Determinants of Banking Efficiency: Technical Review, Allocations and Costs in Indonesian Sharia Business throughout 2011-2020

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Abstract

The high value of Operating Expenses and Operating Income (BOPO) is an important problem to be controlled immediately because if this trend is not controlled, it will be very unconducive to the overall performance of Islamic banks in the long term. This research explores Banking Efficiency in each of Technical Efficiency, Allocation Efficiency, and Cost Efficiency, and the perspective of the factors that influence them regarding Governance, Risk, and Compliance (GRC), Gross Domestic Product (GDP), and Inflation. This research uses a quantitative approach with two methods: the DEA method and regression. The research results show that the Sharia Business Efficiency Level, which varies over 10 years, is influenced by Governance, Risk, and Compliance (GRC). However, GDP and Inflation also influence the Efficiency Level simultaneously. It is hoped that the results of this research can be a reference in comprehensively evaluating Indonesia's Gross Domestic Product (GDP) for 10 years, so that it can show a more complex and reflective representation of Sharia banking efficiency for the long-term development of the Sharia economy through Sharia businesses.

Keywords: Efficiency, Governance, Risk and Compliance (GRC), Gross Domestic Product (GDP), Inflation.

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Introduction

The high growth in Sharia banking assets is supported by an increase in Sharia bank capital, sufficient liquidity, improvements in the quality of financing, efficiency levels, profitability of Sharia banks, and, most importantly, supported growth in fund collection and distribution of funds managed by Sharia banks. The average BOPO on 12 BUS each year in the 2014-2019 period is always high, which means the average performance of BUS could be more efficient. The lowest average BOPO was 89,635 (in 2019), and the highest was 110,647 (in 2017). The annual average BOPO in the six years was 99.454%, almost close to 100%. It means that BUS management's ability to control operational costs towards operational income is relatively low. The phenomenon of high BOPO values on BUS is an important problem to be controlled immediately because if this trend is not controlled immediately, it will be very unconducive to the overall performance of Sharia banks in the long term. Therefore, it is significant to carry out a more in-depth study regarding the efficiency of Islamic banks. The efficiency of Islamic banks in producing productivity is important because measuring efficiency will be a balance between measuring the output elements produced and the input elements issued to produce that output. Anagnostopoulos et al. (2020) formulated a measure of efficiency by dividing output by input. The sum of the output weights divided by the sum of the input weights. Efficiency is a performance measure that describes a bank's ability to manage input to obtain output. In the process of measuring efficiency, banks will face conditions on how to obtain optimal output with the available input. There are three general concepts for measuring efficiency: technical efficiency, allocative efficiency, and cost efficiency (Batir et al., 2017; Hardianto & Wulandari, 2016).

Of course, the factors that influence the efficiency of Sharia banking must be distinct from assessing the soundness level of Sharia banking. According to the Financial Services Authority (OJK) Regulation Number 8/POJK.03/2014 concerning the Assessment of the Soundness Level of Sharia Commercial Banks and Sharia Business Units, it is explained that the assessment of the bank's soundness level is carried out using the Risk-based Bank Rating (RBBR) approach. Based on the theory above, this research uses independent variables, namely Governance, Risk and Compliance (GRC), which influence efficiency; this is because the Governance, Risk and Compliance (GRC) variables are still rarely used and are the latest issues compiled by GRC The Indonesian Forum collaborates with the OJK in 2020. Apart from that, Governance, Risk and Compliance (GRC) is one of the assessments of the health level of Islamic banks, so that it automatically influences the efficiency level of an Islamic bank itself. The Governance, Risk, and Compliance Excellence Model (GRC Excellence Model) was prepared by GRC Forum Indonesia in collaboration with OJK in 2020. The aim is to encourage organisations to develop professional and

responsible organisational management practices through implementing good governance, risk management, and compliance. Better. The GRC Excellence Model is the ideal GRC condition that an organisation has to ensure that organisational goals are achieved optimally.

Regarding efficiency measurements, as well as data analysis techniques, there are variations in various studies. For example, research by Rahman & Rosman (2013), as well as Islamic research conducted by Rahman & Hasan (2013), only used one efficiency parameter, namely Technical Efficiency (TE). Research by Alqahtani et al. (2017) only uses two measurements for sharia banking efficiency, namely cost efficiency and profit efficiency. Research by Sufian et al. (2008) and research by Aghimien et al. (2016) tend to be more complete because they use three efficiency measurement tools at once, namely Technical Efficiency (TE), Pure Technical Efficiency (PTE), and Scale Efficiency (SE). The research results show that PTE and SE are potential factors that influence the efficiency of Islamic banks. Research by Beck et al. (2013) and Hardianto & Wulandari (2016) only uses one measure of efficiency, namely cost efficiency (CE). Based on this research gap, the state-of-the-art (SOTA) and, at the same time, research novelty in terms of efficiency measurement aspects is to use complete banking efficiency measurements, namely TE, and PTE, and SE all at once, with an alternative efficiency measurement that is a combination of Technical Efficiency (TE), Allocative Efficiency (AE), and Cost Efficiency (CE) (Batir et al., 2017).

