The Influence of Macroeconomic Factors toward Bank Efficiency: Comparison between Conventional and Sharia Bank in Indonesia

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ABSTRACT

In this research, an effort had been conducted to discover the influence of macroeconomic factors toward bank efficiency and comparison between sharia bank and conventional bank over the periods of 2007-2014. Efficiency of bank was one of core issues for the economists all over the world and it depend on its performance. When the performance of bank was decreasing, the efficiency of banks would be decreasing as well. While macroeconomic factors also had influence toward bank efficiency. This research attempted to examine the influence of macroeconomic factors toward bank efficiency and the difference between sharia bank and conventional bank. For this purpose, DEA (Data Envelopment Analysis) method was used to calculate the efficiency of banks from 2007-2014. To support this research, t test was used to test the influence of macroeconomic factors toward bank efficiency. To support the test, Jorque-Bera normality test was used. As the result, there were different influence of macroeconomic factors toward the efficiency of sharia bank and conventional bank.

Keyword: *bank, bank efficiency, macroeconomic factors, DEA, Indonesia, t-test, Jorque-Bera*

ABSTRAKSI

Dalam penelitian ini, upaya telah dilakukan untuk menemukan adanya pengaruh ekonomi makro terhadap efisiensi bank yang ada di Indonesia dan membandingkan terhadap bank konvensional dengan bank sharia selama periode 2007-2014. Effisiensi bank sudah menjadi hal tersendiri yang menjadi fokus semua para ahli ekonomi yang ada di dunia dan hal ini di pengaruhi oleh performa bank tersebut. Di saat performa bank menurun maka effisiensi bank tersebut mengalami penurunan juga. Sementara itu, ekonomi makro sendiri dapat memberikan pengaruh terhadap efisiensi sebuah bank. Penelitian ini berupaya untuk menguji adanya pengaruh ekonomi makro terhadap efisiensi sebuah bank dan melihat ada tidaknya perbedaan bank konvensional dan bank sharia. Untuk tujuan ini, metode yang digunakan adalah DEA (*Data Envelopment Analysis*) untuk menghitung bagaimana effisiensi sebuah bank selama periode 2007-2014. Untuk mendukung tulisan ini, uji beda t digunakan untuk menguji adanya pengaruh ekonomi makro terhadap efisiensi sebuah bank. Untuk mendukung normalitas, uji *Jorque-Bera* dilakukan. Maka hasilnya, terdapat pengaruh yang berbeda dari ekonomi makro terhadap bank sharia dan bank konvensional.

Kata kunci: *bank, bank efisiensi, DEA, ekonomi makro, Indonesia, uji beda t, Jorque-Bera*

1. *Introduction*

The recent financial crisis has led to a large increase in the number of bank failure, making the banking industry more complicated than any other industries despite the financial details of banks file in their annual reports (Ng & Rusticus, 2012). The issue of bank survival in this millennium has attracted a high interest to scholars of financial services and regulators, as the diversity of significance for bank survival does not only apply to strategic decisions made by banks, but also to decisions made by regulators that are concerned on bank stability (Berger & Bouwman, 2013). Regulatory and technology advancement factors was said to have contribution to this threat, that includes the removal of regulatory ceilings on bank deposit rates, introduction of interest bearing checking accounts, relaxation of branching laws, the increasing competition with the emergence of mega banks through mergers and acquisitions, and also the lack of personal interaction between bankers, borrowers and depositors (Ndu & Wetmore, 2005). Hence, in periods of crisis, many financial institutions are bound to face hardship for business survival (Pramuka, 2011).

Efficiency of commercial banks is one of the core issues for the economists all over the world due to its strong association with economic growth of the country (Zaidi, 2005). Economic growth would be achieved by utilizing the existing resources of the banks in an appropriate and efficient way (Saeed, 2005). Efficiency of commercial banks has an importance for evaluation of its performance. Banking efficiency provides signal for the economic development of a country (Sathye, 2005). Efficiency of commercial banks is actually the relationship of different combinations of outputs and inputs of the banks to achieve the optimum level. The optimum level can be achieved under the objective of inputs minimization, while producing the same level of outputs and outputs maximization with the same level of inputs.

The influence of interest rate and exchange rate changes on bank stock returns has been the major interest of bank managers, regulatory authorities, academic communities and investors, since the failure of numerous banks have been especially attributed to the adverse influence of fluctuations in interest rates and exchange rates.

The issue of interest rate risk is one of the major interest on the banking regulatory and academic communities. The Interest rate risk (IRR) is

acknowledged as one of the major financial risk born by companies. This is due to the fact that changes in interest rates influence both a firm expected cash flows and the discount rates used to value them. As a mater of fact, the only two studies that have employed a nonparametric approach in the context of corporate exposure to risk have focused on the exchange rate exposure (Guo and Wu, 1998; Aysun and Guldi, 2009).

This research was written to compare the efficiency of sharia banks and conventional banks are under loan based approach and income based approach. In addition, it aims to investigate the economies of scales for both banking streams. The result revealed the influence of banks specific factors on efficiency, like investment, loans, zakat, bills payable, fixed assets and deposits and borrowing from other financial institutions.

2. *Literature Review*
Bank

Financial service industry plays a very imperative role in today dynamic environment, and banks take a very important part in the financial intermediation (Akhtar, 2002). Bank is the one of financial institution that has big influence on the economy of a country. Bank have two types, which is conventional bank and sharia bank. These types have different basic. Conventional bank is the bank that do its business based on profit principle. Sharia bank is the bank that do its business based on Islamic principle.

