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THE PERFORMANCE EVALUATION OF THE STATE-OWNED ENTERPRISE'S STOCKS IN INDONESIA

Abstract

State-owned enterprises (SOEs) play a strategic role in the Indonesian economy. In Indonesia, SOEs have contributed around 16.41% for the Indonesian state budget. Many Indonesian state-owned enterprises (SOEs) have listed their stocks on the Indonesia Stock Exchange. However, the study on the performance of SOEs' stocks is still relatively limited and tends to use indicators such as Sharpe Index, Treynor Ratio or Jensen Index. In addition to using indicators such as Sharpe Index, Treynor Ratio or Jensen Index, this study examines the performance of SOEs' stocks using Adjusted Sharpe Index, Adjusted Jensen Index and Sortino Ratio that can measure the downside risk of those stocks. The objective of this study is to analyze the performance of the SOEs' stocks in Indonesia. The sample in this research were 19 SOEs' stocks listed on Indonesia Stock Exchange during the period from January 2013 until April 2019. The result of this research indicated that INAF (PT Indo Farma) stocks had the best performance when measured by using all measurement methods. The performing stocks came from the construction sector and the pharmaceutical sector. Therefore, investors are suggested to give more attention to SOEs from the pharmaceutical sector and the construction sector.

Keywords Sharpe Index, Treynor Ratio, Jensen Index, Adjusted Sharpe Index, Adjusted Jensen Index, Sortino Ratio

JEL Classification G11

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INTRODUCTION

State-owned enterprises (SOEs) play a strategic role in the Indonesian economy. According to Directorate General of Budget (2017), the profit from Indonesian SOEs has contributed around 16.41% to the Indonesian state budget. SOEs can also be an income distribution tool for Indonesian people (Sugiharto, 2007). This income distribution can be realized if SOEs become public companies and their stocks are owned by Indonesian people as investors so that the Indonesian people as investors can enjoy the dividend of profits in the form of dividends or in the form of capital gains.

There are approximately 20 state-owned enterprises listed on the Indonesia Stock Exchange hold by the government and public company until April 2019. Associated with stocks of SOEs, various studies have been conducted on the performance of stocks of these SOEs. Sari (2015) conducted a special study on risk and return on SOEs banking sector. Sari (2015) linked the banking finance variables such as Return on Asset, Return on Equity, Price to Book Value, and Economic Value Added to the stock of banking sector of SOEs from 2005 till 2014 and found that only Price to Book Value had a significant influence on

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stock returns. While in an international context, there are several studies examining the performance of SOEs such as Radygin, Simachev, and Entov (2015), Wang, Jin, and Yang (2016).

In addition to the studies above, there are several studies that specifically examine the performance of state-owned stocks using performance evaluation approaches in the stock market. Some of these studies are researches conducted by Dewi (2011) and Al-Falah and Alayk (2008). Dewi (2011) reviewed the performance of state-owned stocks using common measurements such as Sharpe Ratio introduced by Sharpe (1966), Jensen Index introduced by Jensen (1967) and Treynor Ratio introduced by Treynor (1965), while Al-Falah and Alayk (2008) also use the same measurements including Sharpe Ratio, Jensen Index and another measurement was Appraisal Ratio.

Although it was widely accepted and widely used by practitioners and academics (Bednarek, Patel, & Ramezani, 2014), and even becoming the industry standard for investment (Kidd, 2011a, 2011b), performance measurement such as Sharpe Ratio and Jensen Index are not criticism-free. Such criticism, for example, for Sharpe Index is seen to be problematic due to the difference of time horizon (Cvitanic, Lazrak, & Wang, 2007). Further, Kidd (2011b) argued that Sharpe Index had a weakness, because it measured risk by using one dimension that was only by using variance. Kidd (2011b) and Robiyanto (2018b) also pointed to another Sharpe Index's weakness, which used the assumption of a normal return distribution. This assumption is clearly difficult to meet in real conditions, therefore, Jobson and Korkie (1981) developed the Adjusted Sharpe Index (ASI) to overcome the biases of Sharpe Index.

