


Analysis of IDX-MES BUMN17 stocks using capital asset pricing model as a basis for investment decisions

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Article Info	ABSTRACT
Keywords: CAPM, stock, IDX-MES BUMN 17	The purpose of this study is to analyze the CAPM method as the basis for the IDX-MES BUMN 17 share investment decision in January 2021-December 2022. The type of research in this study is quantitative research. The sampling technique used is purposive sampling. The sample in this research were 14 stocks on the IDX-MES BUMN 17 index with several criteria. To assess stock efficiency by comparing actual return (R_i) and expected return (R_j) and using the Security market Line (SML). The results of this study indicate there are 2 stocks including efficient stock, namely PGAS & PTPP. These shares have a value $R_i > E(R_j)$, $\beta > 1$ and based on Security market Line (SML) area. The investment decisions that investors make are to buy the stock.
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INTRODUCTION

Investment is a commitment to placing a certain amount of funds at this time with the aim of obtaining *a return* in the future. Investments in financial assets such as shares or *marketable securities* will be more volatile than warrants, bonds or other equities. The fundamental thing in the investment process is understanding the linearity between *risk and return* (Sri Handini & Erwin Dyah Astawinetu, 2020) . Stock buying and selling activities as an investment instrument in Indonesia are officially regulated based on Republic of Indonesia Law Number 8 of 1995 concerning capital markets (Fahmi, 2013, p. 36.42) . The concept of shares is a concept of musyarakah/syirkah activities, namely capital participation with the right to share business profits. According to Islam, investment is one of the muamalah activities with musyarakah and mudharabah contracts (Madjid, 2018, p. 17) .

To make it easier for investors to choose stock issuers, IDX has grouped shares according to certain criteria in *stock index trading* . Stock index is historical information that presents stock price movements. Stock index information varies, including the Individual *Stock Price Index* and the *Composite Stock Index* . On the Indonesian Stock Exchange (BEI) there is also a group stock price index which records the share price movements of a group of large capitalization stocks called *blue chips* or sharia stock groups. In Indonesia, sharia-based stock indices include ISSI, JII, JII 70, IDX-MES17, IDXSHAGROW (Tan, 2008) .

The Islamic stock index is a statistical measure that reflects the price movements of a group of Islamic shares selected based on certain criteria. Since its launch on April 29 2021, the IDX-MES17 stock index measures the price performance of 17 shares of State-Owned Enterprises (BUMN) and their affiliates which are considered to run their businesses in accordance with sharia principles, have good liquidity, large market capitalization, and are supported by good company fundamentals (idx, 2023) .

Reading stock movement trends on the IHSG is important for determining stock investment decisions. With this movement, investors can know the right time to buy and sell shares (Stiawan, 2021) . Investors need to be more careful in choosing shares that are still efficient to invest in. Investors can find out about this through the Capital Asset Pricing Model (CAPM) method. CAPM is an analytical model for efficient portfolio formation, because CAPM is a balance model that can help to simplify the picture of the relationship between risk and return. This is in line or linear with the principle of "high risk, high return" meaning that the greater the desired result, the greater the risk and vice versa (Bodie, Zvi; Kane, Alex and Marcus, 2014) . CAPM provides accurate predictions between the risk relationship of an asset and the expected level of return. Stock risk in CAPM is measured by beta (β). In CAPM, the greater the beta coefficient, the greater the return on a stock and the riskier it will be. In CAPM, the expected rate of return is determined by the market rate of return, risk-free rate of return and systematic risk/beta (Yulianti, Topowijono, & Azizah, 2016) .

Based on the research results of Pasaribu, et al (2018), it was found that the CAPM model stock portfolio is the most optimal portfolio model in generating investment returns (Pasaribu, Maruddani, & Sugito, 2018) . This is reinforced by the research results of Tandiontong (2015) which concluded that stock analysis using the CAPM method provides more valid and robust results in explaining variations in sectoral stock returns. National capital market risk premiums and national interest rates can be appreciated as risk factors for sectoral stocks (Tandiontong & Rusdin, 2015) . Meanwhile, research by Hardianti, et al (2020) shows the results of using the CAPM method in determining investment decisions, finding that out of 17 samples, 12 samples were confirmed as valid results that can be used as a reference in choosing shares to invest in (Hardiyanti, Yuni; Prijanto, 2020) .

