Forecasting PT Triputra Agro Persada Tbk (TAPG) Share Prices Using Multivariate Time Series Analysis

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ABSTRAK

Peningkatan harga *crued palm oil* (CPO) menyebabkan pengaruh positif terhadap harga saham perusahaan yang bergerak di industri sawit. PT Triputra Agro Persada Tbk (TAPG) sepanjang tahun 2021 tercatat sebagai salah satu perusahaan dengan bisnis CPO yang memperoleh *capital gain* terbesar. Prediksi atau peramalan akan harga saham dimasa mendatang sangat perlu bagi investor sebagai pertimbangan sebelum keputusan untuk berinvestasi. Penelitian prediksi harga saham telah banyak dilakukan sebelumnya secara univariat. Pemodelan univariat tidak dapat mempresentasikan adanya pengaruh dari variabel lain terhadap harga saham. Peramalan dengan adanya pengaruh dari variabel lain dapat dilakukan dengan analisis *multivariate time series.* Penelitian ini bertujuan untuk menganalisis *multivariate time series* harga saham TAPG dan faktor yang mempengaruhinya. Berdasarkan hasil penelitian, data harga saham TAPG dan harga CPO terdapat kointegrasi, sehinga model *multivariate time series* yang digunakan adalah *vector error correction model* (VECM). Pada model VECM lag optimumnya yang digunakan adalah lag 11. Dalam jangka panjang harga CPO berpengaruh signifikan terhadap harga saham TAPG.

Kata kunci: *Kointegrasi*; *Multivariate Time Series*; *VAR*; *VECM*.

ABSTRACT

An increase in the price of crude palm oil (CPO) positively affects the share prices of companies engaged in the palm oil industry. PT Triputra Agro Persada Tbk (TAPG) 2021 was recorded as one of the companies with the CPO business that received the most significant capital gain. Prediction or forecasting of stock prices in the future is crucial for investors as a consideration before deciding to invest. Many kinds of research on stock price prediction have been carried out previously using univariate methods. Univariate modeling cannot represent the influence of other variables on stock prices. Forecasting with the influence of other variables can be done with multivariate time series analysis. This study aims to analyze the multivariate time series of TAPG stock prices and the factors that influence them. Based on the research results, data on TAPG stock prices and CPO prices are cointegrated, so the multivariate time series model used is the vector error correction model (VECM). In the VECM model, the optimum lag used is lag 11. In the long run, CPO prices significantly affect TAPG stock prices.

Keywords : *Cointegration; Multivariate Time Series; VAR; VECM.*

INTRODUCTION

From the end of 2021 until the first quarter of 2022, the price of cooking oil in traditional and modern markets has increased [1]. The leading cause of the increase in cooking oil prices in Indonesia is the increase in global demand for crude palm oil (CPO), which is used as a raw material, causing an increase in world CPO prices that has occurred since mid-2020 [2].

The increase in CPO prices positively influences the share prices of companies operating in the palm oil industry. PT Triputra Agro Persada Tbk (TAPG) 2021 was listed as one of the companies with a CPO business that obtained the most significant capital gain, where the company's shares provided a return of more than 50%. This company operates in the oil palm plantation and palm oil processing industry. TAPG recently joined BEI. TAPG conducted an initial public offering (IPO) on 12 April 2021 but can compete with large companies that have long been on the IDX. Investors are undoubtedly interested in investing in TAPG shares. However, predictions or forecasting of future share prices are necessary for investors to consider before investing.

