Shariah Bank in Global Financial Crises:
A Historical Comparative toward Efficiency and Productivy of Shariah Bank in Global Financial Crises

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ARTICLE INFO	ABSTRACT
	Purposes: The article aims to describe in compartive view of how the shariah bank faces the global financial crises. Both effinciency and productivity is selected as main variabel to understand the main issues. ***Design/Methodology/Approach:*** Quantitative with explonatory design, namely DEA, is applied in this research. In practise, various hyphoteses was tested through empirical data. ***Findings***: It can be proved that, there are significance different in effienciency and productivity of shariah bank before and after global crises of finance. To sum up, efficiency of shariah bank decrease extremely after crises. But, conversely, their productivity indicate an increasing in various indicators. In general, in both efficiency and productivity of shariah bank shown a rebalancing in two aspects. With level 99,23% point. ***Originality/Value***: This study contribute new information for that crises can effect significantly to efficiency and productivity of financial industries such as shariah bank.

INTRODUCTION

The growth of Islamic banking in Indonesia since its inception in 1992, proved to provide color and variety for the banking industry. The development and growth of the banking industry in the financial sector was driven more by the growth of banks since the deregulation of the financial sector in October 1988. Since then, the banking industry has become the dominant industry in the

financial sector.[1] In October 27, 1988 the policy has provided a fundamental changes in the Indonesian banking system, and continued in 1992 with the issuance of Law No. 7 of 1992 concerning Islamic banks which are permitted to operate in Indonesia by applying a profit sharing system. Then confirmed by the issuance of Law Number 10 of 1998 which strengthens Law Number 7 of 1992, Indonesia de jure has implemented a dual banking system, namely conventional banking and Islamic banking can operate side by side in all regions of Indonesia.

The following table shows a comparison of asset value between Islamic banks and conventional banks based on the types of books:

Tabel 1.
Development of Assets Commercial Bank and Commercial Bank Syariah Based Operations (in billion Rupiah)

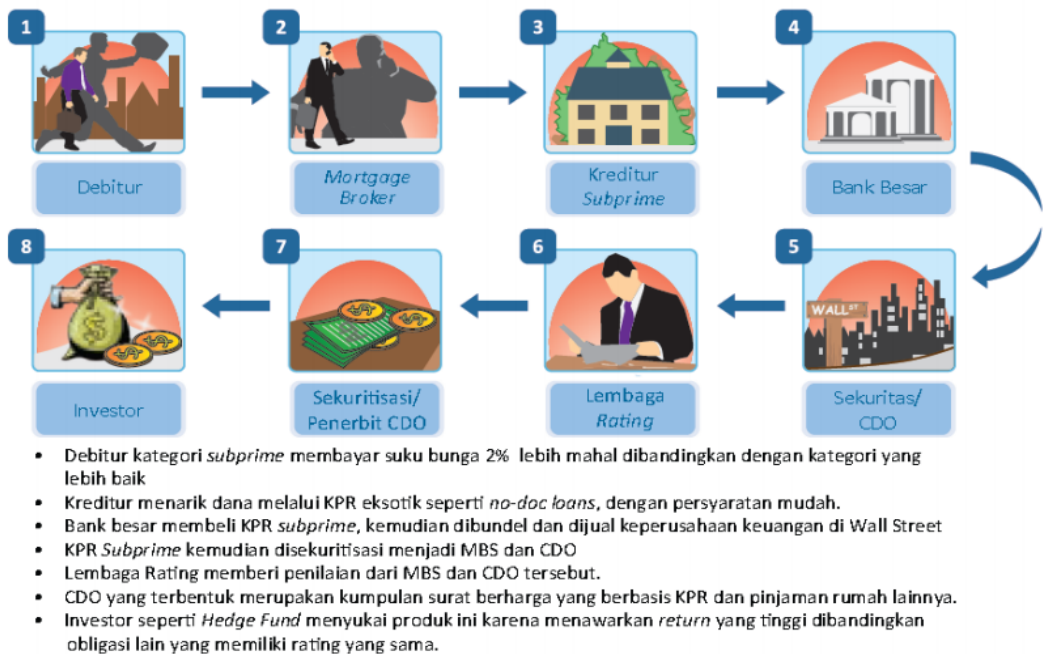| Bank Group	2014	2015	2016	TW III 2017
BOOK 1 Conventional	131.016 100.103 68.143			166.367
BOOK 3 conventional	2,245,451 2,410,757 2,427,775			1,762,817
BOOK 4 conventional	2,728,358 3,120,003 3,539,204			2,477,667
BOOK 1 OF ISLAMIC	35.163	23.592	15.968	17,027
BOOK 2 SHARI'A	119.031 159.374 174.821			169.797
BOOK 3 SHARI'A	-	70.799	78.839	84.087
Total	6,129,146 6,729,799 7,150,388			5,615,150

Source: SPI FSA, Sept 2017

While running a role in the monetary as a banking, the characteristics of the two banks are different. The striking difference between the two lies in the interest system that is not owned by Islamic banks. In addition, the characteristics of each banking system. This difference could have an effect on the growth of the performance of each bank. Or it could not be a distinguishing factor. Looking at the growth of Islamic banks that are higher against national banks. Also the resilience of Islamic banks when facing two periods of global crisis, 1998 and 2008. The current banking conditions have certainly increased compared to when faced with the global financial crisis in 2007-2008. The crisis that began in the United States, apparently had an impact on other parts of the world. In general, most of the world economy is affected by the global economic crisis through both trade and financial channels. In the trade channel,