In contrast to Sharpe (1966) who used variance to represent a risk, Treynor (1965) created an approach called Treynor Ratio using market risk. Beta shares were used to represent market risk or systematic risk. In addition to the Sharpe Index and Treynor Ratio, the popular portfolio performance measurement tool is Jensen Alpha created by Jensen (1967). However, Jensen Alpha also has a weakness, where it is less appropriate to use if the level of stock market performance occurred is different. Therefore, there is a need for adjustment by sharing it with systematic risk. This adjustment is called the Adjusted Jensen Alpha Index (Robiyanto, Wahyudi, & Pangestuti, 2017; Zulkafli, Ahmad, & M, 2017). In addition to those ratios/indices, there is another measurement method called Sortino Ratio (SoM). This SoM describes the difference in portfolio return when it is compared to downside risks. Zulkafli et al. (2017) argue that the risk of this price reduction in the form of portfolio risk calculation by considering the probability of return was smaller than returns that could be accepted by investors.

Previous studies tend to focus on Sharpe Index, Jensen Index, and Treynor Ratio only. Unlike previous studies which focused on the Sharpe Index, Jensen Index, and Treynor Ratio to measure the performance of the SOEs' stocks, this study will also use the Adjusted Sharpe Index and Adjusted Jensen Index for non-biased measurements. Also, Sortino Ratio is also used in this study considering the fact that researches on the performance of the SOEs have never used Sortino Ratio, although it can indicate a downside risk (La Monaca, Assereto, & Byrne, 2018). This study aims to determine the SOEs' stocks that have the best performance based on the measurement methods used in this study. The benefit of this study is to assist investors interested in investing in the SOEs' stocks in Indonesia. This is important because investors tend to worry about the future of their stock investment (Preqin, 2014).

1. LITERATURE REVIEW

1.1. State-owned enterprises

Reviewing the role of the state as a company owner can be a starting point for the selection of economic policy (Abramov, Radygin, & Chernova, 2017). Scholars have long been involved in the discussion about the size of the public sector allowed in the economy. Most studies on this topic generally deal with the privatization of SOEs', as it is also common in Indonesia. Associated with government ownership on SOEs, governments can do so through direct and indirect ownership. Direct own-

ership implies that state-owned stocks are managed by authorized state institutions, while indirect ownership implies that the government owns shares, but not through authorized state institutions or through other organizations (Abramov et al., 2017; Radygin et al., 2015). SOEs have an important role in national economies. A new round of SOEs reformation began to occur when privatization was done to implement mixed state ownership as what had been implemented in China (Wang et al., 2016) and Indonesia (Wicaksono, 2008).

1.2. Portfolio/stock performance evaluation

In the areas of financial management, especially related to portfolio and behavioral finance, risk and performance are closely related to each other. Modern portfolio theory provides a range of measurement tools to facilitate its calculations (La Monaca et al., 2018; Surianshah, Karim, & Khalid, 2017; Yiannaki, 2015). There are some measurement tools such as Sharpe Index, Jensen Alpha, Treynor Ratio (Yiannaki, 2015).

Sharpe Index introduced by Sharpe (1966) is aimed at measuring stock/portfolio performance by using variability as the denominator. Bednarek et al. (2014) and Low and Chin (2013) stated that the Sharpe Index is widely known and applied by academics and practitioners in the field of investment because of its simplicity, while Grau-Carles, Doncel, and Sainz (2018) stated that Sharpe Index is the principal financial performance measure. In addition to Sharpe Index, Treynor Ratio is a measurement tool that is also often used by investors (Robiyanto et al., 2017). Associated with Treynor Ratio, Ferruz and Vicente (2005) suggest that the Treynor Ratio shows a systematic risk per unit risk. Therefore, the Treynor Ratio measures the premium return on each unit of market risk (Beer, Estes, & Munte, 2011). Scholz and Wilkens (2006) suggest that the Sharpe Index or Treynor Ratio can be used to examine performance ratings. In addition to these two measurement tools, there is a performance measurement tool introduced by Jensen (1967) called Jensen Alpha. Jensen Alpha is a risk-adjusted return gauge of performance that pays special attention to systematic risk.