Different types of research using the CAPM method produce different conclusions. So it can be used as initial source data. Ria (2022) who analyzes the use of the Capital Asset Pricing Model (CAPM) as a basis for making investment decisions in shares listed on the Jakarta Islamic Index (JII) for the period June 2019 – June 2021 shows that the CAPM can be used in assessing shares (JII) efficiently and inefficient. There are 10 stocks that are classified as efficient stocks with a buy recommendation because they have a value of $R_i > E R_i$ including ADRO, AKRA, ANTM, BRPT, BTPS, CPIN, EXCL, INCO, JPFA, SCMA (Ria, 2022) .

Putra and Rinaldo's (2022) research, which aims to determine the development and comparison of efficient stocks in the consumer goods industry sector before and after the Covid-19 pandemic, concludes that there is a significant difference in excess returns in a positive direction in conditions after Covid-19. The results of the research found that three

shares are still included in efficient shares, namely TBLA, WIIM, and INAF (Putra & Rinaldo, 2022). Meanwhile, Hasan, et al (2019) from their research stated that there were 11 company shares that were included in the efficient share category, including; AKRA, BBKA, BBNI, BBRI, BMRI, CPIN, GGMR, INDF, INTP, PGAS, SMGR and 8 company shares which are included in the inefficient share category out of 19 company shares used as research samples. Meanwhile, the 8 shares that fall into the inefficient stock category include: AALI, ADRO, ASII, BSDE, KLBF, PWON, TLKM, UNTR shares. These shares have a R_i value that is smaller than $E(R_i)$ or $[R_i < E(R_i)]$, so investors should sell these shares before the price falls (Hasan, Pelleng, & Mangindaan, 2019) .

Furthermore, Hardiyanti and Prijanto (2020) in their research on the case study of JII shares in 2014-2016 regarding return and systematic risk using the CAPM model concluded that there were 12 shares which were classified as efficient shares, namely ADRO, AKRA, ASII, BSDE, INDF, KLBF, LSIP, SMRA, TLKM, UNTR, UNVR and WIKA. These shares have a value of $E(R_i) > E(R_j)$ CAPM. The investment decision that investors must make is to buy efficient shares (Hardiyanti, Yuni; Prijanto, 2020) . Meanwhile, research by Rahmanita, et al (2021) on efficient property and *consumer goods stocks* during the Covid-19 pandemic using CAPM mode for the 2016 - 2020 period showed different results. The beta calculation for each company shows that β_i is more than 1, which means there is a high risk in property companies, namely APLN, ASRI, CTRA and BSDE, while in the group of *consumer good companies* , namely ADES companies. Apart from that, there are shares that have the smallest beta, namely ULTJ with a beta value (β) < 1 . Meanwhile, the results of the expected return calculation show that $E(R_i)$ with the highest value is ULTJ and negative $E(R_i)$ for issuers APLN, ASRI, CTRA, BSDE and ADES (Rahmanita, Nugraha, Sari, & Anggarini, 2021) .

Based on this initial study, researchers are interested in conducting research on the IDX-MES 17 stock index using the CAPM approach in the 2021 - 2022 stock exchange period to determine shares that are categorized as efficient and worthy of consideration as investment issuers.

METHOD

This type of research uses associative descriptive quantitative methods. This research was conducted by collecting secondary data in the form of *monthly adjusted closing prices* of companies listed on the Indonesia Stock Exchange which were collected through the official websites of the Indonesia Stock Exchange (www.idx.co.id), yahoo finance (www.finance.yahoo.com), investing .com (<https://id.investing.com>), and Bank Indonesia (www.bi.go.id). Data collection and data processing will be carried out in April 2023. The research population is IDX-MES BUMN17 index shares. The sampling technique used was a *purposive sampling method* , so that a sample of 14 issuers was obtained. The data calculation for this research is by taking into account the variables from CAPM in Microsoft Excel. The analysis stages in this research are as follows;

1. Selecting a sample of IDX-MES BUMN 17 index shares during the 2021-2023 period.
2. Collecting secondary data on *monthly adjusted closing prices* .

3. Calculate reference interest rate / BI Rate data
4. Calculate the profit rate of each share (R_i).
5. Calculating market return (R_m)
6. Calculating Risk free rate (R_f)
7. Calculating systematic risk or stock beta (β)
8. Classification of shares as an investment decision based on the criteria of Ross A, Westerfird, R and Jordan, B, 2010 in Komara (2021);
 - a. A stock's beta is more than 1 (one), meaning the stock is an aggressive class of stock.
 - b. Excess return is positive (+) or can be described as $(R_i) > (R_j)$
 - c. Stock risk and return have a linear relationship from the SML graph
Produces a significant beta (β) value.

