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MEASUREMENT OF EFFICIENCY: AN EMPIRICAL OF ISLAMIC STOCK EXCHANGES IN OIC COUNTRIES

Mauizhotul Hasanah[1], Faris Kurnia Hakim[2], Sri Herianingrum[3]
[1]Islamic Economic Department, STIS Sentra Bisnis Islami Surabaya, Surabaya, Indonesia
[2]Study Program of Economic Development, Faculty of Economics and Business, Universitas Pembangunan Nasional Veteran Jawa Timur, Surabaya, Indonesia
[3]Department of Islamic Economics, Faculty of Economics and Business, Universitas Airlangga, Surabaya, Indonesia
Corresponding author: faris_kurnia.ep@upnjatim.ac.id

Abstract: *The efficienct market is one of the benchmarks for investors, because investors need to monitor all information to consider investing decisions. This study aims to measure the level of efficiency in the Islamic stock exchanges of Islamic countries. The data used is secondary data using a sample of 6 Islamic countries that are members of the OIC in the January 2014-December 2018 period. The method used is the Stochastic Frontier Approach (SFA) with an analysis tool, namely the Frontier 4.1 software. The input variable used is Market Capitalization (KP) and Trading Volume (VP), while the output variable used is Individual Market Return (IMR). The results of this study indicate that during the study period there was no stock market that obtained a perfect efficiency value of one. The average result of the technical efficiency value of Islamic stock exchanges in Islamic countries is 0.9706, then based on γ of 0.38221 or 38%, it means that this inefficiency value needs to be optimized. . The country with the highest average technical efficiency value was in the UAE at 0.97173 and the country with the lowest average technical efficiency value was Saudi Arabia at 0.96939. Based on the classification of the overall countries operating efficiently, namely the UAE, Indonesia, and Iran, while the less efficient countries are Saudi Arabia, Kuwait, and Qatar.*

Keywords: *Sharia Stock Exchange, Market Efficiency, Islamic Countries, Stochastic Frontier Analysis.*

Abstrak: *Efisiensi pasar merupakan salah satu tolok ukur bagi investor, karena investor perlu memantau semua informasi untuk mempertimbangkan keputusan investasi. Studi ini bertujuan untuk mengukur tingkat efisiensi di bursa saham syariah negara-negara Islam. Data yang digunakan adalah data sekunder dengan sampel 6 negara Islam anggota OKI pada periode Januari 2014-Desember 2018. Metode yang digunakan adalah Stochastic Frontier Approach (SFA) dengan alat analisis, yaitu perangkat lunak Frontier 4.1. Variabel input yang digunakan adalah Kapitalisasi Pasar (KP) dan Volume Perdagangan (VP), sedangkan variabel output yang digunakan adalah Individual Market Return (IMR). Hasil penelitian ini menunjukkan bahwa selama periode penelitian tidak ada pasar saham yang memperoleh nilai efisiensi sempurna satu. Rata-rata hasil nilai efisiensi teknis bursa saham syariah di negara-negara Islam adalah 0,9706, kemudian berdasarkan γ sebesar 0,38221 atau 38%, artinya nilai inefisiensi ini perlu dioptimalkan. Negara dengan nilai efisiensi teknis rata-rata tertinggi adalah UEA dengan nilai 0,97173 dan negara dengan nilai efisiensi teknis rata-rata terendah adalah Arab Saudi dengan nilai 0,96939. Berdasarkan klasifikasi negara-negara yang beroperasi secara efisien secara keseluruhan, yaitu UEA, Indonesia, dan Iran, sedangkan negara-negara yang kurang efisien adalah Arab Saudi, Kuwait, dan Qatar.*

Kata Kunci: Bursa *Saham Syariah, Efisiensi Pasar, Negara-negara Islam, Stochastic Frontier Approach*

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1. INTRODUCTION

Globally, the Islamic financial industry has enormous total assets. According to the Global Islamic Economy Report (2018). in 2017 the assets of the Islamic financial industry were contributed by 56 countries consisting of the Middle East, South Asia and Southeast Asia. Then the countries that have a big role in contributing 65% to the Islamic financial industry are Iran, Saudi Arabia, and Malaysia. The amount of total Islamic financial assets is contributed by various Islamic financial instruments, one of which is the Islamic capital market. For example, Indonesia in June 2020 had significant growth with the market share of the Islamic financial industry reaching 9.63% of Indonesia's total financial assets.