As the world of investments grows, these performance measurement tools have been criticized by experts for having various weaknesses that encourage various adjustments and improvements (Fu & Blazenko, 2017; Grau-Carles et al., 2018; Jackwerth & Slavutskaya, 2016). One of the experts who made adjustments were Jobson and Korkie (1981) who modified the Sharpe Index, because the Sharpe Index was considered biased and used the assumption of normal distribution. Jobson and Korkie (1981) modified the Sharpe Index and then named the modified version as Adjusted Sharpe Index (ASI). This Sharpe Index modification also appears in another form called Sortino Ratio (Rollinger & Hoffman, 2013). Sortino Ratio is the modification result of Sharpe Index by using downside deviation in place of standard deviation (Chen, Yang, & Peng, 2014; Robiyanto, Santoso, & Ernayani, 2019). Sortino Ratio was formed by accommodating the opinion of Markowitz (1959), which stated that only the downside deviation was relevant to investors (La Monaca et al., 2018; Oikonomou, Platanakis, & Sutcliffe, 2018). As stated by Rollinger and Hoffman (2013), "In many ways, the Sortino ratio is a better choice, especially when measuring and comparing the performance of managers whose programs exhibit skew in their return distributions. The Sortino ratio is a modification of the Sharpe ratio but uses downside deviation rather than standard deviation as the measure of risk – i.e. only those returns falling below a user-specified target".

Other modifications to the measurement indicator are also performed on Jensen Alpha. Zulkafli et al. (2017) suggest that Jensen Alpha cannot be used to measure performance at different levels of performance index with different performance, so it needs to be adjusted with systematic risk factors. This adjustment is often called Adjusted Jensen Alpha Index (AJI).

2. METHOD OF THE RESEARCH

2.1. Data

The data used in this research were the monthly closing price of SOEs' stocks that were used as the sample of this study, monthly closing of Jakarta Composite Index (JCI) data to calculate the market return in order to calculate stocks' beta, and

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Bank Indonesia (BI) rate and Bank Indonesia (BI) Repo rate data from January 2013 till April 2019.

The monthly closing of the SOEs' stock prices and monthly closing of JCI were obtained from Real Time Information program, while the BI rate and 7-day Repo rate data were obtained from the official website of Bank Indonesia. On August 19, 2016, Bank Indonesia introduced a new reference interest rate or BI rate policy, which was the BI 7-day Repo rate, to replace the BI rate even in the transitional period, the BI rate was still in use. Therefore, in this study, BI rate data would be replaced by BI 7-day Repo rate after the date of August 19, 2016 (Robiyanto, 2018a).

2.2. Population and sample

The population of this study was the SOEs' stocks that had been listed on Indonesia Stock Exchange until April 2019. There were 20 SOEs listed on the Indonesia Stock Exchange until April 2019. Not all of these stocks were used in this study. Sampling was done by using purposive sampling technique using these 3 criteria, whereas the SOEs' stocks should have been listed on the Indonesia Stock Exchange since January 2013 and still listed in Indonesia Stock Exchange until April 2019 and directly owned by the government. Finally, there were only 19 SOEs' stocks meeting these criteria. The stocks that were used as the sample of this study can be seen in Table 1.

Table 1. Samples

Source: Secondary data, processed.