There are three independent variables, which are three indicators of efficiency values, which are the results of efficiency studies, namely Technical Efficiency (TE) (Y1), which is a measure of the proportional reduction in input use that can be obtained if the bank operates efficiently. TE reflects the bank's ability to produce output with several available inputs. Allocative Efficiency (AE) (Y2) measures the proportional cost reduction when a bank selects the right mix of inputs. AE reflects the bank's ability to optimise the use of its inputs with its pricing structure and production technology. Cost Efficiency (CE) (Y3) measures the proportional cost reduction that can be obtained if the bank is technically and allocationally efficient. Cost efficiency is the product of Technical Efficiency (TE) and Allocation Efficiency (AE), with the equation CE = AE*TE (Batir et al., 2017). There are independent variables divided into one internal independent variable, namely GRC (Governance et al.). Governance is a company's effort to create a conducive pattern of relationships between stakeholders in the company. A risk is an event with the potential for negative effects arising from an action either currently or in the future. Sharia compliance is an absolute requirement that must be fulfilled by financial institutions that carry out business activities based on Sharia principles (Hidayah et al., 2020). Based on the background and problem identification, the problem of this research is regarding measuring the efficiency of Sharia Commercial Banks (BUS) and Sharia Business Units (UUS), the level of efficiency between UUS and BUS, the factors that play a role in influencing the level of efficiency of UUS and BUS in 10 year period (2011-2020). This research aims to explore, among other things:

1.) How high are BUS and UUS's cost, allocation and technical efficiency levels nationally in the 2011-2020 period? 2.) Is there an influence of GRC (Governance, Risk, Compliance), GDP, and inflation partially and simultaneously (together) on the efficiency of national BUS and UUS in the 2011-2020 period?

Literature Review

Signaling Theory

Signaling theory focuses on reducing information asymmetry between two parties (individuals or organisations) with different access to information. It describes how behaviour occurs when both parties access different information (Connelly et al., 2011). Similar to communication theory, the signal theory has main actors (signaler and receiver), signal elements, and feedback that the receiver may provide to the signaler and signal environment.

Middle Range Theory

Academics have long initiated the philosophical-theoretical concept of sharia accounting. For example, Gambling and Karim (1991) created a balance sheet based on Chamber's Continuously Contemporary Accounting. Then came the design of Islamic Corporate Reports (ICRs) by Baydon and Willet (1994). The ICR's concept includes a cash flow statement, current value balance sheet, and value-added statement (VAS). According to Mulawarman et al. (2007), specifically regarding profit and loss reports, what is more suitable for Islamic accounting is VAS because VAS tends to apply the principles of social and environmental accountability. Through VAS, information on the company's net profit is obtained as the company's value-added (VA), but is distributed fairly to the groups involved in forming the VA with the company. The VAS model from Baydoun and Willet (1994) is presented in. However, the VAS model from Baydoun and Willet (1994) was criticised by Hameed and Yahya (2003) as being considered inadequate as Islamic accounting information. The new VAS considers distribution aspects of economic resources, but still needs to provide space for halal considerations. Triyuwono (2012) states that VAS is yet to be based on the shari'ate enterprise theory. Apart from that, according to Triyowono (2012), in the company's investment process, to meet its capital adequacy, in the VAS model, a form of additional capital cost appears, which is related to the time value of money concept, which means interest. Starting from the US model, which is not yet fully syar'i, Triyuwono (2012) introduced the shari'a value added statement (SVAS) model, which in accounting practice is more in line with Islamic values and the objectives of shari'ah (maqasid al-shariah).

Sharia Enterprise Theory (SET)

Before discussing Sharia enterprise theory, the researcher explains

several capitalist accounting theories because capitalist accounting theory is inseparable from Sharia accounting. Regarding Iwan Triyuwono's initial thoughts, first look at capitalist accounting theory from an Islamic perspective, namely as follows:

Proprietary theory

According to Isgiyarta (2009), the proprietary theory is that the business or company is an extension of the owner. In this concept, assets represent the owner's property, and liabilities are debts the owner must bear. Isgiyarta further explained that in proprietary theory, the company belongs to shareholders, so the debt position will reduce the company's wealth, and interest is treated as a business expense. Meanwhile, according to Harahap et al. (2010), the proprietary theory is considered an agent, representative, wakalah, or assignment from the entrepreneur or owner. Therefore, the proprietor (owner) is the center of attention that will be served by accounting information, described in the implementation of accounting records and presentation of financial reports. From the definitions above, it can be understood that the concept of proprietary theory is an ownership concept where ownership is prioritised; in this concept, the distribution of profits is also based on ownership of assets owned in a company. This theory emphasises the nature of changes in ownership and their classification in the balance sheet. This theory is more appropriately applied in companies with sole ownership or partnerships. This theory is the most ancient accounting theory and has many concepts.