The capital market, known as the financial center, has a strategic role in the development of a country, one of which is as a source of financing for the business world and as a means of investment for the community. The term investment aims for the long term, providing an opportunity for investors to get optimal returns (Zahera & Bansal, 2018). The phenomenon that occurs is that many investors make transactions in the short term, which depend on the ups and downs of prices on the exchange. Also supported by emotional or psychological factors of investors, without reading much information about these stocks. According to Santoso (2017) states that without adequate information knowledge, it is likely that they will fail to beat the market in trading or investing, while in order to beat the market investors need to have a combination of skills, knowledge, and sufficient information (information), if one of them is not fulfilled it will be difficult to get an optimal return.

Predicting the perfect volatility of the market is a difficult task, although there are various models and techniques (Bhowmik and Wang, 2020). It is appropriate for an investor who wants to buy shares to always monitor all information that will affect the stock price. Market uncertainty is a challenge for investors. Information will make investors react, not only lies in market uncertainty but market sentiment plays a major role (Bird and Yeung, 2012). Meanwhile, investors who know this information strongly usually have a profit motive. If all investors know all the information and analysis of stocks that are wrong on price, then the logical consequence will be that competition between investors and the market will be more efficient (Fabozzi and Modigliani, 2009).

The efficient market is one of the benchmarks for investors (Mensi et al., 2018). When the market is efficient, investors do not use information to generate abnormal returns because the information is already reflected in asset prices (Ling et al., 2020). However, an efficient stock exchange is needed to defuse speculation because all information forms the basis for investors in making decisions (Samudra, et al, 2016). Whereas speculation in Islam is prohibited not because there are *gharar* and *maysir* concepts in it, the concept is not caused by the uncertainty but the way a person uses this uncertainty. On the Islamic stock exchange there is a choice between the right to information that supports the efficiency of sharia in the form of *maslahah mursalah*. The term *maslahah* is something that brings benefits and rejects harm (Qorib and

Harahap, 2016). Islam advises every human being to act efficiently, by means of which he must leave useless actions and words.

The theory of Efficient Market Hypothesis (EMH) predicts that stock prices reflect all information, but it is also driven by investor psychology (Audrino et al, 2020). So that no investor uses the information to get an abnormal return. According to Wira (2016), economic theory is based on the belief that individuals behave rationally, so that many argue that irrational investor behavior is only a short-term anomaly. Meanwhile, in the long term this anomaly will disappear and the market will return to its efficiency. However, investor behavior is not always rational, resulting in behavioral finance based on three aspects, namely psychological, economic, and financial origins. Behavioral finance can influence investors' decisions in investing (Senewe et al, 2018). So that investors must control their emotions in investing, apart from using rationality.

The efficiency rating is very much needed by investors because it can be information aimed at effective risk management. This risk management is expected to support good investor decision making (Mohammed and Knapkova, 2016). The general concept of efficiency refers to the difference between the value of input, output, and the optimally observed input-output mix (Ferreira et al, 2014). As for several previous studies regarding the efficiency of the stock market such as those conducted by (Hasan et al., 2012) analyzed the efficiency of the Stock Exchange in Bangladesh using the Stochastic Frontier Model Approach and OLS methods. In line with Ferreira et al (2014) research which uses the Stochastic Frontier Analysis method and technical inefficiency, it examines the efficiency of the PSI-20 index of the Portuguese stock market. On the other hand, research from Ali et. al, (2018), Uddin et. al, (2018)., Mensi et al., (2018), Bouoiyour et al., (2018), Alam et al., (2016) compared several Islamic stock indices and conventional stock indices, and compared them in developing countries and in developed countries, using the Multifractal Detrended Fluctuation Analysis (MF-DFA) analysis.