No.	Stock ticker	No.	Stock ticker
1	INAF (PT Indofarma (Persero) Tbk)	11	BBTN (PT Bank Tabungan Negara (Persero) Tbk)
2	KAEF (PT Kimia Farma (Persero) Tbk)	12	BMRI (PT Bank Mandiri (Persero) Tbk)
3	PGAS (PT Perusahaan Gas Negara (Persero) Tbk)	13	ANTM (PT Aneka Tambang (Persero) Tbk)
4	KRAS (PT Krakatau Steel (Perseo) Tbk)	14	PTBA (PT Pertambangan Batu Bara Bukit Asam (Persero) Tbk)
5	ADHI (PT Adhi Karya (Persero) Tbk)	15	TINS (PT Timah (Persero) Tbk)
6	PTPP (PT PP (Persero) Tbk)	16	SMGR (PT Semen Gresik (Persero) Tbk)
7	WIKA (PT Wijaya Karya (Persero) Tbk)	17	JSMR (PT Jasa Marga (Persero) Tbk)
8	WKST (PT Waskita Karya (Persero) Tbk)	18	GIAA (PT Garuda Indonesia (Persero) Tbk)
9	BBNI (PT Bank Negara Indonesia (Persero) Tbk)	19	TLKM (PT Telekomunikasi Indonesia (Persero) Tbk)
10	BBRI (PT Bank Rakyat Indonesia (Persero) Tbk)		

2.3. Analytical technique

The technique of analysis used in this research was portfolio evaluation technique or stock by using Sharpe Index, Treynor Ratio, Jensen Index, Adjusted Sharpe Index (ASI), Adjusted Jensen Index (AJI) and Sortino Ratio (SoM). These measurement methods were more frequently used than other measurement methods (Kidd, 2011a, 2011b; Kidd, 2012).

Prior to the stock evaluation, stock returns were calculated. As for the return of SOE's stock price studied here was calculated by the following formula:

$$R_{i,t} = \left[\frac{Price_{i,t} - Price_{i,t-1}}{Price_{i,t-1}} \right], \quad (1)$$

where $Price_{i,t}$ – monthly closing of the stock price i on Indonesia Stock Exchange at month t, $Price_{i,t-1}$ – monthly closing of the stock price i on Indonesia Stock Exchange at month $t-1$.

To calculate stock's beta, this study uses the Jakarta Composite Index (JCI) as a proxy of the market, so the market return calculated by using the following formula:

$$R_{m,t} = \left[\frac{JCI_t - JCI_{t-1}}{JCI_{t-1}} \right], \quad (2)$$

where $R_{m,t}$ – market return at month t, JCI_t – monthly closing of the JCI on Indonesia Stock Exchange at month t, JCI_{t-1} – monthly closing of the JCI on Indonesia Stock Exchange at month $t-1$.

Sharpe Index was calculated using the following formula (Pangestuti, Wahyudi, & Robiyanto, 2017; Rini, Handayani, & Hidayat, 2013; Robiyanto, 2017; Robiyanto et al., 2017; Sharpe, 1966):

$$Sharpe\ Index\ (SI) = \\ = \frac{Average\ stock\ return - Risk\ free\ rate}{Standard\ deviation\ of\ stock\ return}. \quad (3)$$

Treynor Ratio is formulated as follows (Robiyanto, 2017; Treynor, 1965):

$$Treynor\ Ratio = \\ = \frac{Average\ stock\ return - Risk\ free\ rate}{Stock\ beta}. \quad (4)$$

Jensen Index or Jensen Alpha (α) is formulated as follows (Jensen, 1967; Pangestuti et al., 2017; Zulkafli et al., 2017):

$$\alpha = \left(R_{i,t} - RFR_t\right) - \beta\left(R_{m,t} - RFR_t\right), \quad (5)$$

where $R_{i,t}$ – stock i return at month t, RFR_t – risk-free rate at month t, $R_{m,t}$ – stock market return (represented by JCI return at month t).

Sharpe Index, Treynor Ratio, and Jensen Alpha are based on the assumption that stock return is normally distributed. However, this assumption is clearly difficult to meet in real conditions (Jobson & Korkie, 1981; Ogata, 2012; Robiyanto, Ernayani, & Ismail, 2019). So, some measurements been made in order to comply with non-normal/skewed return distribution, such as Adjusted Sharpe Index (ASI), Adjusted Jensen Index (AJI), and Sortino Ratio (SoM).

