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Stock portfolio and optimal return

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ABSTRACT

The lifting of restrictions on community activities (or PPKM) gave a positive signal to the capital market, especially listed firms in the transportation and logistics sector. This study aims to compile an investment portfolio in order to obtain optimal returns and make estimates for the next 120 days. The sample used in this study is obtained from observations on 1 January 2023 to 30 April 2023. This study uses the Treynor ratio to determine which stocks have a better risk-return trade-off. The results of the analysis using ARIMA show that TRJA has a high return and risk, while TMAS and ELPI have the highest return with low risk.

Keywords: returns; Treynor ratio; transportation & logistic
JEL Classification: G11; G12; G17

1. Introduction

According to Rianti (2021), investment is an activity of investing capital or assets carried out for a certain period of time with the aim of obtaining profits in the future. Shares can be defined as evidence/securities or ownership of equity interests in a company with a nominal value, company name, and stated rights and obligations to their respective owners (Azzahra et al., 2023; Rahmawati & Jalaluddin, 2022). The share price is the price of a piece of paper that is traded in the capital market, where the price can change at any time or at any time, and the share price can also change according to demand and supply (Rizky et al., 2018; Suryani et al., 2021).

One of the sectors listed on the Indonesia Stock Exchange is the transportation and logistics sector. The transportation and logistics sector is one of the sectors affected by the COVID-19 pandemic (Agustian & Syofyan, 2022; Ningtias & Jaeni, 2022). Figure 1 shows that the movement of the transportation and logistics indices tends to move stably from January to April 2023. The lifting of the Community Activity Restrictions (or PPKM) on 30 December 2022 had a positive impact on people who wanted to return to their hometowns without PPKM restrictions. In addition, with the repeal of PPKM, it is hoped that the transportation and logistics sector will also make a better contribution to the economy in Indonesia. Based on the existing opportunities, the purpose of this research is to compile a portfolio of shares in the transportation and logistics sector that can be used as a reference for investors.

The Contrarian: Finance, Accounting, and Business Research
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pp. 28-35

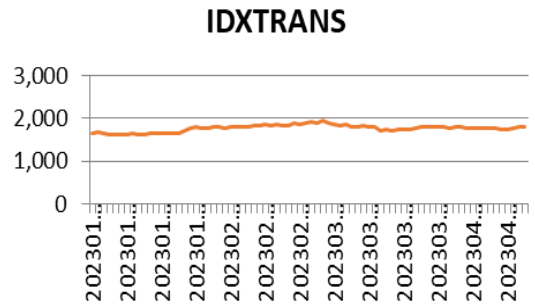

Figure 1. Transportation and logistics index

2. Literature review

According to Purnama and Juliana (2019), the Capital Asset Pricing Model (CAPM) is a model that links stock returns with the risk of these stocks in balanced market conditions. According to Hasan et al. (2019), the CAPM can also assist investors in calculating the risk of an undiversified portfolio and comparing it with predicted returns.

One of the analytical tools that can provide a reference for the better risk-return trade-off is the Treynor ratio. Setiawan (2017), and Catherine and Robiyanto (2020) explain that the importance of using the beta in investment preferences is due to fluctuations in stock prices due to uncertainty in the capital market. Fajar (2020) explains that the Treynor ratio has an advantage because it takes into account the beta that comes from the CAPM.

3. Research method

This study uses secondary data originating from the Indonesia Stock Exchange with an observation period of 1 January 2023 to 30 April 2023. The sample is stocks of the transportation and logistics sector for all trading boards. The types of the trading boards are Main (M), Development (D), and Acceleration (A). Moreover, this study carries out the preparation of a stock portfolio that focuses on the rate of return. The rate of return is calculated as the difference between the current daily closing prices and the previous daily closing prices and divided by the previous daily closing prices. In addition, in order to obtain a better stock portfolio then the Treynor Ratio (TR) is used as a control variable which is calculated by following formula.

$$TR = \frac{R_{it}-RF_t}{\beta_t}$$

Stock beta for a certain period (β_t) is calculated based on CAPM with the following formula.

$$R_{it} - RF_t = \alpha_t + \beta.(RM_t - RF_t) + \varepsilon_t$$

R_{it} is the rate of return from firm i on day t while RM_t is the rate of return from the market index on day t. The market index used in the CAPM model is the composite index. RF_t is the rate of return on a risk-free investment from the Indonesian Central Bank on a 365-day basis to determine the daily return. In the final stage, the Autoregressive Integrated Moving Average (ARIMA) is used to see the optimum return based on the portfolio of the selected stocks. Irawan (2015), Yani (2018), and Putri and Aghsilni (2019) suggest using the ARIMA model in making the best forecasting of data. At this stage, the ARIMA model was selected based on the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) supported by the Augmented Dickey-Fuller test (ADF test), Autocorrelation Function (ACF), and Partial Autocorrelation Function (PACF). In addition, this study assesses the feasibility of the selected ARIMA model using the Ljung-Box (LB) test. Some of the ARIMA models used in this study for forecasting stock returns are as follows.

