholders is important).

a. Clear understanding and definition of the multidimensional phenomenon to be measured.

b. Discuss the added-value of the composite indicator.

c. Nested structure of the various sub-groups of the phenomenon (if relevant).

d. List of selection criteria for the underlying variables, e.g., input, output, process.

Step 2. Data selection

Data Selection should be based on the analytical soundness, measurability, country coverage, and relevance of the indicators to the phenomenon being measured and relationship to each other. The use of proxy variables should be considered when data are scarce (involvement of experts and stakeholders is important).

a. Quality assessment of the available indicators.

b. Discuss strengths and weaknesses of each selected indicator.

c. Summary table on data characteristics, e.g., availability (across country, time), source, type (hard, soft or input, output, process), descriptive statistics (mean, median, skewness, kurtosis, min, max, variance, histogram).

Step 3. Data treatment

Data Treatment consists of imputing missing data, (eventually) treating outliers and/or making scale adjustments.

a. Confidence interval for each imputed value that allows assessing the impact of imputation on the composite indicator results.

b. Discuss and treat outliers, so as to avoid that they become unintended benchmarks (e.g., by applying Box-Cox transformations such square roots, logarithms, and other).

c. Make scale adjustments, if necessary (e.g., taking logarithms of some indicators, so that differences at the lower levels matter more).

(back to step 2)

Step 4. Normalization

Normalization should be carried out to render variables comparable.

a. Make directional adjustment, so that higher values correspond to better performance in all indicators (or vice versa).

b. Select a suitable normalisation method (e.g., min-max, z-scores, and distance to best performer) that respects the conceptual framework and the data properties.

Step 5. Weighting and aggregation

Should be done along the lines of the theoretical/ conceptual framework

a. Discuss whether compensability among indicators should be allowed and up to which level of aggregation.

b. Discuss whether correlation among indicators should be taken into account during the assignment of weights.

c. Select a suitable weighting and aggregation method that respect the conceptual framework and the data properties. Popular weighting methods include equal weights, factor analysis derived weights, expert opinion, and data envelopment analysis. Popular aggregation methods include arithmetic average, geometric average, Borda, Copeland.

Step 6. Uncertainty and sensitivity analysis

Should be undertaken to assess the robustness of the composite indicator scores/ranks to the underlying assumptions and to identify which assumptions are more crucial in determining the final classification. Important to note the trade-off between multidimensionality and robustness in a composite indicator, given that a mono-dimensional Index is likely to be more robust than a multi-dimensional one. This does not imply that the first Index is better than the second one. In fact, robustness analysis should NOT be treated as an attribute of the composite indicator but of the inference which the composite indicator has been called upon to support.

a. Consider different methodological paths to build the Index, and if available, different conceptual frameworks.

b. Identify the sources of uncertainty underlying in the development of the composite indicator and provide the composite scores/ranks with confidence intervals.

c. Explain why certain countries notably improve or deteriorate their relative position given the assumptions.

d. Conduct sensitivity analysis to show what sources of uncertainty are more influential in determining the scores/ranks.

Step 7. Relation to other indicators

Should be made to correlate the composite indicator (or its dimensions) with existing (simple or composite) indicators and to identify linkages through regressions.

a. Correlate the composite indicator with relevant measurable phenomena and explain similarities or differences.

b. Develop data-driven narratives on the results.

c. Perform causality tests (if time series data are available).

