

Efficiency, Stability And Productivity on Indonesian Islamic Insurance Industry

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This study attempts to analyze the productivity level of Takaful industry in Indonesia, both in terms of changes of its efficiency and also its technological. There are two things that are calculated in Malmquist index measurement that is catch-up effect and frontier shift effect. Findings from the results are very interesting. The average value of the overall efficiency of Takaful industry in Indonesia is relatively medium at 77.8%, while the mean standard deviation is 0.17. This indicates the enough good performance of Takaful industry in Indonesia. In general, there has been an increase in the level of productivity of Takaful institutions in Indonesia in the period 2016 to 2018, even though its very small. The increase in productivity growth (1.076) of Takaful institutions in Indonesia is generally caused by technological change (1.078) instead of changes in efficiency (0.998). Thus the service of Takaful institutions is needed which is more innovative in relation to the development of technology in the future.

Keywords: Efficiency; Stability; Productivity; Malmquist Index; Takaful

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Received: 28 July 2023
Accepted: 9 August 2023
Published: 20 August 2023

Citation:
(2023)
Efficiency, Stability and Productivity
on Indonesian Islamic Insurance
Industry
Islamic Social Finance.
3.1.

INTRODUCTION

Islamic economics has spread and developed in the world. The Islamic economics and finance industry, being an object of study that is always interesting to be studied. Especially if compared with the conditions of the conventional financial industry that has already existed. For example, the results of research conducted by [Nurfalah et.al \(2018\)](#) which states that Islamic banking is relatively more stable compared to conventional banking in the face of shock both internally and externally. This is an interesting finding that needs to be proven through various researchs in the future.

Asset growth in the Insurance Industry in the past five years shows the progress of the Insurance Industry at the end of this year. As one of the Non-Bank financial industries, the Insurance Industry has an important role in economic and social development by minimizing the risk of all economic activities, on the one hand also by channeling financial resources in the form of investment so that economic turnover runs well. Insurance companies offer different services for households and businesses for their welfare. The main service provided by an Insurance company is to provide a range of risks to the loss of property, business and life or otherwise. Thus, insurance companies encourage individuals and entrepreneurs who avoid the risk of carrying out activities by earning a high rate of return but of course with a higher risk ([Khan & Noreen, 2014](#)).

Insurance development in Indonesia when viewed from the past five years precisely from 2013-2017, where the insurance industry assets experienced an average growth increase from 2013-2017 increased by 16.23% per year. In addition, along with the growth of the conventional insurance industry, so does the growth in the Islamic insurance industry.

The Islamic insurance industry in Indonesia, especially sharia loss insurance (*asuransi kerugian*), has recently shown quite rapid performance, this requires the need for measurement of the level of efficiency. [Abidin and Endri \(2010\)](#) said that one of the most important aspects of a company's success is efficiency. Efficiency is not just to reduce costs as low as possible but involves managing the relationship of inputs and outputs, namely how to manage production factors (inputs) in such a way that they can provide optimal output. One method that is often used in analyzing efficiency is using a non-parametric method called Data Envelopment Analysis.

In the world of efficiency measurement, currently widely known as Data Envelopment Analysis (DEA) approach. DEA is a tool that can be used to measure and compare the performance of a number of service units or business units such as banks, financial industries, hospitals and even educational institutions. DEA may also indicate the inefficiency specifications of the service unit.

Since the DEA method was first introduced by Charnes, Cooper and Rhodes in 1978, researchers in some areas recognize that DEA is an excellent method and relatively easy to use in the operational modelling process for performance evaluation. In this study, DEA is used as a tool to measure and compare the performance of Islamic insurance institutions in this case 21 *takaful* institutions in Indonesia for 2014-2016 periods.

Furthermore, to measure the productivity of Islamic insurance institutions observed, this study used Malmquist Productivity Index (MPI) analysis. Malmquist index is part of the DEA method that specifically looks at productivity level of each business unit, so that it will see a change in the efficiency and technology levels used based on predetermined inputs and outputs. The Malmquist index is also used to analyze intertemporal performance changes.

LITERATURE REVIEW

Efficiency and productivity is a concept that shows the ratio of the result of comparison between input and output. Both ratios show that efficiency and productivity can be controlled by manipulating input and output management, or even both simultaneously. Efficiency and productivity can be used to measure the performance of a unit of economic activity.