Previous stock price prediction research conducted univariately has been widely carried out, such as stock price forecasting with Autoregressive Moving Average Generalized Autoregressive Conditional Heteroscedasticity. In this research, the data is under heteroscedasticity conditions. The best models to predict pre-pandemic conditions are GARCH (1, 1) and GARCH (1, 2) during pandemic conditions [3]. PT. Telkom Share Price Forecasting Using the Hybrid Time Series Regression Linear Model–Autoregressive Integrated Moving Average. As a result of this research, the best hybrid TSR linear-ARIMA (2, 1, 1) model was obtained [4]. Analysis of Oil and Gas Stock Price Volatility Analysis in Indonesia during the Covid-19 Pandemic using the ARIMA-GARCH Method. The results of this research for APEX, ELSA, and RUIS shares show there are symptoms of heteroscedasticity in the ARIMA model and the ARIMA(0, 1, 1) GARCH(1, 1) model for APEX, ELSA, and RUIS companies and the ARIMA(4, 1, 4) for MEDC companies [5]. Univariate modeling cannot represent the influence of other variables on share prices. Forecasting with the influence of other variables can be done using multivariate time series analysis. Multivariate time series analysis is a statistical technique used to analyze and model datasets that involve observing multiple variables over a series of time points.

Several studies that have been carried out previously have used multivariate time series, which can be considered in this research, including Multivariate Forecasting to Determine Global Gold Prices. Research results showed that the vector error correction model (VECM) could model the gold's price well and that all factors under investigation affected the gold's price [6]. Vector Autoregressive Integrated (VARI) Method for Forecasting the Number of International Visitors in Batam and Jakarta. Based on the research results, the model used is VARI (5, 1) [7]. Comparison of the Error Rate of Autoregressive Distributed Lag (ARDL) and Vector Auto-regressive (VAR). This research aimed to explain the application of the Autoregressive distributed-lag model and Vector Autoregressive (VAR) method for forecasting the export amount in DIY. It takes the export amount in DIY, inflation data, kurs, and Indonesia's foreign exchange reserve. Forecasting formation: After defining the Koyck and Almon distributed-lag dynamic model, the best model is chosen, and distribution-lag dynamic forecasting is performed [8]. The Influence of the United States Dollar Exchange Rate, Inflation, and Interest Rates on the Composite Stock Price Index using the Vector Error Correction Model. The VECM model obtained is VECM (2), which shows that changes in the US Dollar Exchange rate variable positively influence the IHSG. In contrast, Inflation and Interest Rates negatively influence changes in the IHSG [9]. Vector Error Correction Model Approach for Analysis of the

Relationship between Inflation, BI Rate, and United States Dollar Exchange Rate. Based on specifications, estimation, and model examination, the VECM (5) model is the best. [10].

In this research, TAPG share prices will be modeled multivariate. Multivariate modeling was carried out to get a more accurate model and to know other variables on TAPG share prices. The variable analyzed in this research is the price of CPO and whether it can influence the TAPG share price. The multivariate time series model is the vector error correction model (VECM).

METHOD

The data used in this research is secondary data, namely stock price data (closing prices) with a daily period from PT Triputra Agro Persada Tbk (TAPG) and CPO prices starting 13 April 2021 to 13 April 2022. The multivariate time series model used in this research is the vector error correction model (VECM). The following are the steps that will be carried out in this research:

1. Carry out stationary tests using the Augmented Dickey-Fuller tests [11].
2. Determine the optimum lag length using the Akaike Information Criterion (AIC), Schwartz Information Criterion (SIC), Hannan-Quin Criterion (HQC), Likelihood Ratio (LR) and Final Prediction Error (FPE) [12].
3. Cointegration occurs, it is necessary to correct errors; for this reason, VECM is used. The Johansen cointegration test is used to determine the long-term relationship between variables [13].
4. Carrying out the Granger Causality test is used to see one-way or two-way relationships in the TAPG and CPO variables in the VECM model [14] .
5. Estimating the VECM model and forecasting TAPG share prices and CPO prices for the next ten days.
6. Conduct impulse response function (IRF) analysis to track the effect of a shock that occurs in one variable on other variables [15].