Bank Performance Measurement

The health of a bank is the interests of all parties concerned, either the owner, bank managers (management, bank users and the community). The bank can be used by the parties to evaluate the performance of the bank in applying the principle of prudence, adherence to the applicable provisions and risk management. There are many kinds of measurement of bank performance, which is CAMELS and RGEC.

The performance of firms, such as banks, is often described in terms of the firm's efficiency. The measured efficiency of a production unit is commonly interpreted as the difference between its observed input and output levels and the corresponding optimal values. An output-oriented measure of efficiency compares observed output with the maximum output possible for given input levels.

Bank Efficiency Measurement

There are many kinds measurement for bank efficiency, like DEA for non parametric measurement and SFA for parametric measurement. SFA is a parametric technique that use standard production function methodology. The approach explicitly recognize that production function represents technically maximum feasible output level for a given level of output.

DEA is a linear programming model used for evaluating the efficiency of particular Decision Making Units (DMU's) in this case the banks regarding to construct frontier develop by DEA over the data. It was first developed by Charnes et al (1978) on the sample of nonprofit organization and later it was extended to the banking sector by Sherman and Gold (1985).

In micro-economic theory, production is usually described as a process of combining inputs to create outputs to achieve a desired goal, normally profit maximization. The term 'efficiency' is applied when a production unit obtains its goal of producing the maximum amount of output (s) possible, using a minimum amount of input (s) available given the constraint of technological conditions (Fare et al 1985).

According our literature, various models of efficiency are measured by different researchers in their studies, Ataullah et al. (2004) found technical efficiency under loand and income based approach. In the same way, we measured the efficiency of Islamic and conventional banks in Indonesia under loan base and income base approaches.

This specification technically efficiency is calculated under both constant return to scale and variable return to scale. In this journal, investment, loans, and zakat are regarded as output. Total loan were used as output in previous study (Hassan et al., 2009; Sufian, 2006; Yudhistira, 2003; Ayadi et al., (1998); Sathye, 2003) while loans and advances are taken as output by Sathye (2001). Investment are taken as output by researchers in their studies (Haung and Wang, 2002), while loan plus advances and investment are taken as output by others (Akhtar,2002). While the inputs for this study is bills payable, fixed assets, deposits plus borrowing from other financial institutions. Pasiouras (2006) used fixed assets, customer deposits plus short term funding and number of employees as inputs. In the same way, Ahmad and Gill (2007a), and Ahmad and Ahmad (2007) used number of employees, operating fixed

asset, bills payable, and borrowing from financial institutions as input for this specification.

Bank Efficiency

Much research effort has been expended on identifying and analyzing the efficiency of financial institution in varying forms over the last few decades. The main areas of research have been scale efficiency, scope efficiency as well as the X-efficiency, which attempts to capture the efficiency of a bank (given its inputs and outputs) relative to other banks. X-efficiency studies of the banking sector typically find that there are large cost inefficiencies. A common finding is that, on average, there are cost inefficiencies in the order of 20 percent. That is, on average, banks are only 80 percent as cost efficient as the "best practice bank" (Berger and Humphrey, 1997).

According to Bashir (2001), the evaluation of efficiency and its determinants are essentially important due to the fast growing environment in today's economic structure. This globalization has indeed put sharia banks in strong competition with conventional banks in financial markets. This is added to the situation where some countries had made complete transformation of their banking system, with the addition to the Islamic elements to this system. Hence, there is a need to determine which among the many potential determinants of efficiency that would emerge to be most important.

Efficiency of banks might result in high profits, good customer service or use for risk diversion (Berger et al., 1993a,b). Efficiency of banks might be influenceed by different factors like size, interest expense, total profits, etc. (Hassan et al., 2009)

There has been general literature in the banking sector that examined the efficiency of conventional commercial banks in the developed countries, especially U.S and European banking sector, over recent years. The work, especially on empirical side, Sharia bank has not been much investigated (Sufian, 2006). Sharia banks are based on equity base relationship instead of loan base relationship between provider of fund and borrower of fund. Equity base relationship is encouraged by Islamic banking between equity provider and entrepreneur (Roy, 1991).

Several studies that have been seen to measure the performance of sharia banks have commonly investigated the association between profitability

and banking characteristics using financial ratios (Samad, 1999; Bashir, 1999; Hassan and Bashir, 2003; Bashir, 2001; Sarker, 1999)

Sarker (1999) used a banking efficiency model to investigate sharia banks efficiency in Bangladesh. He argued that, sharia banks could stay alive still within a conventional banking design in which profit and loss modes of financing were less dominated. He further claimed that due to difference in sharia banking system and conventional banking system, sharia banks have different products and different risk characteristic, so different rules and regulation should be implemented over sharia banks.

The other group of researchers conducted their studies on the efficiency of sharia banking sector by considering the frontier approach instead of financial ratios (Yudistira, 2003; Brown and Skully, 2005; Hassan, 2005; Shamsher et al., 2007; Badar et al., 2007a; Sufian, 2006).

Batchelor and Wadud (2004) found the efficiency of sharia banks in Malaysia by applying DEA model and using technical and scale efficiency, their result revealed that full fledged sharia banks are generally inefficient due to scale inefficiency and not due to pure technical inefficiency. Technical efficiency means the ability of firm (bank in this case) to produce more output with a given level of input, this is called technical efficiency by output side. Technical efficiency input side means to reduce the same level of output with less input (Farrell, 1957). More theoretically, if a firm produces one unit of output with the same level of input or it can produce the same level of output by marginally decreasing in input, and can be called technically efficient firm.