Although extensive research on stock market efficiency has been conducted using various approaches, most previous studies have focused on conventional stock markets or simply compared Sharia-compliant and conventional stock indices in developed or developing countries in general. Meanwhile, cross-border research on Sharia-compliant stock market efficiency within the OIC member states remains relatively limited. Therefore, this study aims to fill the gap by analyzing the efficiency of Islamic stock exchanges in OIC countries using the Stochastic Frontier Approach (SFA). This is expected to provide new contributions to the development of Islamic stock market efficiency literature and provide an overview of the characteristics of Islamic stock market efficiency in OIC countries. It is hoped that the results of this study can serve as a reference for investors in determining investment strategies and international diversification in the Islamic stock market, taking into account the efficiency levels of each market. Furthermore, this research is expected to provide input for Islamic capital market regulators and managers in improving information transparency, strengthening market oversight, and developing infrastructure and regulations that can support the

creation of a more efficient, stable, and competitive Islamic stock market in OIC countries.

2. LITERATURE REVIEW

2.1 Market Efficiency Theory

In general, what Beaver (1989) defines, market efficiency is the relationship between security prices and information (Nasution, 2017). The term efficiency in financial markets shows the fact that investors do not have the opportunity to earn abnormal returns and cannot beat the market (Ţiţan, 2015). Meanwhile, an important principle of measuring efficiency is the correlation between prices and all information on the market (Rossi, 2018). Based on the theory of the Efficient Market Hypothesis popularized by Fama in 1970, an efficient market is in the form of a market price that reflects all available information at a certain time (Nwachukwu & Shitta, 2015). Simultaneous measurement of efficiency takes into account all inputs and outputs (Sharma, 2018). According to Ferreira et al., (2014) the general concept of efficiency refers to the difference between the optimal observed input, output, and input-output values. Thus, it can be concluded that efficiency is a measure of effectiveness which is always related to input and output.are three points will be discussed in literature review, the basic theory, previous study and hypothesis from previous study.

2.2 Efficient Islamic Stock Exchange Concept

The Islamic stock exchange is an effective means of mobilizing funds from the public. For producers of the stock exchange as a forum to increase capital by issuing shares (Ruhani et al., 2018). Shares are an alternative source of long-term funds in the form of equity, which are issued either through private placements or through public overing (IPO) nuclei (Sudana, 2009). As for seeing a performance of variable Islamic stocks seen from the Islamic stock index. An efficient stock market valuation, each share is given a fair price, if the efficiency assessment is seen from the index, to measure whether the price of each share reflects its value, the valuation efficiency is all equal to one, and the efficiency deviation is equal to zero (Yi et al., 2019). The concept of market efficiency according to Fama (1965) is a market where there is a large number of rational maximum profits that are actively competing and each of them tries to predict the future market value of the price of individual securities and where important information is freely available for all investors to access.

2.3 Stochastic Frontier Approach

Initially, SFA was developed by Meeusen and Broeck (1977) then one month later Aigner et al., (1977) developed it again. Efficiency measurement uses the SFA approach if the measurement of technical efficiency is carried out using an output-oriented approach, and if it is for measuring cost efficiency, it is carried out using an input-oriented approach. Technical efficiency is measured based on the production frontier, while cost efficiency is measured based on cost efficiency (Kumbhakar & Lovell, 2000). The SFA method is a method with a parametric approach to determine

a particular form of cost function, then the cost function equation is channeled into a translog form, allowing random errors. It is assumed that this error consists of inefficiencies following an asymmetric distribution, usually if it does not follow it is distributed as a half normally, whereas random problems following an asymmetrical distribution are normally distributed (Fries et al., 2004).

3. RESEARCH METHODS

This study uses a quantitative approach using the Parametric Stochastic Frontiers Analysis (SFA) method. Based on the production function in weak-form stock efficiency. The analysis tool used is the Frontier 4.1 software. This study aims to measure the efficiency of Islamic stock exchanges in Islamic countries. The input variables used are Market Capitalization (KP) and Trading Volume (VP), while the output variable used is Individual Market Return (IMR). The data used is secondary data in the form of panel data, which is a combination of cross section data and time series data. The sampling technique uses probability sampling techniques. The criteria are in the form of Islamic stock exchanges in OIC countries that publish financial reports on their respective official websites during the research period January 2014 to December 2018. Based on the criteria, the sample data used are as follows:

Table 1. List of Research Samples

No	Country	Stock Exchange
1	Iran	*Tehran Stock Exchange*
2	Saudi Arabia	*Saudi Arabian Stock Exchange*
3	Uni Emirat Arab	*Abu Dhabi Securities Exchange*
4	Kuwait	*Kuwait Stock Exchange*
5	Indonesia	*Indonesia Stock Exchange*
6	Qatar	*Qatar Stock Exchange*

4. RESULTS AND DISCUSSION

Based on the results of testing the stochastic frontier approach and panel data regression analysis to get the following results:

4.1 Estimation from the Stochastic Frontier Approach Model

The maximum-likelihood estimation for the Cobb-Dougas Stochastic Frontier Production translog with the assumptions listed in table 2 is as follows:

Table 2. Maximum-likelihood Estimation for the Translog of the Stochastic Frontier Production Model

Variable	Parameter	Koefisien	Standard Error	t-value
Constant	β_0	0.48979	0.28433	0.17226
Market Capitalization	β_1	-0.81653	0.90895	-0.89832
Trading Volume	β_2	0.74656	0.72835	0.10250
Sigma-Squared	σ^2	0.37588	0.58757	0.63973
Gamma	Υ	0.38221	0.15770	0.24236
Mu	M	0	0	0
Eta	η	0	0	0
Log-likelihood			0.54456	

Significance level at * 1%, **5%, *** 10%, @ *means insignificant*

Source : Data processing, SFA *Frontier* 4.1, (2019)

Model the effect of inefficiency on positive coefficient values can increase the level of inefficiency and vice versa. Based on table 2, it shows that the parameter estimate with an inefficiency effect is 0.28433 for the market capitalization input variable of -0.81653 and insignificant, and for the trading volume input variable it is 0.74656 and insignificant. Then at σ2 it is 0.37588 different from the number Zero which shows good suitability and accuracy. Based on, it can be interpreted that 38% of random variations in individual stock returns are due to inefficiency. Then at η indicates the number zero means that the effect of technical inefficiency tends to be stable over time.

4.2 Measurement of the Technical Efficiency Value of the Sharia Stock Exchange

At this stage, we will measure the efficiency with the parametric method using the Stochastic Frontier Analysis method which will produce a technical efficiency value on a scale of zero to one. Where countries with Islamic stock exchanges have a score of one, it shows the more efficient the country's Islamic stock exchanges. This study will divide 3 analyzes, namely technical efficiency analysis based on the whole, based on the country of the Islamic stock exchange, and based on the time period.

4.2.1 Overall Technical Efficiency Value Analysis

This technical efficiency value analysis will be discussed in its entirety, it can be seen in the table below:

Table 3. Result of Technical Efficiency Value of Sharia Stock Exchange (Percent)

Periode		Iran	Saudi Arabia	UAE	Kuwait	Indonesia	Qatar
2014	1	0.95989	0.97567	0.98285	0.97612	0.97502	0.98167
	2	0.96402	0.97739	0.98034	0.97057	0.97755	0.97979
	3	0.96892	0.97749	0.97010	0.96918	0.97605	0.97049
	4	0.97000	0.97353	0.97687	0.96797	0.97313	0.98290
	5	0.96504	0.97546	0.97820	0.96917	0.97387	0.98216
	6	0.95508	0.96544	0.93569	0.96314	0.97010	0.92507
	7	0.98018	0.98111	0.98445	0.97552	0.97834	0.98514
	8	0.96550	0.98236	0.97328	0.97800	0.97320	0.97986
	9	0.96847	0.96726	0.97314	0.97591	0.96919	0.97400
	10	0.97655	0.95413	0.96268	0.96537	0.96784	0.96950
	11	0.96461	0.93158	0.96491	0.95259	0.97423	0.96112
	12	0.96368	0.96493	0.96645	0.96578	0.97404	0.96526
2015	1	0.96072	0.98029	0.96955	0.97291	0.97430	0.96652
	2	0.96661	0.97853	0.97934	0.97273	0.97423	0.97877
	3	0.97559	0.95918	0.96300	0.96202	0.97136	0.96001
	4	0.97101	0.98475	0.97804	0.97438	0.95533	0.97793
	5	0.96386	0.96891	0.96762	0.96962	0.97656	0.97079
	6	0.97545	0.95794	0.97841	0.96944	0.95984	0.97444
	7	0.97570	0.97183	0.97593	0.97333	0.96750	0.96596
	8	0.96348	0.91835	0.95680	0.95651	0.95303	0.96907
	9	0.96247	0.96871	0.97269	0.96904	0.95959	0.97098
	10	0.97499	0.96403	0.96450	0.97339	0.97848	0.97436
	11	0.97040	0.97418	0.96879	0.97276	0.97009	0.93704
	12	0.96842	0.96221	0.97496	0.96576	0.97713	0.97729
2016	1	0.98651	0.93460	0.95996	0.95054	0.97129	0.95076
	2	0.98237	0.97414	0.98149	0.97482	0.97779	0.97846
	3	0.97851	0.97494	0.97380	0.97264	0.97630	0.97909