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[1] Nuryakin Chaikal and Perry Warjiyo, "Perilaku Penawaran Kredit Bank Di Indonesia: Kasus Pasar Oligopoli Periode Januari 2001 - Juli 2005," *Buletin Ekonomi Moneter Dan Perbankan* Vol. 9, no. 2 (2006): h. 15.

export performance is depressed due to falling prices which have a negative impact, mainly on countries exporting natural resource commodities (SDA). As for the financial transaction channel, the impact of the *global financial crisis (GFC)* spread to the Asian region due to the decline in the stock market and the depreciating exchange rate. Banking as a financial sector is certainly one of the elements affected by this crisis. Bank Indonesia described the situation at that time in the following infographics:

Figure 1.
Chronology of Global Financial in 2008

- Debitur kategori *subprime* membayar suku bunga 2% lebih mahal dibandingkan dengan kategori yang lebih baik
- Kreditur menarik dana melalui KPR eksotik seperti *no-doc loans*, dengan persyaratan mudah.
- Bank besar membeli KPR *subprime*, kemudian dibundel dan dijual keperusahaan keuangan di Wall Street
- KPR *Subprime* kemudian disekuritisasi menjadi MBS dan CDO
- Lembaga Rating memberi penilaian dari MBS dan CDO tersebut.
- CDO yang terbentuk merupakan kumpulan surat berharga yang berbasis KPR dan pinjaman rumah lainnya.
- Investor seperti *Hedge Fund* menyukai produk ini karena menawarkan *return* yang tinggi dibandingkan obligasi lain yang memiliki rating yang sama.

Source: Bank Indonesia

Crisis The crisis began with defaults on the subprime group, which triggered a *bubble* in the property sector. The problem with thedefaults *subprime mortgage* raises questions about the role of rating agencies. So far, subprime-based CDOs and MBS have always received ratings above *investment grade.* The high rating at the time was justified because its assessment was based on risk management practices that were considered normal such as *over collateralization* or the existence of collateral if credit defaulted. The high rating prompted investors to buy subprime-based securities so that they helped finance the boom in the property sector. Between the third quarter of 2007 and the second quarter of 2008, the rating agency lowered the credit rating for MBS by USD 1.9 T, causing the price of shares of companies with lots of MBS to fall. Failure to pay in the subprime sector caused the value of MBS assets to fall and

pushed the largest investment bank in the US to suffer heavy losses. During September 2008 Lehman Brothers declared bankruptcy, while Bear Sterns and Merril Lynch were taken over by other banks. The collapse of 3 of the 5 largest investment banks in the US added to instability in the global financial markets. Banking growth in Indonesia during the crisis showed *growth* lowercompared to the previous year. Interestingly, in 2008 in the crisis period, the number of Islamic commercial banks in Indonesia increased by 2 BUS.

Tabel 2.
The growth of Indonesian Banks in Pre-Crisis 2008

Year	Conventional Bank DPK	*Growth*	Credit	*Growth*	Sharia Bank in deposits	*Growth*	Financing	*Growth*
2006	2005	14.11%	792.297	13.89%	18.509	23:06%	19.839	22.98%
2007	1,510,834	17:38%	1,002,012	26.47%	23.960	29.45%	25.663	29.36%
2008	1,753,292	16.05%	1,307,688	30.51%	30,546	27.49%	33,026	28.69%
2009	1,973,042	12.53%	1,437,930	9.96%	43,858	43.58%	46,386	40.45%

Source: Results of Analysis from BI Statistics for the year related to

Both Islamic banks and conventional banks experienced lower growth in 2008 in the year of 2008. compared to the previous year. At conventional banks, this decline continued the following year. In contrast to Islamic banks, in 2009 again showed higher growth than before. This also happened in Qatar, in the period before and after the crisis, Islamic banks were stronger in the growth of total assets, financing and deposits. Although in terms of profitability, Islamic banks are still lower than conventional banks. Growth in the number of deposits and credit / financing for banks is very important because it is the main operational activity. In measuring efficiency, DPK and Credit become input and output variables if they use the intermediation approach. The different conditions of DPK and Credit in sharia and conventional banks when facing a crisis, certainly become an interesting study to know the impact on the efficiency and productivity of each type of bank.

Measurement of the level of efficiency can provide an overview of the performance of banking businesses. The more efficient the banking industry, the better its performance, and vice versa. For investors, efficient banking can provide confidence that the funds invested in these banks will provide results and profits. For customers, efficient banks can provide benefits with low transaction costs, and for the government, efficient banks will provide benefits in the form of corporate tax. Therefore, banks must pay more attention to the efficiency and productivity of their institutions. In addition to efficiency, productivity is also an important factor in a company's success, because in addition to affecting production costs, productivity also influences employee motivation and satisfaction (Hutabarat & Huseini, 2006). In addition, high productivity will have broad consequences for companies, including savings in costs incurred in the company's daily operations. The existence of these cost

savings will result in increased business profit. Productivity is one of the main indicators in assessing the competitiveness of Islamic banks. This measure will show how far the Islamic banks can utilize the limited resources they have (input) to the results (output) to be obtained (Hidayati, 2005).

