

# Calculating Operational Risk Capital Charges for Indonesian Rural Banks

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## Abstract

In January 2001, the Basel Committee on Banking Supervision published a proposal for a new capital framework, the “New Basel Capital Accord (Basel 11)” thus replacing Basel 1. One of the major motivations in the proposal is the introduction of explicit capital charge for operational risks in the business activities of banks. The objective of this paper is to estimate operational risk capital charge using historical data for 77 rural banks in Indonesia for a three-year period, 2006 to 2008. This study uses three approaches: (i) Basic Indicator Approach (BIA), (ii) Standardized Approach (SA) and (iii) Alternative Standardized Approach (ASA). We found that the average capital charge required to cover operational risk is IDR 154 million (1.5% of asset). When the calculation is conducted using the SA method, we found, on average a requirement of IDR 123 million (1.23% of asset). When the calculation is conducted using the Alternative Standardized Approach (ASA), the capital required was IDR 43 million (0.43% of asset). The results provide evidence that banks using more advance model require less capital charge.

**Keywords:** Operational Risk, BIA, SA, Capital Charge, Rural Banks, Indonesia

## 1. Introduction

Effective management of operational risk is essential to the banking business and to fulfil their role as financial intermediary and subsequently maintain the stability of the financial system. Deregulation, globalization and the growing sophistication in technology are making the activities of banks and their operational risk profiles more complex. After the introduction of Basel II in 2001, all banks are required to calculate operational risk capital charges. However, the question is “Does this include rural banks?” If that is so, rural banks are not excluded in calculating operational risk capital charges in their capital requirement.

Rural banking is a specific entity in the Indonesian banking system. According to Banking Act #10, 1998, there are two types of banks. The first is commercial banks which provide full services of banking business and secondly, People Credit Banks (BPR) which provide limited banking service. People Credit Banks are known as rural banks since they are mostly operating and servicing customers in the rural area. For that reason the rural bank operation is limited compared to commercial banks. The rural banking services include deposit taking, lending and placement to central bank or inter-banks. Other services such as deposits taking in current accounts are not allowed. Buying and selling foreign exchange is also prohibited except through an application. Apart from that, rural banks are also prohibited from being involved in capital placement in other businesses. In terms of regional operation, rural banks are only allowed to operate within the provincial area.

The objective of this study is to estimate operational risk capital charges for rural banks using three approaches: Basic Indicator Approach (BIA), Standardised Approach (SA) and Alternative Standardised Approach (ASA). Definitely rural banks need a simple but accurate model for a comprehensive operational risk capital charges method and at lower cost. This study is regarded as important as it will provide a better tool for operational risk capital charges calculation for rural banks. It is hoped that it will be able to reduce regulatory cost of capital and most important will reduce operational risk model development cost.

According to Doerig (2003) operational risk management is - simply put - good management and close to quality management. As management in financial services is dealing with people for people - in a continuous process and ever changing environment – there cannot be an easy answer or a simple model that can easily capture it. The management of operational risk, apart from capital calculation, should deal to achieve profit stability, reduce likelihood of failure and fulfil stakeholder demand for better and reliable tools.

This study focuses on the Indonesian rural banks. The objective of this paper is to estimate operational risk capital charge using historical data for 77 rural banks in Indonesia for a three-year period, 2006 to 2008. As rural banks are a single business line and their business is basically retail banking only, the calculation is simple. In terms of expertise, their modelling capacity is still lacking. If these banks were to consider purchasing the tools or outsourcing expertise to develop the model, it will be expensive. Therefore, they need a simple but realistic technique to calculate operational risk capital charges if this Basel II regulatory setting is applied.

As a relatively new method, operational risk capital charges are therefore very interesting research area. Most research used a very sophisticated method that requires sophisticated mathematical skills; this research however is relatively simple in approach and does not require very high mathematical skills. This study is considered a pioneer study as this is the first time rural banks have been used as a research subject.

The paper is organized as follows. Section 2 discusses the theoretical background related to the operational risk capital charges. In Section 3, we describe the data and methodology. Findings are reported in Section 4 which is followed by a concluding section.

## **2. Theoretical Background**

Banking is the most regulated industry in the world. There are many reasons that make the banking industry must be regulated. First, is the asymmetric distribution of information between borrowers and investors. In deposit taking side, investors that put money in the bank do not know what their money used for. At the same time, in lending side, bank managers also do not know exactly the use of loan disbursed to the borrowers. This asymmetric condition both bank with its depositors and bank with its borrowers results in the problems of 'adverse selection' and 'moral hazard' (Stiglitz and Weiss 1981).