RESULTS AND DISCUSSION

BUMN IDX-MES Sample 17

The IDX-MES BUMN 17 stock index is a sharia stock index consisting of 17 sharia stocks according to the criteria of IDX (Indonesia Exchange) and MES (Sharia Economic Society). Since it was published on 17 Ramadhan 1442H or coinciding with 29 April 2021, it has gone through major evaluations 3 times. Based on IDX major evaluation data, and research objectives, a sample of 14 share issuers of the IDX_MES BUMN 17 index was obtained. The results of the research sample analysis are presented in the table below;

Table 1 Research Sample

No	Code	Share Name
1	ANTM	Aneka Tambang Tbk.
2	BRIS	Bank Syariah Indonesia Tbk.
3	ELSA	Elnusa Tbk.
4	KAEF	Kimia Farma Tbk.
5	PGAS	Perusahaan Gas Negara Tbk.
6	PPRE	PP Presisi Tbk.
7	PTBA	Bukit Asam Tbk.
8	PTPP	PP (Persero) Tbk.
9	SMBR	Semen Baturaja (Persero) Tbk.
10	SMGR	Semen Indonesia (Persero) Tbk.
11	TLKM	Telkom Indonesia (Persero) Tbk.
12	WEGE	Wijaya Karya Gedung Tbk.
13	WIKA	Wijaya Karya (Persero) Tbk.
14	WTON	Wijaya Karya Beton Tbk.

IDX-MES 17 share classification as an investment decision

Further analysis for decision making, in determining which issuers are worthy of being selected as investment instruments, is to calculate the investment return (R_i) for the 14 issuers, calculate the systematic risk (β), and calculate the expected return for each of the 17 IDX-MES BUMN share issuers. Based on (Haming and Basalamah, 2014), if β is more

than 1 ($\beta > 1$), it indicates that the stock has high risk. On the other hand, if the stock's beta is less than 1 ($\beta < 1$), it indicates high risk. Meanwhile, to find out the level of return, the monthly required return is calculated for the 2021-2022 period. If the stock's beta is more than 1, it shows that the stock is classified as an aggressive stock, then a positive excess return (+) or $E(R_i) > E(R_j)$ shows that the stock is undervalued (Haming, Murdifin and Basalamah, 2003) . We present the data from our calculations in the following stock classification table.

Table 2 Classification of IDX-MES BUMN 17 Shares as an investment decision

No	Code	Share Name	Ri	β	Rj
1	ANTM	Aneka Tambang Tbk.	0.003334517	1.443872746	-0.021573503
2	BRIS	Bank Syariah Indonesia Tbk.	-0.019778023	0.373679287	0.02228878
3	ELSA	Elnusa Tbk.	-0.001476474	0.942831463	-0.001038137
4	KAEF	Kimia Farma Tbk.	-0.036699925	0.169569107	0.030654313
5	PGAS	Perusahaan Gas Negara Tbk.	0.01608142	1.636181583	-0.029455353
6	PPRE	PP Presisi Tbk.	-0.01471093	0.84514006	0.002965782
7	PTBA	Bukit Asam Tbk.	0.01996351	1.184267441	-0.010933481
8	PTPP	PP (Persero) Tbk.	-0.029288697	1.074076579	-0.006417267
9	SMBR	Semen Baturaja (Persero) Tbk.	-0.026685037	0.992884791	-0.003089591
10	SMGR	Semen Indonesia (Persero) Tbk.	-0.01529178	0.927558338	-0.000412162
11	TLKM	Telkom Indonesia (Persero) Tbk.	0.009516909	0.504096578	0.016943578
12	WEGE	Wijaya Karya Gedung Tbk.	-0.009619244	0.438767711	0.019621106
13	WIKA	Wijaya Karya (Persero) Tbk.	-0.028721779	0.885695066	0.00130362
14	WTON	Wijaya Karya Beton Tbk.	-0.021779245	0.669008925	0.010184583

on the beta value calculation data, individual returns and *excessed returns* above, it can be further explained in an advanced analysis table. The criteria used to translate this data into investment decisions are the criteria explained in Haming and Basalamah (2014) where if $\beta > 1$ is classified as an aggressive stock and if it produces a positive (+) excess return [$E(R_i) > E(R_j)$] interpret undervalued shares (Haming, Murdifin and Basalamah, 2003) . We can present a representation of this in table form as follows.