Entity Theory

This theory assumes that companies have a separate existence. This separation occurs in the interests of the owner and other equity holders. The founders and owners of the company do not need to be identified with the existence of the company. Entity theory emphasises the concepts of stewardship and accountability, where businesses care about the level of business continuity and business financial information for equity owners to fulfil legal needs and maintain a good relationship with these equity holders in the hope of easily obtaining funds in the future. (Triyuwono, 2012). Islam views these two theories as imperfect to serve as a forum for stakeholders because they are still influenced by property and wealth rights. Individual and group owners are very important parties and influence the company's sustainability.

In simple terms, stakeholders are parties interested in the company, either directly or indirectly. The theories above cannot be applied in Sharia-based financial institutions. Therefore, it is necessary to perfect accounting theories that are based on Islamic views. Further discussion of enterprise theory states that a company is influenced by direct and indirect parties who have an important role in the company's sustainability. This theory has a broader meaning than the

previous theory because, from an accounting perspective, the responsibility for financial reporting in the company will be conveyed to shareholders, creditors, and the community group as a whole (stakeholders).

The Effect of Governance, Risk, Compliance (GRC) on Efficiency

Terms and definitions are intended to ensure that the terms and definitions used in various sources are clear. The following are several terms and definitions of the GRC Excellence Model adopted (GRC Forum Indonesia, 2020). According to OCEG (Open Compliance & Ethics Group), governance is actions that direct, control, and evaluate an entity, process, or resource externally. According to ISO 31000:2018, risk is the impact of uncertainty on achieving objectives (goals) or, in other words, deviation from what is expected, which can be positive and negative. In an organisation, risks are not always negative, but risks must be faced so that they do not create additional risks. The way to deal with risk is to identify, analyse, and evaluate whether the risk should be overcome or managed. According to OCEG, Compliance is the ability to prove compliance with applicable requirements, rules, and laws.

The concept of efficiency originates from production theory. Koutsoyiannis (1979), in his book Modern Microeconomics, stated that the production function explains the technical correlation between input and output factors. The production function describes transforming input into output in a certain period. Production is the change of two or more inputs (resources) into one or more outputs (production). It means that production is an activity that converts input into output (Herlambang, 2002). Production activities are combining various inputs or inputs to produce output. This activity in economics is called the production function.

Governance, risk and compliance (GRC) activities are fundamentally interconnected, and by establishing common, integrated disciplines around regulations, policies, risks, controls and issues, relying on a common set of information, methodologies, processes and technologies, leading organizations have demonstrated that they can make better use of information, improve operational efficiency, and provide greater transparency to legal, regulatory, operational, and overall business risks (Pertiwi & Muslih, 2023; Accelus, 2012). Governance, Risk, and Compliance is a combination of three concepts that work together to adjust the facts of activities throughout the company to function more effectively and efficiently (Maulana & Iradianty, 2022). If a company does not apply the GRC concept without integrity, it will cause weak coordination and lead to inefficiency in managing costs, which will have an impact on the company's performance. On the other hand, if its implementation is integrated, it can be a company resolution for weak qualifications in various industries and other commodities to support the country's economy and boost the company's performance level (Habsyi, Suharman, & Handoyo, 2021).

The production function shows the maximum amount of output that can be produced using a certain amount of output using a certain technology (Sutanto & Imaningati, 2014). The factors of production are known as inputs, and the production results are called outputs. Combining certain production factors can produce different outputs depending on the company's efficiency. Efficiency in this research is divided into three, namely Technical Efficiency (TE), Allocative Efficiency (AE), and a combination of both (TE and AE) to become cost efficiency or economic efficiency (Batir et al., 2017). Technical efficiency (TE) measures the proportional reduction in input use that can be obtained if the company operates efficiently. TE reflects a company's ability to produce output with several available inputs (Batir et al., 2017). Allocative Efficiency (AE) measures the proportional cost reduction when a company chooses the right mix of inputs. AE reflects the bank's ability to optimise the use of its inputs with its price structure and production technology (Batir et al., 2017). Cost Efficiency (CE), or economic efficiency, measures the proportional reduction in costs obtained if the company is technically efficient and allocative efficient. Cost efficiency or economic efficiency is a combination of technical efficiency and allocative efficiency.