1. Autoregressive Model (AR) or the general form of an autoregressive model on the order p or AR(p) or ARIMA model (p,0,0) with the following formula.

$$X_t = \mu + \emptyset_1 X_{t-1} + \emptyset_2 X_{t-2} + \cdots + \emptyset_p X_{t-p} + e_t[0]$$

In this equation, μ is a constant, $\emptyset_p$ is the p-th autoregressive parameter, and ε_t is the error at t.

2. Moving Average Model (MA) or the general form of the moving average model of order q or MA (q) or ARIMA (0,0,q) which is expressed by the following formula.

$$x_t = \mu + e_t - \theta_1 e_{t-1} - \theta_2 e_{t-2} - \cdots \theta_q e_{t-k}$$

In this equation, μ is a constant, θ_q is a moving average parameter, and ε_{t-k} is an error at t-k.

3. The mixed model or general model for a mixture of AR(1) and MA(1) is expressed by the following formula.

$$X_t = \mu + \emptyset_1 X_{t-1} + e_t - \theta_1 e_{t-1}$$

4. Result and discussion

Table 1 presents the mean return, stock beta, and TR of the transportation and logistics sector. This study chooses stocks that have a positive mean return with a higher beta to provide a better TR which reflects a better risk-return trade-off. The results of the analysis show that all stocks on the acceleration board cannot be selected as they have a negative TR.

Firms in the acceleration board on average have a fairly low rate of return throughout the observation period. This makes sense because those firms also have relatively low stock beta (or less than 1). Consistent with Effendy and Pamungkas (2018), high-beta stocks tend to be followed by high returns as well. However, Gea and Silalahi (2022) also find that high-beta stocks do not always provide positive returns.

Table 1. Mean return, stock beta, and the TR

Firm	Board	Mean	Beta	TR
ASSA	M	0.00256	1.64547	0.00155
BIRD	M	0.00317	1.40119	0.00226
BLTA	M	-0.00016	-0.00003	6.10189
SMDR	M	0.00027	2.18607	0.00012
TAXI	M	-0.00016	-0.00003	6.10189
TMAS	M	0.00560	0.21255	0.02635
WEHA	M	0.00187	0.55313	0.00337
BPTR	M	-0.00038	3.06228	-0.00013
TRJA	M	0.00668	1.71743	0.00389
HAIS	M	0.00230	0.73055	0.00314
ELPI	M	0.00244	0.47952	0.00509
AKSI	D	-0.00217	-1.44855	0.00150
CMPP	D	-0.00558	1.02675	-0.00543
GIAA	D	-0.01410	1.30903	-0.01077
LRNA	D	-0.00156	0.49163	-0.00317
MIRA	D	-0.00016	-0.00003	6.10189
NELY	D	0.00333	0.06472	0.05153
SAFE	D	-0.00103	-0.06634	0.01557
SDMU	D	-0.00213	0.09693	-0.02199
HELI	D	-0.00392	-0.71648	0.00546
TRUK	D	-0.00015	0.37803	-0.00039
TNCA	D	-0.00608	1.10819	-0.00549
SAPX	D	0.00346	-1.23524	-0.00280
DEAL	D	-0.00016	-0.00003	6.10189
JAYA	D	0.00043	-0.03249	-0.01309
KJEN	D	0.00070	0.41690	0.00169
PURA	D	-0.00016	-0.00003	6.10189
HATM	D	-0.00320	0.61548	-0.00519
PPGL	A	-0.00130	0.52106	-0.00250
RCCC	A	-0.00370	0.80912	-0.00458

This study selects the stocks which have a better TR. In addition, the mean and beta of the selected stocks have positive values. Several stocks with high TR (for example, BLTA, TAXI, MIRA, DEAL, and PURA) cannot be selected because they have a negative mean and beta values.

In subsequent analysis, the median of TR is used to separate stocks that have a better risk-return trade-off. Table 2 presents stocks that have a better optimal return possibility with minimum risk, especially TMAS and NELY.