Adjusted Sharpe Index (ASI) is formulated as follows (Jobson & Korkie, 1981; Pangestuti et al., 2017; Zulkafli et al., 2017):

$$ASI = \\ = SI \cdot \frac{number\ of\ observations\ (N)}{number\ of\ observations\ (N) + 0.75}. \quad (6)$$

Adjusted Jensen Index (AJI) is formulated as follows (Pangestuti et al., 2017; Zulkafli et al., 2017):

$$AJI = \frac{Jensen\ alpha}{Stock\ beta}. \quad (7)$$

Sortino Ratio (SoM) is formulated as follows (Kidd, 2012; Pangestuti et al., 2017; Rollinger & Hoffman, 2013; Simforianus & Hutagaol, 2008; Sortino & Price, 1994):

$$SoM = \frac{R_i - RFR_t}{\delta}, \quad (8)$$

where δ is the downside deviation from market return durin time t, which is formulated as follows:

$$\delta = \frac{\sqrt{\sum \left(\min R - MAR, O\right)^2}}{N - 1}, \quad (9)$$

where δ – downside deviation, R – return, MAR – minimum acceptable return, N – number of observation, where:

if $(R - MAR)$ has a negative sign, use $(R - MAR)$, if $(R - MAR)$ has a positive sign, use 0.

Sortino Ratio (SoM) can be used for both normal and skewed stock return distribution.

3. RESULT

3.1. Beta, standard deviation, and average monthly return

The beta value, standard deviation and average monthly return of SOE stocks in this study can be seen in Table 2.

Table 2. Beta, standard deviation, and average monthly return

Source: Real-time information, processed.

No.	Stock ticker	Beta	STDEV	Average return
1	INAF	1.3680	0.3126	0.0705
2	KAEF	2.0979	0.2135	0.0366
3	PGAS	1.6430	0.1230	–0.0042
4	KRAS	0.8450	0.1232	–0.0004
5	ADHI	1.9934	0.1348	0.0061
6	PTPP	0.7819	0.1418	0.0142
7	WIKA	1.3943	0.1293	0.0126
8	WKST	1.9741	0.1368	0.0271
9	BBNI	1.3877	0.0846	0.0148
10	BBRI	1.4461	0.0822	0.0169
11	BBTN	1.3089	0.1023	0.0117
12	BMRI	1.5311	0.0888	0.0043
13	ANTM	1.0067	0.1491	0.0030
14	PTBA	0.8173	0.1305	0.0077
15	TINS	0.8909	0.1570	0.0062
16	SMGR	1.2063	0.0898	–0.0011
17	JSMR	0.7586	0.0743	0.0032
18	GIAA	0.4434	0.1159	0.0006
19	TLKM	0.5767	0.0593	0.0114

The largest stock beta is KAEF with a beta value of 2.0979, while stocks with the smallest beta are GIAA with a beta value of 0.4434. If they were

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categorized into aggressive stock (having a stock beta greater than 1) and defensive stock (having a stock beta less than 1) categories, then there would be 12 stocks in the aggressive stock category, and seven stocks were categorized into the defensive stock category. Stocks included in the aggressive category were INAF, KAEF, PGAS, ADHI, WIKA, WSKT, BBNI, BBRI, BBTN, BMRI, and SMGR, while stocks included in the defensive category were stocks of KRAS, PTPP, PTBA, TINS, JSMR, GIAA, and TLKM. Also, one stock in the neutral category, which is ANTM.

