





Research article

An Analysis of the Soundness of Sharia State-Own Enterprises (SOE) Bank Before Merger to Bsi by using the Rgec Method

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Abstract.

The sound level of a bank is an important aspect that stakeholders must know about. A bank soundness assessment will be useful in implementing good corporate governance and for dealing with future risks. The purpose of this study was to determine the soundness level of a Sharia BUMN bank before the BSI merger with the RGEC method. This study uses a quantitative approach. Sources of research data are the financial statements of the Bank Rakyat Indonesia Syariah, Bank Negara Indonesia Syariah, and Bank Mandiri Syariah for the period 2016-2019. The data analysis used in this study is a quantitative descriptive analysis using the RGEC method (Risk Profile, Good Corporate Governance, Earnings, Capital). The results of his research analysis of the health level using the RGEC method, the conclusion is that three banks consisting of Bank Negara Indonesia Syariah (BNI Syariah), Bank Rakyat Indonesia Syariah (BRIS), and Bank Mandiri Syariah are in the healthy category seen from the Risk Profile aspect as measured by NPF and FDR of three banks are in the healthy category. Aspects of Good Corporate Governance, the three banks are in good health as well. The Earnings aspect as measured by ROA and ROE shows that the three banks are also in a healthy condition and the last is the capital aspect as measured by CAR shows that the three banks are in a healthy category.

Keywords: Health Level; RGEC; Islamic Bank

1. Introduction

The progress of Islamic banks in Indonesia has entered the third decade which was initiated by the pioneering of the first Islamic bank in 1992, namely Bank Muamalat Indonesia (BMI). This is inseparable from the good prospects in the Islamic finance sector, especially Islamic banking in Indonesia. Islamic banks are proven to have strong resilience in the face of the financial crises of 1998 and 2008. Evidently, Islamic banks have the potential in facing financial crises in 1998 and 2008. It can stable and provide profits, also convenient for their customers. Inspired by the resilience of Bank Muamalat in facing the 1998 crisis, was established Bank Syariah Mandiri (BSM) was the second Islamic bank in Indonesia. Then, the establishment of other Islamic banks, such as Bank

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Rakyat Indonesia Syariah and Bank Negara Indonesia Syariah, has begun. According to data, Islamic banks in Indonesia continue rapid growth every year. In the period 2014-2018, Islamic banking was able to record a Compounded Annual Growth Rate (CAGR) of 15 percent, higher than the national banking industry which recorded a CAGR of 10 percent in the same period. Currently, the number of Islamic bank customers has reached 31.89 million people, or about 12 percent of the total Muslim population in Indonesia (1).

The development of Islamic banking in Indonesia continuously. Indications of the development of the Islamic finance industry are characterized by three important factors. First, the increasing amount of Islamic financial institutions both in products, services, also the infrastructure for Islamic finance. Based on the 2019 Financial Services Authority (OJK) data release, total Islamic financial assets reached USD 94.44 billion with a market share of 8.29 percent. Second, the issuance of Sovereign Green Sukuk was issued by Indonesia. In early 2019, through this product, Indonesia could raise up to USD2 billion. Third, in 2019 Islamic Finance Country Index (IFCI) has been awarded based on the 2019 Global Islamic Finance Report (GIFR) released by the Cambridge Institute of Islamic Finance (Cambridge-IIF) in the UK. Our country surpasses 48 countries with a total of 81.93 points.

This ranking is based on several indicators including the total number of Sharia Commercial Banks, Sharia Business Units, BPRS, and non-bank financial institutions as well as the level of effectiveness of supervision carried out by the National Sharia Council (DSN) - Indonesian Ulema Council (MUI). until 2019, the Financial Services Authority (OJK) release that the number of Islamic banks in Indonesia was 189 Islamic banks consisting of 14 Sharia Commercial Banks (BUS), 20 Sharia Business Units (UUS), and 164 Sharia Public's Financing Banks (BPRS). The number of sharia banking customers is small considering that the total Muslim population in Indonesia reaches 227 million people or 87 percent of the total population of Indonesia. It means that the market share of Islamic banking assets is still low, which is 6.01 percent (2).