The second argument that support for regulating financial institutions is the difficulty of objectively judging the performance of a financial institution. This situation creates the risk of run. Risk of run is a panic situation that inhibit the withdrawal of all deposits, forcing the financial institution into liquidity drain and then to bankruptcy situation. Diamond and Dybvig (1983), using maximum utility function, have shown that a bank run by depositors can be perfectly rational behavior to maximise their asset value. The information and incentive problems are the reason behind the regulation of financial institution.

On the macroeconomics perspective, According to Llewellyn (1999), banking regulation has related to macroeconomic aspect such as to sustain systemic stability of the economy, to maintain the safety and soundness of financial institutions, and the last, to protect the consumer. These reasons are more significant currently as the cost of economic crisis due to the failure of banking industry are so huge. To respond the current crisis, US has give money as part of its recapitalization program almost USD 1 trillion. The cost of economic contraction as result of banking crisis usually is much more. Experience suggests, however, that financial systems are prone to periods of instability and bank failures around the world increase from time to time. IMF (2000) argue that banking crises in Asia have in part been a product of 'the poorly regulated and often distorted financial sectors in these countries'.

Stolz (2007) wrote the capital regulation is required because banks were extending their activities beyond their traditional national activities. Their becoming active internationally and competing with other bank from different jurisdiction. As funding from capital is more expensive than from deposits, minimum capital requirement affect bank profitability and thus affect the competitiveness in the international level.

According to Modigliani and Miller (1958), effects of capital requirement on the banking risk and value is not effective and necessary. It is because Modigliani Miller assume that financial market information is complete meaning depositors have complete information on the risk of bank. It means bank's owner and managers do not have the capabilities to exploit their position for their own benefit at the cost of depositors. When the risk position is higher, depositors will ask for higher return.

However, Kim and Santomero (1998) analysed the effect of capital regulation on the bank behavior and found it is effective. Without any restriction on risky assets, bank will increase risky asset to achieve the required return. In conclusion, risk sensitive capital may be effective mean to prevent banks from increasing asset risk in reaction to the imposition of capital regulation.

As responses to the importance of banking industry to the economic and to create a level of playing field among internationally active banks, the central bank governors of the Group of Ten countries in 1975 set The Basel Committee on Banking Supervision known as "the Committee". However a formal and systematic banking regulation is relatively new. In 1988, Basel Committee on Banking Supervision set a minimum capital standards for internationally active banks known as Basel I.

Basel I set a capital ratio of 8% of risk-adjusted assets and was adopted by majority world. In June 1999, the Committee issued a proposal for a New Capital Adequacy Framework to replace the 1988 Accord. After an extensive consultative process, including consultation and impact studies, on 26 June 2004, the central bank governors and the heads of bank supervisory authorities in the Group of Ten (G10) countries met and endorsed the publication of the International Convergence of Capital Measurement and Capital Standards: a Revised Framework, the new capital adequacy framework commonly known as Basel II. (Basel Committee on Banking Supervision, 2004).

Under Pillar I of Basel II, banks are required to adopt a methodology to assess the operational risk capital charge that would serve as a shield against potential future losses given a one-year horizon. There are three choices that a bank can choose to apply- from a simple to very advance model. The available approaches proposed by Basel II consist of:

- (i) Basic Indicator Approach (BIA)
- (ii) Standardised Approach (SA)
- (iii) Advanced Measurement Approach (AMA).

Banks are allowed to choose from the simplest and must move up along the spectrum as they develop more complex operational risk measurement systems. By this approach, Basel II imbedded operational risk concepts and the provisioning of operational risk capital to be considered in their risk management considerations.

According to the Basel committee on Banking Supervision, **“Operational Risk is the risk of direct or indirect loss resulting from inadequate or failed internal processes, people, and systems or from external events.** Operational risk received intensive attention after the

incidence of failures linking to operational risk such as the collapse of Baring Bank. The most substantial progress is the introduction of operational risk under the Basel II Framework in 1999.

However, operational risk is not new. In fact, it is the first risk that banks must manage, even before they make their first loan or do their first trade service business. What is new is the idea that operational risk management is a discipline with its own management structure, tools, and processes, much like credit or market risk. Before the introduction by the Basel Committee, operational risk received less attention. In 1991, the Committee of Sponsoring Organizations or COSO issued an internal control framework where the term of operational risk was initially introduced. However, the attention was limited. Further discussion on the invention of operational risk can be read from Power (2003).