Table 3 Representation of IDX-MES BUMN 17 share classification as a follow-up investment decision

No	Code	Share Name	Ri	β	Stock Evaluation
1	ANTM	Aneka Tambang Tbk.	Undervalued	Aggressive	Worthy
2	BRIS	Bank Syariah Indonesia Tbk.	Overvalued	Defensive	Not Eligible Yet
3	ELSA	Elnusa Tbk.	Overvalued	Defensive	Not Eligible Yet
4	KAEF	Kimia Farma Tbk.	Overvalued	Defensive	Not Eligible Yet
5	PGAS	Perusahaan Gas Negara Tbk.	Undervalued	Aggressive	Worthy
6	PPRE	PP Presisi Tbk.	Overvalued	Defensive	Not Eligible Yet
7	PTBA	Bukit Asam Tbk.	Undervalued	Aggressive	Worthy
8	PTPP	PP (Persero) Tbk.	Overvalued	Aggressive	Worthy

9	SMBR	Semen Baturaja (Persero) Tbk.	Overvalued	Defensive	Not Eligible Yet
10	SMGR	Semen Indonesia (Persero) Tbk.	Overvalued	Defensive	Not Eligible Yet
11	TLKM	Telkom Indonesia (Persero) Tbk.	Overvalued	Defensive	Not Eligible Yet
12	WEGE	Wijaya Karya Gedung Tbk.	Overvalued	Defensive	Not Eligible Yet
13	WIKA	Wijaya Karya (Persero) Tbk.	Overvalued	Defensive	Not Eligible Yet
14	WTO	Wijaya Karya Beton Tbk.	Overvalued	Defensive	Not Eligible Yet
N					

Graphic Depiction of Security Market Line (SML)

CAPM via the Security Market Line (SML) is a trendline that visualizes the sensitivity of changes in β to the risk-free rate of return (R_f). In theory, the greater the systematic risk/beta (β), the greater the expected return on an issuer (R_i). Based on the analysis, below is a graph of the SML for 14 IDX-MES BUMN17 share issuers.

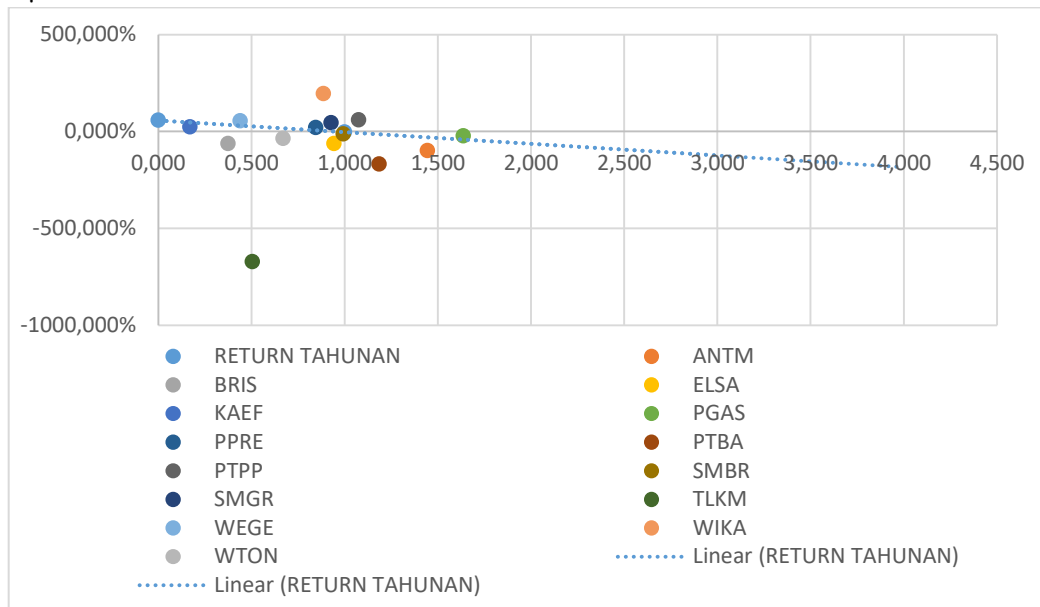


Figure 1. Security Market Line sample of IDX-MES BUMN 17 shares

Discussion

The sample in this research is secondary data from www.idx.co.id which was processed using Microsoft Excel. In the sample selection process, issuers who entered because they replaced other issuers and were not present during the 3 evaluation periods from 2021-2022 were not included in the sample. Based on IDX major evaluation data, with the share criteria used in the research, namely by determining sample shares as shares that remained constant for 3 IDX evaluation periods, a sample of 14 stock issuers with the IDX_MES BUMN 17 index was obtained. Meanwhile, the secondary data referred to in this research is the adjusted closing price data for the 14 stocks that have been selected. *The adjusted closing price* used is the position data for the last day of each month from January