RESULT AND DISCUSSION

Observation Data

The type of data used in this research is secondary data, namely stock price data (closing price) with a daily period from PT Triputra Agro Persada Tbk (TAPG) and CPO prices starting 13 April 2021 to 13 April 2022, which consists of 248 data (Figure 1).

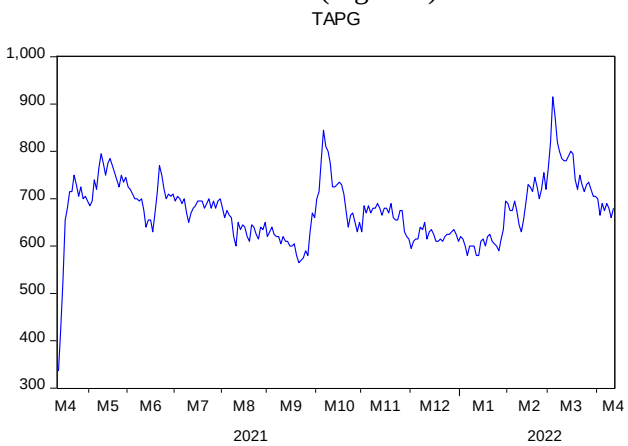

Figure 1. Daily closing price of TAPG shares (Rupiah**)**)

Figure 1 shows data that fluctuates and tends to be stationary on average. From October 2021 to December 2021, TAPG's share price tends to decline. From January 2022 to March 2022, TAPG's share price will increase (Figure 2).

Figure 2. Daily CPO price (US$/ton)

Figure 2 shows data that fluctuates and tends to be non-stationary on average. From June 2021 to March 2022, CPO prices tend to increase. The highest price occurred in March 2022.

Stationary Test

In time series analysis, the assumption of data stationarity is an important property. A time series data is said to be stationary if there is no increase or decrease in data over time; the data is spread around a constant mean and variance. Stationarity testing uses the Augmented Dickey-Fuller test. They are calculated using the t-statistic value of the Augmented Dickey-Fuller test (Table 1). The hypothesis used is:

Ho: $\phi_1 = 0$ (Y_t not stationary)

H_1: $\phi_1 < 0$ (Y_t stationary)

Table 1. Augmented Dickey Fuller test

Data	Augmented Dickey Fuller test	t-Statistic dengan α=5%	Probability
TAPG	-5.469873	-2.873045	0.0000
CPO level	-0.878600	-2.873045	0.7939
CPO lag-1	-14.70 104	-2.873045	0.0000

Table 1 shows that the TAPG data at the level has an Augmented Dickey-Fuller t-test value (-5.469873), which is smaller than the t-table (-2.873045) or the probability value (0.0000) is smaller than the significance level value (0.05), so reject Ho. The TAPG data is at a stationary level. The CPO data at the level has an Augmented Dickey-Fuller t-test value (-0.878600), which is greater than the t-table (-2.873045), or the probability value (0.7939) is greater than the significance level value (0.05) so accept Ho. The CPO data at the level is not stationary. The CPO data at lag-1 has an Augmented Dickey-Fuller t-test value (-14.70104), which is smaller than the t-table (-2.873045) or the probability

value (0.0000) is greater than the significance level value (0.05) so reject Ho. The CPO data at lag-1 is stationary.

Determine the Optimum Lag

Estimating the VECM model requires determining the optimal lag length, which will be used in subsequent analyses. Determining the optimal lag length is beneficial in eliminating autocorrelation in the VECM, which will be used as a stability analysis in the VECM. Determining the optimum lag length is known by looking at the lag with the most asterisks (*) in each of the Akaike Information Criterion (AIC), Schwartz Information Criterion (SIC), Hannan-Quin Criterion (HQC), Likelihood Ratio (LR) and Final Prediction Error (FPE) (Table 2).