An increase of customer demand in terms of product and service availability and faster process, intense competition and regulations are more vigilant to legal and fraud prevention. This is especially true after the existence of massive fraud such as Enron, WorldCom *etc.* These events are frequently quoted, highlighting the importance of operational risk management. At the same time, the management of banking firms are required to achieve a shareholder value maximisation.

According to Harmantzis (2004), the definition of operational risk underlies four important concepts:

- **Process:** Losses due to a deficiency in an existing procedure or the absence of a procedure. Losses in this category can result from human error or failure to follow an existing procedure. Process-related losses are unintentional.
- **People:** Losses associated with intentional violation of internal policies by current or past employees. In some specific cases, the risk extends to people who are being considered for employment.
- **Systems:** Losses that are caused by breakdowns in existing systems or technology. Losses in this category are unintentional. If intentional technology-related losses occur, they should be placed in either the people or external category.
- **External Event:** Losses occurring as a result of natural or man-made forces or the direct result of a third party's action.

To cope with potential losses from the four sources above, the Basel Committee proposed three methods for calculating Operational Risk. These are:

(I) Basic Indicator Approach (BIA)

This is a technique to calculate capital charges for operational risk. Banks using the Basic Indicator Approach calculate operational risk capital equal to the average over the previous three years of a fixed percentage number 15%, known as Alpha Multiplier. Only positive annual gross income is used. If there is negative gross income, it is excluded from the calculation.

The formula is as follows:

$$K_{BIA} = \Sigma (GI \times \alpha \text{ (15\%)})$$

where:

$K_{BIA}$  = the capital charge under the Basic Indicator Approach

GI = annual gross income, where positive, over the previous three years

n = number of the previous three years for which gross income is positive

$\alpha$  = 15%, which is set by the Basel Committee on Banking Supervision (BCBS).

Gross income in this concept is defined as net interest income plus non-interest income. As BIA is regarded as the simplest method, there is no criterion for a bank to use it.

## (II) Standardised Approach

The Standardised Approach (SA) is relatively more advance compared to the Basic Indicator Approach (BIA). In SA, operational risk is calculated using eight (8) business lines times its gross income. The Standardised Approach (SA) is better able to reflect the differing risk profiles across bank business activities. The eight business lines under the Standardised Approach (SA) are corporate finance, trading and sales, retail banking, commercial banking, payment and settlement, agency services, asset management, and retail brokerage. Every business line has its own beta to indicate embedded risk. Every business line beta is multiplied by each business line gross income. Under SA, gross incomes are still regarded as a proxy for the scale of business operations and an indicator of operational risk exposure. In SA, beta serves as a proxy for operational risk loss related to bank gross income. Beta for corporate finance, trading and sale and retail banking are 18%. Beta for commercial banking and agency service are 1%. Beta for retail banking and asset management is 12%.

The capital charge is the sum over all the 8 business lines' charges:

$$K_{SA} = \Sigma (GI - 8 \times \beta_1 - 8)$$

In case the bank has embedded the operational risk factor in its pricing, the bank is allowed to use the Alternative Standardised Approach (ASA) for retail and commercial business lines. It is used to prevent from double calculation of risk capital either from pricing structure and capital allocation. Bank replaces gross income with loan and advance for retail and commercial banking business line. Other business lines are still using the same techniques. However, the gross income is replaced by loans and advances for calculating capital charge. The result is then multiplied by m number known as m multiplier. The m multiplier is set as 0.035.

The formula for calculating the ASA for retail banking is as follows;

$$\Sigma (\text{Loans and advances X Commercial or Retail Banking Beta (BL3-4) X m (0.035)})$$

However, note should be given to the issue. When bank cannot separate its gross income clearly whether it is from retail or commercial banking activities, beta should be 15% follow commercial banking beta. When the gross income is a mixture all of eight business lines, beta must be 18%.

### (III) Advance Measurement Approach (AMA)

AMA is a model used to calculate the capital charges for operational risk in a more sophisticated way. The features of the AMA approach should be able to calculate the expected loss (EL) and unexpected loss (UL), and have the capability to identify potential loss from extreme event (tail events). As this method is advanced, it is beyond this paper.