A stock that has the largest standard deviation is INAF stock with a standard deviation value of 0.3126, while TLKM stock is stock with the smallest standard deviation value of 0.0593. This standard deviation represents the total risk of a stock, whereas the beta of stock represents a systematic risk of a stock. This shows that INAF stock has the biggest total risk compared to other stocks. Meanwhile, the stock with the largest average return value is INAF stock with an average monthly return of 7.05%. The appreciation of INAF stock ranged from IDR 330 in the initial period of study to IDR 3,930 in the final period of this study made it be a stock with the largest average monthly return value. Different things happened to PGAS, KRAS and SMGR stocks that became stocks with the average value of monthly returns of marked negative. PGAS become the biggest loser during the period of this study, with the monthly return –0.42%. This could happen because the stock price of PGAS at the beginning of the research period was IDR 4,600 and decreased to IDR 1,955 at the end of the study period.

3.2. SOEs' stocks performance evaluation

In Table 3. we can see the results of performance measurement of SOE stocks using Sharpe Index, Jensen Index, Treynor Ratio, Adjusted Sharpe Index (ASI), Adjusted Jensen Index (AJI), and Sortino Ratio (SoM). Stock with the highest Sharpe Index value is INAF stock with Sharpe Index of 0.2070, while a stock with the largest negative Sharpe Index is PGAS with Sharpe Index of –0.0807. Similarly, when measuring performance using ASI, INAF stock has the greatest ASI value of 0.2042 and PGAS stock has the highest negative value of –0.0796. The largest Treynor Ratio is INAF with Treynor Ratio of 0.0473, while the largest Treynor Ratio with a negative sign is the GIAA with Treynor Ratio of –0.0117.

When they were measured using Jensen Index, the stock which has the largest Jensen Index value is INAF with Jensen Index value of 0.0645, while the stock with the biggest negative value of Jensen Index is PGAS with Jensen Index of –0.0101. Meanwhile, different things were found when AJI measurement was used. Stock with the largest AJI is INAF stock with AJI value of 0.0472, while a stock with the biggest negative value of AJI is GIAA stock with AJI value of –0.0118. By using SoM, it was known that the stock that produces the highest SoM is INAF stock with an SoM value of 0.0153, while the stock with the lowest SoM value is TLKM stock with an SoM value of 0.0046.

Table 3. The result of SOEs' stock performance

Source: Real-time information, processed.

No.	Stock ticker	Sharpe Index	Treynor Ratio	Jensen Alpha	ASI	AJI	SoM
1	INAF	0.2070	0.0473	0.0645	0.2042	0.0472	0.0153
2	KAEF	0.1447	0.0147	0.0306	0.1427	0.0146	0.0114
3	PGAS	–0.0807	–0.0060	–0.0101	–0.0796	–0.0062	0.0111
4	KRAS	–0.0496	–0.0072	–0.0062	–0.0489	–0.0074	0.0110
5	ADHI	0.0027	0.0002	0.0001	0.0027	0.0001	0.0106
6	PTPP	0.0595	0.0108	0.0083	0.0587	0.0107	0.0105
7	WIKA	0.0530	0.0049	0.0067	0.0523	0.0048	0.0104
8	WSKT	0.1560	0.0108	0.0211	0.1538	0.0107	0.0098
9	BBNI	0.1073	0.0065	0.0089	0.1059	0.0064	0.0097
10	BBRI	0.1350	0.0077	0.0109	0.1332	0.0075	0.0097
11	BBTN	0.0580	0.0045	0.0058	0.0572	0.0044	0.0094
12	BMRI	–0.0158	–0.0009	–0.0016	–0.0156	–0.0011	0.0082
13	ANTM	–0.0186	–0.0028	–0.0029	–0.0184	–0.0029	0.0082
14	PTBA	0.0152	0.0024	0.0019	0.0150	0.0023	0.0080
15	TINS	0.0029	0.0005	0.0003	0.0029	0.0004	0.0077
16	SMGR	–0.0766	–0.0057	–0.0070	–0.0755	–0.0058	0.0071
17	JSMR	–0.0347	–0.0034	–0.0027	–0.0342	–0.0035	0.0066
18	GIAA	–0.0448	–0.0117	–0.0053	–0.0442	–0.0118	0.0061
19	TLKM	0.0946	0.0097	0.0055	0.0933	0.0096	0.0046

