

Correlation of Sectoral Stock Indexes on the Indonesian Stock Exchange for Portfolio Diversification Strategies

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ABSTRACT

This research aims to examine opportunities for stock portfolio diversification on the IDX Industrial Classification index on the Indonesian Stock Exchange. This research data uses daily returns from 11 sectoral stock price index. The research period used is from January 25, 2021, to March 28, 2024. The analysis method uses correlation analysis to determine the level of index return correlation between sectors. The research results show that all stock sectors have varying levels of correlation, but the level of correlation is low to moderate. The technology stock sector has the lowest correlation with other stock sectors. Investors have a huge opportunity to diversify their shares into several stock sectors to reduce the risk of investing.

Keywords: *Portfolio Diversification, Sectoral Stock Price Index, IDX Industrial Classification, Indonesia stock exchange.*

1. INTRODUCTION

Research on portfolio diversification is an interesting topic to conduct because it is useful for investors (Muharam et al., 2020). Portfolio theory was introduced by Markowitz (1952) who explained that never allocate assets into only one investment instrument. Allocating assets to several investment instruments aims to reduce risk in investing. Diversification is a basic strategy in investing to avoid risk and uncertainty (Koumou, 2020). Diversifying a stock portfolio means buying other stocks that have a low correlation with the stocks already in the portfolio (Baur & Lucey, 2010). Allocating assets to several investment instruments with high correlation will reduce the benefits of diversification (Baur & Lucey, 2010). In Santoso & Muharam (2021) state that diversification can be done by buying shares in other countries' stock markets which have low or no correlation with the domestic capital market. The problem is that not all investors have access to buy shares in other countries' stock markets, so they only diversify between stock sectors in a stock market.

The Indonesian Stock Exchange publishes the IDX Industrial Classification (IDX IC) index as an update to the previous sectoral stock price index, namely *the Jakarta Stock Industrial Classification (JASICA)*. Companies are classified based on the final goods or services produced. The purpose of forming this index is so that market players, namely investors or other parties, can carry out analysis to develop strategies when investing in shares on the Indonesian Stock Exchange (IDX). In Atahau et al. (2022) stated that diversifying shares into several sectors aims to reduce the risk in investing. According to Sharma & Banerjee (2015) portfolio diversification can increase opportunities to maximize investment profits. Investing in only one investment instrument has a high risk, if the investment experiences a decline then the investor will experience an absolute loss because there is no other investment that can cover the loss (Santoso & Muharam, 2021).

The IDX Industrial Classification Index has 11 sectoral stock price indexes, namely energy, basic materials, industrials, non-cyclical consumer goods, cyclical consumer goods, healthcare, financials, properties & real estate, technology, infrastructures, and transportation & logistics. The movement of the IDX Industry Classification sectoral stock price index on the Indonesia Stock Exchange for the period 25 January 2021 to 28 March 2024 is as follows:

Figure 1 shows that in general almost all industry classification stock sectors have relatively similar movements, but the stock sector index technology has a different movement pattern from other sectors. The technology sector stock index experienced a large increase in 2021, but after that the movement tended to experience a downward trend. The energy sector stock index has become the stock sector with the highest performance since the IDX Industrial Classification was launched. According to research results by Purwani & Santoso (2023), the movement of the energy

sector stock index is influenced by movements in related commodity prices. Meanwhile, stock indexes for other sectors apart from the technology and energy sectors have identical movements, but there are still differences in index performance.

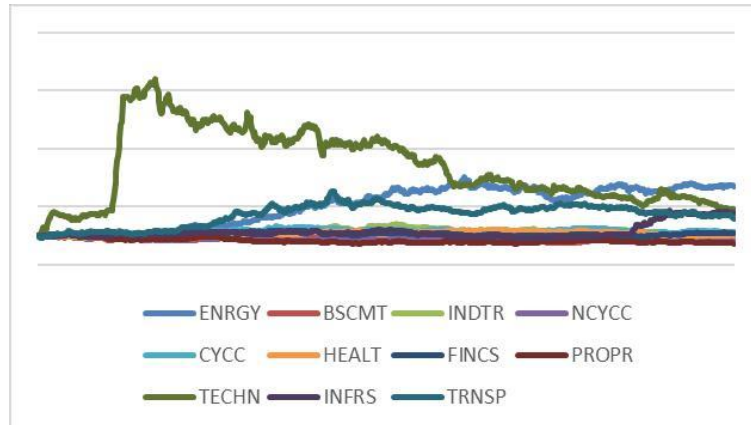


Figure 1. Movement of Sectoral Indexes on the IDX Industrial Classification on the Indonesian Stock Exchange