Table 2. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2.464.913	NA	9427715	21.73492	21.76509	21.74709
1	-2.218.077	487.1480	1109746	19.59539	19.68592*	19.63192
2	-2.207.244	21.18927	1044917	19.53519	19.68607	19.59607*
3	-2.205.467	3.443746	1065614	19.55478	19.76601	19.64001
4	-2.200.999	8.581231	1061278	19.55066	19.82224	19.66024
5	-2.195.007	11.40407	1042882	19.53310	19.86503	19.66704
6	-2.191.619	6.388406	1048622	19.53849	19.93078	19.69678
7	-2.188.637	5.569342	1058215	19.54746	20.00010	19.73011
8	-2.186.096	4.700733	1072098	19.56032	20.07331	19.76732
9	-2.183.605	4.565634	1086687	19.57361	20.14695	19.80496
10	-2.177.806	10.52586	1069889	19.55776	20.19145	19.81346
11	-2.170.386	13.33605*	1038481*	19.52763*	20.22167	19.80768
12	-2.169.924	0.822104	1071790	19.55880	20.31319	19.86321
13	-2.168.824	1.937463	1100048	19.58436	20.39910	19.91312
14	-2.164.887	6.868992	1101253	19.58491	20.46000	19.93802
15	-2.159.756	8.859877	1091022	19.57494	20.51039	19.95241
16	-2.157.550	3.771143	1109193	19.59075	20.58655	19.99257
17	-2.153.946	6.096993	1113968	19.59424	20.65039	20.02041
18	-2.151.858	3.494726	1133928	19.61108	20.72759	20.06161
19	-2.151.468	0.646477	1171760	19.64289	20.81974	20.11777
20	-2.147.996	5.689666	1178556	19.64754	20.88475	20.14677

Table 2 above shows that lag-11 has the most signs (*), namely 3 with an LR value of 13.33605, an FPE value of 1038481, and an AIC criterion of 19.52763, so this shows that the optimum lag occurs at lag-11. So, the model will use lag-11.

Stability Test

Test the stability of the VAR model on TAPG shares and daily CPO prices to determine whether the VAR model used is stable (Table 3). The VAR model is considered stable if the characteristic inverse root has a modulus value < 1 or all the points are inside the circle (Figure 3).

Table 3. VAR model stability test results on TAPG shares and CPO prices

Root	Modulus
0.902280 + 0.080243i	0.905841
0.902280 - 0.080243i	0.905841
-0.743166 - 0.516016i	0.904748
-0.743166 + 0.516016i	0.904748
-0.309314 + 0.847774i	0.902439
-0.309314 - 0.847774i	0.902439
0.194752 + 0.862690i	0.884399
0.194752 - 0.862690i	0.884399
0.624524 - 0.598305i	0.864869
0.624524 + 0.598305i	0.864869
0.314865 - 0.802390i	0.861957
0.314865 + 0.802390i	0.861957
-0.584701 - 0.620009i	0.852225
-0.584701 + 0.620009i	0.852225
-0.841190 + 0.036708i	0.841990
-0.841190 - 0.036708i	0.841990
0.775165 - 0.296340i	0.829879
0.775165 + 0.296340i	0.829879
-0.038162 - 0.798688i	0.799599
-0.038162 + 0.798688i	0.799599
0.683852	0.683852
-0.619084	0.619084