Income efficiency shows how particular firms obtain their financial and non financial revenues while utilizing the same level of financial and non financial expenditure. It is actually the earning side of the banks (Ahamad and Gill, 2007b). In the same way Pasiouras (2006) took the revenue side of the banks for the income efficiency and found how much a particular bank increases its revenue while utilizing the same level of financial and non financial expenses. Atuallah et al. (2004) found technical and scale efficiency of Pakistan and Indian commercial banks under two models, loan base model and income base model.

There are two widely accepted concepts used in banking literature about the functions of banks; production approach and intermediation approach

(Sealey and Lindley, 1977). In production approach banks are considered as firms that use factors of production (that is land, labor, and capital) to produce a deposits and loans account. Outputs are measured by the number of accounts and numbers of transactions done in each type of product mean, in terms of physical accounts, deposits are taken as output under this approach (Colwell and Davis, 1992; Rizvi, 2001). While on the other hand, intermediation approach treated bank as intermediatory of financial services rather than producer of loans and deposits, which takes funds from surplus unit and provides it to deficit unit of the economy. Deposits are taken as input under this approach (Colwell and Davis, 1992; Rizvi, 2001; Akhtar, 2001).

Using financial ratios is a good indicator for measuring the performance of banks, but it loses, advantages and influenceiveness when a DMU's operates in different environmental structures and practices like different capital structures and accounting practices (Ikhaid, 2000). Further, financial ratios deal for short term performances of the company and that's why it misleads the analysts (Oberholver and Westuizen, 2004). For measurement, the efficiency of banks various models and techniques are available. Among these available models and techniques the parametric and non parametric models are frequently used. Parametric model takes the residual value and also a need to develop in functional form. While non parametric model has minimum constrain on its structure form. DEA has an advantage over regression analysis because single regression analysis captures the average performance of banks and it is also influenceed by high values. In contrast the DEA analyzes the efficiency of various DMU's on yearly bases, and constructs a separate frontier on the yearly basis. It might be possible that the bank efficiency varies over the years that a particular DMU in this case the bank may be efficient in one year while inefficient in other year (Sufian, 2006).

Apart from industry and bank specific features or characteristics discussed above, significant empirical studies also exist suggesting that ultimately, the macroeconomic environment within which such banks operate, also has significant influence on performance. As key financial actors channeling financial resources to various sectors of the economy, operational activities of banking institutions have been shown to be influenced by prevailing macroeconomic dynamics and other external factors. Reviewed empirical evidences suggests that macroeconomic performance and trend conditions associated with key economic indicators have significant influence

on bank performance. For instance, in an earlier study focusing on the relationship, Afanasieff, Lhacer and Nakane (2002) concluded that inflationary conditions have negative influence on net interest margins; this conclusion supported earlier finding s by Saunders and Schumacher (2000) in a related analysis. Additionally, in a recent study verifying similar relationship among Tumisian deposit banks, Ayadi and Boujelbene (2012) also showed that inflationary conditions have negative influence on profitability among banks studied. Schwaiger and Liebig (2008) further made a strong case for the role of macroeconomic conditions by showing that banks perform better in periods of significant growth characterized by relatively high investment and consumption growth, and growth in credit supply. This condition suggest that favorable macroeconomic conditions, tends to have positive influence on bank performance. Bikker and Hu (2002) in earlier study also established that bank profits correlates positively with movements in the business cycles. A study by Allen and Saunders (2004), further provided empirical evidence in support of the importance of macroeconomic factors or conditions in determining bank profitability. These reviewed studies to a greater extent support the general view of positive association between economic performance and bank profitability. However, in a study focusing on a similar relationship among Sub-Saharan African economies, Al-Haschimi (2007) who employed net interest margin as a measure of performance, concluded that macroeconomic factors, have much less influence on bank performance than other studies have suggested. Again, Sufian and Razali (2008) whose study focused on bank profitability in the Philippines also indicated that not all macroeconomic variables are significant in bank performance; the study found that specific variables/conditions such as money supply and stock market capitalizations have insignificant influence on bank performance.

The Influence of Macroeconomic Factors Toward Bank Efficiency

The banking industry is very sensitive to macroeconomic conditions. Thus, the operation of the bank should closely related to economic movements. Therefore, business cycles and monetary policy might influence the efficiency of a bank. Loans are one of the bank's major outputs. There is a linkage between loan and business cycles and monetary policy movements. Problem loans might occur more frequently in worse economic conditions. Berger and DeYoung (1997) interpreted several reason that cost inefficient bank might tend to have problem loans. One potential reason that they cite is local economic downturns.