Table 2. Firms with better risk-return trade-off

Firm	Board	Mean	Beta	TR
WEHA	M	0.00187	0.55313	0.00337
TRJA	M	0.00668	1.71743	0.00389
ELPI	M	0.00244	0.47952	0.00509
TMAS	M	0.00560	0.21255	0.02635
NELY	D	0.00333	0.06472	0.05153

The Contrarian: Finance, Accounting, and Business Research
Volume 2, Issue 2, 2023
pp. 28-35

This study applies the ARIMA model on the 5 best stocks to estimate returns for the next 120 market days. Table 3 shows that the ARIMA (2,0,2) for WEHA is fit according to LB test and is stationary according to the ADF test.

Table 3. ARIMA 2,0,2 for WEHA

	Coef.	SE Coef.	t	Sig.
Constant	0.0016	0.0030	0.54	0.589
AR 1	0.593	0.125	4.75	0.000
AR 2	-0.548	0.123	-4.45	0.000
MA 1	0.829	0.053	15.69	0.000
MA 2	-0.959	0.043	-22.42	0.000
		ADF test	-4.972	0.000
		AIC	-336.70	
		BIC	-322.71	
		LB test:		
		Lag 12	10.49	0.162
		Lag 24	18.02	0.521
		Lag 36	19.47	0.946
		Lag 48	31.15	0.911

Figure 2 shows that the ACF and PACF of the WEHA's residuals also stationary which is support the result of ADF test.

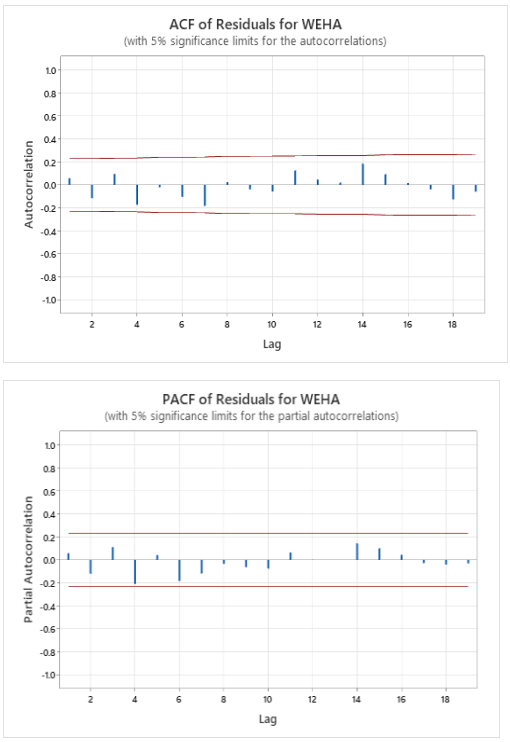

Figure 2. ACF and PACF of WEHA

Table 4 shows ARIMA (4,0,3) for TRJA is fit according to the LB test and is stationary according to the ADF test.

Table 4. ARIMA 4,0,3 for TRJA

	Coef.	SE Coef.	t	Sig.
Constant	0.0289	0.0167	1.73	0.089
AR 1	-1.621	0.291	-5.56	0.000
AR 2	-1.350	0.269	-5.02	0.000
AR 3	-0.337	0.247	-1.36	0.177
AR 4	0.310	0.142	2.18	0.033
MA 1	-1.775	0.248	-7.15	0.000
MA 2	-1.698	0.145	-11.69	0.000
MA 3	-0.7129	0.0845	-8.43	0.000
		ADF test	-7.83157	0.000
		AIC	-269.984	
		BIC	-249.007	
		LB test:		
		Lag 12	5.66	0.226
		Lag 24	13.36	0.646
		Lag 36	18.72	0.907
		Lag 48	28.95	0.903

Figure 3 shows that the ACF and PACF of the TRJA residuals are stationary and support the results of the ADF test.