	4	0.96365	0.98280	0.97741	0.97662	0.97316	0.96915
	5	0.96560	0.96041	0.95841	0.97223	0.97026	0.95876
	6	0.96560	0.97290	0.98005	0.97082	0.97982	0.97763
	7	0.97665	0.96565	0.97506	0.97452	0.97824	0.98149
	8	0.97256	0.96455	0.96822	0.97098	0.97589	0.97764
	9	0.97156	0.95419	0.97258	0.97130	0.96979	0.96215
	10	0.97699	0.98063	0.96469	0.97206	0.97364	0.96780
	11	0.97073	0.98718	0.97269	0.97625	0.96062	0.96521
	12	0.97007	0.97616	0.97974	0.97710	0.97353	0.98082
2017	1	0.96768	0.96883	0.97245	0.98836	0.97198	0.97482
	2	0.97041	0.96821	0.97249	0.97072	0.97373	0.97401
	3	0.97121	0.97229	0.96800	0.97728	0.97654	0.96698
	4	0.97567	0.97432	0.97513	0.96698	0.97524	0.96650
	5	0.97279	0.96780	0.96856	0.97051	0.97008	0.96955
	6	0.96698	0.98173	0.97229	0.97143	0.97347	0.95166
	7	0.97668	0.96240	0.97702	0.97410	0.97097	0.97825
	8	0.97467	0.97522	0.96849	0.97297	0.97299	0.95852
	9	0.97597	0.97217	0.96955	0.96609	0.96982	0.96085
	10	0.97467	0.96161	0.97525	0.96735	0.97306	0.96923
	11	0.97720	0.97324	0.96364	0.96195	0.96563	0.96090
	12	0.97822	0.97639	0.97640	0.97702	0.97907	0.98405
2018	1	0.97547	0.97959	0.97878	0.97818	0.97747	0.98211
	2	0.97096	0.96573	0.97222	0.97404	0.97004	0.95971
	3	0.96935	0.97983	0.97194	0.96822	0.95791	0.97082
	4	0.96432	0.97782	0.97521	0.87220	0.96897	0.98053
	5	0.97464	0.97059	0.96996	0.96863	0.96754	0.96772
	6	0.98720	0.97460	0.97070	0.97842	0.96761	0.97492
	7	0.98205	0.97121	0.98081	0.98188	0.97479	0.98285
	8	0.98550	0.96312	0.97631	0.97084	0.97329	0.97344
	9	0.99338	0.97269	0.97060	0.97447	0.97114	0.97116
	10	0.95803	0.96952	0.97123	0.96822	0.96743	0.97919
	11	0.94348	0.96668	0.96740	0.97452	0.97526	0.97343
	12	0.96864	0.97419	0.97686	0.97032	0.97649	0.97135

Source: Processed data, SFA *Frontier* 4.1 (2019)