Since loans are one of the bank major outputs, problems loans might lead to bank X-efficiency reduction. Berger and DeYoung (1997) employed Granger causality techniques to test the relation between loan quality and a bank's cost efficiency. They found intertemporal relationships between loan quality and cost efficiency in both directions. They indicated that high levels of problem loans caused banks to increase costs in monitoring, working out, and/or selling off those problem loans. Thus, those non-performing loans tended to decrease the cost efficiency of banks. DeYoung (1998) also found similar results. He found that cost efficiency is positively related examiners ratings of the management quality. His results also showed that banks management ratings were strongly related to their asset quality rating. Berger, Bonime, Covitz, and Hancock (2000) also indicated that bank performance was sensitive to regional/macroeconomic shocks. They show that even the greater geographic diversification and the greater use of financial engineering techniques employed to manage risk in recent years still could not reduce the banking industry's sensitivity to regional/macroeconomic shocks. They also explained that bank profitability would increase during economic boom periods because all regions likely had the unexpected favorable economic conditions. During favorable macroeconomic conditions a shifting toward higher-return investments with higher-risk taking might occur (Berger and Mester (1999), Berger, Bonime, Covitz, and Hancock (2000)). Thus, if this was the case, the profitability of banks should increase. However, this does not mean that banks can reduce the cost efficiently. The cost efficiency in the banking industry may reduce during the boom economy. However, during downturns in the economy, the banking industry might need to operate more efficiently in order to survive. Thus, the influence of economic conditions on efficiency is still a question mark.

The Influence of Inflation Toward Bank Efficiency

To measure the relationship between economic conditions and bank profitability, the annual inflation rate is used. Inflation is an important determinant of banking performance. In general, high inflation rates are associated with high loan interest rates and high income. Perry (1992), however, asserts that the influence of inflation on banking performance depends on whether inflation is anticipated or unanticipated. If inflation is fully anticipated and interest rates are adjusted accordingly, a positive influence on profitability will be exerted. Alternatively, unexpected raises in inflation causes

cash flow difficulties for borrowers which can lead to premature termination of loan arrangements and precipitate loan losses. Indeed if the banks are sluggish in adjusting their interest rates, there is possibility that banks cost may increase faster than bank revenue. Hoggarth et al. (1998) also conclude that high and variable inflation may cause difficulties in planning and negotiating loans.

To findings of the relationship between inflation and profitability are mixed. Empirical studies of Guru et al. (2002) for Malaysia and Jiang et al. (2003) for Hong Kong show that high inflation rates lead to higher bank profitability. The study of Abreu and Mendes (2001) nevertheless report a negative coefficient of inflation for European countries. In addition, Demirguc-Kunt and Huizinga (1999) notice that banks in developing countries tend to be less profitable in inflationary environments particularly when they have a high capital ratio. In these countries bank cost actually increase faster than bank revenue.

Yong Tan (2012) in his research found that inflation rate have positively influence to bank performance. The empirical findings suggest that higher cost efficiency, lower volume of non traditional activity higher banking sector and stock market development tend to increase profitability of Chinese banks. There are mixed findings about the influence of risk on Chinese banking profitability in terms of ROA and NIM; in particular, small bank size seems to increase the NIM of Chinese banks, while the higher NIM can also be explained by the higher liquidity of Chinese banks. Higher labor productivity leads to higher ROA of Chinese banks. The positive relationship found between inflation and profitability in Chinese banking sector reflects that fact that the inflation in China can be fully anticipated and the interest rates are adjusted accordingly. This further implies that revenues increased faster than costs. This result is in line with Pasiouras and Kosmidou (2007) for the European banks, Fadzlan and Kahazanah (2009) and Garcie-Herrero et al. (2009) for Chinese banks.

H1:Inflation rate has positive influence toward bank efficiency.

The Influence of Interest Rate Toward Bank Efficiency

Interest rates play an important role in bank operations. The major business of commercial banks is taking deposits and making loans. When interest rate increases, the cost of a bank's liabilities also increases. However,

the interest rate of the bank's loans will also increase. In the past, interest rate ceilings kept deposit costs low creating less volatility in the spread between a bank's deposits and liabilities. Interest rate deregulation caused higher bank funding costs and lower bank profits in the early 1980s, because the cost of raising funds for commercial banks was closely related to interest rates in the money and capital market (The 1980 Depository Institution Deregulation and Monetary Control Act [DIDMCA] phased out interest rate ceilings [Regulation Q], 1986). This increased the volatility of raising funds for banks. Lam and Chen (1985) expected that banks of different sizes (small and big banks) might react differently to changes in capital regulation because of the phase out of the interest rate ceiling. Brown (1983) found the deregulation of interest rates gave more freedom to the small community bank. However, community-oriented small banks might also be at risk to interest deregulation because of their traditionally high concentration of low-cost deposits. Brown shows that high-performance banks maintain the profitability by controlling non-interest expenses to compensate for decreased margins and when comparing the non-interest expenses, Brown shows that smaller banks are more efficient than the larger banks.

Humphrey and Pulley (1997) showed the large banks bore the brunt of interest rate deregulation between 1977-1981 and 1981-1984. Large banks tend minimize the negative influence on profits from the deregulation-induced rise in funding costs by adjusting their use of labor and capital inputs and deposit and loan output prices. However, between 1981-1984 and 1985-1988, the situation was reversed for the large banks. According to the evidence of Humphrey and Pulley, smaller banks with assets between $100 and $500 million had done less adjustment to the deregulation. Thus, those smaller banks less relied on the improved business environment in order to stabilize profitability and larger banks relied more on the business environment to improve their profitability. The results also imply that the volatility of larger banks profits is higher than that smaller banks after the deregulation of the interest rate ceiling.