Assets must be allocated to several other investment instruments that have a low correlation with the assets held in the portfolio (Joyo & Lefen, 2019). In Woerheide & Persson (1993) it is stated that one way to determine a diversification strategy is to analyse the level of correlation of two or more assets. Analysing sectoral index movements in the stock market allows investors to increase their investment returns with a minimal level of risk (Karim & Majid, 2009; Sharma & Banerjee, 2015)s. Several studies have been conducted on portfolio diversification. Research by Robiyanto et al. (2023) examined portfolio diversification opportunities in 5 ASEAN country stock markets. Research by Santoso et al. (2023) examined portfolio diversification opportunities between sectors on the Indonesia Stock Exchange and portfolio diversification opportunities in 5 ASEAN country stock markets. Research by Robiyanto (2019) examined portfolio diversification opportunities between sectors on the Indonesian Stock Exchange. Research by Sharma & Banerjee (2015) examined sectoral index movements in the Chinese stock market. Research by Surya & Natasha (2018) examined the joint movements of sectoral stock price index on the Indonesia Stock Exchange.

This research aims to determine the correlation between the IDX Industry Classification sectoral stock price index on the Indonesian Stock Exchange. This research is a novelty from research conducted by Robiyanto (2019) which still used 10 stock sectors. In January 2021, there was a change in the classification of stock sectors from 10 stock sectors to 11 stock sectors. Based on previous research, there is still little research that discusses correlation analysis of sectoral stock price index returns in Indonesia. Research examining the correlation of the IDX Industrial Classification sectoral stock price index on the Indonesian Stock Exchange has never been carried out, therefore there is a gap in research and novelty. This research is worth carrying out because it has benefits for investors who invest on the Indonesian Stock Exchange.

2. RESEARCH METHODS

Sectoral stock price index based on the IDX Industrial Classification Index on the Indonesian Stock Exchange. The IDX Industrial Classification Index consists of *energy sector index* (ENRGY), *basic materials* (BSCMT), *industrials* (INDTR), *non-cyclical consumer goods* (NCYCC), *cyclical consumer goods* (CYCC), *healthcare* (HEALT), *financials* (FINCS), *properties & real estate* (PROPR), *technology* (TECHN), *infrastructures* (INFRS) and *transportation & logistics* (TRNSP). The research period was from when the index was launched on January 25, 2021 – March 28, 2024, so the amount of data used was 8514 data. The source of research data comes from the official website www.idx.co.id, accessed on 26 April 2024. The data was tested for stationary using the *Augmented Dickey-Fuller Unit Root Test* and analysed using bivariate correlation analysis with the help of the EViews 10.

Sectoral stock price index data is first converted into daily returns. The formula for sectoral stock price index returns is written as follows:

$$R = \frac{R_t - R_{t-1}}{R_{t-1}} \times 100\% \dots\dots\dots (1)$$

Equation 1 are the equation used in this paper. R is Daily return, R_t is Return on the day of observation, R_{t-1} is Return on the day before the day of observation.

Sectoral stock price index return data was analysed using bivariate correlation with the following formula:

$$r = \frac{n \sum XY - (\sum X)(\sum Y)}{\sqrt{(n \sum X^2 - (\sum X)^2)(n \sum Y^2 - (\sum Y)^2)}} \dots\dots\dots (2)$$

Equation 2 are the equation used in this paper. R is Correlation, X is Variable X, Y is Variable Y, and N is Amount of data.

Correlation test results are divided into several categories, namely uncorrelated or weak correlation, moderate correlation, and high correlation. The correlation categories for interpreting correlation results based on Ratner (2009) are as follows:

Table 1. Interpretation of Correlation Coefficient Results

Scale of Coefficient Correlation	Interpretation
0 – 0.3	Weak Correlation
> 0.3 – 0.7	Moderate Correlation
> 0.7 - 1	High Correlation

3. RESULTS AND DISCUSSIONS

3.1. Stationary Test

Table 2. shows the results of the stationary test using the *Augmented Dickey-Fuller Unit Root Test* with the *Schwarz Info Criterion* at level. The analysis results are as follows:

Table 2. ADF Level Stationary Test

IDX IC Index	t-statistic	Prob.
ENRGY	-19.6347	0.0000**
BSCMT	-21.8136	0.0000**
INDTR	-23.9622	0.0000**
NCYCC	-21.2587	0.0000**
CYCC	-18.3404	0.0000**
HEALT	-23.1741	0.0000**
FINCS	-22.7616	0.0000**
PROPR	-20.9572	0.0000**
TECHN	-9.8811	0.0000**
INFRS	-24.0607	0.0000**
TRNSP	-19.8827	0.0000**

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

Table 2. shows the results of the *Augmented Dickey-Fuller Unit Root Test* with the *Schwarz Info Criterion* at level. The results of the stationary test show that all sectoral stock price index return data has a probability value of <0.05. Based on these results, it was concluded that the data used in this research had passed the stationary test.