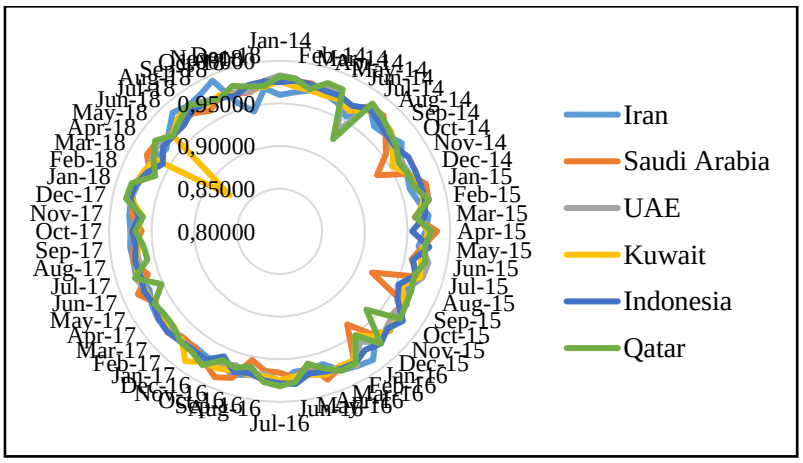


Figure 1. Result of Technical Efficiency Value of Sharia Stock Exchange (Percent)

Based on the results of the calculation of the value of technical efficiency, it shows that as a whole there is no country that gets a perfect efficiency score with a score of one, it's just that it is almost close to number one. So it can be said that the value of technical efficiency in Islamic countries is close to efficient, even though it has not reached perfect efficiency with the number one. When the stock exchanges of Islamic

countries are efficient it means that the stock price reflects all relevant information. The sooner the information is reflected in the stock price, the more efficient the stock market will be (Machmuddah et al., 2020). The concept of efficiency is in accordance with the principles of sharia which aims to maintain the *maqashid sharia*, namely in the form of maintaining *al-maal* (Kamaruddin & Mohd, 2008). contained in the Al-Quran surah Al-Isra 'verses 26-27 *"Give to close relatives their due, as well as the poor and ˹needy˺ travellers. And do not spend wastefully. Surely the wasteful are ˹like˺ brothers to the devils. And the Devil is ever ungrateful to his Lord.".*

Based on the EMH theory, especially on the random walk model in the stock market, the information entered is random and unpredictable (Naseer & Bin Tariq, 2015). So that investors must be able to consider various things in making investment decisions. When investors consider relevant information, they can be called rational investors because information is one of the main keys in investing (Mo et al., 2015). However, not all information is relevant to consider. So that investors need to analyze the information thoroughly, then this information forms a model for making the best investment decisions (Christanti and Mahastanti 2011). On the other hand, investors who consider information are investors who apply sharia principles because when investors do not consider various things it will contain *gharar* and *maysir*, meaning that this investment activity contains a zero-sum game, where someone gets a profit at the expense of another (M. A. Uddin, 2015). Activities that contain *gharar* and *maysir* have a link between risk and uncertainty, where there is risk, there is uncertainty in it.

Islam describes *maysir* in the book *Al Mu'jam al Wasith* as follows *"Any form of game that contains elements of betting (gambling)"* (Huda & Heykal, 2010). Then Allah SWT and Rasulullah SWT have prohibited all types of gambling contained in the Al-Qur'an chapter Al-Maidah verses 90-91: *"O you who have believed, indeed, intoxicants, gambling, [sacrificing on] stone alters [to other than Allah], and divining arrows are but defilement from the work of Satan, so avoid[1] it that you may be successf (90). Satan only wants to cause between you animosity and hatred through intoxicants and gambling and to avert you from the remembrance of Allah and from prayer. So will you not desist? (91)".* Based on the above verse, maysir is an activity that is prohibited by Islam which will cause negative things, both for humans and for others. In addition, according to the hadith of Abu Hurairah, the Prophet Muhammad sallallaahu 'alaihi wa sallam said: *Rasulullah shallallahu 'alaihi wa sallam prohibits buying and selling of al-hashah (by throwing stones) and buying and selling of gharar* (HR Muslim)". Therefore, when investors invest without information, it will be biased and contain *maysir* and *gharar*. G*harar* occurs when investors do not know what is stored in a business activity or sale and purchase (Gusniarti, 2015). Then this must be avoided by investors so that when investing not only get a return but the investment becomes a blessing.