The Effect of Gross Domestic Product on Efficiency

Gross Domestic Product (GDP) or gross domestic product is the total monetary or market value of all finished goods and services produced within a country's borders in a certain period. As a broad measure of overall domestic production, GDP is a comprehensive scorecard of a country's economic health (Tacchella et al., 2018). The foreign trade balance is very important for all the components of a country's GDP. A country's GDP tends to increase when the total value of goods and services sold by domestic producers abroad exceeds that of foreign goods and services purchased by domestic consumers. When this situation occurs, a country is said to experience a trade surplus (Coscieme et al., 2020). GDP can be calculated on a nominal or a real basis, the latter taking inflation into account. Real GDP is a better method for expressing long-term national economic performance because it uses constant dollars. GDP can be divided into several types, namely nominal GDP, real GDP, GDP per capita, and GDP growth rate (Kummu et al., 2018). GDP in this research is GDP growth, namely the annual growth of GDP (%) (Batir et al, 2017). Bank Indonesia explained that increasing economic growth and the welfare of people's lives are influenced by the stability of a country's inflation. Inflation is a condition that experiences a general increase in the price of goods and services over a certain period (Arfiani & Mulazid, 2017). The condition of an increase in the price of one or two types of goods is not said to be inflation, but if the price of an item increases, it can affect the prices of most other goods.

Banks that operate in countries that have higher GDP (Gross Domestic Product) growth tend to compete with other banks, which will result in more competitive profit margins. The correlation between bank efficiency and GDP growth shows varying results. Several studies show that growing economic conditions make banks more efficient (Sufian and Noor, 2009; Noor and Hayati, 2011; Ahmad and Noor, 2011; Akhtar, 2013). GDP growth is a good (positive) signal for investment and vice versa. GDP growth has a positive effect on consumer purchasing power, so it can increase demand for company products. Increasing demand for company products increases company profits and ultimately increases the company's share price in the context of Financial Efficiency (CE). (Kusumaningsih et al., 2023). Garcia (2012) and Muljawan et al (2014) state that GDP has a positive influence on the level of efficiency. This is because improving economic growth will affect people's income, then demand for credit will also increase, which includes technical efficiency and allocative efficiency (Fatmawati, 2018).

Inflation shows a situation where the prices of goods and services increase overall in a certain period of time (Pambuko, 2016; Zeman and Jurca, 2008). Inflation is measured using the Consumer Price Index (CPI), which measures the costs of the market for consuming goods and services. Inflation conditions make bank operations increasingly inefficient (Garza-Garcia, 2012; Hassan and Sanchez, 2007). High inflation rates affect the economy and the performance of the financial industry. The increase in prices of goods and services can indirectly increase operational costs in the banking sector, which will then reduce the efficiency of sharia banking.

Method

Considering that this research paradigm is positivist, research findings are true if they can be observed and measured. Population is the total group of something we want to research. Meanwhile, the sample is a portion of the total population selected for research (Sekaran & Boeugie, 2016). The population in this research is Sharia Commercial Banks (BUS) and Sharia Business Units (UUS), which have permits to operate in Indonesia and were registered with the Financial Services Authority (OJK) before 2011 and are still operating until 2020, and have the necessary financial data. In filling in the variables for this research for the 2011-2020 research period. The sample for this research was 19 Sharia Banks. This research was tested into 2 stages, namely: 1.) Stage 1 is a study of the efficiency of Islamic banks (BUS and UUS) using non-parametric analysis techniques, namely Data Envelopment Analysis (DEA). And 2.) Stage 2 is a study of the truncated linear regression analysis model (Widarjono, 2015; Setiawan et al., 2018).

Results and Discussion

The sampling method used in this research is saturated sampling, where all population members become the research sample. The objects of this research are eight conventional banks and 19 banks, where the samples taken have provided annual financial reports for the 2011-2020 period. Evaluating all combinations of input and output from Decision-Making Units (UPK), often called Decision-Making Units (DMU) in banks sharia (BUS and UUS), produces efficiency limits in terms of technical efficiency, allocative efficiency and cost efficiency.

The research results show that 12 banks are experiencing technical inefficiency among the 19 other bank samples during the 2011-2020 observation period. There are eight banks that have yet to achieve technical efficiency during 2011 - 2020. Several banks experienced efficiency in only a few periods, including BRIS for the 2013-2016 period, BCA Syariah for the 2011-2012 period, Maybank Syariah for the 2015-2016 period, and Bank Sinarmas for the 2011-2014 period. Meanwhile, seven other banks experienced technical efficiency throughout 2011 – 2020, namely: BPD West Nusa Tenggara Syariah, Bank Maybank Indonesia, Tbk, Bank OECB Niaga, Tbk, BPD East Java, Tbk, BPD Jambi, BPD West Sumatra, BPD Riau and Riau Islands.