In general it is rational if all banks want to reduce capital requirement as capital is expensive. At the same time the more advance method always produces lower capital requirement. To prevent bank exploit the benefit, Basel Committee require bank to fulfil certain conditions to move from simple method to more advance. Bank that applies Basic Indicator Approach (BIA) is not required to fulfil certain condition as it is the simplest technique. For bank that applies standardised approach (SA), it must a system and function to manage its operational risk. The system and function must be suitable with its purpose and implemented correctly. Bank also required to own resources to supervise its main business, proper internal control and audit department. Furthermore, the board of directors and senior management conduct active supervision of risk management function. (BCBS: 2006).

Chernobai *et. al.*, (2008) argued that operational risk has a prominent firm specific dependence. Factors such as scale, capital structure, profitability, and volatility play a significant part in operational loss formation. In particular, they show that internal events such as fraud are closely linked to proxies for the internal control environment of the firm. There are significant and non linear relationships between operational risk and the human factor; as the number of employees increases, the frequency of internal loss events first increases, and then falls. The market-related factors play a weaker and mixed role in determining the levels of operational risk in firms. A persistent finding is that the frequency and severity of operational losses are negatively related to the GDP growth rate, indicating that they tend to rise during economic downturns. It is possible, however, that this result is primarily driven by the damage to physical assets during September 2001 for this sample.

In contrast to Chernobai *et. al.*, (2008), previous empirical examination by Shih *et. al.*, (2000) suggested that little of the variability in the size of operational losses is explained by the size of a firm. Smithson (2000) added, BIA and SA approaches run the risk of setting up perverse incentives – a financial institution that dramatically improves the management and control of its operational risk could actually be penalized by being required to hold more capital, if the improvements lead to an increase in the volume of the institution's business.

### 3. Data and Methodology

This study is based on two assumptions. First, that capital regulation under Basel II is not only a matter of putting capital to shield the operational risk but it should be an integral part to improve risk management in general. The second assumption is that the rural bank under investigation is simple in its operation, meaning that calculating capital charges for operational risk will not require sophisticated models under the Advance Measurement Approach (AMA). The use of AMA will increase costs substantially, at the same time there is no certainty if more benefits will be enjoyed. By referring to the assumptions, we calculate capital charge using BIA, SA and ASA. The study uses historical data from 77 rural banks over a three-year period, 2006-2008. Data was gathered from the Bank Indonesia Kediri Office.

We define gross income as total income minus interest rate expenses. It follows the definition under Basel II which defines gross income as net interest income plus net non-interest income. As rural bank operates in a very simple way, extraordinary income can be regarded as nonexistent.

For calculating Alternative Standardised Approach (ASA) we define loans and advances as total loans and advances in a gross figure. It is treated to prevent from lowering capital. This means loan losses provision that has been put aside is excluded for reducing outstanding. Another item is inter-bank placement. It means loans and advances are loan plus inter-bank placement.

This study covers 77 rural banks. On average, the asset value is IDR 10,962,474,000. The biggest bank is managing assets of IDR 59,509,393,000. The smallest bank has an asset value of IDR 951,095,000. In terms of income, the mean value is IDR 1,498,123,000 with standard deviation of IDR 1,360,262,000. The biggest income from banks under observation was IDR 7,209,937,000. The smallest bank revenue was only IDR 94,154,000.

As it is a very simple approach, the information used to estimate capital charge is three years gross income which is collected from rural banks income statements for three years. Another data is loans and advances which is collected from rural banks balance sheets. All data is three years at current price. No treatment on inflation and adjustment is affected.

Table 1 presents the gross income of the banks under investigation. Gross income (GI) is total income minus interest rate expenses. In 2006, the mean was IDR 927,795,900 and the median of GI is IDR 769,708,000. The size of rural banks varies very much. Referring to Table 1, the minimum GI for 2006 is IDR 84,927,000 and the maximum GI is IDR 4,014,839,000. However, the mean of GI for 2006 is larger than its standard deviation. For 2007, average GI is IDR 1,026,365,000. Maximum GI is IDR 4,723,340,000 and the minimum value is IDR 90,348,000. The mean is still larger than its standard deviation.