Overall, the technical efficiency value of Islamic stock exchanges tends to fluctuate with a negative trend. Because there are several imbalances in a country with a certain period of time that is relatively small. This imbalance is a potential volatility and is difficult to predict because it is always changing. Investors have the challenge of predicting future profits due to market uncertainty. If all investors know all the

information and analysis of stocks that are wrong in price, then the logical consequence will be that competition between investors and the market will be more efficient (Fabozzi & Modigliani, 2009). Information that is not perfect means that investors are unsure about the information obtained. In addition, investors also have behavior that is not always rational, there is the theory of Behavioral Finance which understands and explains how investors' emotions greatly influence the decision-making process in investing (Amin & Shahzaib, 2014). There is no doubt that behavioral factors have a role in the decision-making process of investors, but this does not invalidate the theory of efficient markets (Singh, 2012). Humans have bounded rationality, so that human behavior is influenced by cognitive bias and psychological bias (Ady & Mulyaningtyas, 2017).

Table 4. Descriptive Statistics of Overall Technical Efficiency Value

Information	Average Technical Efficiency Value	Country
Maximum	0.9933	Iran
Minimum	0.8722	Kuwait
Total Average	0.9706	

Source: Processed data, SFA *Frontier* 4.1 (2019)

When viewed as a whole, based on table 4, the average technical efficiency value of the six Islamic stock exchanges in Islamic countries is 0.9706. This means that 97% of the potential output is being realized by Islamic stock exchanges in Islamic countries that provide estimates of technical efficiency. Furthermore, the highest technical efficiency value is found in Iran, which is 0.9933, this value almost reaches a perfect efficiency score with a score of one. Meanwhile, the lowest average technical efficiency value was found in Kuwait at 0.8722.

4.2.2 Analysis of Technical Efficiency Value Based on Time Periods

This section will explain the value of technical efficiency based on the time period, it can be seen in Table 5 below:

Table 5. Average Technical Efficiency Value Based on Time Period

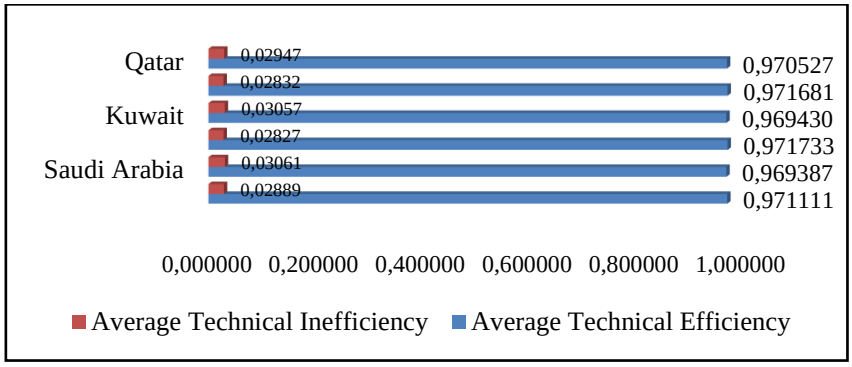
Country	Years				
	2014	**2015**	**2016**	**2017**	**2018**
Iran	0.9668	0.9691	0.9734	0.9735	0.9728
Saudi Arabia	0.9689	0.9657	0.9690	0.9712	0.9721
UAE	0.9707	0.9708	0.9720	0.9716	0.9735
Kuwait	0.9691	0.9693	0.9717	0.9721	0.9650
Indonesia	0.9735	0.9681	0.9734	0.9728	0.9707
Qatar	0.9714	0.9686	0.9707	0.9679	0.9739
Maximum	0.9735	0.9708	0.9734	0.9735	0.9739
	(Indonesia)	(UAE)	(Indonesia)	(Iran)	(Qatar)
Minimum	0.9668	0.9657	0.9690	0.9679	0.9650
	(Iran)	(Saudi Arabia)	(Saudi Arabia)	(Qatar)	(Kuwait)
Average	0.9701	0.9686	0.9717	0.9715	0.9713

Source: Processed data, SFA *Frontier* 4.1 (2019)

Based on table 5 based on the research time period, namely the average for each year during the research period of the year with the highest and most efficient average

technical efficiency value, namely in 2016 of 0.9717 (97.17%), found in the State of Indonesia. In 2016 the Islamic stock index in Islamic countries that were the object of research tended to have a positive trend and increased, therefore the average value of technical efficiency in 2016 was the highest. Furthermore, the lowest average technical efficiency value was 0.9686 (96.86%) in 2015. In 2015 the Islamic stock index in Islamic countries that were the object of research tended to have a downward trend, therefore the average value of technical efficiency in 2015 was the lowest.