In measuring the degree of efficiency and productivity, Data Envelopment Analysis (DEA) is preferable. DEA is widely used to measure the level of technical efficiency, scale of economic and industrial banks and financial institutions. This is suitable according to research of [Rani et.al \(2017\)](#), [Kamarudin, et.al \(2008\)](#); [Ozdemir \(2013\)](#); [Shahreki \(2012\)](#); also [Tsolas and Dimitris \(2012\)](#).

An activity can be called efficient if the effort has been done to provide maximum output, both quantity and quality. An activity can also be said to be efficient if the minimum effort can achieve a certain output. [Oscar \(2008\)](#) divides efficiency into several parts, namely: technical efficiency, scale

efficiency, cost efficiency and allocation efficiency. Technical efficiency is the process of converting inputs into outputs. This concept applies only to internal technical relationships between inputs and outputs. A company is considered to be economically efficient if it can minimize the production costs to produce certain output within common technology level and market price level (Farrell, 1957, Ramanathan, 2003).

Scale efficiency is associated with achieving the economies of scale of the unit in carrying out its operations. Inefficient on a scale can only be overcome by adopting new technologies or production processes. On the other hand, technical efficiency is a managerial problem, where more output is required for a given number of resources.

However, we must understand that technological differences can create economies of scale in the production process. Economies of scale are terms used to explain the decrease in cost per unit due to the addition of units produced. In a microeconomics, economies of scale are cost savings that companies earn when expanding. Measurement of efficiency can also be assessed using price information or input and / or output costs. This notion is commonly known as the concept of cost efficiency. Meanwhile, the allocation efficiency is related to how to combine various inputs to be able to produce maximum output. If there is more than one input or output, management will be interested in using the proper input mix to maximize the results so that the organization can be efficient.

The discussion is whether the use of various inputs in the calculation of efficiency is appropriate. Is it necessary to weight the use of inputs based on their contribution to output. This weighting is not available, but at least DEA can estimate this weighting in comparative evaluation. In its development, the frontier efficiency measurement model has increased, both in theory and practice concepts. In general, the efficiency and productivity level measurement model is divided into two parts: parametric and nonparametric.

The concept of productivity is basically a relationship between output and input in a production process. Productivity can be measured partially or totally. Partial productivity is the relationship between output with one input. Examples of commonly used partial productivity are labor productivity which shows the average output per worker, as well as the capital productivity that describes the average output per capital.

Total productivity or so-called Total Factor Productivity (TFP) measures the relationship between outputs with multiple inputs simultaneously. The relationship is expressed in the ratio of the output index to the aggregate input index. If the increased ratio means more output can be produced using a certain number of inputs, or some output can be produced using fewer inputs.

In productivity measurement, the most widely used is the total factor productivity (TFP) method. This method is used to overcome the weakness of efficiency calculation more than one input and one output. TFP is measured using index numbers that can measure changes in price and quantity over time. In addition, TFP also measures comparisons and differences between entities.

The Malmquist index was first created by Sten Malmquist in 1953 to measure productivity. But in its development, Malmquist Index was introduced by Caves et.al (1982). There are two things that are calculated in Malmquist index measurement that is catch-up effect and frontier shift effect. The catch-up effect measures the rate of change in relative efficiency from period 1 to period 2. Meanwhile the frontier shift effect measures the rate of technological change that is a combination of input and output from period 1 to period 2. The frontier shift effect is often called an innovation effect.

In the first generation model developed by Caves et.al (1982), there are 2 (two) Malmquist productivity index models (Bjurek, 1996). The first is 'Malmquist input quantity index' and the second is 'Malmquist output quantity index'. Malmquist input quantity index for a production unit, at observation time t and $t + 1$, for tech reference in period k , $k = t$ and $t + 1$. The Malmquist input quantity index measures only the change in the quantity of inputs observed between time t and $t + 1$, where:

$$MI_k(y_k, x_t, x_{t+1}) = \frac{E_k^I(y_k, x_t)}{E_k^I(y_k, x_{t+1})}, \quad k = t, t + 1 \quad (1)$$

Next, for the Malmquist quantity output index for a production unit, at observation time t and $t + 1$, for tech reference in period k , $k = t$ and $t + 1$. This Malmquist quantity output index measures only the change in the observed quantity of output between time t and $t + 1$, where:

$$MO_k(y_t, y_{t+1}, x_k) = \frac{E_k^0(y_{t+1}, x_k)}{E_k^0(y_t, x_k)}, k = t, t + 1 \quad (2)$$