How efficiency and productivity of Islamic banking after facing a crisis is certainly very important to know. Banks should ideally improve efficiency and increase productivity after experiencing the shock of the global financial crisis. Therefore it is necessary to do a comparative analysis of the efficiency and productivity of Islamic banks, both the period before the crisis (2005-2008) and the period after the crisis to date (2009-2017). This study examines the *Comparison of Efficiency and Productivity of Islamic Banks in Indonesia Before and After the 2008 Global Crisis.*

LITERATURE REVIEW

Measurement of the level of efficiency can provide an overview of the performance of a business. The more efficient, the better the performance, and vice versa. For investors, an efficient company can provide confidence that the funds invested will provide results and profits. The definition of efficiency according to Archer (2010) is: A *measure of effectiveness that results in minimizing wasted time, energy and skills.* At the company, the implementation of efficiency is known in 3 types: 1) *Technical Efficiency* is efficiency that reflects the company's ability to be able to achieve the optimal level of output from a particular input. *Technical Efficiency* measures the production process in producing a certain output with minimal input. It can also be said, a production process is said to be technically efficient if the output of an item cannot be increased without reducing the output of other goods; 2) *Allocative Efficiency*, is efficiency that reflects a company's ability to optimize its inputs with price structures and technology. In terminology, allocative efficiency is often equated with pareto efficiency to respect economists who developed the concept of *efficiency in exchange* from Italy, Vilfredo Pareto. Efficiency Pareto said, production input is used efficiently if the input is no longer possible to be used to improve a business without causing at least the condition of another business to be worse. In other words, an input is called inefficient if the input allocated to produce output, cannot be used or is not desired by consumers; 3) *Economic Efficiency*, is a combination of technical efficiency and allocative efficiency. Implicitly, economic efficiency is the concept of *least cost production*. At a certain level of output, a company's production is said to be economically efficient if the company uses the most minimal cost per unit of output.

Measurement of Efficiency in Financial Institutions

Analysis of efficiency in banks or financial institutions can use efficiency in scope (*Scope Efficiency*), scale efficiency (*Scale Efficeiency*), location efficiency (*Allocative Efficiency*), and technical efficiency (*Technical Efficiency*). Banks can be

said to meet coverage efficiency when banks are able to operate in diversified locations. Whereas efficiency in scale is achieved if the bank is able to operate on a *constant return to scale*. Efficiency of allocation is achieved when the bank is able to determine various outputs that are able to maximize profits. The technical efficiency is the relationship between input and output in the production process. A production process is said to be efficient if the use of certain inputs can produce maximum output. It can also be vice versa, to produce a certain number of outputs using minimal input.

The concepts used in defining the relationship of input output in the activities of financial institutions in parametric and non-parametric methods are: a) The *production approach*, seeing banks as producers of account deposits *(funding)* and credit loans (*loans / financing*); b) The intermediation *approach*, according to Hadad (2003), the intermediation approach views the function of banks or financial institutions as intermediaries: changing and transferring financial assets from surplus units to deficit units. In this case institutional inputs such as costs and payment of *returns* on funding, with output measured in the form of financing or *loans* and *financial investments*; c) Asset approach (*the asset approach*), this approach visualizes the main function of a financial institution as a *creator of* credit / financing (*loans / financing*). The asset approach is almost similar to the intermediation approach, where output is really defined in the form of assets.

Measurement of Productivity in Financial Institutions

Measurement of changes in productivity can be through three alternatives namely, the 5 *Fisher Index, Tornqvist Index* and *Malmquist Index*. Compared to *Fisher* and the *Tornqvist Index, the Malmquist Index* has three main advantages. Among the strengths of the *Malmquist Index:* 1) Does not require maximization of profits or assumptions of minimization of costs, 2) Does not require information about input and output prices, 3) if the researcher has panel data, then productivity changes can be made into two components, namely technical efficiency and technical change.

Achievement of productivity can be seen from the total value of *Total Factor Productivity Change (tfpch)* and its two forming components, namely *Technological change (techch)* and *Efficiency Change (effch)*. Whereas *Pure Efficiency Change (pech)* and *Scale Efficiency Change (sech)* are subcomponents of *Efficiency Change*. A number in the *Malmquist Productivity Index* below 1 means that the bank has decreased productivity. Meanwhile, if the value is above 1, it means that the bank has increased productivity.

Efficiency and Productivity of Islamic Banks Intermediation

Approach The intermediation approach sees financial institutions as an intermediary function. Financial institutions channel financial assets from parties who are overfunded, to those who are underfunded. Output in this approach is measured through loan / financing and income loans, while institutional inputs

are sources of third-party funds (TPF), operational costs and asset capital. Basically the intermediation approach is complementary to the production approach. The intermediation approach explains the main activities of banks as intermediaries for money obtained from third party funds into money channeled in the form of financing to debtors.