Several studies have been conducted to investigate the influence of interest rate changes on the demand for Islamic deposits. Overall, the findings show that a negative relationship exists between the two variables. Haron and Ahmad (2000) analyzed the relationship between total Islamic deposits and conventional rate of return on deposits for the period 1984 to 1999 in Malaysia

banks. They found a negative relationship between the interest rates of fixed deposits of conventional banks and the volume of interest free investment deposits of sharia banks. The finding is consistent with the theory that during rising interest rates, returns on sharia bank deposit are relatively lower which cause customers to switch to the conventional bank. The study by Rahmatina (2007) also found that sharia bank depositors in Indonesia behaved in accordance with the dictates of the profit motive; responding positively to changes in the real rate of return and negatively to rising interest rates although it was not significant in the short run.

Another study by Obiyathulla (2014) examined the relationship between changes in the interest rate of conventional bank deposits and the rate of return on sharia bank deposits for the period 1984 to 2003. Dividing the overall period into two segments (rising and falling interest rates), the study found strong positive correlations between the two rates for both segments. The results showed both rates moved closely in the same direction regardless of rising or falling interest rates. Obiyatullah argued that the result supported the theory that falling interest rates had a favorable influence on sharia banks but it also indicated that sharia banks were forced to raise deposit rates when interest rates rose in order to remain competitive which would imply a potential squeeze on the banks earnings.

H2: Interest rate has negative influence toward Bank Efficiency.

The Influence of Exchange Rate Toward Bank Efficiency

Exchange rate models since the 1970s have emphasized that nominal exchange rates are asset prices and are influenced by expectations about the future. The "asset market approach to exchange rates" refers to models in which the exchange rate is driven by a present discounted sum of expected future fundamentals. Obstfeld and Rogoff (1996,529) say that "one very important and quite robust insight is that the nominal exchange rate must be viewed as an asset price. Like other assets, the exchange rate depends on expectations of future variables" (italics in the original). Frenkel and Mussa's (1985) survey explains the asset market approach.

These facts suggest that exchange rates should be viewed as prices of durable assets determined in organized markets (like stock and commodity exchanges) in which current prices reflect the market's expectations concerning

present and future economic conditions relevant for determining the appropriate values of these durable assets, and in which price changes are largely unpredictable and reflect primarily new information that alters expectations concerning these present and future economic conditions. (726)

Yourougou (1990) explained that the interest rate and exchange rates have a significant influence on these hares of financial institutions including banks. Moreover, Kessel (1956), Bach and Ando (1957), French et al (1983) explained the sensitivity of banks interest rate, given the composition of their balance sheets. The first empirical studies have drawn attention to the risk of exchange rate on bank stock returns were generated by Grammatikos and al (1986) and Chamberlain et al (1997). The results of these studies have shown that U.S banks were exposed to the risk of exchange rate. Furthermore, by employing the same three-factor model to return the generating process of Korean Banks, Hahm (2004) concluded on the risk of interest rate risk and exchange rate in that Korean bank stock return were sensitive to those factors. His work shows that Korean commercial banks have been very involved with the risk of interest rate and currency risk. The result also shows that the efficiency of Korean banks is significantly associated with the degree of interest rate and credit policy.

Mouna and Anis (2011) in their research found that the exchange rate have positive relationship with bank performance. In their research said the fluctuation of the exchange rate leads to an increase of bank stock return volatility. While the influence of long term interest rate volatility on the bank stock volatility is very important, when the long term interest rate becomes more volatile, this will lead to an increase in the bank stock return volatility.

Rexord Abaidoo (2014) in he research about macroeconomic condition and other factors influence operational efficiency among commercial banks found that GDP growth and exchange rate volatility have positively influence aggregate operational efficiency among commercial bank; with a percentage increase in the variables significantly augmenting aggregate operational efficiency.

H3: Exchange rate has positive influence toward bank efficiency.

3. Research Method

The population used in this research was annual report of conventional bank and sharia bank in Indonesia.

The method used to get the sample in this research is Non-probability sampling. This method gave the same chance for every element of population to be sampled. The sample used in this research was annual report of every bank in Indonesia from 2007-2014..

Types of data used in this research are such as bills payable, fixed asset, deposit for input in bank efficiency and investment, loans, zakat, corporate social responsibility (CSR) as output in bank efficiency. For macroeconomic factors such as inflation rate, exchange rate, and interest rate,

Variable Definition

Data analysis was explained by describing the statistical analysis which was the way to describe the data that had been collected without intending to make the conclusion which was applied to public. The data were the mean, standard deviation, and variant.

a. Time Series Regression
   Time series data were the data collected on the same observational unit at a multiple time period. This method was used to analyze the correlation between bank efficiency and macroeconomic factors. The formula of time series regression is like this:

$$BE = \alpha + \beta_1 INF + \beta_2 INTR + \beta_3 EXCHR$$

Where as:
BE = Bank Efficiency
$\beta_1 INF$ = Inflation Rate
$\beta_2 INTR$ = Interest Rate
$\beta_3 EXCHR$ = Exchange Rate

4. Analysis Data and Discussion
4.1. Bank Performance

The results of the analysis of bank performance in this research are as follows:

Table 4.1.