Bjurek (1996) introduces a new definition of the Malmquist productivity index for the production unit between t and $t + 1$ based on the technological level at k , $k = t$ and $k = t + 1$, following the tradition of most productivity indices. Adjusting the Tornqvist productivity index, the index constructed is the ratio between an output index and an input index:

$$MTFP_k = \frac{MO_k(y_t, y_{t+1}, x_k)}{MI_k(y_k, x_t, x_{t+1})} = \frac{E_k^0(y_{t+1}, x_k)/E_k^0(y_t, x_k)}{E_k^1(y_k, x_t)/E_k^1(y_k, x_{t+1})}, k = t, t + 1 \quad (3)$$

The equation above illustrates the ratio between the output index and the Malmquist input index. If the value of the productivity index is greater than the number 1, then there has been an increase in productivity. If the index value is less than 1, the productivity level decreases, whereas if it equals 1, the productivity level does not change.

Some research that applies takaful institution efficiency and productivity measurement with DEA and TFP change value for example done by [Shah and Masood \(2017\)](#). The findings of the study suggest that insurance sector is far much superior when it comes to input productivity as the results of technical efficiency for them are higher than that of banking sector in Pakistan. The phenomenon exists in both Islamic and conventional financial services sectors. [Shah and Masood \(2017\)](#) state that the cost efficiency of insurance sector again is better than that of banking sector.

[Khan and Noreen \(2014\)](#) compare the Pakistan's takaful and conventional insurance companies in terms of efficiency and productivity for the period 2006-2010. The results indicate that the insurance industry as a whole is cost inefficient due to high allocative inefficiency. However, technical efficiency components show improving trends. Results further indicate that Takaful firms are more efficient as compared to conventional insurance firms. Malmquist productivity index shows a significant improvement in scale efficiency. However, the research do not find any considerable contribution of technology to improve overall productivity. The study suggests introduction of innovative and diversified products in insurance industry of Pakistan, particularly for Takaful companies.

Other research done by [Rusydiana & Nugroho \(2017\)](#). The study tries to measure the level of efficiency of the life insurance industry in Indonesia. The approach used is Data Envelopment Analysis (DEA). This study consists of three input variables (cost of commission (X1), Operational Cost (X2), Total Equity (X3) and 2 output variables (Premium) (Y1) and Investment Revenue (Y2)). The results explain that there are 15 perfectly efficient DMUs (100%). And an inefficient of 24 DMU, consisting of 7 DMU conditions IRS and 17 DMU with DRS conditions. Of all the DMU observed, Prudential insurance is a life insurance company that is able to maintain its gradual efficiency level from 2013 to 2016 when compared to other life insurance in this observation. In general, the main factor inefficiency of life insurance industry in Indonesia (in observation) from 2012 to 2016 is from the output side. To be more efficient then life insurance companies should increase the value of premiums by 91% and investment income of 8%.

Research related to measuring the level of efficiency and productivity of the Islamic insurance industry, has been carried out by several other studies. [Kader et.al \(2014\)](#) take case in 17 different countries, meanwhile [Saad et.al \(2006\)](#) investigate efficiency of the life insurance and takaful industry in Malaysia and [Benarda et.al \(2016\)](#) take case in Indonesia.

METHODOLOGY

In this study, the estimated growth of TFP and its components refers to Malmquist Index and application of DEA-Dual Programming method. The Malmquist TFP change index is formed from the value of efficiency change and technology change. Through the value of efficiency change will be known whether there is a change in the efficiency level from year to year. While technological change indicates whether there is a change of technical limit of efficiency from year to year. The malmquist TFP change is part of DEA method developed by Charnes Cooper Rhodes and Banker Charnes Cooper ([Coelli et al, 1998, Coelli et al, 2005, Cooper et al, 2010](#)). DEA is a mathematical programming technique that measure the efficiency and productivity of decision making unit or DMU to other similar DMU (Cooper et al, 2002). Early DEA and Malmquist TFP change are widely applied to the banking industry (Sherman & Gold, 1985). Other applied research using DEA and MPI has been done by [Rusydiana \(2019\)](#), [Rahayu & Rusydiana \(2018\)](#), and [Rusydiana \(2018b\)](#).