Table 1: Gross Income (IDR, 000)

	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>All</b>
Mean	927,795.9	1026,365.	1,131,893	1,028,685
Median	769,708.0	856,516.0	839,036.0	851,505
Maximum	4,014,839	4,723,340	4,757,042	4,498,407
Minimum	84,927	90,348	96,441	90,572
Std. Dev.	682,011.8	768,015.6	834,892.4	757,799.5
<b>Observations</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>

For 2008, the gross income on average was IDR 1,131,893,000. The median was IDR 839,036,000. The lowest GI was IDR 96,441,000 and the highest was IDR 4,757,042,000. Similar to the previous figure, the standard deviation is lower than the mean. On average, the mean is IDR 1,028,685,000 with the median of IDR 851,505,000. As it is the average figure from three years observation, the minimum value GI is IDR 90,572,000 and the standard deviation is IDR 757,799,500. Average data will be used further in calculations as it reflects operational risk exposure. The higher the average GI, the higher the bank exposure to operational risk will be.

Table 2 presents the loans and advances that rural banks have provided during the period of observation. Loans and advances (LAA) is defined as total gross loan and placement on inter-banks. In 2006, mean of LAA was IDR 9,054,858,000 and the median was IDR 7,514,878,000. The maximum of LAA was IDR 46,452,125,000 and the minimum LAA was IDR 855,262,000. In terms of standard deviation, the figure was IDR 7,729,370,000 meaning it is less than its mean value. For 2007, the LAA's mean was IDR 10,034,336,000 slightly higher than the mean for 2006. The median was IDR 8,200,747,000. The maximum value was IDR 54,649,559,000 and the minimum value was IDR 973,507,000. The standard deviation of LAA for 2007 was IDR 8,764,338,000 which is less than its mean value.

Table 2: Loans and Advances of Rural Banks (IDR, 000)

	2006	2007	2008	All
Mean	9,054,858.	10,034,336	11,446,657	10,178,617
Median	7,514,878.	8,200,747.	8,493,184.	7,983,958.
Maximum	46,452,125	54,649,559	51,819,785	50,973,823
Minimum	855,262	973,507	920,315	936,306
Std. Dev.	7,729,370.	8,764,338.	9,579,309	8,642,583
<b>Observations</b>	<b>77</b>	<b>77</b>	<b>77</b>	<b>77</b>

For the year 2008, the means of LAA was IDR 11,446,657,000 with the median of IDR 8,493,184,000. Maximum value of LAA for 2008 was IDR 51,819,785,000 and the minimum value was IDR 920,315,000 with the standard deviation of 9,579,309,000. This means they are slightly larger than figures in 2007. On average from 2006 to 2008, the value was IDR 10,178,617,000 and the median was slightly lower at IDR 7,983,958,000. The maximum value of LAA was IDR 50,973,823,000 and the minimum value was IDR 936,306,000. The standard deviation was slightly lower than 2008 at IDR 8,642,583,000. The average data will be used to calculate operational exposure under the Alternative Standardised Approach (ASA).

#### 4. Results

After calculating the gross income (GI) and loans and advances (LAA) for individual banks over three years, the calculation of capital charge under different methods was conducted. We used average figure of GI and LAA for calculating capital requirements as prescribed under the Basel II. Gross Income (GI) was used to calculate capital charge under the Basic Indicator Approach (BIA) and the Standardised Approach (SA). For calculating capital charge using the Alternative Standardised Approach (ASA), the loans and advances (LAA) was used.

Table 3 presents the results. On average, banks that used BIA must put additional capital to cover operational risk, as much as IDR 154,302,700. The maximum additional capital is IDR 674,761,000 and the minimum is IDR 13,585,800. The standard deviation is IDR 113,669,900. If we compare to the average asset of rural banks, IDR 10,962,474,000, it is 1.4% of assets. The additional capital is quite substantial.

On average IDR 123,442,200 should be put aside to cover operational risk when a bank chose to use the SA approach. The median value is IDR 102,180,600. This means there is a

decrease by 20% and this is very substantial. If we look at the biggest bank, the amount that must be allocated is also less than before. Under BIA, the biggest bank had to allocate IDR 674,761,000, now under the SA, they only need to put IDR 539,808,800 to cover operational risks. This means bank enjoys around 20% reduction.

Still referring to Table 3, we can see another substantial decrease when banks used the Alternative Standardised Approach (ASA). As prescribed, banks are allowed to use ASA methodology if the embedded operational risk has been considered in its costing and pricing. Basically it is similar to the Standardised Approach (SA), the only difference is on the treatment of retail and commercial banking. Gross income in this business line is replaced by loans and advances of retail and commercial business. M factor is decided at 0.035. As rural banks are retail banking, this means they are eligible to use the ASA approach.