In the DEA model, a UPK or DMU is considered inefficient if it has a value of 1 or 100%; conversely, if it has a value of less than 1, it is considered inefficient. In the 2011 period, in terms of technical efficiency, eight firms were efficient because they had a technical efficiency value = 1, namely PT BPD West Nusa Tenggara Syariah, PT BCA Syariah, PT Bank Maybank Indonesia, Tbk, PT Bank Bank Sinarmas, PT BPD East Java, Tbk, PT BPD Jambi, PT BPD West Sumatra, and PT BPD Riau and Riau Islands, for the other firms it is still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, there are two efficient firms, namely PT Bank, Bank Sinarmas, and PT BPD East Java, Tbk. Furthermore, in terms of Cost Efficiency, there are two efficient firms, namely PT Bank, Bank Sinarmas, and PT BPD Jawa Timur, Tbk. The mean (average) efficiency value of 19 firms in 2011 for technical efficiency was 0.896, allocative efficiency was 0.845, and cost efficiency was 0.753.

In the 2012 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1, namely PT BPD West Nusa Tenggara Syariah; PT BCA Syariah; PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT Bank Bank Sinarmas; PT BPD East Java, Tbk; PT BPD Jambi; PT BPD West Sumatra; PT BPD Riau and Riau Islands, the other firms are still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD Yogyakarta Special Region; and PT BPD East Java, Tbk. Based on data

processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. The mean (average) efficiency value of 19 firms in 2012 for technical efficiency was 0.897, allocative efficiency was 0.873, and cost efficiency was 0.779.

In the 2013 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1, namely PT BPD West Nusa Tenggara Syariah, PT Bank BRI Syariah / Bank Syariah Indonesia, PT Bank Maybank Indonesia, Tbk, PT Bank OECB Niaga, Tbk, PT Bank Bank Sinarmas, PT BPD East Java, Tbk, PT BPD Jambi, PT BPD West Sumatra, PT BPD Riau and Riau Islands, for the other firms it is still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, there are several efficient firms, namely PT Bank OECB Niaga, Tbk, and PT BPD Jawa Timur, Tbk. Based on data processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank OECB Niaga, Tbk, and PT BPD Jawa Timur, Tbk. The mean (average) efficiency value of 19 firms in 2013 for technical efficiency was 0.896, allocative efficiency was 0.826, and cost efficiency was 0.737.

In the 2014 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1, namely PT BPD West Nusa Tenggara Syariah, PT Bank BRI Syariah / Bank Syariah Indonesia, PT Bank Maybank Indonesia, Tbk, PT Bank OECB Niaga, Tbk, PT Bank Bank Sinarmas, PT BPD East Java, Tbk, PT BPD Jambi, PT BPD West Sumatra PT BPD Riau and Riau Islands, for the other firms it is still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, there are several efficient firms, namely PT Bank BRI Syariah / Bank Syariah Indonesia; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; and PT BPD Riau and Riau Islands. Based on the results of data processing regarding Cost Efficiency, there are several efficient firms, namely PT Bank BRI Syariah / Bank Syariah Indonesia; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; and PT BPD Riau and Riau Islands. The mean (average) efficiency value of 19 firms in 2014 for technical efficiency was 0.893, allocative efficiency was 0.884, and cost efficiency was 0.787.

In the 2015 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1, namely PT Bank BRI Syariah / Bank Syariah Indonesia; PT Bank Mega Syariah; PT Maybank Syariah Indonesia; PT Bank Maybank Indonesia, Tbk; PT BPD East Java, Tbk; PT BPD Jambi; PT BPD West Sumatra and PT BPD Riau and Riau Islands, the other firms are still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; PT BPD Jambi. Based on data processing results regarding Cost Efficiency,

there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; and PT BPD Jambi. The mean (average) efficiency value of 19 firms in 2015 for technical efficiency was 0.920, allocative efficiency was 0.859, and cost efficiency was 0.793.

In the 2016 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1, namely PT Bank BRI Syariah / Bank Syariah Indonesia; PT Bank Mega Syariah; PT Maybank Syariah Indonesia; PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; PT BPD Jambi; PT BPD West Sumatra; and PT BPD Riau and Riau Islands for other firms is still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; PT BPD Jambi. Based on data processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT BPD East Java; and Tbk PT BPD Jambi. The mean (average) efficiency value of 19 firms in 2016 for technical efficiency was 0.918, allocative efficiency was 0.851, and cost efficiency was 0.785.