3.2. Correlation Test

Table 3. shows the results of the correlation analysis of the energy, basic materials, industrials, non-cyclical consumer goods, cyclical consumer goods, healthcare, financials, properties & real estate, technology, infrastructures, and transportation & logistics sector index. The results of the correlation analysis are shown as follows:

Table 3. Correlation between Sectoral Indexes

	ENRGY	BSCMT	INDTR	NCYCC	CYCC	HEALT	FINCS	PROPR	TECHN	INFRS	TRNSP
ENRGY	1	,428**	,515**	,265**	,286**	,098**	,262**	,313**	,089*	,248**	,247**
BSCMT	,428**	1	,410**	,406**	,398**	,205**	,443**	,417**	,159**	,446**	,335**
INDTR	,515**	,410**	1	,364**	,342**	,142**	,425**	,401**	,098**	,312**	,320**
NCYCC	,265**	,406**	,364**	1	,369**	,322**	,426**	,339**	,076*	,322**	,225**
CYCC	,286**	,398**	,342**	,369**	1	,212**	,429**	,437**	,265**	,312**	,336**
GOOD	,098**	,205**	,142**	,322**	,212**	1	,203**	,149**	,033	,173**	,137**
FINCS	,262**	,443**	,425**	,426**	,429**	,203**	1	,491**	,226**	,375**	,314**
PROPR	,313**	,417**	,401**	,339**	,437**	,149**	,491**	1	,183**	,345**	,306**
TECHN	,089*	,159**	,098**	,076*	,265**	,033	,226**	,183**	1	,131**	,128**
INFRS	,248**	,446**	,312**	,322**	,312**	,173**	,375**	,345**	,131**	1	,244**
TRNSP	,247**	,335**	,320**	,225**	,336**	,137**	,314**	,306**	,128**	,244**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The results of the analysis in Table 3 generally show that there is a positive correlation between sectoral stock price index on the IDX Industrial Classification on the Indonesian Stock Exchange, but the correlation is classified as low (0 – 0,3) to moderate (>0,3 – 0,7). The highest correlation in the stock sector is in the energy sector with the industrial sector with a correlation value of 0,515. The lowest correlation in the stock sector is in the technology sector and the healthcare sector with a correlation value of 0,033. This figure is almost close to 0, meaning there is almost no correlation between the two stock sectors. The correlation between the technology stock sector and other stock sectors is the lowest, all correlation results with other sectors are at a low level of correlation. Based on the research results, it can be explained that it is still possible for investors to diversify between industrial class stock sectors on the Indonesian Stock Exchange.

The research results support research conducted by Santoso et al. (2023) whose results show that the technology stock sector is segmented with other stock sectors. The research results are different from the results of research conducted by Robiyanto (2019) which shows that the movement of the mining and agricultural stock sector index is segmented with other stock sectors, while the results of this research show that the technology stock sector is segmented with other sectors. Investors who diversify their shares into several sectors will benefit. This was said by Joyo & Lefen (2019) that diversifying will reduce the risk of investing. Investors will basically look for investments with low risk but high levels of profit. Based on the results of his research, it is stated that diversifying when investing is highly recommended, one of which is by combining investments in several places.

4. CONCLUSION

Based on the research results, it was concluded that in general it shows that there is a positive correlation between sectoral stock price index on the IDX Industrial Classification on the Indonesian Stock Exchange, but the correlation is classified as low to moderate. Low correlation between sectors can be an opportunity for investors to diversify their shares in different sectors. Therefore, investors will gain benefits if they diversify their shares into several stock sectors in the IDX Industrial Classification on the Indonesian Stock Exchange.

It is recommended that further research be conducted again with a newer sample period, besides adding other assets that can be used as portfolio diversification. Future research can also use better methods such as *Orthogonal Generalized Autoregressive Conditional Heteroscedasticity* (GARCH) to find out which sectors have different return variants or are segmented from other sectors.

AUTHORS CONTRIBUTIONS

Rahmat Budi Santoso is the first author and corresponding author who has written almost all the papers. M. Rifki Bakhtiar performed in data analysis and interpretation. Bunga Rosa Afilia and Abdul Basid collected the data.

ACKNOWLEDGMENTS

We thank all parties because this article was fully supported by Faculty of Economics and Business, AKI University.

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