The productivity index is expressed by the TFP index of Malmquist over a given period. As the suggestion of Caves et.al (1982), this index is defined using a distance function that permits multi-input and multi-output use without the need to involve explicit price information. The function of this distance can be classified into a distance function oriented to the input and output. The input distance function seeks a minimal proportional expansion of input vectors for a constant output vector. In contrast, the output distance function seeks a minimum proportional expansion of the output vector for a constant input vector. The Malmquist TFP index measures TFP changes between two data points by computing the distance ratio for each data point, relative to the technological constraints.

The data used in this study are 21 Islamic insurance institutions in Indonesia from 2016 to 2018. The input and output variables are obtained from the financial statements of each takaful institutions. Four inputs and three outputs are used to measure the efficiency and productivity level of Islamic insurance institution. As input variables are Marketing Costs (X1) Investment Costs (X2), Operational Costs (X3) and Reinsurance Premium (X4). Meanwhile, the output variables are Premium Fund (Y1) Tabarru' Fund (Y2) and Profit (Y3).

The analysis tools used in this research are Banxia Frontier Analyst 4 to measure the efficiency level of all takaful institutions DMUs during 2016-2018. To measure Malmquist's productivity index, the DEAP 2.1 software is used. Furthermore, to make the plot of takaful institutions group quadrant with 2 categories (change of efficiency and technological change) on x and y axis, SPSS 16 software is used as a tool. This classification based on Rusydiana & Sanrego (2018), Rusydiana (2018) also Rusydiana & Firmansyah (2017).

RESULT AND FINDINGS

Efficiency & Stability Analysis of Islamic Insurance Industry

In the table below, it appears that during the 2016-2018 study periods, the level of efficiency of the Takaful insurance industry in Indonesia was relatively impaired, as indicated by the average value of efficiency from year to year. In 2016, the average efficiency of Islamic insurance institutions in Indonesia was 0.819 and then dropped to 0.784 in 2017. In the last period of observation namely 2018, the average efficiency of the Islamic insurance industry in Indonesia even decreased to 0.732 or at the most low compared to previous years.

Meanwhile, in terms of the institution of the Takaful insurance industry, which has the highest average value of efficiency during the 2016-2018 period, which is at an optimal rate of 1.000, is Sinar Mas insurance. Just like the Sinar Mas, Astra Buana also has an average efficiency score of 1.000 or achieves maximum efficiency every year. Furthermore, the Takaful insurance company with high efficiency value is Bintang (0.932) and Adira (0.904). These four Islamic insurance companies are included in the group of sharia insurance industry with high efficiency values above 90%.

The next group, with an average efficiency value between 80-90%, among others: TPI insurance (0.884), Bangun Askrida (0.881), Adira (0.875), Pan Pacific (0.843), Chubb Syariah (0.827), Parolamas (0.822), and Ramayana (0.805). These Islamic insurance industries are included in the insurance group with high efficiency. Subsequently successive are: Staco (0.794), Jasindo (0.792), Tripakarta (0.753), Takaful (0.738), Wahana Tata (0.707), Mega insurance (0.653), ACA (0.639), Bumida (0.613), Bringin Sejahtera (0.549) and Jasa Raharja insurance (0.332). The following is a complete table regarding the efficiency score of the Islamic insurance industry in Indonesia during the 2016-2018 periods.

Table 1: Efficiency Score of Islamic Insurance Industry in Indonesia

FIRM	2016	2017	2018	MEAN	RANK	STDEV
(1)	0.759	0.859	0.596	0.738	15	0.13
(2)	1.000	0.739	0.743	0.827	9	0.15
(3)	0.838	0.751	0.787	0.792	13	0.04
(4)	0.812	0.814	1.000	0.875	7	0.11
(5)	0.712	1.000	1.000	0.904	4	0.17
(6)	1.000	1.000	1.000	1.000	2	0.00
(7)	0.884	0.760	1.000	0.881	6	0.12
(8)	1.000	1.000	0.797	0.932	3	0.12
(9)	0.760	0.486	0.403	0.549	20	0.19
(10)	1.000	0.463	0.375	0.613	19	0.34
(11)	1.000	0.446	0.474	0.639	18	0.31
(12)	1.000	1.000	0.465	0.822	10	0.31
(13)	0.415	1.000	1.000	0.805	11	0.34
(14)	1.000	1.000	1.000	1.000	1	0.00
(15)	0.592	1.000	0.666	0.753	14	0.22
(16)	0.924	0.619	0.416	0.653	17	0.26
(17)	0.797	0.715	0.869	0.794	12	0.08
(18)	1.000	1.000	0.653	0.884	5	0.20
(19)	0.305	0.334	0.358	0.332	21	0.03
(20)	1.000	0.748	0.779	0.843	8	0.14
(21)	0.403	0.718	1.000	0.707	16	0.30
MEAN	0.819	0.784	0.732	0.778		0.17

