AUTOREGRESSION VECTOR PREDICTION ON BANKING STOCK RETURN USING CAPM MODEL APPROACH AND MULTI-FACTOR APT

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ABSTRACT

This study aims to predict banking stock returns in Indonesia. The problem under study is the difficulty of determining banking stock returns. This study uses the VAR approach by comparing CAPM and APT. The results show the CAPM (Capital Asset Pricing Model) method through RF (Return Risk-Free Assets) is more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. In the medium term, the CAPM (Capital Asset Pricing Model) method through RF (Return Risk-Free Assets) is more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. In the long run, the CAPM (Capital Asset Pricing Model) method is also more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. Model specifications formed using the Roots of Characteristic Polynomial and Inverse Roots of AR Characteristic Polynomial obtained stable results; it can be shown that all roots units are in the Inverse Roots of AR Characteristic Polynomial circle.

Keywords: CAPM, APT, VAR Approach.

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1. INTRODUCTION

In predicting the required or expected return on assets, two models are often used by investors, the Capital Assets Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) [1]–[3]. Sharp and Lintner introduced Capital Assets Pricing Model (CAPM) which is a model for determining the price of an asset in equilibrium conditions [4]. In equilibrium, the level of profit required by investors for a stock will be affected by the stock [5]–[8]. In this case, the

calculated risk is the systematic risk represented by beta, because non-systematic risks can be eliminated by diversification. However, in the CAPM model, there are empirical weaknesses that occur that encourage financial management experts to look for alternative models that explain the relationship of income with stock risk [9]–[11] Stephen A. Ross in 1976 formulated a theory called Arbitrage Pricing Theory (APT) [12]. Although this model cannot completely solve the deficiencies that occur in the CAPM model, it is this model that was first developed to minimize the shortcomings that occur in the CAPM model and have the opportunity to replace the model. Both models can predict the expected return of investors but differ in the variables used. The following is information and an overview of the CAPM variable, one of which is risk-free assets. Risk-free assets in Indonesia are Bank Indonesia Certificates.

Table 1 Risk-free Asset Return (R_f)

Period	2011	2012	2013	2014	2015
January	0,06500	0,06000	0,05750	0,07500	0,07750
February	0,06750	0,05750	0,05750	0,07500	0,07500
March	0,06750	0,05750	0,05750	0,07500	0,07500
April	0,06750	0,05750	0,05750	0,07500	0,07500
May	0,06750	0,05750	0,05750	0,07500	0,07500
June	0,06750	0,05750	0,06000	0,07500	0,07500
July	0,06750	0,05750	0,06500	0,07500	0,07500
Agustu	0,06750	0,05750	0,06500	0,07500	0,07500
September	0,06750	0,05750	0,07000	0,07500	0,07500
October	0,06500	0,05750	0,07250	0,07500	0,07500
November	0,06000	0,05750	0,07250	0,07500	0,07500
Desember	0,06000	0,05750	0,07500	0,07750	0,07500
R_f					0,06758

Source: www.bi.go.id, data processed, 2017

Figure 1 describes the monthly SBI interest rate is used to calculate risk-free asset returns. From the table above, the return calculation of the average risk-free asset (R_f) that the investor will receive is 0.06758 or 6.758% per month which includes a minimum interest rate of 0.05750 or 5.75% and a maximum interest rate of 0.07750 or 7.75%. Many asset pricing models, the final result to be achieved is the certainty of the stock returns that have been predicted previously. According to C. A. Shook, the return is an investment profit, either through interest or dividends [13]. This stock return uses fluctuations from the closing stock price at the end of the month (monthly closing price) on some public companies.