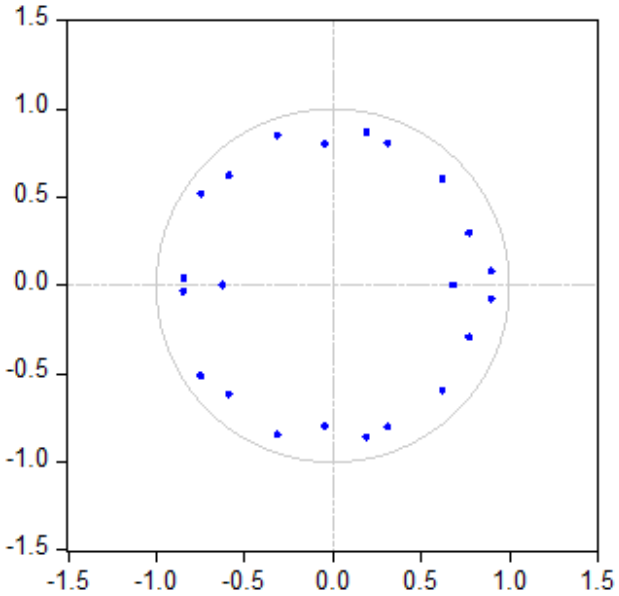

Figure 3. Inverse roots of AR characteristic polynomial

Table 3 shows that all moduli have values < 1. Figure 3 shows that the points are inside the circle; this means that the VAR model is in a stable condition.

Cointegration Test

The Johansen cointegration test is used to determine the long-term relationship between variables. At the stationary test stage, Augmented Dickey-Fuller (ADF) shows that the CPO variable is stationary at the First Difference. So, carrying out a Johansen cointegration test is necessary to see the long-term relationship between the TAPG share price variables and daily CPO prices (Table 4).

Table 4. Cointegration Test

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.095	30.940	15.495	0.0001
At most 1 *	0.031	7.448	3.842	0.0063

Table 4 shows that the probability value is smaller than the significance level α=5%; this means there is cointegration in the model. So, the model that will be used is the VECM model.

Granger Causality Test

The Granger causality test is used to see one-way or two-way relationships in the TAPG and CPO variables in the VECM model. Based on the Granger causality test in Table 5, it shows that TAPG significantly influences CPO, with a probability value of 0.0287 < 0.05, and CPO significantly influences TAPG, with a probability value of 0.031 < 0.05. So, there is a two-way causality between TAPG and CPO.

Table 5. Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
TAPG does not Granger Cause CPO	237	2.01071	0.0287
CPO does not Granger Cause TAPG	237	2.67288	0.0031

VECM Model Estimation

The model between variables in this study is VECM with lag 11, using a deterministic trend with the assumption of no intercept, no trend, and one cointegration (Table 6). The VECM model if TAPG is the dependent variable is as follows:

$$D(TAPG) = C(1)*(TAPG(-1) - 0.427789766837*CPO(-1)) + C(2)*D(TAPG(-1)) + C(3)*D(TAPG(-2)) + C(4)*D(TAPG(-3)) + C(5)*D(TAPG(-4)) + C(6)*D(TAPG(-5)) + C(7)*D(TAPG(-6)) + C(8)*D(TAPG(-7)) + C(9)*D(TAPG(-8)) + C(10)*D(TAPG(-9)) + C(11)*D(TAPG(-10)) + C(12)*D(TAPG(-11)) + C(13)*D(CPO(-1)) + C(14)*D(CPO(-2)) + C(15)*D(CPO(-3)) + C(16)*D(CPO(-4)) + C(17)*D(CPO(-5)) + C(18)*D(CPO(-6)) + C(19)*D(CPO(-7)) + C(20)*D(CPO(-8)) + C(21)*D(CPO(-9)) + C(22)*D(CPO(-10)) + C(23)*D(CPO(-11)) \quad (1)$$