In the 2017 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1, namely PT BPD West Nusa Tenggara Syariah; PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; PT BPD Jambi; PT BPD West Sumatra; and PT BPD Riau and Riau Islands for other firms are still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; and PT BPD Riau and Riau Islands. Based on data processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT BPD East Java, Tbk; PT BPD Riau and Islands. The mean (average) efficiency value of 19 firms in 2017 for technical efficiency was 0.883, allocative efficiency was 0.843, and cost efficiency was 0.743.

In the 2018 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1 PT Bank BRI Syariah / Bank Syariah Indonesia; PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT Bank Bank Sinarmas; PT BPD East Java, Tbk; PT BPD Jambi; PT BPD West Sumatra; and PT BPD Riau and Riau Islands for other firms is still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. Based on data processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. The mean (average) efficiency value of 19 firms in 2018 for technical efficiency was 0.883, allocative efficiency was 0.839, and cost

efficiency was 0.740.

In the 2019 period, in terms of technical efficiency, some firms were efficient because they had a technical efficiency value = 1 PT BPD West Nusa Tenggara Syariah; PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; PT BPD Jambi; PT BPD West Sumatra; and PT BPD Riau and Riau Islands for other firms is still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. Based on data processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. The mean (average) efficiency value of 19 firms in 2019 for technical efficiency was 0.905, allocative efficiency was 0.819, and cost efficiency was 0.740.

In the 2020 period, in terms of technical efficiency, some firms are efficient because they have a technical efficiency value = 1, namely PT BPD West Nusa Tenggara Syariah; PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; PT BPD East Java, Tbk; PT BPD Jambi PT BPD West Sumatra; and PT BPD Riau and Riau Islands, while the other firms are still inefficient because the technical efficiency value is less than 1. Then, in terms of Allocative Efficiency, several firms are efficient, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. Based on data processing results regarding Cost Efficiency, there are several efficient firms, namely PT Bank Maybank Indonesia, Tbk; PT Bank OECB Niaga, Tbk; and PT BPD East Java, Tbk. The mean (average) efficiency value of 19 firms in 2019 for technical efficiency was 0.902, allocative efficiency was 0.793, and cost efficiency was 0.716.

In stage 2 testing, statistical regression analysis was performed using a truncated regression approach (tobit model). In this Tobit model analysis, E-views software is used. The following are the results of the analysis using the Tobit model:

Table 1. Results of Tobit Model Analysis (TE)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.607571	1.165611	0.521247	0.6022
GRC	0.007744	0.000933	8.298080	0.0000
GDP	-0.016027	0.071970	-0.222693	0.8238
INFLATION	-0.201696	0.444983	-0.453266	0.6504

Source: Data processed 2024

Based on the analysis results in Table 1, one variable has a negative effect, and the other variables have a positive effect. This research's dependent variable is the DEA method's efficiency score. By using this tobit model, we can see that GRC has a significant positive effect on bank efficiency. Partial test results show that:

1. GRC has a significant positive effect on TE because the p-value is 0.0000, where this value is smaller than 0.05
2. GDP does not have a significant effect on TE because the p-value is 0.8238, which is greater than 0.05
3. INFLATION has no significant effect on TE because the p-value is 0.6504, which is greater than 0.05

Table 2 Tobit Model Analysis Results (AE)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.694574	1.239757	1.366860	0.1717
GRC	0.007146	0.000993	7.198776	0.0000
GDP	-0.085822	0.076548	-1.121156	0.2622
INFLATION	0.238342	0.473289	0.503585	0.6146

Source: Data processed 2024

Based on the analysis results in Table 2, one variable has a negative effect, and the other variables have a positive effect. This research's dependent variable is the DEA method's efficiency score. Using this Tobit model, we can see that GRC significantly positively affects Allocative Efficiency. Partial test results show that:

1. GRC has a significant positive effect on AE because the p-value is 0.0000, which is smaller than 0.05
2. GDP does not have a significant effect on AE because the p-value is 0.2622, which is greater than 0.05
3. INFLATION has no significant effect on AE because the p-value is 0.6146, which is greater than 0.05

Table 3. Results of Tobit Model Analysis

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.107080	1.209966	0.914968	0.3602
GRC	0.013723	0.000969	14.16552	0.0000
GDP	-0.083440	0.074708	-1.116878	0.2640
INFLATION	0.009898	0.461916	0.021427	0.9829

Source: Data processed 2024

Based on the analysis results in Table 3, one variable has a negative effect, and the other variables have a positive effect. This research's dependent variable is the DEA method's efficiency score. Using this Tobit model, we can see that GRC significantly positively affects Allocative Efficiency. Partial test results show that:

1. GRC has a significant positive effect on CE because the p-value is 0.0000, where this value is smaller than 0.05
2. GDP does not have a significant effect on CE because the p-value is 0.2640, which is greater than 0.05
3. INFLATION has no significant effect on CE because the p-value is 0.9829, which is greater than 0.05

***The Effect of Governance, Risk, Compliance (GRC)* on Efficiency**

The research results show that GRC has a partial effect on Efficiency. TE is global efficiency in measuring a bank's ability to produce output with less input or fewer resources indicating h, higher efficiency (Marsondang et al., 2019). One of the biggest contributions of technology in GRC is process automation. Sophisticated software solutions can automate routine tasks in risk management, compliance monitoring, and reporting. For example, GRC software can send automated notifications about reporting deadlines or identify potential compliance violations in real time. Sharia banking needs to strengthen the implementation of integrated governance, risk, and compliance (GRC). To fulfil this, technology has an important role in implementing integrated GRC. It relates to how Islamic banking improves technology to build a more integrated GRC.

Implementing Good Corporate Governance in UUS and BUS operational activities is a guideline in organising and managing or positioning the relationship between shareholders, company managers, creditors, and other stakeholders in running the company to create company value and good profitability while still paying attention to stakeholders' interests. In this research, although BUS and UUS were found to have implemented GCG principles well in carrying out their business activities, several factors caused the application of GCG principles to be implemented optimally in the performance of BUS and UUS.

The implementation of risk management in each UUS and BUS, which is assessed by the level of handling of liquidity risk, credit risk, operational risk, and legal risk, is governed by the provisions set by the Financial Services Authority. Active supervision carried out by the Board of Commissioners and Directors, policies, procedures, and limit determination are good based on applicable rules, and the identification, measurement, and monitoring processes in risk management are carried out by established rules. The risks faced by

financial institutions such as BPRs are not low-level risks, but rather, the risks faced by BPRs are quite high. Business competition is tight, and BUS and UUS must continue to maintain liquidity and manage other risks well to create healthy company conditions. Not only that, if we look at internal conditions, BUS and UUS also still need to evaluate and develop the implementation of risk management. The reason is that in general, the company's operational activities are still improving and improving risk management. However, consider BUS and UUS's various problems, such as capital, weak IT systems, and increasingly competitive business competition. In that case, there is a need for innovation and collaboration so that BUS and UUS grow healthily and can maintain their existence and contribute to economic development. To improve GRC implementation, all functions must be aligned and operated through fully integrated governance. The absence of a guideline that can be used together has been one of the reasons why Integrated GRC cannot be understood and implemented optimally. The results of this research are based on statistical tests, which found that GRC had a positive and significant effect on technical efficiency. The results of this research are from previous research conducted by Batir et al. (2017), Fajar et al. (2020 and Setiawan et al. (2018.

The Effect of Gross Domestic Product on Efficiency

Partially, GDP does not significantly affect Efficiency because the p-value is 0.8238, where this value is greater than 0.05. Based on the results of testing the economic growth variable on the level of banking technical efficiency, GDP does not affect bank efficiency. It is not in line with efficiency theory, which states that economic growth influences the level of banking efficiency. The higher GDP will cause the efficiency of Sharia banking to decrease and vice versa (Chuweni & Eves, 2019). It is because GDP is an indicator for measuring national income, the greater the income that people have, the more people will use their income to fulfil all their desires and needs without having to borrow money or funds from banks; the impact of the FDR ratio in industry Sharia banking will decline because financing distributed to the public is reduced.

According to previous research, when the economy improves, people's wealth will also increase, causing an increase in people's demand for financial services. However, public demand for financial services is only evenly distributed across some Islamic banks in Indonesia. People's criteria for choosing which financial services to use also vary. People will tend to choose banks with good credibility, so the efficiency level of Islamic banks is not evenly distributed. Therefore, increases in efficiency values cannot be predicted using GDP even though Indonesia's nominal GDP continues to increase yearly (Suwignyo & Musdholifah, 2019). Besides that, Marsondang et al. (2019) found that Indonesia's nominal GDP continues to increase yearly, and GDP growth continues to decline. The decline in the percentage of economic growth does not

have a large range of values, while the level of banking efficiency fluctuates with varying values from one bank to another.