The result of the OJK (Financial Services Authority) survey in 2019 represents that the market share of Islamic banking in Indonesia is still low when compared to other countries such as Malaysia (28 percent). That is due to several things, such as a low level of Islamic financial literacy (8,93 percent) that affects the low level of Islamic financial inclusion (9.1 percent). To amplify the fundamentally of Islamic banking, the government merged three state-owned banks. In addition, President Joko Widodo emphasized that the establishment of Islamic banks is one of the government's efforts to strengthen the Islamic finance industry in Indonesia (3). Bank soundness is an important aspect known **KnE Social Sciences**



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by stakeholders. The bank soundness assessment will be useful in implementing good corporate governance to face the risks in the future (PBI No.13/1/PBI/2011). Especially for stakeholders, the assessment of the soundness of the bank will give a signal in making investment decisions. The higher soundness of the bank affects the higher stock price

investment decisions. The higher soundness of the bank affects the higher stock price of the bank in the stock market. The assessment of bank soundness is analyzed by financial statements. Financial statements are providing financial information as material for consideration in decision-making by interested parties. From the financial statements, it will be known how the condition of the bank, especially on the level of health (4).

In simple terms, it can be concluded that a healthy bank is a bank that can carry out its functions well, an assessment of the health of the bank is very important because the bank manages funds from the public entrusted to the bank. In other words, a healthy bank is a bank that can maintain public trust, can carry out the intermediation function, can help payment flow, and can be used by the government in implementing various policies, especially monetary policy. Bank Indonesia as the central bank has an important role in regulating the development of banking both with sharia and conventional systems. Formulating and regulating the latest policies in accordance with global economic conditions, it is expected that banks (between Islamic and conventional banking) have good performance, so they can compete at the national banking market in Indonesia with healthy bank criteria (5). For this reason, Bank Indonesia stipulates a provision that must be fulfilled and implemented by banking institutions, namely based on the Decree of the Board of Directors of Bank Indonesia No. 30/12/KEP/DIR and Bank Indonesia circular letter No. 30/3/UPPB dated 30 April 1997 concerning Procedures for Assessment of Bank Indonesia's Soundness Level. The assessment is carried out by qualifying several components of each factor, namely the components of Capital (Capital), Assets (Assets), Management, Earnings (Rentability), Liguidity or called CAMEL. In addition, there is the sensitivity of market or called CAMELS based on Bank Indonesia circular letter number 6/23/DPNP of 2000 (4).

Then based on PBI No.13/1/PBI/2011 concerning the Assessment of Bank soundness individually using the risk approach (Risk-Based Bank Rating) as referred to Article 2 Paragraph (3), with an assessment scope of 4 factors, these factors are: risk profile factor (bank risk), Good Corporate Governance (GCG), factor, earnings factor (profitability) and capital factor (capital) or called RGEC. Each factor provides assessment results from various sides and points of view in Islamic banking. This can provide an overview of the overall banking condition from several aspects measured. In PBI No. 13/1/PBI/2011 Regarding Commercial Bank Soundness Assessment Article 7 paragraph 1 assessment of the risk, profile factors referred to article 6 letter a, namely: credit risk, market risk,



liquidity risk, operational risk, legal risk, reputation risk, strategic risk, compliance risk. Each risk is measured using different methods and assessments (6). Based on the background above, the purpose of this study is to find out how the soundness of Islamic state-owned banks before the BSI merger with the RGEC method.

2. Research Method

This study uses a quantitative approach, the type of research is descriptive analysis. The research data sources are the financial statements of Bank Rakyat Indonesia Syariah, Bank Negara Indonesia Syariah, and Bank Mandiri Syariah for the 2016-2019 period. The data collection technique uses the documentation method. Analysis of the data used in this study is descriptive quantitative analysis with the RGEC method (Risk Profile, Good Corporate Governance, Earnings, Capital).

3. Literature Review

3.1. Financial Statement Analysis

Financial statement analysis is a report that describes financial statement items into smaller units of information and notices the significant or meaningful relationships with another between quantitative and non-quantitative data with the aim of knowing financial conditions which are very important in producing the right decision (7).

3.2. Bank

The bank is a financial institution with funds activities, such collect and distributing funds from the public to the public and providing other banking services. While the definition of a financial institution is any company engaged in finance where its activities are only to collect funds or only to distribute funds or both (8).