4. DISCUSSION

Based on all 19 SOEs' stocks examined in this study, not all resulted in higher returns than the risk-free rate; this could also be indicated from the value of Sharpe Index, ASI, Treynor Ratio, Jensen Index and AJI with a negative sign. There

were seven SOEs' stocks generating returns below the risk-free interest rate, such as PGAS, BMRI, ANTM, KRAS, SMGR, JSMR, and GIAA. SOEs' stocks in the mining sector such as ANTM and infrastructure such as PGAS and KRAS stocks generate returns below the risk-free interest rate. This could happen because, during the research period, the price of mining commodities in the world market experienced a downturn, which resulted in poor performance of these SOEs' stocks. The same thing was also experienced by PGAS stock whose products followed prices in world markets. This finding supports Robiyanto (2018b) who also finds that mining sector stocks perform the worst in the IDX during 2011–2017, and Wicaksono (2008) who found that PGAS performance is not good. Unfortunately, this finding is not consistent with Rini et al. (2013), who found that those stocks have been performing well in 2011 when the commodity price was still good.

There was one stock of SOEs in the banking sector generating a return below the risk-free interest rate, which was BMRI. This was different from other state-owned banks that could generate returns above the risk-free rate. During the research period, BMRI stock showed less expected performance due to the impact on government policy to lower lending rates. Unlike other state-owned banks that did not focus on the corporate sector in lending, BMRI was more likely to channel credit to large corporations.

SMGR and JSMR stocks also yielded a return below the risk-free interest rate, because, during the study period, these stocks were declined due to their performance that did not meet the expectations of investors. SOEs' stock that earned return below the risk-free interest rate and produces the worst performance was PGAS stock. As an infrastructure company that also produces natural gas, PGAS was heavily dependent on natural gas market prices and held a very high burden of depreciation that ultimately affected its performance.

There were 12 SOEs' stocks generating a higher return than the risk-free rate. They were INAF, KAEF, ADHI, PTPP, WIKA, WSKT, BBNI, BBRI, BBTN, PTBA, TINS, and TLKM. They were included in the pharmaceutical sectors (INAF and KAEF), construction (ADHI, PTPP, WIKA, and WSKT), mining (TINS), banking (BBNI, BBRI, and BBTN) and telecommunications (TLKM). They were positively influenced by government policies such as health insurance and social security (positively impacting state-owned pharmaceutical sector, especially generic drugs), acceleration of infrastructure development (positively impacting state-owned enterprises in infrastructure sector such as ADHI, PTPP, WIKA, and WSKT, even banks that contribute to finance development infrastructure such as BBRI and BBTN); and policies to develop the micro and small industry sector (impact on state-owned banks such as BBRI). Overall, SOEs' stocks had performed well, because they were supported by conducive industrial conditions during the study period; the same thing happened to SOE stocks with poor performance, where their condition that was not conducive giving a negative impact to the performance of the SOEs. These findings supported the results of studies by Dewi (2011) and Al-Falah and Alayk (2008). Overall, this study was in line with a statement by Abramov et al. (2017) saying that SOEs must support the economic policy. The Jokowi's administration in Indonesia through Indonesian SOEs tried to boost infrastructure development during the research period, his administration also imposed the new policy in social health. These policies also had a positive impact on the overall Indonesian SOEs' stock performance.

4.1. The segmentation of SOEs' stocks based on the Jensen Alpha and Beta

From 19 SOEs' stocks examined in this study, each can be segmented based on the Jensen Alpha and Beta. This segmentation was conducted in order to give guidance to investors so they can choose which stocks to invest according to their risk-return preferences.

The segmentation is made by combined Jensen Alpha and Beta, as formulated by Widodo and Robiyanto (2018). Jensen (1967) stated that Alpha < 0 means that the stock returns have not inappropriate for its risk (or, it was too risky with low return); Alpha = 0 means that the stock has produced an adequate return for the risk; Alpha > 0 means that the stock has produced higher return for the assumed risk, while $\beta < 0$ means that the

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stock categorized as aggressive; $\beta = 0$ means that the stock categorized as neutral; $\beta > 0$ means that the stock categorized as defensive.