Sharia Bank Performance

Bank Performance	Years							
	2007	2008	2009	2010	2011	2012	2013	2014
A. Input								
1. Bills Payable	944,497	2,423,992	3,852,000	6,117,000	6,992,000	12,082,000	12,320,000	9,847,000
2. Fixed Assets	295,959	436,020	672,000	899,000	1,194,000	1,803,000	2,198,000	4,094,000
3. Deposits	3,750,376	4,238,337	6,202,000	9,056,000	12,006,000	17,708,000	18,523,000	18,649,000
B. Output								
1. Investment	5,640,000	7,910,000	9,955,000	13,416,000	17,903,000	26,585,000	33,839,000	41,718,000
2. Advances plus Loans	26,624,905	36,584,973	46,186,000	68,181,000	102,655,000	147,505,000	184,120,000	199,329,000
3. Zakat	1,904,390	2,463,225	59,000	55,000	64,000	3,025,000	205,000	585,000

Source: Data processed

Table 4.2.

Conventional Bank Performance

Bank Performance	Years							
	2,007	2,008	2,009	2,010	2,011	2,012	2,013	2,014
A. Input								
1. Bills Payable	20,866,000	237,053,000	207,893,000	224,737,000	308,396,000	312,288,000	400,057,000	474,835,000
2. Fixed Assets	168,612,000	264,723,000	301,382,000	272,356,000	290,390,000	343,130,000	355,058,000	427,782,000
3. Deposits	1,510,834,000	1,753,292,000	1,973,042,000	2,338,824,000	2,784,912,000	3,225,198,000	3,663,968,000	4,114,420,000
B. Output								
1. Investment	12,230,000	9,607,000	9,719,000	8,436,000	8,918,000	591,425,000	798,157,000	903,194,000
2. Advances plus Loans	1,002,012,000	1,307,688,000	1,437,930,000	1,765,845,000	2,200,094,000	2,725,674,000	3,319,842,000	3,706,501,000
3. Corporate Social Responbility	263,000	291,000	756,000	1,761,000	1,276,000	2,607,000	2,914,000	3,305,000

Source: Data Processed

From the above table, it can be concluded that the input of sharia bank especially in bills payable was relatively increasing every year and for fixed assets and deposits were increased every year. Thus, the output of sharia bank especially in investment and loans were increased every year and for zakat was relatively fluctuating.

From the above table, it can be concluded that the input of conventional bank especially in bills payable was relatively increasing every year, for fixed assets was relatively fluctuating every year and for deposits increased every year. Thus, the output of conventional bank especially in investment and corporate social responsibility were relatively fluctuating every year and for loans was increased every year.

4.2. Bank Efficiency

The results of the bank efficiency of conventional bank and sharia bank in this research are as follows:

Table 4.3.

Bank Efficiency

Period	BE conventional	BE Sharia	Period	BE conventional	BE Sharia
2007Q1	0,904	0,99	**2011Q3**	0,911	0,96
2007Q2	0,831	0,994	**2011Q4**	0,938	0,893
2007Q3	0,822	1	**2012Q1**	0,862	0,962
2007Q4	1	1	**2012Q2**	0,892	0,911
2008Q1	0,941	0,932	**2012Q3**	0,901	0,909
2008Q2	0,96	1	**2012Q4**	0,902	0,817
2008Q3	1	1	**2013Q1**	0,918	0,988
2008Q4	1	0,941	**2013Q2**	0,944	0,967
2009Q1	0,833	0,897	**2013Q3**	0,962	1
2009Q2	0,894	0,841	**2013Q4**	0,968	0,949
2009Q3	0,871	0,891	**2014Q1**	1	1
2009Q4	0,887	0,745	**2014Q2**	1	1
2010Q1	0,824	0,832	**2014Q3**	0,985	0,975
2010Q2	0,808	0,692	**2014Q4**	0,976	1
2010Q3	0,826	0,778	**Average**	0,9087	0,9215
2010Q4	0,816	0,745	**Levene Test**	F = 2264	sig = 0,137
2011Q1	0,827	0,898	**t test**	t = -0,664	sig = 0,509
2011Q2	0,876	0,982			

Source: Data processed

From the above table, we can see that the efficiency of sharia bank is relatively fluctuating. In 2009 until 2010, the efficiency of sharia bank relatively decreasing. But, start from 2011 until 2014 the efficiency of sharia bank increased. For the efficiency of conventional bank was relatively fluctuating too. In 2009 until 2010, the efficiency of conventional bank relatively decreasing. But, start from 2011 until 2014 the efficiency of conventional bank was increased.

4.3.The Influence of Macroeconomic Factors Toward Bank Efficiency

Before using the independent sample test, firstly homogeneity test with F test (levene's test) was done. From the above data, it could be seen that the significant value in this research was 0.137. This probability was bigger than the standard probability which was 0.05. Thus, all variants in this research was the same. Based on F test, independent sample t-test was done by using equal variance assumed.

After doing F test, independent sample t test was done by using equal variance assumed. Based on the data above it can be seen that the result of independent samples t test based on equal variance assumed was -0.664 with the significant value of 0.509>0.05. Based on that result, it can be concluded that there was no significant difference between the efficiency of conventional bank and the efficiency of sharia bank.

Table 4.4.

The Result of Multiple Linier Regression Test of Sharia and Conventional Bank

Newey-West HAC Standard Errors & Covariance (lag truncation=3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	0.001072	0.000641	1.673078	0.1055
INTR	-0.020423	0.015864	-1.287384	0.2085
EXCHR	0.385645	0.145762	2.645715	0.0132
C	1.077360	0.104729	10.28713	0.0000

R-squared	0.252712	Mean dependent var	0.937813
Adjusted R-squared	0.172645	S.D. dependent var	0.059536
S.E. of regression	0.054153	Akaike info criterion	-2.877522
Sum squared resid	0.082113	Schwarz criterion	-2.694305
Log likelihood	50.04035	F-statistic	3.156270
Durbin-Watson stat	0.903138	Prob(F-statistic)	0.040265

The result of regression equation in the above table could be formulated by using multiple regression as follow:

BE = 1.077360+0.001072INF-0.020423INTR+0.385645EXCHR

The coefficient of each variable can be explained as follow:

From the result of regression test, the value of constant = 1.077360. It showed that besides variables which had been determined, there were another variables that influence bank efficiency of 1.077360. In other word, every independent variable was a zero sum. Thus, the bank efficiency was 1.077360.