In 2017, Indonesia's GDP rose to 1,016 billion rupiah from the previous year, which was only 931.9 billion rupiah in 2016. This condition gradually increased significantly up to 20% until 2019. The economic level in Indonesia in 2019 showed several quite good achievements in the midst of Global conflicts, mainly trade wars and geopolitical conflicts. In 2020, this decreased due to the pandemic that occurred throughout the world. It also encourages researchers to suspect that GDP does not affect efficiency in the BUS and UUS sectors. Researchers suspect that GDP growth in Indonesia is relatively small, so there is no significant influence on banking performance. In this case, banks, as institutions that function as intermediaries, must be able to play a greater role in channelling funds from parties who have a surplus of funds to parties who need funds so that the wheels of the economy can turn. With the economy growing rapidly, more credit can be distributed to businesspeople so that BUS and UUS income will increase. Another estimate is that GDP growth, in general, continued to increase from 2011 to 2019, although there was a decline in certain years in certain BUS and UUS. Apart from that, in 2020, the overall percentage decline in GDP decreased. It is due to the COVID-19 pandemic, which has affected GDP. It also means that GDP does not affect the level of bank efficiency. The results showing the influence of GDP on efficiency are supported by research conducted by Rafif et al. (2024), Abdullahi et al. (2023), Marsondang et al. (2019), Apriyana et al. (2015), and Fatmawati & Aji (2018).

Statistical test results show that inflation does not affect efficiency. High inflation rates are usually associated with overheated economic conditions. An overheated economy is a condition where product demand exceeds product supply capacity, so prices tend to increase. Inflation that is too high will also cause a decrease in the purchasing power of money. Inflation is when the prices of goods and services increase overall over a certain period. Inflation is measured using the Consumer Price Index (CPI), which measures the costs of the market for consuming goods and services. Inflation conditions make bank operations increasingly inefficient (Fatmawati & Aji, 2018). Previous research states that the risk of inflation causes a decrease in the purchasing power of investors' income, so this hampers banking technical efficiency. Inflation conditions make bank operations increasingly inefficient. Inflation will increase bad credit, making BUS and UUS inefficient because banks must incur extra costs to manage bad credit (Pambuko, 2016).

Previous research states that inflation has a bad effect on a country's economy and can impact people's interest in entrusting their funds, both in saving and investing, and production activities will experience a decline. Thus, with inflation, banking activities to achieve efficiency are not optimal (Hanania, 2015). Previous research conducted by Pambuko (2016) found that inflation has

a negative and insignificant influence; in other words, an increase in the inflation rate does not have a real contribution to achieving efficiency in Islamic banks. The researchers' observations found that from 2011 to 2019, inflation tended to increase slightly, but in 2020, the inflation value tended to decrease. There are changes in inflation that occur in a fluctuating manner; namely, in 2012, 2013, and 2017, there was an increase in inflation, while in 2014, 2015, 2016, and 2018 to 2020, there was a decrease in the inflation rate. Changes in the inflation value cause the data to be distributed unevenly, so that inflation does not affect efficiency. The results of this research support the results of previous research conducted by Sujarwo et al. (2019), Pambuko (2016), and Hanania (2015).

Conclusion

The results of regression testing show that GRC has a partial effect on Sharia Banking Efficiency. Strengthening the implementation of integrated governance, risk and compliance (GRC) is necessary. To fulfil this, technology has an important role in implementing integrated GRC. The results of the regression test show that GDP does not affect the efficiency of GDP growth in Indonesia, which is relatively small, so there is no significant effect on banking performance. In this case, banks, as institutions that function as intermediaries, must be able to play a greater role in channelling funds from parties who have a surplus of funds to parties who need funds so that the wheels of the economy can turn. With the economy growing rapidly, more credit can be distributed to business people so that BUS and UUS income will increase. Another estimate is that GDP growth continued to increase from 2011 - 2019, although there was a decline in certain years in certain BUS and UUS. Apart from that, in 2020 the overall percentage decline in GDP decreased. It is thought to be due to the Covid-19 pandemic, which has affected GDP. It also means that GDP does not affect bank technical efficiency. The results of regression testing show that inflation does not affect efficiency. From 2011 to 2019, inflation tended to increase slightly, but in 2020, the inflation value tended to decrease. There are changes in inflation that occur in a fluctuating manner; namely, in 2012, 2013, and 2017, there was an increase in inflation, while in 2014, 2015, 2016, and 2018 to 2020, there was a decrease in the inflation rate. Changes in inflation values cause data to be distributed unevenly so that inflation does not affect efficiency.

The government can create and implement a policy on the bank concerned. The GRC policy needs to be improved to be effective and further encourage the growth of Sharia banking, or has the opposite impact, being counterproductive to the growth of BUS and UUS. Apart from that, the government can comprehensively evaluate Indonesia's GDP for 10 years to show a more complex and reflective representation of Sharia banking efficiency for the long-term development of the Sharia economy through BUS and UUS. Future research is advised to consider comparative testing between variables that

evaluate internal performance and external factors related to BUS and UUS to obtain more reflective comparative study results related to more comprehensive Sharia banking efficiency.

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