3.3. Bank Soundness

The more integrated of financial system not only has an impact on the number of transactions, but also the types. Whatever type of financial activity will ultimately lead to a financial transaction that is executed through banking. Therefore, if the banking sector is not managed properly, it will destroy its credibility as an institution of trust



(9). The soundness of a bank is one of the most important benchmarks for a bank's financial performance today, because of this assessment can performance the owner and thebank manager's professionalism. There are several parties who need the results of the assessment of the soundness of the bank, namely: bank management (Board of Commissioners, Board of Directors, Owners), customers of bank services, Bank Indonesia (as the supervisor and supervisor of the Bank), Counterparty Bank (there is a correspondence relationship) (10).

3.4. RGEC method

The RGEC method is a development of the previous method, namely CAMELS. In the RGEC method, there are inherent risks and the implementation of quality risk management in bank operations which is carried out on eight (8) factors, namely, credit risk, market risk, liquidity risk, operational risk, legal risk, strategic risk, compliance risk, and reputation risk. Management in the CAMELS method was changed to Good Corporate Governance (6).

4. Result and Discussion

4.1. Risk Profile

Based on PBI Number 13/1/PBI/2011 concerning the Rating of Commercial Bank Soundness Article 7 contains an assessment of the risk profile of eight types of risk, namely: credit risk, market risk, liquidity risk, operational risk, legal risk, strategic risk, risk compliance, and reputation risk. Non-Performing Financing (NPF):

$$NPF = \frac{Trouble \ Financing}{Total \ Financing}(1)$$

This financial ratio explains that NPF is obtained from non-performing financing, namely financing to third parties (non-bank) which are classified as non-current, doubtful, and stuck fast divided by the total financing to third parties (non-banks). In other words, if this ratio is high, the quality of Islamic bank financing is low. Islamic banks with high NPF will increase the cost of productive assets and other costs, so it has the bank disadvantage potential. The high NPF is the same as the high amount of debtor who does not provide their obligations (a form of margin or profit-sharing) to creditors, so it has to reduce income and CAR potential.





The following are the result of NPF calculation on Bank Negara Indonesia Syariah (BNI Syariah), Bank Rakyat Indonesia (BRIS) and Bank Mandiri Syariah from 2016 to 2019:

TABLE 1: NPF Calculation on BNI Syariah, BRIS and Mandiri Syariah 2016-2019.

YEAR	BNI Syariah	BRIS	Mandiri Syariah
2016	2.94%	3.19%	4.92%
2017	2.89%	4.72%	4.53%
2018	1.52%	4.97%	1.56%
2019	1.44%	3.38%	1.00%

Source: researcher, 2021



Figure 1

From the results of the calculation of the NPF ratio, it can be seen that BNI Syariah Bank has an NPF value ranging from (2% - 5%) > 5%, which indicates that BNI Syariah Bank is in the very good category. In 2016 Bank BNI Syariah had the highest NPF of 2.94% while the lowest NPF value was 1.44%. Furthermore, the results of the NPF calculation on BRIS are on average 4% or >5%, which indicates that BRIS is included in the good category. In 2018 BRIS had the highest NPF value of 4.97% while in 2016 BRIS had the lowest NPF value of 3.19%. Meanwhile, the results of the NPF calculation at Bank Mandiri Syariah are around 4%. this also indicates that Bank Mandiri Syariah is in a good category. Bank Mandiri Syariah had the highest NPF value in 2016 of 4.92% and had the lowest NPF value in 2019 of 1.00%. Thus, the three banks consisting of Bank



Negara Indonesia Syariah, Bank Rakyat Indonesia Syariah, and Bank Mandiri Syariah are in a good category because the average NPF value is below 5%. This indicates that the number of non-performing financing at the three banks has been well resolved (4).