Step 8. Visualization of the results

Should receive proper attention given that it can influence (or help to enhance) interpretability.

a. Identify suitable presentational tools for the targeted audience.

b. Select the visualisation technique which communicates the most information without hiding vital information.

c. Present the results in a clear, easy to grasp and accurate manner.
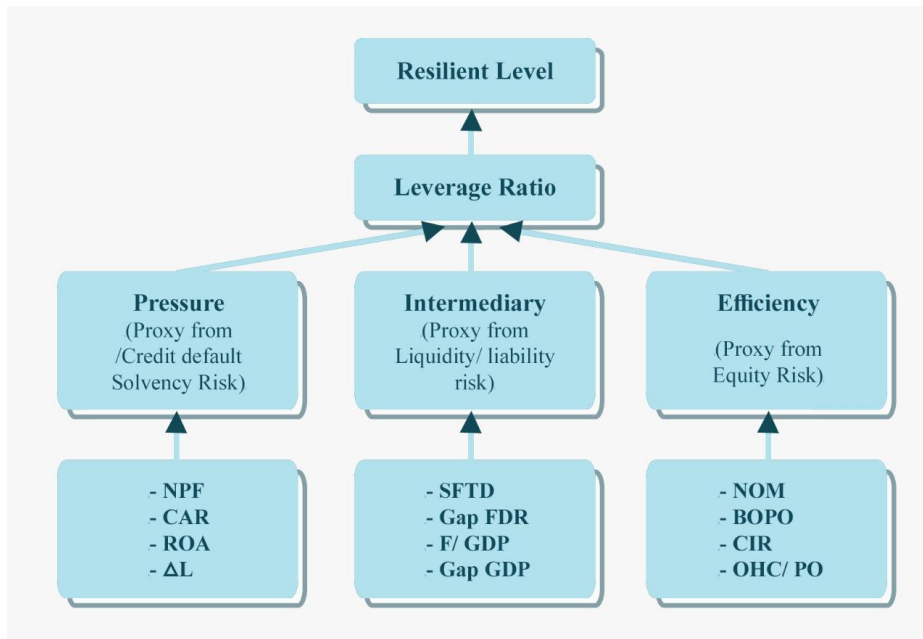
E. Research Model

FIGURE 2.6

Indicator Forming SHABAR Index

The analysis method includes three kinds, namely Hodrick-Prescott Filter (HP Filter) to perform islamic banking financing excessive analysis on Indonesian banking, standardization normalization and agregation method to convert indicators to a cmmon scale with a mean of zero and standardization of one and to combine it become composite indicator. This study uses a tool that is in the form of computer software program EViews 9. 1. and merely MS. Excel.

Model Analysis Hodrick Prescott Filter One method to identify the existence of excessive credit growth is the Hodrick Prescott Filter (HP Filter) approach. The HP filters introduced by Hodrick and Prescott (1980) are a

flexible and commonly used method of detrending in economic research. For example, a series of data can be separated into two components namely, trend (gt) and cycle (ct) and written as yt = gt + ct Technically a two-sided linear filter (backward-forward) used to calculate smoothed-trend series S) of output (y) by minimizing the loss function (L), ie the variance y around the s value, with a certain penalty which is then also known as the two-sided HP filter approach: Σ The penalty parameter λ controls the gradability of the series st the greater the value , The smoother the development of st. If λ reach infinity value, st approach linear polatrend.

Hodrick and Prescott recommend λ = 14400 for monthly data, λ = 1600 for quarterly data and λ = 100 for annual data. Undoubtedly, this HP filter method also has some drawbacks as proposed by Cottarelli et al. (2005): a) The HP filter measures the trend of the whole observation and ignores the possibility of structural breaks. b) HP filters are quite sensitive with end point bias. If the starting point or end point of the data does not reflect the same thing in the cycle, the likelihood of bias up or down. c) HP filters are sensitive to timing. d) The HP filter is sensitive to the smoothing parameter (λ) used. In this study, excessive credit growth will be analyzed by looking at deviations from long-term trends (by HP filter methods) on credit growth, both total and aggregate, as well as loan to GDP ratio and looking at long-term deviations and trends.

The use of credit to GDP ratio follows the approach proposed by the Basel Committee on Banking Supervision (2010). The basic threshold used for

contructing threshold composite Index is 1,3 time, 1,7 time and 2 times (following Bank Indonesia).