Note: (1)Takaful, (2)ChubbSyariah, (3)Jasindo, (4)Adira, (5)Allianz, (6)Astra Buana, (7)Bangun Askrida, (8)Bintang, (9)Bringin Sejahtera, (10)Bumida, (11)ACA, (12)Parolamas, (13)Ramayana, (14)SinarMas, (15)Tripakarta, (16)Mega, (17)Staco, (18)TPI, (19)JasaRaharja, (20)PanPacific, (21)WahanaTata.

Table 2 also showed that the efficiency of Takaful industry in Indonesia from 2016-2018 has fluctuated. The average value of the overall efficiency of Takaful industry in Indonesia is relatively medium at 77.8%, while the mean standard deviation is 0.17. This indicates the enough good performance of Takaful industry in Indonesia. DMUs that have stable values include: Astra Buana, Sinar Mas, Jasa Raharja and Jasindo. The difference is, if Astra Buana and Sinar Mas have stability in high level of efficiency, Jasa Raharja has stability in low level. Meanwhile, Jasindo has stability in medium level of efficiency.

Quadrant Based on the Malmquist Productivity Index

Islamic insurance institutions are grouped into 4 (four) quadrants based on technical change level (TECH) categories and efficiency change (EFFCH) level categories, ie high and low. Quadrant 1 includes Islamic insurance institution which has technical change and high-efficiency change, so it can be considered as a high-productivity takaful institution.

Table. 2: Malmquist Index Summary of Firm Means

FIRM	EFFCH	TECHCH	PECH	SECH	TFPCH	PLACE
1	0.861	1.313	1.088	0.792	1.131	Q2
2	1.019	1.276	1.004	1.015	1.300	Q1
3	0.892	1.199	0.998	0.893	1.069	Q2
4	0.784	1.230	0.990	0.792	0.964	Q2
5	1.000	0.464	1.000	1.000	0.464	Q3
6	0.907	1.030	1.000	0.907	0.934	Q4
7	0.870	1.178	0.974	0.894	1.025	Q2
8	1.000	1.896	1.000	1.000	1.896	Q1
9	1.311	0.989	1.205	1.088	1.297	Q3
10	1.378	1.319	1.356	1.016	1.817	Q1
11	1.231	1.117	1.221	1.008	1.375	Q1
12	1.000	1.461	1.000	1.000	1.461	Q1
13	0.736	0.794	0.787	0.936	0.584	Q4
14	1.000	0.853	1.000	1.000	0.853	Q3
15	0.817	1.127	0.861	0.949	0.922	Q2
16	1.334	1.275	1.324	1.008	1.701	Q1
17	1.008	0.895	1.000	1.008	0.903	Q3
18	1.133	1.558	1.127	1.005	1.765	Q1
19	1.166	0.764	1.419	0.822	0.891	Q3
20	1.012	1.337	1.000	1.012	1.353	Q1
21	0.820	0.624	1.000	0.820	0.511	Q4
MEAN	0.998	1.078	1.054	0.947	1.076	

Note: (1)Takaful, (2)ChubbSyariah, (3)Jasindo, (4)Adira, (5)Allianz, (6)Astra Buana, (7)Bangun Askrida, (8)Bintang, (9)Bringin Sejahtera, (10)Bumida, (11)ACA, (12)Parolamas, (13)Ramayana, (14)SinarMas, (15)Tripakarta, (16)Mega, (17)Staco, (18)TPI, (19)JasaRaharja, (20)PanPacific, (21)WahanaTata.

On the other hand, Quadrant 4 is a group of Islamic insurance institution with low technical change and efficiency change. A collection of institution in this group can be regarded as a Islamic insurance institution whose productivity progress is relatively stagnant due to the small value of TECH and EFFCH.