There are five stocks in the segment of underperform-defensive; one stock in the segment of underperform-neutral, three stocks in the segment of outperform-defensive; two stocks in the segment of underperform-aggressive; eight stocks in the segment of outperform-aggressive; while none in the segment of neutral-neutral. Overall, nine stocks are categorized as underperforming and ten stocks are categorized as outperform.

The results of mutual funds' segmentation are shown in Table 4.

Table 4. The segmentation of equity mutual funds

Segment	$\beta < 1$ (defensive)	$\beta = 1$ (neutral)	$\beta > 1$ (aggressive)
$\alpha < 0$ (underperform)	KRAS GIAA JSMR	ANTM	PGAS SMGR BMRI
$\alpha = 0$ (neutral)	–	–	–
$\alpha > 0$ (outperform)	TINS PTBA TLKM PTPP	–	ADHI BBTN WIKA BBNI BBRI WSKT KAEF INAF

CONCLUSION

Not all SOEs' stocks in Indonesia were performing well. This study shows that there were SOEs' stocks that generate returns below the risk-free interest rate. This could be seen through the existence of SOEs' stocks resulting negative Sharpe Index, ASI, Treynor Ratio, Jensen Index and AJI. Stocks with Sharpe Index, ASI, Treynor Ratio, Jensen Index and AJI were stocks worthy of investment, because they could generate a higher return than the risk-free interest rate, for example, INAF, KAEF, ADHI, PTPP, WIKA, WSKT, BBNI, BBRI, BBTN, PTBA, TINS, and TLKM. Among the investment-worthy stocks, INAF stock was the best-performing stocks when it was measured using all measurement methods. This might happen because during the research period, Indonesia under the Joko Widodo's administration had heavily emphasized on the social health programs, so the INAF stock price hike across the research period. The same finding has high possibility to occur in the period 2019–2024, because the same administration (the Joko Widodo's administration) is continuing to govern Indonesia and will continuing their infrastructure program. Hopefully, this finding will encourage Indonesia investors to invest in the SOEs' stocks, so the SOEs' stocks could deliver the benefit to Indonesian investors.

Stock investors in Indonesia Stock Exchange are advised to invest in stocks of SOEs worth investing by focusing on the best performing state-owned enterprises such as KAEF (PT. Kimia Farma Tbk. (Persero)), INAF (PT. Indofarma Tbk. (Persero)), and WSKT (PT. Waskita Karya Tbk. (Persero)). Based on their risk preferences, investors also could select stock, which is suitable for them. For investors who prefer to stock with low volatility, they can choose a stock, which segmented in the outperform-defensive category. On the other hand, investors who prefer to stock with high volatility, they can choose a stock, which segmented in the outperform-aggressive category.

The Indonesia SOE Ministry can also use the portfolio evaluation techniques used in this study to ranks the performance of Indonesian SOEs' stocks. Also, the Indonesia SOE Ministry must give extra attention for the SOE with low stock performance, because the stock performance also reflects its financial performance. Some financial restructuring even the BOD's member replacement must consider. The best performer stock has high possibility to continuing it performance in the period 2019–2024, because the same administration (the Joko Widodo's administration) is continuing to govern Indonesia and will continuing their infrastructure and social health program. Hopefully, this finding will encourage Indonesia investors to invest in the SOEs' stocks, so the SOEs' stocks could deliver the benefit to Indonesian investors.

The results of this study show that the portfolio evaluation techniques can be applied for evaluating the performance of SOEs' stocks. This study also shows that each performance measurement method must be applied carefully and must complements each other, because each method could produce different results. The conclusions withdrawal also must be based on the sign of the risk premium. Meanwhile, researchers who want to conduct a study on the performance of SOE stocks can use other alternative measurement methods or create new stock performance measurement methods.

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