Table 6. VECM coefficient with TPAG as dependent variable

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.010098	0.010964	-0.920984	0.3581
C(2)	0.001572	0.071985	0.021840	0.9826
C(3)	-0.157124*	0.071903	-2.185.241	0.0300
C(4)	-0.035250	0.071947	-0.489945	0.6247
C(5)	-0.023473	0.071562	-0.328012	0.7432
C(6)	0.003092	0.069659	0.044381	0.9646
C(7)	-0.018209	0.069332	-0.262643	0.7931
C(8)	-0.125067	0.068826	-1.817.147	0.0706
C(9)	0.057415	0.069323	0.828229	0.4085
C(10)	-0.105243	0.065083	-1.617.049	0.1073
C(11)	-0.014492	0.063280	-0.229014	0.8191
C(12)	-0.025057	0.061990	-0.404203	0.6865
C(13)	0.093138*	0.033902	2.747.247	0.0065
C(14)	0.134615*	0.035886	3.751.175	0.0002
C(15)	0.037349	0.036781	1.015.439	0.3110
C(16)	0.085114*	0.036552	2.328.595	0.0208
C(17)	-0.006210	0.036726	-0.169083	0.8659
C(18)	-0.065943	0.036999	-1.782.311	0.0761
C(19)	-0.059160	0.035891	-1.648.317	0.1008
C(20)	0.019201	0.035730	0.537385	0.5916
C(21)	0.023702	0.035485	0.667941	0.5049
C(22)	0.045722	0.034225	1.335.931	0.1830
C(23)	0.053892	0.031144	1.730.430	0.0850

Based on Table 6, it can be seen that the coefficients C(3), C(13), C(14), and C(16) are significant because they have a probability value smaller than the value α=5%. So, it can be interpreted that in the short term, the change in TAPG's share price two days ago significantly influenced changes in TAPG's current share price. If the change in TAPG's share price two days ago increased by 1 rupiah, it would cause the current change in TAPG's share price to fall by 0.157124 rupiah. In the short term, changes in CPO prices one day ago significantly influenced TAPG's current share prices. If the change in the CPO price one day ago increased by 1 dollar, it would cause the change in the current TAPG share price to increase by 0.093138 rupiah. In the short term, changes in CPO prices two days ago significantly influenced TAPG's current share prices. If the price of CPO 2 days ago increased by 1 dollar, it would cause the change in the current TAPG share price to increase by 0.134615 rupiah. In the short term, changes in the CPO price four days ago significantly influenced changes in the current TAPG share price. If the CPO price increased by 1 dollar four days ago, it would cause the change in the current TAPG share price to increase by 0.085114 rupiah (Table 7).

The VECM model if CPO is the dependent variable is as follows:

D(CPO) = C(24)*(TAPG(-1) - 0.427789766837*CPO(-1)) + C(25)*D(TAPG(-1)) + C(26)*D(TAPG(-2)) + C(27)*D(TAPG(-3)) + C(28)*D(TAPG(-4)) + C(29)*D(TAPG(-5)) +

C(30)*D(TAPG(-6)) + C(31)*D(TAPG(-7)) + C(32)*D(TAPG(-8)) + C(33)*D(TAPG(-9)) + C(34)*D(TAPG(-10)) + C(35)*D(TAPG(-11)) + C(36)*D(CPO(-1)) + C(37)*D(CPO(-2)) + C(38)*D(CPO(-3)) + C(39)*D(CPO(-4)) + C(40)*D(CPO(-5)) + C(41)*D(CPO(-6)) + C(42)*D(CPO(-7)) + C(43)*D(CPO(-8)) + C(44)*D(CPO(-9)) + C(45)*D(CPO(-10)) + C(46)*D(CPO(-11)) (2)

Table 7. VECM coefficient with CPO as the dependent variable

	Coefficient	Std. Error	t-Statistic	Prob.
C(24)	0.012587	0.023387	0.538189	0.5910
C(25)	-0.172913	0.153545	-1.126.139	0.2614
C(26)	-0.232738	0.153369	-1.517.503	0.1306
C(27)	0.013543	0.153464	0.088252	0.9298
C(28)	-0.139134	0.152643	-0.911501	0.3631
C(29)	0.019711	0.148583	0.132659	0.8946
C(30)	-0.009082	0.147885	-0.061413	0.9511
C(31)	0.256917	0.146807	1.750.028	0.0816
C(32)	0.037776	0.147867	0.255470	0.7986
C(33)	0.276100*	0.138824	1.988.847	0.0480
C(34)	-0.400692*	0.134978	-2.968.580	0.0033
C(35)	-0.059817	0.132226	-0.452384	0.6515
C(36)	-0.301166*	0.072314	-4.164.670	0.0000
C(37)	-0.106542	0.076546	-1.391.874	0.1654
C(38)	0.005086	0.078454	0.064830	0.9484
C(39)	0.182824*	0.077965	2.344.947	0.0199
C(40)	0.242396*	0.078337	3.094.270	0.0022
C(41)	0.129729	0.078919	1.643.822	0.1017
C(42)	0.006538	0.076557	0.085400	0.9320
C(43)	-0.090709	0.076214	-1.190.192	0.2353
C(44)	-0.090522	0.075689	-1.195.967	0.2330
C(45)	0.139044	0.073002	1.904.672	0.0582
C(46)	-0.081330	0.066430	-1.224.290	0.2222