4.2. Financing Deposit Ratio (FDR)

$$FDR = \frac{Total \ Financing}{Total \ Third \ Party \ Funds} (2)$$

This financial ratio is used to assess the liquidity of a bank by comparing the total financing provided by the bank with the total third-party funds. The high level of FDR ratio indicates that the growth of financing at the bank is higher than the growth of the source of funds, namely third-party funds. It is feared that the high level of FDR could disrupt the fund distribution activities due to the unavailability of funds that can be distributed to customers. The following are the result of FDR calculation on Bank Negara Indonesia Syariah (BNI Syariah), Bank Rakyat Indonesia (BRIS) and Bank Mandiri Syariah from 2016 to 2019:

TABLE 2: FDR Calculation on BNI Syariah	, BRIS and Mandiri Syariah 2016-2019.
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YEAR	BNI Syariah	BRIS	Mandiri Syariah
2016	84.57%	81.47%	79.46%
2017	80.21%	71.87%	77.77%
2018	79.62%	75.49%	77.25%
2019	74.31%	80.12%	75.54%

Source: researcher, 2021

From the results of the calculation of the FDR ratio, it can be seen that BNI Syariah Bank has an FDR value ranging from 70%-80%, which indicates that BNI Syariah Bank is in a good category. In 2016 Bank BNI Syariah had the highest FDR of 84.57% while the lowest FDR value was 74.31%. Furthermore, the results of the FDR calculation on BRI are average 70-80%, which indicates that BRIS is included in the very good category. In 2016 BRIS had the highest FDR value of 81.47% while in 2017 BRIS had the lowest FDR value of 71.87%. Meanwhile, the results of the FDR calculation on Bank Mandiri Syariah are around 70%. This also indicates that Bank Mandiri Syariah is in the very good category. Bank Mandiri Syariah had the highest FDR value in 2016 of 79.46% and had the lowest FDR value in 2018 of 77.25%. Thus, three banks consisting of Bank Negara Indonesia Syariah, Bank Rakyat Indonesia Syariah, and Bank Mandiri Syariah are in a good category because the average FDR value is below 70%. This indicates that the growth of financing at the bank is higher than the growth of the source of funds, namely third-party funds (4).



Figure 2

4.3. Good Corporate Governance

The assessment of the GCG factor is based on PBI No. 13/1/PBI/2011 concerning the Assessment of the Soundness of Commercial Banks, by using an assessment of the implementation of the duties and responsibilities of the board of commissioners, the implementation of the duties and responsibilities of the board of directors, the completeness and implementation of committee duties, handling conflicts of interest, implementation of functions bank compliance, implementation of internal audit function, implementation of external audit function, risk management function including internal control system, provision of funds to parties and large debtors, transparency of financial and non-financial conditions, reports on GCG implementation and internal reporting, and bank strategic plans. The following are the GCG results of Bank Negara Indonesia Syariah (BNI Syariah), Bank Rakyat Indonesia (BRIS) and Bank Mandiri Syariah from 2016 to 2019:

Based on the results of self-assessment calculations carried out by the company, the lowest average value of good corporate governance is Bank Mandiri Syariah then BRI Syariah, and BNI Syariah. This can increase the efficiency, effectiveness, and sustainability of an organization, and increase the legitimacy of an organization that managed free-for-all, fair and accountable manner, based on well Good Corporate Governance implementation.



YEAR	BNI Syariah	BRIS	Mandiri Syariah
2016	2	1.60	1
2017	2	1.60	1
2018	2	1.54	1
2019	2	1.94	1

TABLE 3: GCG on BNI Syariah, BRIS and Mandiri Syariah 2016-2019.

Source: researchers, 2021

4.4. Earnings

Earning or commonly called profitability is the bank's effort to generate profits. A bank with a good condition has an increasing level of profitability. This assessment is proportioned by ROA and ROE (5).

a) Return On Assets (ROA)

ROA = Profit before tax total assets(3)

The high ROA is the same as the high level of profit achieved by the bank, so in other words, the ability of a bank in a problematic condition is smaller. A higher ratio of ROA indicates that the company is more effective in managing its assets and more productive in generating a larger amount of net profit. ROA analysis will be very useful for companies that have competitors in the same industry. Then, different industries will use different assets in carrying out their operations. However, the same industry is likely to use the same assets as well. Ideally, the higher ROA means a better assumption of the company's performance in terms of asset management. However, to find out a good ROA value there is no specific standard. One way to determine a company's ROA is used comparing ROA between similar companies or the industry sectors of its company (4).