From the result of regression test, the value of consistent inflation = 0.001072. It showed that there were positive relationship between inflation and bank efficiency. If inflation increased by one, the bank efficiency would increased by 0.001072 with the assumption that other variable was constant.

From the result of regression test, the value of consistent interest rate = -0.020423. It showed that there were positive relationship between interest rate and bank efficiency. If interest rate increased by one, the bank efficiency would increased by -0.020423 with the assumption that other variable was constant.

From the result of regression test, the value of consistent exchange rate = 0.385645. It showed that there were positive relationship between exchange rate and bank efficiency. If exchange rate increased by one, the bank efficiency would increased by 0.385645 with the assumption that other variable was constant.

To prove the influence of independent variable toward dependent variable, partial test was done by using T test. By comparing p-value (sig-t) toward significant degree by the tolerance of 5%, it can be used to make decision if hypothesis was rejected or accepted. Based on the above table and significant degree by the tolerance of 5%, we can know that inflation had significant influence toward bank efficiency, interest rate had significant influence toward bank efficiency, and exchange rate did not have significant influence toward bank efficiency.

F test was used to know the significant positive influence of independent variable at the same time against the dependent variable which was compared, to Sig F that was resulted by multiple linear regression with the significant degree of 5% ($\alpha = 0.05$). Table 4.4 showed that the result of F test was Sig F = 0.0400265. Because 0.0400265 < 0.05, Ho was rejected and Ha was accepted, or it can be concluded that there was positive influence in macroeconomics variable which consisted of inflation, interest rate and exchange rate at the same time toward bank efficiency.

Discussion

Bank Performance and Bank Efficiency

Based on the above result, it could be concluded that the performance of sharia bank in input relatively increased every year. But in 2014, bills payable for sharia bank had decreased from the previous year. In 2013, bills payable of sharia bank was 12,320,000 and in 2014, it was 9,847,000.

The performance of sharia bank in output was relatively increasing every year. While in zakat, sharia bank was relatively fluctuating. This happened from 2008 until 2014. In 2009, zakat was decreasing from 2009 until 2010. But in 2011, it was increasing until 2012. Afterward, it was decreasing in 2013 and then it was increasing again in 2014.

The performance of conventional bank in input was relatively increasing every year. While bills payable was relatively fluctuating. Bills payable in conventional bank had fluctuating progress every year. Sometimes bills payable in conventional bank was increasing but sometime it was decreasing. It also happened in fixed asset of conventional bank. Fixed asset of conventional bank was also relatively fluctuating but increasing more. Only in 2010 fixed asset of conventional bank was decreasing.

The performance of conventional bank in output was relatively fluctuating every year. Investment of conventional bank was the one variable that had the most fluctuating among others. Sometimes investment in conventional bank was increasing but sometimes it was decreasing. In 2011 to 2012, it had high increase of 891,800 to 798,157,000. Corporate social responsibility in conventional bank was also fluctuating. Sometimes corporate social responsibility in conventional was increasing and sometimes it was decreasing.

Based on the above result, the efficiency of sharia bank was relatively fluctuating every year. Sometimes the efficiency of sharia bank was increasing but sometimes it was decreasing. Similar to the efficiency of conventional bank, the efficiency of conventional bank was relatively fluctuating. Sometimes it was increasing but sometimes it was decreasing.

The relation between the performance of bank and the efficiency of bank was when bank performance was increasing which lead to bank efficiency. It could be seen from the result of this research. When the performance of sharia bank was decreasing, the efficiency of bank will also decreasing.

The Influence of Inflation Toward Bank Efficiency

Based on the above result, it can be concluded that inflation did not have an influence toward bank efficiency either in sharia bank or conventional bank. The amount of inflation would not influencing bank efficiency either in sharia bank or conventional bank.

Inflation happened because the development of business cycle influenced the economy and suffers booming. Beside that, it happened because of the development of business cycle, actually it had more influence on input than output and finally in the bank performance would increase. The influence of inflation depends on the inflation that had been fully anticipated or not fully anticipated by the bank. If the inflation had been fully anticipated, the interest rate which was applied by bank would increase to cover inflation risk. Thus, the income enhancement would be faster than cost enhancement and then it would influence positively on the performance of bank especially profitability. But if the management of bank did not anticipate the changes of inflation, the interest rate applied by bank were slowly adapted and the cost enhancement would be faster than the income enhancement. At the end, the inflation would not influence toward bank efficiency.