Quadrant 2 includes Islamic insurance institution that has a high technical change, but on the other hand has a low efficiency change. A collection of institution in this group can be regarded as an Islamic insurance institution with low catching up ability. Increasing the number of DMUs of Islamic insurance institution in this 2nd quadrant is a sign of ineffectiveness of takaful institution to produce efficiently (technical change and efficiency change rates are classified into high and low categories based on their mean values).

The quadrant 3 includes groups of Islamic insurance institution that have a low technical change, but on the other hand has a relatively high-

efficiency change. The collection of institution in quadrant 3 can be regarded as an Islamic insurance institution with low production technology improvement, but relatively able to achieve a high level of efficiency improvement.

Group quadrant 1 is an Islamic insurance institution category that has technical change and high-efficiency change. Islamic insurance institution in this category are (2) Chubb Syariah, (8) Bintang, (10) Bumida, (11) ACA, (12) Parolamas, (16) Mega, (18) TPI, and (20) Pan Pacific. All of them are included in Islamic insurance institution with high productivity value.

Quadrant Group 2 is an Islamic insurance institution category that has a high technical change, but on the other hand has a low efficiency change. The collection of institution in this group is considered an Islamic insurance institution with low catching up ability. Based on the results listed in the picture above,

(1) Takaful, (3) Jasindo, (4) Adira, (7) Bangun Askrida, and (15) Tripakarta are included in this category.

Group quadrant 3 is an Islamic insurance institution category that has a low technical change, but on the other hand has a relatively high efficiency change. The institution in quadrant 3 can be considered as an Islamic insurance institution with low production technology improvements, but are relatively capable of achieving a high level of efficiency. Based on the results listed in the picture above, (5) Allianz, (9) Bringin Sejahtera, (14) Sinar Mas, (17) Staco, and (19) Jasa Raharja are included in this category.

The last quadrant is quadrant 4 is a group of Islamic insurance institution with technical change and low efficiency change. Islamic insurance institution in this category are (6) Astra Buana, (13) Ramayana and (21) Wahana Tata. The collection of institution in this group can be considered as an Islamic insurance institution whose productivity progress is relatively stagnant.

The distribution of Islamic insurance institution in 4 (four) quadrants can be influenced by the characteristics of the existing Islamic insurance institution in each group. Some variables that can describe the characteristics of each Islamic insurance institution such as product innovation, marketing strategy, location and network of Islamic insurance institution and types of ownership of the company.

This figure is still indicative and requires formal testing, but is not covered in this study.

Annual Productivity Index of Islamic Insurance Industry

On table below, it appears that for the duration of the 2016-2018 study, Islamic insurance institution in Indonesia show an improvement in productivity growth even though its very small, as indicated by the value of 1.076 TFPCH. The increase in this TFPCH showed improvement levels of productivity in the Islamic insurance institutions in Indonesia. This is evidenced by the increase TECH above 1 (1.078), also PECH (1.054). In the other side, the changes in efficiency or EFFCH decreased below 1 (0.998) and SECH (0.947). It means, the increase in productivity levels of Islamic insurance institutions in Indonesia has been largely contributed by the high level of technological change (TECH) technological innovation and the stagnation of changes in its efficiency (EFFCH).

Yearly analysis, there are also conditions in which there is an increase in TFP productivity in Islamic insurance institutions in general. As happened in 2016-2017 (TFPCH = 1.156), and 2017-2018 intervals (TFPCH = 1.001). Beyond that, in general, the MPI rate of Islamic insurance institution in Indonesia has increased productivity levels that are marked by the change value of Total Factor Productivity or TFPCH above number 1 (1.076).

Table 3: Malmquist Index Summary of Annual Means

PERIODS	EFFCH	TECH	PECH	SECH	TFPCH
2016-2017	1.033	1.119	1.045	0.988	1.156
2017-2018	0.964	1.039	1.063	0.907	1.001
MEAN	0.998	1.078	1.054	0.947	1.076

CONCLUSION

This research tries to analyze BCC model as base model in DEA to see efficiency level of Islamic insurance institution in Indonesia for period 2016-2018. Further Malmquist index is used to see the productivity level of Islamic insurance institution, both in terms of changes in efficiency and technological change which is then displayed in the form of quadrant 4 groups.