TABLE 4: ROA Calculation on BNI Syariah, BRIS and Mandiri Syariah 2016-2019.

YEAR	BNI Syariah	BRIS	Mandiri Syariah
2016	1.44%	0.95%	0.55%
2017	1.31%	0.51%	0.55%
2018	1.42%	0.43%	0.88%
2019	1.82%	0.31%	1.89%

Source: researcher, 2021

From the results of the calculation of the ROA ratio, it can be seen that the ROA value of BNI is around 1% and above, which indicates that BNI Syariah Bank is in a quite healthy



Figure 3

category. In 2019 BNI Syariah had the highest ROA of 1.82% while the lowest ROA value was 1.31% in 2017. Furthermore, the results of the calculation of ROA on BRIS average 0% and above, which indicates that BRIS is included in the quite healthy category. In 2016 BRIS had the highest ROA value, while in 2019 BRIS had the lowest ROA. While the results of the calculation of ROA on Bank Mandiri Syariah are in the range of 1% and below, this also indicates that Bank Mandiri Syariah is in the quite healthy category. Bank Mandiri Syariah had the highest ROA in 2019 and the lowest ROA in 2016 and 2017.

b) Return On Equity (ROE)

ROE is a ratio to measure a bank's ability to obtain net finances with dividend payments. This ratio is formulated by (5):

$$ROE = \frac{Profit\ after\ tax}{Own\ Capital} x100\%(4)$$

ROE is a ratio calculation that shows the company's ability to generate net income by using its own capital and generating net income available to owners or investors. This ratio indicates the power to generate a return on investment based on the book value of shareholders and is often used in comparing two or more companies for good investment opportunities and cost-effective management. ROE is very attractive for holders or prospective shareholders and also for management, because this ratio is an important measure or indicator of shareholder value creation, in other words, the



high ROE ratio is the same as high the company value, this is certainly an attraction for investors to invest in the company (4).

YEAR	BNI Syariah	BRIS	Mandiri Syariah
2016	11.94%	7.40%	5.08%
2017	11.42%	4.10%	4.99%
2018	10.53%	2.49%	8.21%
2019	13.54%	1.57%	15.65%

TABLE 5: ROE Calculation on BNI Syariah, BRIS and Mandiri Syariah 2016-2019.

Source: researcher, 2021



From the results of the calculation of the ROE ratio, it can be seen that the ROE value on BNI Syariah is around 10% and above, which indicates that BNI Syariah is in the healthy category. In 2019 BNI Syariah Bank had the highest ROE of 13.54% while the lowest ROE value was 10.53% in 2018. Furthermore, the results of the ROE calculation on BRIS average 7% below this indicates that BRIS is included in the healthy category. In 2016 BRIS had the highest ROE value, while in 2018 BRIS had the lowest ROE. While the results of the ROE calculation on Bank Mandiri Syariah are around 10% and below, this also indicates that Bank Mandiri Syariah is in the healthy category. Bank Mandiri Syariah had the highest ROE value in 2019 and had the lowest ROE value in 2017.



4.5. Capital

The function of CAR is to determine the bank's ability to fulfill capital reserves and to manage its capital. The formula for calculating CAR is as follows:

$$CAR = \frac{Modal \ of \ Bank}{Total \ of \ ATMR}(5)$$

The following are the result of CAR calculation on Bank Negara Indonesia Syariah (BNI Syariah), Bank Rakyat Indonesia (BRIS) and Bank Mandiri Syariah from 2016 to 2019:

YEAR	BNI Syariah	BRIS	Mandiri Syariah
2016	14.19%	20.63%	14.01%
2017	20.10%	20.29%	15.89%
2018	19.24%	29.73%	16.26%
2019	18.88%	25.26%	16.15%

TABLE 6: CAR Calculation on BNI Syariah, BRIS and Mandiri Syariah 2016-2019.