Under the ASA, the mean of capital charge is IDR 42,750,190 and the median is IDR 33,352,620. It is much lower than the two other methods. On average banks use this method to enjoy 72% lower charges than using BIA. Compared to the SA, banks enjoy 64.3% reduction in capital charges. The biggest bank will enjoy more benefits as the capital savings is 68.1% compared to use the BIA and enjoys 60.3% compared to use the SA. The smallest banks will enjoy benefits in terms pay less capital charges to cover operational risk exposure.

Table 3: Operational Risk Exposure under Different Methods (IDR, 000)

	<b>BIA</b>	<b>SA</b>	<b>ASA</b>
Mean	154,302.7	123,442.2	42,750.19
Median	127,725.8	102,180.6	33,532.62
Maximum	674,761.0	539,808.8	214,090.1
Minimum	13,585.80	10,868.64	3, 932.485
Std. Dev.	113,669.9	90,935.94	36,298.85
Observations	77	77	77
<b>Note:</b> BIA – Basic Indicator Approach, SA – Standardised Approach, ASA – Alternative Standardised Approach			

In conclusion, banks using BIA require higher operational risk capital charge than when the Standardised Approach is applied. The lowest is banks using the ASA. This means the banks

that used Alternative Standardised Approach will have to pay less capital charges than banks that used more advanced approach. The results are in accordance to the expectation from the Basel Committee.

Looking on the wide difference in results from three different methods, it is very important to put in place the condition for rural banks that will move to more advanced methods. As the advanced method requires only 28% capital charges (enjoy 72% savings) compared to BIA, it is very important to prevent banks to exploit the benefit of using advance method merely to reduce capital burden but the operational risk management process is weak. A minimum requirement should be set up to prevent riskier banks from using the more advanced method. According to BIS publication “Sound Practices for the Management and Supervision of Operational Risk” July 2002, there are ten principles must be followed by banks and banking authority for successful operational risk management.

## **5. Conclusions**

Calculating operational risk capital charges is a relatively new idea. The recognition of this risk is especially on the regulator side after much evidence indicating the banks can collapse due to operational risk losses. The banking regulators around the world then recognize the danger of operational risk and then elaborate it in the capital charge under Pillar I of Basel II and risk management.

Although the operational risk is viable, calculating capital charges is more problematic. After following some discussion and consultative papers, Basel Committee on Banking Supervision decided on three methods to be used to calculate capital charges for operational risk. The simplest is Basic Indicator Approach (BIA). Then Standardized Approach (SA) which divides banking business into eight business lines. Banks are allowed to apply Alternative Standardized Approach (ASA) for retail banking and the commercial banking business line. The most advance method is Advance Measurement Approach (AMA). The AMA allows banks to use their own model to calculate operational capital charges upon regulator permission.

In this paper we conducted a study using BIA, SA and ASA using 77 rural banks in the Kediri area. Average asset of rural bank is IDR 10 billions. Using BIA, we found that the average capital charge required to cover operational risk is IDR 154 million (1.5% of asset). When the calculation is conducted using the SA method, we found, on average a requirement of IDR 123 million (1.23% of asset). When the calculation is conducted using the Alternative Standardised Approach, the capital required was IDR 43 million (0.43% of asset).

The result provides evidence that banks using more advance model require less capital charge. This implies that banks using relatively more advanced methods get benefits in terms of paying less capital charge. It is in accordance to the BCBS principle that banks should use more advanced methods to enjoy the benefits of capital requirement savings. However results provide evidence that regulator must impose the minimum standard to prevent banks from just evading from higher capital. A minimum requirement to use the more advanced method should be imposed at least audit on the operational management function. Regulatory rating

of bank management soundness may be implemented to prevent risky banks from putting less capital charge for operational risk.

This study is without its limitations. First, we should incorporate more years but since this is our first study, three years are considered appropriate. Second, comparison should also be taken into consideration with other rural banks for example in the Philippines. Further research should be carried out to take into consideration a wider scope and cover more years.

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## **LIST OF ACRONYMS**

<b>ASA</b>	Alternative Standardised Approach
<b>AMA</b>	Advanced Management Approach
<b>BCBS</b>	Basle Committee on Banking Supervision
<b>BIA</b>	Basic Indicator Approach
<b>BIS</b>	Bank of International Settlements
<b>BPR</b>	People Credit Banks (Bank Perkreditan Rakyat)
<b>GDP</b>	Gross Domestic Product
<b>IDR</b>	Indonesian Rupiahs
<b>LAA</b>	Loans and Advances
<b>GI</b>	Gross Income
<b>SA</b>	Standardised Approach