Based on Table 7, it can be seen that the coefficients C(33), C(34), C(36), C(39), and C(40) are significant because they have a probability value smaller than the value α=5%. So, it can be interpreted that in the short term, changes in TAPG share prices nine days ago significantly influenced changes in current CPO prices. If the TAPG share price increased by 1 rupiah 9 days ago, it would cause the change in the current CPO price to increase by 0.276100 dollars. In the short term, changes in TAPG share prices ten days ago significantly influenced current CPO prices. If the TAPG share price increased by 1 rupiah 10 days ago, it would cause the change in the current CPO price to decrease by 0.400692 dollars. In the short term, changes in CPO prices one day ago significantly influenced current CPO prices. If the CPO price increased by 1 dollar one day ago, it would cause the current CPO price to decrease by 0.301166 dollars. In the short term, changes in CPO prices four days ago significantly influenced current CPO prices. If the CPO price increased by 1 dollar four days

ago, it would cause the current CPO price to increase by 0.182824 dollars. In the short term, changes in CPO prices five days ago significantly influenced current CPO prices. If the CPO price increased by 1 dollar five days ago, it would cause the current CPO price to increase by 0.242396 dollars. In the long term, CPO prices significantly affect TAPG share prices.

Forecasting TAPG share prices and CPO prices

Based on the results of VECM modeling, forecasting of TAPG share and CPO prices for the next ten days can be predicted, as in Table 8.

Table 8. Forecasting TPAG share prices and CPO prices for the next ten days

Date	TAPG	CPO
14/4/2022	687,353	1678,825
15/4/2022	712,861	1672,707
16/4/2022	718,301	1657,182
17/4/2022	711,784	1671,627
18/4/2022	713,584	1662,646
19/4/2022	713,092	1671,799
20/4/2022	708,384	1656,295
21/4/2022	710,194	1657,632
22/4/2022	705,026	1679,577
23/4/2022	708,717	1674,195

Based on Table 8, the forecast for the TAPG share price in the next three days will experience an increase, while on the fourth day, it will experience a decrease; on the fifth day, it will increase. It will decrease again on days 6 to 7, then increase on the eighth day, then decrease again. On day nine and day ten, there was an increase. Forecasting results show that prices fluctuate and tend to rise. Meanwhile, the forecast price of CPO shows a contradictory relationship with the TAPG share price.

Impulse Response Function

The impulse response function (IRF) is an approach to viewing relationships between variables. IRF is a dynamic function that tracks the influence of a shock that occurs in one variable on other variables (Figure 4).