Source: researcher, 2021

From the results of the calculation of the CAR ratio, it can be seen that BNI Syariah has a CAR value ranging 14% - 20% > 8%, which indicates that BNI Syariah is in the healthy category. In 2017, Bank BNI Syariah had the highest CAR of 20.10% while the lowest CAR value was 14.19%. Furthermore, the results of the CAR calculation on BRIS averaged 20% and above, this indicates that BRIS is included in the healthy category. In 2018 BRIS had the highest CAR value of 29.73% while in 2017 BRIS had a low CAR value of 20.29%. While the results of the calculation of CAR on Bank Mandiri Syariah ranged in number (14% - 16%) > 8%, this also indicates that BANK Mandiri Syariah is in the healthy category. Bank Mandiri Syariah had the highest CAR value in 2018 of 16.26% and had the lowest CAR value in 2016 of 14.01%. Thus, three banks consisting of Bank Negara Indonesia Syariah, Bank Rakyat Indonesia Syariah, and Bank Mandiri Syariah in provide funds for business development as well as accommodate the possible risk of losses cause the Bank's operations are in good categorized. This is because the good CAR ratio is 2016 to 2019 is still above the determined government criteria, which is 8%, so this value is included in the healthy category (4).



5. Conclusion

Based on the description of the analysis of the level of soundness by using the RGEC method, the conclusion is that three banks consisting of Bank Negara Indonesia Syariah (BNI Syariah), Bank Rakyat Indonesia Syariah (BRIS), and Bank Mandiri Syariah are in the healthy category observed from the Risk Profile aspect as measured by The NPF and FDR of the three banks are in the healthy category. Aspects of Good Corporate Governance of three banks are in the healthy category. The Earnings aspect as measured by ROA and ROE shows that the three banks are also in a healthy category and the last is the capital aspect as measured by CAR shows that the three banks are in a healthy category.

References

- [1] BPS. Penduduk Menurut Wilayah dan Agama yang Dianut [Internet]. 2020. Available from: https://sp2010.bps.go.id/index.php/site/tabel?Tid=321
- [2] Mannan MA. Ekonomi Islam Teori dan Praktek Dasar-dasar Ekonomi Islam. Yogyakarta: Dana Bhakti Wakaf; 1993.
- [3] Budiman A. Kapitalisme Ekonomi Syariah [Internet]. Vol. 1, An-Nisbah: Jurnal Ekonomi Syariah. IAIN Tulungagung; 2014. **Available** from: http://dx.doi.org/10.21274/an.2014.1.1.47-71
- [4] Realita TN, Anggoro Y. Menakar Urgensi Komersialisasi Aset Wakaf Dalam Upaya Meningkatkan Nilai Manfaat Aset Wakaf. Semin Nas ... [Internet]. 2019;37-45. Available from: http://ojs.senmea.fe.unpkediri.ac.id/index.php/senmea/article/view/15
- [5] Maghfira Maulidia Putri, Tanjung H, Hakiem H. Strategi implementasi pengelolaan cash waqf linked suku k dalam mendukung pembangunan ekonomi umat: pendekatan analytic network process (anp). Al-infaq J Ekon Islam. 2020;11(2):204-25.
- [6] KEMENKEU D. Apa itu Cash Waqf Linked Sukuk? 2020; Available from: https://www.youtube.com/watch?V=E8HB7njmQ84&list=UU13ONe5X-Wem6M3vzz4jew
- [7] Hiyanti H, Fitrijanti T, ... Pengaruh literasi dan religiusitas terhadap intensi berwakaf pada cash waqf linked sukuk. J ilm mea ... [Internet]. 2020; Available from: http://journal.stiemb.ac.id/index.php/mea/article/view/440
- [8] Arikunto S. Prosedur Penelitian. 2010;



- [9] Kominfo. Kominfo: Pengguna Internet di Indonesia 63 Juta Orang [Internet]. 2021. Available from: https://kominfo.go.id/index.php/content/detail/3415/kominfo+{%}3A+ pengguna+internet+di+indonesia+63+juta+orang/0/berita_satker
- [10] Setiadi A. Pemanfaatan media sosial untuk efektifitas komunikasi. J Hum [Internet]. 2016;16(2):1–7. Available from: https://ejournal.bsi.ac.id/ejurnal/index.php/cakrawala/article/download/1283/1055
- [11] Utomo DA. Motif Pengguna Jejaring Sosial Google + Di Indonesia. E-Komunikasi. 2013;1(3):147–56.
- [12] Dennis, Alan. Systems Analysis and Design with UML –3rd Edition. John Wiley & Sons, Inc.; 2009.