2021 to December 2022. The *adjusted closing price* was chosen because after stock trading is closed according to the schedule determined by the IDX, there are still price adjustments for trades carried out close to market closing.

Further analysis is used as a basis for decision making, in determining which issuers are worthy of being selected as investment instruments by calculating the investment return (R_i) for the 14 issuers, calculating systematic risk (β), and calculating the expected return for each issuer of IDX-MES BUMN shares. 17. The rate of return on individual shares, symbolized by R_i , is the amount of profit that investors actually receive when investing. R_i is calculated by finding the difference between the closing price of shares (closing price) this month (month t) and the closing price of shares in the previous month ($t-1$) then dividing it by the closing price of shares in the previous month ($t-1$). Meanwhile, the β calculation is intended to determine the level of risk in making investment decisions. Beta (β) is obtained by calculating the slope between market returns and returns per each share.

The CAPM approach is used as a basis for assessing the feasibility of investing in an individual issuer, which in principle compares the expected return and required return. If the stock's beta is more than 1, it shows that the stock is classified as an aggressive stock, then a positive excess return (+) or $E(R_i) > E(R_j)$ shows that the stock is undervalued (Haming, Murdifin and Basalamah, 2003) . Based on table 4.2, it is known that several shares fall into the undervalued category, namely ANTM, PGAS, PTBA and PTPP. This is in accordance with the findings of Aprilinita (2022) who concluded that 31 companies fall into the undervalued efficient stock category, namely, ADRO, ANTM, ASII, BBKA, BBNI, BBRI, BBTN, BMRI, BSDE, CTRA, ERAA, INCO, INKP, INTP , ITMG, JPFA, JSMR, MDKA, MIKA, MNCN, PGAS, PTBA, PTPP, PWON, SCMA, SMG, SMRA, TBIG, TKIM, TLKM, and WIKA. The investment decision that investors should take is to buy these shares when they are undervalued or below the market price (Aprilinita, Waldeska Aulia, Dwi Aristi, Hikmah Putri, & Putri Permatasari, 2019) .

To make it easier to understand the data, based on the criteria mentioned in Haming and Basalamah (2014) where if $\beta > 1$ it is classified as an aggressive stock and if it produces a positive (+) excess return [$E(R_i) > E(R_j)$] it is interpreted as an undervalued stock (Haming , Murdifin and Basalamah, 2003) . Based on this, the interpretation of this information is presented in table 4.3 above. As a result, from the 14 samples studied, there were 4 shares in the undervalued category and 10 shares in the *overvalued category* . Based on initial individual return data, the decision made on the stock issuers was to consider purchasing the three issuers, namely ANTM, PGAS, PTPP and PTBA. If investors already own these shares, they can consider increasing the amount of ownership or holding these shares until the price rises. On the other hand, overvalued shares in the near future can be considered for sale. Meanwhile, if the consideration used is only the beta value of the stock, then investors can consider aggressive stocks to sell first, because they are very volatile in relation to general market conditions, and buy defensive stocks. In this case, there are 4 shares that have $\beta > 1$, namely the stock issuers ANTM, PGAS, PTBA and PTPP. Meanwhile, the other 10 stocks in the table are defensive.

The process of making investment decisions is entirely the investor's decision, while recommendations for a method are a consideration of the probability of a market. Comprehensively, by considering the return and risk relationship from the β and R_i values obtained, it can be concluded that there are 4 issuers that are worth considering for purchase, including ANTM, PGAS, PTBA, PTPP. Meanwhile, shares that fall into the unfit category are KAEF, BRIS, PTBA, TLKM, WIKA, SMGR, SMGR, WEGE, WTON, PPRE. These ten shares are included in the category of shares that need to be avoided in certain time frames for investors who are just going to buy stock issuers.