The efficiency of Takaful industry in Indonesia from 2016-2018 has fluctuated. The average value of the overall efficiency of Takaful industry in Indonesia is

relatively medium at 77.8%, while the mean standard deviation is 0.17. This indicates the enough good performance of Takaful industry in Indonesia.

The results obtained from the Malmquist index score (TFP Change) indicate that 12 institutions from the Islamic insurance institution observed (21 institutions) has increased productivity, or 57%. It is marked with a score of more than 1. This is evidenced by the increase TECH above 1 (1.078), also PECH (1.054). In the other side, the changes in efficiency or EFFCH decreased below 1 (0.998) and SECH (0.947). It means, the increase in productivity levels of

Islamic insurance institutions in Indonesia has been largely contributed by the high level of technological change (TECH) technological innovation and the stagnation of changes in its efficiency (EFFCH).

For analysis of Islamic insurance institution group with efficiency change criterion (EFFCH) and technological change (TECH), there are 8 Islamic insurance institution that is in quadrant 1 (technical change and high-efficiency change), there are 5 Islamic insurance institution in quadrant 2 (technical change high but low efficiency change), and 5 Islamic insurance institution in quadrant 3 (technical change is low but high-efficiency change). Meanwhile there are 3 Islamic insurance institutions that enter the quadrant category 4 (technical change and low-efficiency change).

Calculation of the level of productivity in this study are relative, not absolute. So it is very possible when the sample of Islamic insurance institution added or time series of observation expanded, would get different results. The need for every Islamic insurance Institution both public and private to issue annual financial statements in order to increase accountability and transparency in the management of funds. The ultimate goal is improvement and development of Islamic insurance industry in Indonesia.

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APENDIX

MALMQUIST INDEX SUMMARY (OUTPUT DEAP 2.1)

year = 2

firm	effch	techch	pech	sech	tfpch
1	1.334	1.193	1.294	1.031	1.591
2	1.020	0.988	0.992	1.029	1.008
3	0.826	1.186	0.842	0.980	0.980
4	0.635	1.269	0.979	0.649	0.806
5	1.000	0.972	1.000	1.000	0.972
6	1.002	1.369	1.000	1.002	1.372
7	0.982	0.804	1.000	0.982	0.789
8	1.000	1.627	1.000	1.000	1.627
9	1.290	0.938	1.038	1.243	1.210
10	1.350	1.013	1.366	0.988	1.368
11	0.998	0.963	0.987	1.011	0.962
12	1.000	3.793	1.000	1.000	3.793
13	1.000	0.758	1.000	1.000	0.758
14	1.000	0.812	1.000	1.000	0.812
15	1.305	1.479	1.236	1.056	1.930
16	1.490	1.110	1.507	0.989	1.655
17	0.854	0.985	0.843	1.014	0.841
18	1.283	1.478	1.271	1.010	1.896
19	0.996	0.918	0.852	1.169	0.915
20	0.864	1.073	1.000	0.864	0.928
21	0.879	0.681	1.000	0.879	0.599
mean	1.033	1.119	1.045	0.988	1.156

year = 3

firm	effch	techch	pech	sech	tfpch
1	0.557	1.446	0.915	0.608	0.805
2	1.018	1.647	1.017	1.001	1.677
3	0.963	1.213	1.182	0.814	1.167
4	0.968	1.192	1.000	0.968	1.153
5	1.000	0.222	1.000	1.000	0.222
6	0.820	0.775	1.000	0.820	0.636
7	0.771	1.726	0.948	0.813	1.331
8	1.000	2.209	1.000	1.000	2.209
9	1.332	1.043	1.399	0.952	1.389
10	1.406	1.717	1.346	1.044	2.414
11	1.519	1.294	1.510	1.006	1.965
12	1.000	0.562	1.000	1.000	0.562
13	0.542	0.831	0.619	0.875	0.450
14	1.000	0.897	1.000	1.000	0.897
15	0.512	0.860	0.600	0.853	0.440
16	1.195	1.464	1.163	1.027	1.749
17	1.190	0.814	1.187	1.002	0.968
18	1.000	1.643	1.000	1.000	1.643
19	1.365	0.635	2.364	0.578	0.867
20	1.184	1.666	1.000	1.184	1.972

21	0.764	0.571	1.000	0.764	0.436
mean	0.964	1.039	1.063	0.907	1.001