This section will explain the value of technical efficiency based on the country on the Islamic stock exchange seen from the average value of technical efficiency, the highest and lowest values of the 6 countries in this study. This can be seen in Figure 2 as follows:



Source: Processed data, SFA Frontier 4.1 (2019)

Figure 2.
Average Value of Technical Efficiency and Technical Inefficiency

Based on the picture of 2 countries whose performance is below the average technical efficiency value, there are Saudi Arabia countries with a technical efficiency value of 0.96939 (96.939%). However, this value is not too far from the average value of the overall technical efficiency, therefore the country of Saudi Arabia has an opportunity of 0.03061 (3.061%) to achieve the most efficient rate of return on profit. Furthermore, there is the country of Kuwait with a technical efficiency value of 0.96943 (96.943%), then the country of Qatar with a technical efficiency value of 0.97053 (97.053%).

As for countries whose performance is above the average technical efficiency, there are in the UAE with an average technical efficiency value of 0.97173 (97.173%) so that the UAE only needs to achieve an opportunity of 0.02827 (2.827%) to achieve the most return on profit. efficient. Then the country of Indonesia which is not far from the UAE country with an average technical efficiency of 0.97168 (97.168%), the Iranian country with an average technical efficiency of 0.97111 (97.111%).

Therefore, when efficiency is low or has decreased during the research period from January 2014 to December 2018, a combination of factors that cover Islamic stock exchanges in Islamic countries is needed, such as information on financial reports that are less detailed or not all-encompassing, trading is very important. few transactions, decreased investor confidence, and there was manipulation. Islamic stock exchanges in Islamic countries have a condition with an increasing efficiency, this is because the

institutional infrastructure is good, and the regulatory framework is adequate to support investment players, both investors and issuers. These findings provide theoretical implications that the efficiency of Islamic stock exchanges is not solely influenced by the availability of information, as explained in the Efficient Market Hypothesis (EMH), but also by investor behavior, institutional quality, and the effectiveness of market regulation. Therefore, this research reinforces the view that Islamic stock market efficiency is dynamic and influenced by institutional conditions and the psychology of market investors in each country.

Furthermore, this research also provides managerial implications for regulators, capital market authorities, and stock exchange managers in each country. Regulators need to improve the transparency and quality of corporate financial information disclosure to reduce information asymmetry in the market. Supervision of stock trading activities also needs to be strengthened to minimize market manipulation and increase investor confidence. Furthermore, stock exchange managers need to strengthen institutional infrastructure, increase market liquidity, and create more effective regulations so that Islamic stock markets can operate more efficiently and attract domestic and international investors.

5. CONCLUSION

Based on the results of the analysis and discussion on research on the level of efficiency of the Islamic stock market in Islamic countries. Consisting of Iran, Saudi Arabia, UAE, Kuwait, Indonesia, and Qatar from January 2014 to December 2018, using the Stochastic Frontier Analysis method. It is concluded that based on the technical efficiency value of Islamic stock exchanges in Islamic countries fluctuating with a negative trend because there is a relatively small imbalance and overall no country has a perfect efficiency score with a score of one. Furthermore, the average technical efficiency value of Islamic stock exchanges in Islamic countries is 0.9706 or 97.06%. Based on that there are 0.38221 or 38% random variations in individual stock returns due to inefficiency. This means that there is a 38% chance that it can be optimized to achieve perfect technical efficiency.

Analysis of the technical efficiency value in this study is divided into two groups, first, the value of technical efficiency based on the highest average technical efficiency time period in 2016 and the lowest in 2015. Then the technical efficiency value based on the country has the highest average technical efficiency value found in UAE countries amounted to 0.97173 or 97.173% and countries with the lowest average technical efficiency value were Saudi Arabia at 0.96939 or 96.93%. So that based on the overall classification, the value of technical efficiency that operates efficiently is found in the UAE, Indonesia, and Iran. Meanwhile, countries with the less efficient category are Saudi Arabia, Kuwait, and Qatar.

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