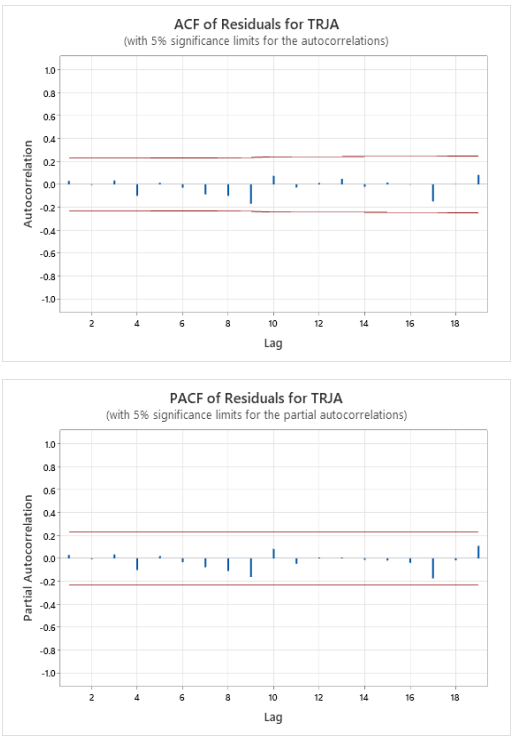

Figure 3. ACF and PACF of TRJA

The Contrarian: Finance, Accounting, and Business Research
Volume 2, Issue 2, 2023
pp. 28-35

Table 5 shows ARIMA (1,0,1) for ELPI is fit according to the LB test and is stationary according to the ADF test.

Table 5. ARIMA 1,0,1 for ELPI

	Coef.	SE Coef.	t	Sig.
Constant	0.00444	0.00432	1.03	0.307
AR 1	-0.885	0.147	-6.04	0.000
MA 1	-0.740	0.206	-3.59	0.001
		ADF test	-5.06557	0.000
		AIC	-362.000	
		BIC	-352.677	
		LB test:		
		Lag 12	6.48	0.691
		Lag 24	14.32	0.856
		Lag 36	27.66	0.730
		Lag 48	40.49	0.663

Figure 4 shows that the ACF and PACF of the ELPI residuals are stationary and support the results of the ADF test.

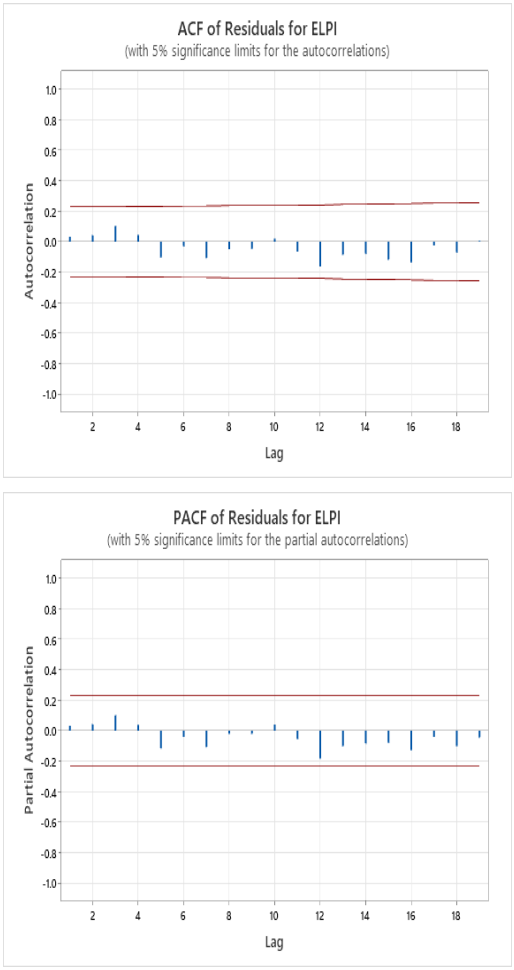

Figure 4. ACF and PACF of ELPI

Table 6 shows ARIMA (2,0,2) for TMAS is fit according to the LB test and is stationary according to the ADF test.

Table 6. ARIMA 2,0,2 for TMAS

	Coef.	SE Coef.	t	Sig.
Constant	0.01184	0.00800	1.48	0.143
AR 1	-0.364	0.110	-3.30	0.002
AR 2	-0.778	0.107	-7.24	0.000
MA 1	-0.2484	0.0733	-3.39	0.001
MA 2	-0.9416	0.0595	-15.81	0.000
		ADF test	-9.64603	0.000
		AIC	-293.766	
		BIC	-279.781	
		LB test:		
		Lag 12	8.20	0.315
		Lag 24	22.43	0.263
		Lag 36	33.24	0.359
		Lag 48	39.00	0.646

Figure 5 shows that the ACF and PACF of the TMAS residuals are stationary and support the results of the ADF test.