Tabel 3.
The Eficiency Differences Between Sharia and Conventional Bank

| Remarks	Sharia	Bank Conventional Bank
Funding (DPK)	Fund collection in Islamic banks generally uses 2 contracts. muḍārabah and Wadi'ah. This difference affects the cost of yields to depositors.	Collecting funds at conventional banks uses interest-bearing savings contracts. Thus there is no difference in principle in DPK funds.
Operational Costs Profit	sharing costs in Islamic banks are significantly different from conventional banks. The return on the muḍārabah contract uses a proportion of the ratio. So when the bank's income is high or low, the yield given to the DPK also matches the bank's income. While for wadi'ah-based contracts, the yields are in the form of bonuses, which are also adjusted to the income of Islamic banks.	Interest costs on conventional banks are fixed, because the nature of the interest does not affect bank income. When bank income is high, interest costs have no effect. Similarly, when the opposite occurs. This becomes a serious risk for conventional banks when income is low, conventional banks are still obliged to give interest at the same amount as when bank revenues are good.
Financing / Credit	Distribution of financing at Islamic banks varies depending on the principle. In general, it is divided into 2: 1. Sales-Based Purchase- 2. Based Revenue Sharing Fund distribution in Islamic banks is limited to the halal sector. In the FSA regulations, there is a *negative list* that lists the sectors that are not allowed to be financed by Islamic banks. Among the liquor industry and other illicit products, financing	At conventional banks, lending is based on the principle of loans with interest. There are 3 categories based on their designation: 1. Working Capital 2. Loans InvestmentConsumer 3. CreditLoans. Conventional banks do not have restrictions on certain sectors. As long as the loans provided do not violate the bank's prudential principles

| | | for agencies whose main income is from interest, cigarette financing, financing which contains elements of *garar, maisir* and *usury.* | and applicable regulations. |

Source: Summarized from Muhamad (2014) This

Table of principles on the input and output factors of the intermediation approach confirms the differences in the determinants of sharia bank efficiency. This characteristic seems to affect cash management at each bank. Bidabad compares the cash stability curves of each bank in Figure 2.1.

Figure 2

Comparison between Cash Stability of Islamic and Conventional Bank

Figure1: Conventional banking

Figure 2: Islamic banking
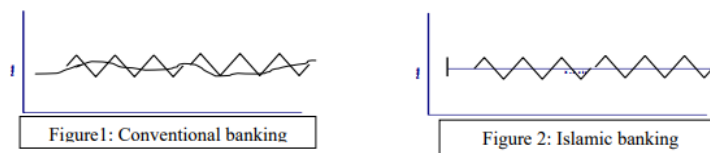
Source: Bijan Bidabad (2008)

Characteristics of Islamic banks as profit sharing banks, can stabilize interest rates and the flow of financing and funding better than conventional banks. Stable liquidity certainly affects the cost efficiency and the obligation of providing profit sharing to depositors' customers. While on the curve, optimum liquidity, Islamic banks are lower than conventional banks. Optimum liquidity can be achieved when liquidity costs can be minimized. This difference is due to Islamic banks do not need to provide more funds related to the cost of savings interest, because the distribution of returns adjusts to the conditions of the bank. This is also one of the factors that the liquidity of Islamic banks is more stable against the global crisis in 2008 (Abdulle, 2013).

Efficiency and Productivity of Islamic Banks Islamic Perspective

One of the striking characteristics of Islamic banks is in terms of providing yields for DPK. The principle of profit sharing for Islamic banks is different from conventional banks which provide fixed cost interest. Islamic banks provide profit sharing to customers in accordance with the ratio of profits obtained from bank operations (DSN-MUI, 2000). In addition, operational costs in Islamic banks, according to Fatwa No.02 / DSN-MUI / IV / 2000 concerning Savings, are only allowed to use the ratio that is a portion of the bank.

Thus, the management of funds by Islamic banks must be efficient, by minimizing the existence of resources that are less than the maximum or wasted. Prohibition of wasting wealth in Islam, one of them is in the Hadith of Bukhari

History No. 2231: "The *Prophet SAW said: "Verily Allah forbids you disobedient to Mother, buries your daughter alive, and hates you from qiila and qaala (preaching every heard), as well as asking many questions, and wasting wealth* (HR Bukhari, No. 2231)."

The purpose of (*wasting property*) according to Al Bugā (2008) is interpreted as an act of utilizing the property for immoral acts. It could also be interpreted as excess with the treasure, even if it is permissible. This means that even if it is used in something that is not haram, excessive or inefficient behavior in the use of property, including acts that are prohibited in Islam.

Islamic banks are business institutions that compete with the market. Providing yields with agreed ratio to customers should be able to compete. This means that Islamic banks are required to be productive so they can adjust to the conditions of the banking market in Indonesia. Islamic banks need to maximize each of the input variables to produce output, so that no change behavior occurs.

> Meaning: *And give to families who are close to their rights, to the poor, and those who are on the way, and do not squander your possessions with credit. In fact the perpetrators of the change are the brothers of the devil and the devil is very disbeliever of his Lord.* (Al-Israa '26-27).

The meaning of "*not squander*(your wealth)*extravagantly", '*Allah forbid exaggeration in giving a living (spending wealth), but what is recommended is mid, or efficient and balanced (*balance*) . Ibn Mas'ud said that the term*tabẓīr* means spending wealth not on the right path. The same thing was said by Ibn Abbas. Meanwhile according to Qatadah, *tabẓīr* is to spend wealth on the path of immorality to Allah SWT., on the path that is not true, and to damage (Ibn Kathir: 2016).