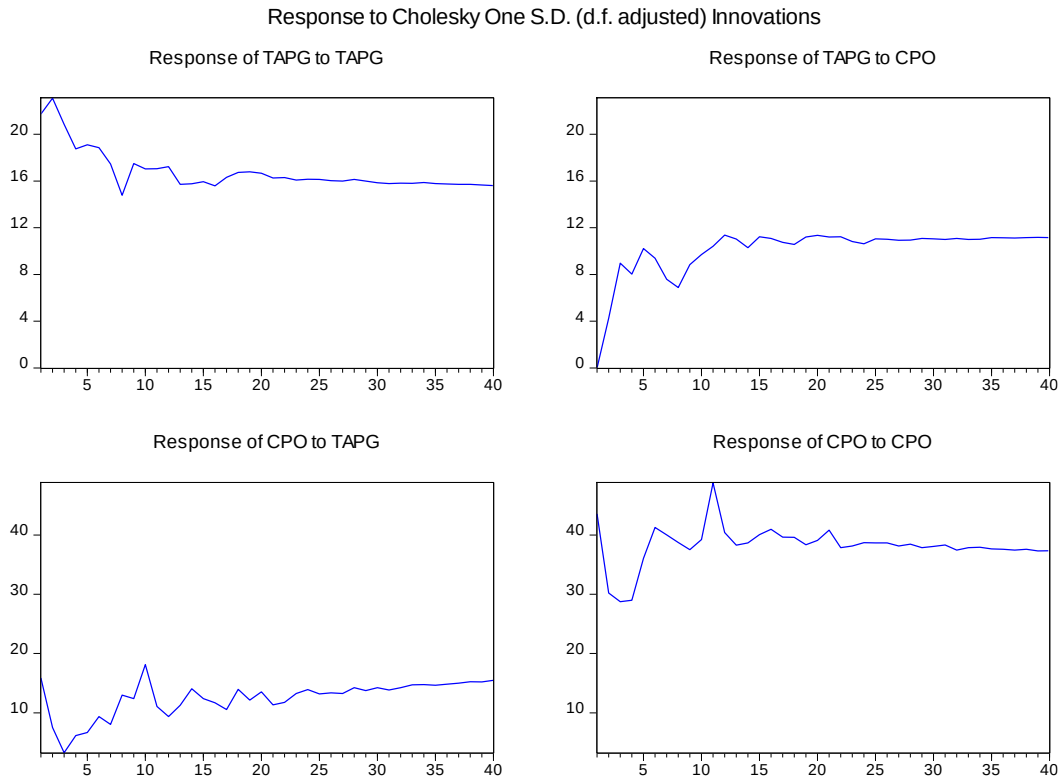

Figure 4. Impulse Response Function

Figure 4 shows the IRF analysis for the next 40 days. The horizontal axis shows the period, where one time period represents one day. Meanwhile, the vertical axis shows changes in variables due to shocks to certain variables, where these changes are expressed in a standard deviation.

TAPG's response to itself decreased until day 10. After day 10, TAPG's reaction to shocks from itself tended to stabilize. TAPG's response to shocks from CPO increased until day five, decreased until day 8, and then increased until day 16. After day 16, TAPG's reaction to shocks from CPO tended to be stable. CPO's response to shocks from TAPG decreased until day two, increased until day 10, and then decreased until day 15. After day 15, CPO's reaction to shocks from TAPG tended to be stable. CPO's response to itself decreased until day five, increased until day 11, and then decreased until day 13. After the 13th day, CPO's reaction to shocks from himself tended to stabilize.

CONCLUSION

Based on the research results, TAPG share price data and CPO prices are cointegrated, so the VECM model is used. In the VECM model, the optimum lag used is lag 11. Based on the results of the estimation of the Vector Error Correction Model (VECM) equation system, in the short term, changes in the current TAPG share price are significantly influenced by changes in the TAPG share price two days ago, changes in CPO prices. One day ago, the CPO price changed two days ago, and the CPO price changed four days ago. In the short term, changes in current CPO prices are significantly influenced by changes in TAPG share prices nine days ago, changes in TAPG share prices ten days ago, changes in CPO prices one day ago, changes in CPO prices four days ago and changes in CPO prices four days ago. Meanwhile, in the long term, CPO's price significantly affects the TAPG

share price. This study only used two-time series data to examine the model. In further research, other variables can be added, such as inflation, dollar exchange rates, and share prices of other palm oil companies.

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