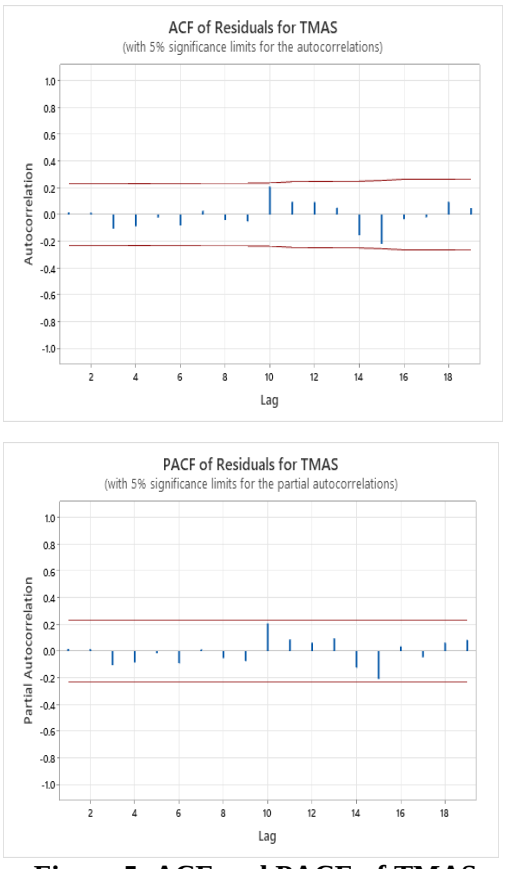

Figure 5. ACF and PACF of TMAS

Table 7 shows ARIMA (2,0,2) for NELY is fit according to the LB test and is stationary according to the ADF test.

Table 7. ARIMA 2,0,2 for NELY

	Coef.	SE Coef.	t	Sig.
Constant	0.01046	0.00988	1.06	0.293
AR 1	-1.534	0.310	-4.96	0.000
AR 2	-0.712	0.286	-2.49	0.015
MA 1	-1.476	0.177	-8.32	0.000
MA 2	-0.912	0.121	-7.51	0.000
		ADF test	-3.46094	0.009
		AIC	-309.818	
		BIC	-295.834	
		LB test:		
		Lag 12	3.11	0.875
		Lag 24	6.99	0.994
		Lag 36	10.02	1.000
		Lag 48	12.02	1.000

Figure 6 shows that the ACF and PACF of the NELY residuals are stationary and support the results of the ADF test.

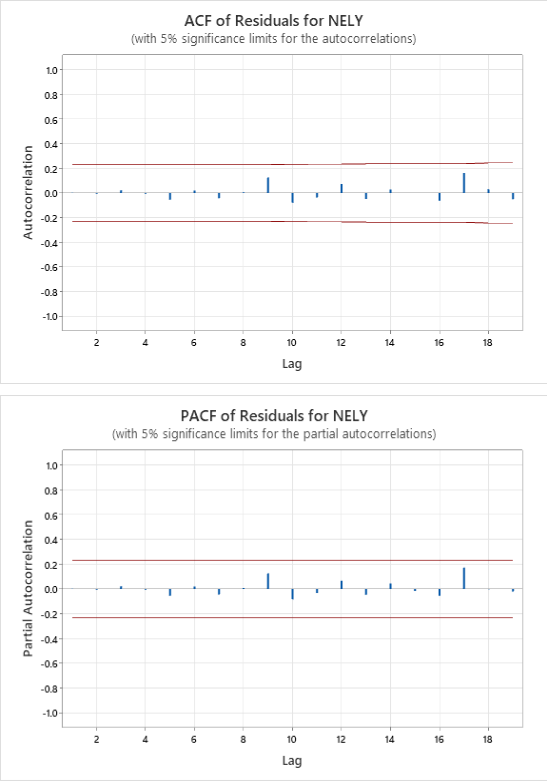

Figure 6. ACF and PACF of NELY

Table 8 provides descriptive statistics based on estimated data for the next 120 market days. The estimation results show that TRJA has the highest average return with the highest standard deviation. In addition, TMAS and ELPI also have the highest returns with minimal risk, while WEHA and NELY, although they have positive returns and positive skewness.

Table 8. Estimated returns of selected firms

Variable	N	Mean	StDev	Skewness	Kurtosis
WEHA	120	0.0017	0.0032	2.40	42.41
TRJA	120	0.0067	0.0989	-0.65	-0.13
ELPI	120	0.0023	0.0021	-0.59	12.07
TMAS	120	0.0055	0.0005	-1.84	22.96
NELY	120	0.0032	0.0172	0.07	19.56

Conclusion

The lifting of restrictions on community activities on December 30, 2022, provides a positive signal and opportunity for the capital market, especially the transportation and logistics sector. Selection using the TR gives five stocks that have the best risk-return trade-off. Based on the ARIMA model, data estimation shows that TRJA has a high average return and risk, while TMAS and ELPI have the highest return with low risk.

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