DSN MUI mentions in Fatwa No.02 / DSN-MUI / IV / 2000 concerning Savings and Fatwa No. 04 / DSN-MUI / IV / 2000 concerning Deposits, Islamic banks as *muḍārib in* order to carry out various kinds of businesses that are not in conflict with sharia and develop the source of these funds. Islam commands to try and work, also commands every resource to be productive. Here are some propositions regarding productive orders:

> Meaning: *He is the One who made the earth easy for you, so walk in all directions and eat some of His sustenance. And it was to Him that you returned after being resurrected.* (Al Mulk: 15)

The phrase (Walk in all directions) in Al-Mulk: 15 is intended as an order to travel in various regions and corners of the earth for the purposes of livelihood or work (Ibn Kathir: 2016). This verse shows God's command to humans to be active and productive in their work. In the case of property, Islam also prefers productive assets, rather than silent property. In Islamic banks,

funds that settle and are not used are also called *idle money*. Unproductive assets, if they have reached haul and nishab, are obligatory to pay zakat. If the assets do not increase, each passing through the haul will continue to get the obligation of zakat. In the following hadith, there is an order to produce the wealth of orphans from being consumed by zakat:

> Meaning: *From Amar Ibn Syu'aib, from his father, from Abdullah Ibn Umar Radliyallaahu 'anhu that the Prophet sallallaahu' alaihi wa Sallam said: "Whoever takes care of the child orphan who has wealth, he should trade it for her property, and do not let that be eaten by charity.* "Tirmidhihistory and DaruquTni, (Book Bulugh al-Maram Chapter zakat hadith # 630).

Narrated the same hadith by the hadith of 'Amr also of Anas, and narrated from Ibn Umar willingly and from Ali ra Ad Daruquṭniy had narrated from the hadith Anas Abu Rafi ', he said: Once the Bani Rafi family' had property in Ali's hands. When Ali gave the treasure to them, then they found less wealth (from the original amount), then they calculated the zakat that had been issued, it turned out to be perfect, then they went to Ali, then Ali said 'Do you all think that the treasure that you keep it to me, don't I remove the zakat? ' (Aṣ-Ṣan'ani, 2015). The hadith shows the obligation of almsgiving even to the property of orphans who are not yet converted. This obligation will continue to apply every time you reach haul and nisab, so that the wealth will continue to decrease until the orphan lives. The phrase (*he should trade the asset for him*) contains an order to buy and sell or business activities of the asset. In other words, it is not recommended to keep a treasure that is silent, but it is ordered to be productive.

METHODOLOGY

This research is a research with *explanatory design*. Explanatory research is research that aims to explain the position of the variables studied and the relationship between one variable with another (Sugiyono, 2013). The study uses statistical inference by conducting hypothesis testing. This research is quantitative, comparing efficiency and productivity in Islamic banks and conventional banks. Measurement of efficiency and productivity using input and output variables with the intermediation approach. Comparisons were also made between the period before the crisis and after the global financial crisis.

Population and Samples

This study did not use samples, but instead used populations. The population of this research is all Islamic commercial banks and conventional commercial banks in Indonesia. The research period began from 2005 to 2017, with the division of the period before the crisis and post-crisis 2008.

Operational Definitions

Variable Input Variables	:	Total Deposits, Assets and Operational Costs of Islamic banks
Output Variables	:	Total Financing and Operating Income

Data Collection Techniques

This study uses secondary data. The population in this study uses data Islamic banks and conventional banks are issued by banks, or published through *bi.go.id* and *ojk.go.id.*Data sources are monthly financial statements for the period 2005-2007 for the pre-crisis period and the 2009-2017 period for the post-crisis period. For analysis using the DEA method, the data is divided into input and outputin the assumption of *variablesa return to scalevariable* (VRS). While the productivity analysis uses the *Malmquist Productivity Index* (MPI).

Data Analysis Techniques

DEA is a method that measures performance, because the main purpose of performance is to improve efficiency. DEA is a non-parametric method for measuring efficiency through evaluating the combination of input and output. DEA was first developed by Farrel (1957) which measures the efficiency of the technique of one input and one output into multi-input and multi-output, using a framework of relative efficiency values as a ratio of inputs to outputs. This analysis tool was popularized by several other researchers. Charnes-Cooper-Rhodes (1978) first discovered the DEA CCR (Charnes-Cooper-Rhodes) model in 1978. This model assumes the existence of *Constant Return to Scale (CRS)*. CRS is the same proportional change at the input level will produce the same proportional change at the output level (for example: an increase of 1 percent of input will result in an increase of 1 percent of output). Then, Charnes and Cooper together with Bankers (1984) further developed the DEA BCC model (Bankers, Charnes and Cooper) in 1984. This model assumes the existence of *Variable Return to Scale* (VRS). VRS is all units measured will result in changes at various levels of output and the assumption that the scale of production can affect efficiency. This is what distinguishes from the CRS assumption which states that the scale of production does not affect efficiency. Technology is one of the factors that influence VRS, thus opening up the possibility of production scale affecting efficiency (Abdul Majid, 2008).