The Influence of Interest Rate Toward Bank Efficiency

Based on the above result, it could be concluded that the interest rate did not have any significant influence toward bank efficiency of conventional bank but it had positive influence toward bank efficiency of sharia bank. It means that the changing of interest rate would not influence the changing of bank efficiency of conventional bank but it would influence toward bank efficiency of sharia bank. In theory, a unique feature that differentiates sharia bank from conventional bank was the profit loss sharing paradigm, which was in sharia predominantly based on the mudarabah and musyarakah concepts of Islamic contracting. Under the PLS paradigm, the assets and liabilities, the assets and liabilities of sharia banks were integrated in the sense that borrowers share profits and losses with the bank, which in turn share profits and losses with the depositors. It means that logically, interest rate should not have any influence toward bank efficiency of sharia bank. But the result of this research was interest rate that had positive influence toward bank efficiency of sharia bank. This result was the same with Chong and Liu research (2007). In their research, sharia banks in Malaysia were not interest free. It means, that interest rate would influence bank efficiency of sharia bank because sharia bank had consideration about interest rate to determine profit loss sharing paradigm.

Interest rate have a big role in the operational of bank. The main business of bank is taking the deposit and giving the loans. If the interest rate increase, the obligation of bank in paid will also increase. But, the interest rate of bank loans will increase too. The efficiency of operational in bank has an influence in determination of the interest rate of credit and will influence bank in controlling its interest rate. In this term, there are causality relationship between interest rate and bank efficiency, which is the determination of bank efficiency can also be done by seeing the attitude of determination in interest rate by experience. This thing can happen because, in general, in normal condition of volatility the interest rate tends to be low, so it can give certainty of work for the bank.

This result is in line with the research of Haron and Ahmad (2000) which proved that interest rate had negative influence toward bank efficiency.

The Influence of Exchange Rate Toward Bank Efficiency

Based on the above result, it could be concluded that the exchange rate had positive influence toward bank efficiency in conventional bank. The bigger the exchange rate the bigger the bank efficiency.

Exchange rate is the price of the currency in other country toward domestic currency. The low currency of Rupiah toward other currency especially US dollars ($) will encourage the weakening of purchasing power of people that can make happen interestingly less the level of investment profit in capital market. In export section, the depreciation of Rupiah toward domestic currency (US$) allows exporter offers goods at lower price, so it makes raising competitiveness in abroad. Based on the theory, exchange rate reflects the balancing of supply and demand toward Rupiah or US Dollars (US$). Depreciation reflects, the declining in the ability of economic in Indonesia and the ability of company fundamental also decreases, and vice versa. Thus, appreciation will increase bank efficiency.

This result is similar to Abaido's research (2014) which proved that the exchange rate had positive influence toward bank efficiency.

But, based on the above result, it can be concluded that exchange rate did not have any significant influence toward bank efficiency in conventional bank. The amount of exchange rate did not have influence toward bank efficiency.

When exchange rate decline, people believe more on sharia bank rather than conventional bank. The reason of that public trust is the historical experience when economic crisis happened in 1997, during that time the

depreciation was very bad and many conventional banks got bankrupt because of the high interest rate to counterbalance the inflation and also to attract people want to do saving. Thus, it makes negative spread and the bank cannot fulfill their obligation to people that had been saving in their bank.

5. Conclusions

Based on the data analysis in the previous chapter, the research results conclusions can be summed up as follows:

The performance of sharia bank based on investment, loans, zakat, bills payable, fixed assets, and deposits was relatively increasing every year on bills payable, fixed assets and deposits. It means, that every year sharia bank always increased its revenue. While in investment, loans, and zakat was relatively increasing every year. Thus, sharia bank had good performance because sharia bank input could support the output of sharia bank.

The performance of conventional bank based on investment, loans, CSR, bills payable, fixed assets, and deposits was relatively increasing every year on bills payable, fixed assets, and deposits. It means, that every year conventional bank always increased its revenue. While in investment, advantages plus loan, and corporate social responsibility was relatively fluctuating every year. Thus, conventional bank had good performance, because conventional bank input could support the output of conventional bank.

The efficiency of sharia bank was relatively fluctuating every year. Sometimes, the efficiency of sharia bank was increasing but sometimes it was decreasing. The efficiency of conventional bank was relatively fluctuating every year. Sometimes, the efficiency of conventional bank was increasing but sometimes it was decreasing. It can be concluded that there was no significant difference between efficiency of conventional bank and efficiency of sharia bank.

It can be concluded that inflation did not have any influence toward bank efficiency either sharia bank or conventional bank. The amount of inflation did not have any influence on bank efficiency. This happened because the bank management did not anticipate inflation. Thus, the interest rate were adapted sluggish. This makes the increasing of output was faster than the increasing of input. Therefore, inflation did not influence bank efficiency.

It can be concluded that the interest rate did not have any significant influence toward bank efficiency of conventional bank but had positive

influence toward bank efficiency of sharia bank. It means that the changing of interest rate would not influence the changing of bank efficiency of conventional bank but it will influence toward bank efficiency of sharia bank.

It can be concluded that exchange rate had positive influence toward bank efficiency in conventional bank. The higher exchange rate the higher bank efficiency. This thing happened because exchange rate reflected the balance of supply and demands toward local currency or US$ currency. The depreciation of Rupiah showed the decreasing ability of Indonesian economy. Thus, the fundamental ability of a company would also decrease, and vice versa. The appreciation would increase bank efficiency. But based on the result of research, it can be concluded that the exchange rate did not have any significant influence toward bank efficiency in conventional bank. When the exchange rate of rupiah was decreasing, people would believe more on sharia bank toward conventional bank. This people's trust happened due to the historical experience when the economic crisis happened in 1997. In that period, exchange rate of rupiah was very decreasing in Indonesia and made conventional bank face bankruptcy.

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