In theory, the greater the systematic risk/beta (β), the greater the expected return on an issuer (R_i). The trendline which visualizes the sensitivity of changes in β to the risk-free rate of return (R_f) for 14 IDX-MES BUMN17 stock issuers can also be analyzed via the Security Market Line (SML) which is presented in figure 1. Based on the distribution of data in figure 1, it is known that there is a nonlinear relationship between risk with expected return. This can be seen by comparing the sample between WIKA shares with $\beta=0.885$ and a rate of return of $E(R_i)= 0.0013$ or PGAS with the highest β of 1.636 but has a rate of return of $E(R_i)= -0.0294$ or unreturn. However, it needs to be understood that in the case of investment, the issuer can still be recommended for purchase because of the potential for price movements to cause unreturnable shares in a certain time frame to experience a reversal in conditions. The direction of the SML diagram towards the bottom right shows a negative correlation. This is because market returns in general based on the IDX-MES BUMN 17 stock index are still negative, or in the time frame conditions of this research, the shares on the IDX-MES BUMN 17 index do not provide returns (unreturn). However, these results cannot be generalized to each issuer. This is the basis for using SML. So, we can identify each issuer that has potential by looking at the distribution of issuers around the SML line.

After drawing the Security Market Line (SML), the distribution of stock issuers will appear to be on the SML line or outside the SML line. Issuers that are not on the SML line have two probabilities, namely undervalued or overvalued. Shares that are above the SML line and are still linear are shares that are categorized as undervalued and are still worth collecting because the realized return can be greater than the expected return. On the other hand, shares will be overvalued and fall into the category of shares to be avoided if they are below the SML line because the potential individual return is smaller than the expected return. Stocks that are above the SML line are called undervalued stocks or cheap stocks because the realized return or actual return is greater than the return expected by investors. Meanwhile, shares that appear to be below the SML line are called overvalued shares or expensive shares because they provide a realized return that is smaller than the expected return. In this research, grouping undervalued and overvalued shares based on the SML line using the CAPM method produces 7 shares that are cheap or undervalued, namely WEGE, PPRE, PGAS, PTPP, SMGR, WIKA, SMGR and 7 shares that are expensive or overvalued, namely KAEF, BRIS, WTON , ELSA, PTBA, ANTM, TLKM. An investor's decision for undervalued shares is to buy these shares or hold off on selling shares until the share price rises.

CONCLUSION

Based on the results of the secondary data analysis carried out, it can be concluded that there is a nonlinear relationship between systematic risk and expected return. This can be proven by taking a sample comparison between WIKA shares with $\beta=0.885$ and a return rate of $E(R_i)= 0.0013$ or PGAS with the highest β of 1.636 but has a return rate of $E(R_i)= -0.0294$. Based on the SML graph, 7 stocks are produced that are cheap or undervalued, namely WEGA, PPRE, PGAS, PTPP, SMGR, WIKA, SMBR and 7 stocks that are expensive or overvalued, namely KAEF, BRIS, WTON, ELSA, PTBA, ANTM, TLKM. An investor's decision for undervalued shares is to buy these shares or hold off on selling shares until the share price rises. Meanwhile, the results of the analysis by considering systematic risk and expected return using the criteria $\beta>1$ are classified as aggressive stocks and if they produce a positive (+) excess return [$E(R_i)>E(R_j)$] there are 4 issuers worth considering for purchase, namely ANTM, PGAS, PTBA, PTPP. Meanwhile, shares that fall into the unfit category are KAEF, BRIS, PTBA, TLKM, WIKA, SMBR, SMGR, WEGA, WTON, PPRE. Assuming the achievement of risk-free linearity and expected return, it is highly recommended to collect PGAS and PTPP shares. The limitation in this analytical research is only calculating the rate of return or returns originating from capital gains from analysis based on *adjusted closing prices* without taking into account dividends obtained during the research data time period. Apart from that, the data calculation used is *the monthly adjusted closing price*. For further research, researchers can use averaged daily closing stock prices, or weekly stock price data. Apart from that, future researchers can examine the IDX_MES BUMN stock index in the next major evaluation period without considering the components of the constituent issuers. So the sample taken was a population, namely the 17 IDX_MES BUMN 17 share issuers. It is hoped that the results of this research can be used as a reference and information consideration for investors and prospective novice investors who will invest in shares. It is very important for investors to invest excess funds in efficient shares so that the risks they face can be minimized properly, so that the investor's goal of getting the expected return can be achieved. However, we need to convey that all shares or recommendations are not an invitation to buy a particular share issuer (DISCLAIMER)

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