Malmquist Productivity Index

MPI's was first introduced by Caves, Christensen and Diewert (1982); a distance function approach to describe technology in defining input, output and productivity indices. MPI is used to measure variations in inputs and outputs. Is one method that is commonly used in measuring changes in productivity. This method is used to differentiate changes in productivity and changes in technical

efficiency. The Malmquist Index measures the change in *total factor productivity* between 2 data points by calculating the ratios of each different data.

Different *Paired Sample T-Test*

Test This test is to find out the significance of the difference between two groups of paired samples. Thus can determine whether to accept a hypothesis or reject a hypothesis that has been made. The T ratio is calculated by finding the average count of the second sample group divided by the standard deviation of the difference in the mean count of the two groups of samples (Rino: 2009). Paired Sample T-Test Different Tests are used to look for comparing each bank in the period before and after the crisis.

RESULTS AND DISCUSSION

The development of Islamic Bank

Banks Islamic banks in the period before the crisis at that time only consisted of 3 Islamic commercial banks. The development of Islamic banks in the period are summarized in the following table:

Tabel 4.
Islamic Bank Growth Before Crises of 2008

Years	DPK	*Growth*	Aset	*Growth*	BO	*Growth*	PO	*Growth*	Financing	Growth
2005	15,041		17,111		939		2,177		16,132	
2006	18,509	23.06%	21,151	23.61%	1,587	68.99%	3,373	54.93%	19,839	22.98%
2007	23,960	29.45%	27,286	29.01%	2,091	31.80%	4,200	24.53%	25,663	29.36%
2008	30,546	27.49%	34,036	24.74%	2,603	24.46%	5,725	36.31%	33,026	28.69%

Source: Analysis of Statistics Islamic Banking BI years on

From the table 3, it can be seen that growth in Islamic banks tends to be stable. There was no *negative growth* either in the year before the crisis or in the year of the crisis. Even the growth of Islamic bank operating income was obtained in a crisis year of 36.32%. Although in the same year, financing growth of 28.69% was not as high as the previous year at 29.36%. The total growth of financing in each year is balanced by the growth in total deposits. Both in 2006, 2007 and 2008, DPK growth and Financing showed close figures.

In 2008, the number of Sharia Commercial Banks increased from only 3 banks to 5 Sharia commercial banks. BRI Syariah officially became a BUS after a spin off from BRI in November 2008. Followed by Bank Bukopin Syariah in December of the same year. The growth of sharia banking in the crisis year of 2008, of course, was also influenced by the increase of the two

banks as new sharia commercial banks. In the next period, ie, after the crisis of 2008 data showed growth in the following table:

Tabel 5.
Islamic Bank Growth After Crises of 2018

Years	DPK	Growth	Aset	Growth	BO	Growth	PO	Growth	Financing	Growth
2008	30,546		34,036		2,602		5,725		33,026	
2009	43,858	43.58%	48,014	41.07%	4,620	77.56%	8,171	42.72%	46,386	40.45%
2010	69,992	59.59%	79,186	64.92%	4,472	-3.20%	8,757	7.17%	76,602	65.14%
2011	115,415	64.90%	145,467	83.70%	6,660	48.92%	12,457	42.26%	102,655	34.01%
2012	147,512	27.81%	195,018	34.06%	8,642	29.76%	16,851	35.27%	147,505	43.69%
2013	183,534	24.42%	242,276	24.23%	14,021	62.25%	23,251	37.98%	184,122	24.82%
2014	170,723	-6.98%	272,343	12.41%	16,644	18.71%	32,615	40.27%	147,944	-19.65%
2015	174,895	2.44%	213,423	-21.63%	30,945	85.92%	31,901	-2.19%	153,968	4.07%
2016	206,407	18.02%	254,184	19.10%	34,174	10.43%	35,517	11.34%	177,482	15.27%
2017	238,393	15.50%	288,027	13.31%	29,682	-13.14%	31,273	-11.95%	189,880	6.99%

Source: Results of analysis in sharia statistics from sharia banking and OJK last yeart

It can be seen that in 2014 Islamic banking had experienced *negative growth in terms* of DPK, Assets, Operational Income and Financing. However, *positive growth* afterwards until 2017. Only the operational costs and operating income in 2017 experienced *negative growth*. Growth rates in DPK, assets and financing in the same year, continued to show *positive growth*.

Efficiency and Productivity of Islamic Banks Before the 2008 Crisis

To find out the efficiency of Islamic banks before the crisis, a DEA test was carried out on the input and output variables. Periode yang digunakan adalah 3 tahun sebelum krisisi yaitu 2005 hingga 2007. Hasil yang diperoleh sebagai mana dalam Tabel 4.5.

Tabel 6.
Efficiency of Islamic Banks Before the Crisis of the 2008

Year	Efficiency	Highest	Lowest
2005	99.3%	100%	98.2%
2006	99.4%	100%	98.1%
2007	99.6%	100%	99.0%
2008	99.7%	100%	98 , 9%

Source: Data processing of input and output variables with DEA

From the table it can be seen that Islamic banks before the crisis experienced an increase in efficiency of 0.1% each year. However, Islamic banks have not experienced optimal efficiency throughout the 3-year period before the crisis. There were only 3 Islamic commercial banks in 2005-2007, namely Bank Muamalat Indonesia, Bank Syariah Mandiri and Bank Mega Syariah Indonesia. Although the annual average is not yet efficient, the efficiency level has shown a close figure. During the 36-month period before the crisis, there were 14 months of experiencing 100% optimal efficiency. While the remaining 22 months are still not efficient below 100%. The level of productivity of Islamic banking during the 36 months before the crisis can be seen in the following Malmquist Index;

Tabel 7.
Index Malmquist of Islamic Bank

Tahun	effch	techch	pech	sech	tfpch
2005	0.992	1.038	1.001	0.991	1.030
2006	1.012	0.962	1.003	1.009	0.973
2007	0.999	0.951	1.001	0.998	0.950
AVG	1.001	0.983	1.002	1.000	0.984

Source: data is analized based on variabel input dan output with DEA tools

Increased productivity Islamic banks occurred in 2005 indicated by values at tfpch> 1. However, on average before the crisis period, Islamic banks were still not productive enough, seen from the average value of *tfpch*<1. However, Islamic banks have increased from changes in efficiency as the average *effch* was at 1,001. Likewise in the *efficiency* and *scale efficiency change* obtains a value> 1. Only on productivity and technological change, Islamic banks are not optimistic. Evidenced by a score *techch* and *tfpch* <1.

Efficiency and Productivity of Sharia Banks After the 2008 Crisis

In Islamic banking after 2008, the results of the efficiency tests use the same input and output variables as conventional banks. With the 2009 to 2017 data period and DEA analysis tools, the following results are obtained:

Tabel 8.
Efficiency of Islamic Banks After the Crisis

Year	TheEfficiency	Highestof	Lowest
2009	99.70%	100.00%	98.90%
2010	99.70%	100.00%	98.00%
2011	99.70%	100.00%	99.30%%
2012	99.90%	100.00%	98.60%
2013	100.00%	100.00%	100.00%
2014	98.60%	100.00%	90.30%

2015	99.80%	100.00%	99.00%
2016	99.80%	100.00%	98.80%
2017	99.70%	100.00%	99.10%

Source: Process data for input and output variables with DEA

The average efficiency of Islamic banks during the post-crisis period was 99.20%. In 2013 both conventional banks and Islamic banks were very efficient at 100% position. But again declined the following year, this also happened to conventional banks. 2011 was the year with the most number of months with inefficiencies of 10 months, so the annual average was the year with the lowest inefficiency.

In 2011 the figure was 98.00% to be the year with the lowest efficiency in the post-crisis period. While the month with the lowest inefficient occurred in November 2014 at 90.3% of Islamic banks experiencing inefficiency for 43 months in the 7 years of the research period. This means 39% of the entire period. However, the average efficiency of Islamic banks is still at 99.2% or more close to 100%. Calculation of productivity Islamic bank through the index malmquist showed the following results:

Tabel 9.

Malmquist Index of Islamic Bank

Years	*effch*	*techch*	*pech*	*sech*	*tfpch*
2009	0.993	1.036	0.996	0.996	1.028
2010	1.010	0.996	1.005	1.005	1.006
2011	0.965	1.291	0.994	0.994	1.245
2012	1.002	1.336	1.002	1.000	1.339
2013	0.997	0.794	1.001	0.996	0.792
2014	0.961	1.229	0.986	0.975	1.181
2015	1.040	0.853	1.013	1.027	0.887
2016	0.996	1.469	0.999	0.997	1.463
2017	0.983	0.619	0.999	0.984	0.608
AVG	*0.994*	*1.069*	*0.999*	*0.997*	*1.061*

Source: *Malmquist Index Summary of Annual Means* Islamic Bank

Average in Islamic banks show value > 1 on *technology change* and *total factor production change*. For other variables such as *eefch, pech* and *sech, the* value <1 means that there is no increase. The *Pech* shows the number is close to 1 at 0.999. In *efficiency change* , Islamic banks only scored> 1 in 2010, 2012 and 2015. While the rest for 6 years still showed <1. This is as in the *scale efficiency change* which also shows the number ≥1 in the same year as what happened in the *effch*. In period As for the *pure efficiency change*, in the period 2010, 2012 and 2013 showed an increase in efficiency indicated by the number> 1, then decreased in 2014 and

returned 1,013 in 2015. But the remaining 2 years of 2016 and 2017 have not yet reached the value of> 1 although it is close enough.

Increased efficiency in technology is indicated by a value of *techch* > 1. Changes to this increase occurred in 2009, 2011, 2012, 2014 and 2016. However, in the last period, namely 2016 to 2017, there was no increase in efficiency in technological factors, indicated by avalue of *tech* 0.619 or <1. *Total factor productivity* tends to show an increase in productivity, indicated by a value of tfpch> 1. At Islamic banks, an increase in productivity occurs over a 6-year period from a 9-year period. Only in 2013, 2015 and 2017 have tfpch <1. This means that on average Islamic banks are quite productive.

Comparison Before and After the Crisis The

Period before the crisis began from 2005 to 2007. For the period after the crisis using efficiency and productivity data in 2009 to 2011. Then the efficiency was compared using the *Paired Samples Test*. The statistical results obtained are as in the following Table 4.9:

Tabel 10.
Efficiency of Islamic Banks Before and After Crises
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before the crisis	.99428	36	.006776	.001129
	After the crisis	.98383	36	.013960	.002327

Source: Results of *Paired Samples Statistics* Efficiency of Islamic Banks

The average efficiency for the 3 years before the crisis was 99.43%, and decreased in the 3 years after the crisis. the crisis to 98.38%. Correlation crisis in the efficiency of Islamic banking at that time can be seen in the table of

Tabel 11.
The Efficiency of Islamic Bank Before and After Crises
Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	sebelum & sesudah	36	.277	.102

Source: *Paired Samples Correlations* Islamic Bank Efficiency

The results of Paired Samples Test to compare the efficiency of Islamic banks in the 3-year period before and after the crisis showed the results as in Table bellow:

Tabel 12.
The efficiency of Islamic Bank Before and After Crises
Paired Samples Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Before-After	.010444	.013727	.002288	.005800	.015089	4.565	35	.000

Source: Results of *Paired Samples Test of* Efficiency of Islamic Banks

Difference between the efficiency conditions of Islamic banks before the crisis before the crisis and after the crisis 1.0444%. The standard deviation of the average is 0.013727. Conventional banks experienced a slight decrease in efficiency after the crisis. The number of Islamic banks before the crisis was only 3 Islamic banks, increasing to 5 Islamic banks in the post-crisis period. Significance indicates 0,000 or lower than 0.05, thus it can be concluded that there is a significant difference in the efficiency of Islamic banks between before and after the 2008 crisis. In terms of total production factors, through the results of the Paired Sample Difference Test, the results obtained as in Table Bellow:

Tabel 13.
Comparison of Productivity of Islamic Bank
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	sebelum	.98844	36	.086234	.014372
	sesudah	1.15625	36	.398385	.066398

Source: Results of *Paired Samples Statistics of* Sharia Bank Productivity

From the comparison of these statistics, we can see an increase in sharia bank productivity after the crisis period. Shown with aaverage of *tpfch* 1.15625. While in the period before the crisis <1.

Tabel 14.
Comparison of Islamic Bank Productivity

		Paired Differences	t	df	Sig.

| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | (2-tailed) |
					Lower	Upper			
Pair 1	Before-After	-.167806	.432815	.072136	-.314249	-.021362	-2.326	35	.026

Source: Results of *Paired Samples of Test* Sharia Bank Productivity

From these results, the relationship between productivity Islamic banks before and after the crisis is shown with a significance of 0.026. This means that the productivity of Islamic banks there are significant differences between before the crisis and after. Refer to the two Paired Sample Difference Test results on efficiency and productivity, both show significant differences. In terms of efficiency, there is a decrease in efficiency in the 3 years after the crisis compared to 3 years before the crisis. But in terms of productivity, Islamic banks have increased productivity in the period of 3 years after the crisis compared to the period before the crisis. The effect of the crisis on decreasing efficiency also occurred in Saudi Arabia as in the research of Solaiman and Kadar (2012). Islamic banks are still inefficient in scale and technical efficiency. The inefficiency of sharia banks before the crisis also occurred in Malaysia in a study by Sufian (2007) with up to 17 sharia banks in Malaysia. Not yet optimal efficiency of Islamic banks in Indonesia was also found in research by Maulidiyah and Laila (2016), that Islamic banks are still inefficient in terms of scale efficiency. Firdaus and Hosen (2013) also found that Islamic banks have not shown optimum efficiency in the post-crisis period 2010-2012.

In contrast to Ascarya and Yumanita's (2006) research, in the pre-crisis period, the efficiency of Islamic banks with an intermediation approach showed 100% optimal efficiency. These results are at odds with this study which found the results of the efficiency of Islamic banks of 99.43%. In terms of productivity, Islamic banks tend to increase changes in productivity. In this study, Islamic banks have increased productivity in the post-crisis period compared to before the crisis. This is as the research of Norfitriani (2016) that Islamic banks tend to show increased productivity, both before and after the *spin-off*, except for 1 bank. In line with Tabash and Dhankar (2014) who researched in Saudi Arabia during 2005-2010. Islamic banks tend to show resilience when facing a crisis in terms of liquidity and CAR.

CONCLUSION

The efficiency of Islamic banks decreased in the post crisis period compared to before the crisis. The average efficiency of Islamic banks in the 3-year period before the global financial crisis was 99.43%. The highest efficiency occurred in

the last year before the crisis, 2007 with an average of 99.6%. The average efficiency for 3 years after the crisis, decreased to 99.23%. Different Tests *Paired Samples Test* shows the significance of 0.000 indicates there is a significant difference in the efficiency of Islamic banks, before and after the global crisis.

Islamic bank productivity increased in the post-crisis period compared to before the crisis. The average level of productivity factors of Islamic banking before the crisis was still <1, which is 0.984. Increased productivity at Islamic banks occurred in 2005, with avalue of *tfpch* 1.030. In the 3 years after the crisis, Islamic banks experienced an increase in productivity as indicated by an average value of *tfpch* 1,114. Difference test results obtained significance of 0.026 which means there are significant differences in the productivity of Islamic banks before and after the crisis.

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