Table 2 Stock returns (R_i)

No.	Company	Code	$E(R_i)$
1	Bank Negara Indonesia Tbk.	BBNI	0,01281
2	Bank Republik Indonesia Tbk.	BBRI	0,02052
3	Bank Tabungan Negara Tbk.	BBTN	0,00726
4	Bank Mandiri Tbk.	BMRI	0,01254
Average			0,01328

Source: www.yahoofinance.com, data processed (2017)

Figure 2 explains that all stocks are showing positive $E(R_i)$ values. A positive $E(R_i)$ value indicates an increase in the share price that is greater than the decrease so that it will benefit

investors and vice versa. The highest value of stock return is shown by BBNI (Bank Negara Indonesia Tbk.) Of 0.012815 and the lowest value of stock return at BBTN (Bank Tabungan Negara Tbk.) Of 0.00726. The average value of stock returns on the four stocks is 0.01328. Beta (β) shares, is a measure of market risk that affects the price of a stock. Beta measures the extent to which stock prices go up and down as market prices rise and fall. The beta value of the stock is obtained from the covariance results between the return of securities "i" with the market return divided by the market return variant.

Table 3 Systematic Risk (Beta)

No.	Code	2011	2012	2013	2014	2015	Rata-Rata
1	BBNI	2,0841	0,9116	0,9281	0,9204	1,4486	1,62172
2	BBRI	1,9550	2,0079	1,8775	1,6736	1,6736	1,78203
3	BBTN	1,5572	3,4324	0,9415	1,1711	2,2211	1,54127
4	BMRI	1,6804	1,6035	1,8700	1,1441	1,7755	1,64876
Overall Beta							1,64846

Sumber: www.yahooofinance.com, data processed (2017)

Figure 3 explains that all stocks have the positive beta, it indicates that the increase in market return will increase the return on these stocks. The highest beta of the 4 shares is BBRI of 1.78203. The overall beta average is 1.64846. The following is information and an overview of APT variables. The rupiah exchange rate against the US dollar has decreased. This decline was due to the decline in fixed investment and public consumption. It has an impact on the sluggish opening of employment and affects the weakening of the exchange rate because the demand for the rupiah also declined while the exchange rate itself is one indicator to see whether a country's economic fundamentals are stable or not. According to previous research, the exchange rate is significant in predicting expected returns [14]. The following is a table of developments in the rates of exchange rates in Indonesia in 2011 to 2015 [15].

Table 4 Exchange Rate (IDR / USD)

Year	Rupiah	Depreciation Development	
		Rp	%
2011	9.068	-	-
2012	9.670	602	7%
2013	12.189	2.519	26%
2014	12.440	251	2%
2015	13.795	1.355	11%

Source: www.bi.go.id, 2017

Figure 4 describes the unstable movement of the rupiah against the US dollar. In 2011 the rupiah exchange rate against the dollar was Rp. 9,068 per 1 US \$ and in 2015 reached Rp. 13,795 per 1 US \$. It is inseparable from Indonesia's exchange rate system which still uses a floating system. Each year the exchange rate of the rupiah against the US dollar continues to decline, especially in September 2015, the exchange rate of the rupiah against the US dollar penetrated Rp. 14,657 per 1 US \$. The decline in the rupiah exchange rate could have a negative impact on the global financial markets that experienced a crisis that affected macroeconomic variables such as inflation and the level of SBI. The inflation and SBI are significant in predicting expected returns. The following is data on the development of inflation rates from 2011 to 2015. The money supply in Indonesia from 2011 is Rp. 722,991 billion up to 2015, which is Rp. 1,055,440 billion continues to increase. It means that with the increase in the money supply, economic growth in Indonesia will increase. The money supply has a positive effect on economic growth. If there is an excess amount of money in circulation, Bank

Indonesia will take a policy (reduce) the interest rate so that this condition encourages investors to make investments [16]–[19].

2. THEORIES

2.1. Capital Asset Pricing Model (CAPM)

In 1952, Harry Markowitz laid the foundation for modern portfolio management [20]. Then the first form of the CAPM standard was developed separately by Sharpe and Lintner. Capital Asset Pricing Model (CAPM) is a concentration of modern financial economics. This model provides a precise prediction of the relationship that should be observed between asset risk and estimated returns. Whereas according to CAPM model is a balanced model that describes the relationship of risk and return more simply because it uses only one variable (also called a beta variable) to describe risk [21].

In summary, the important CAPM assumptions are as follows:

1. There are no trading fees, no taxes and securities can be broken down to the smallest unit.
2. All participants are perfect competitors.
3. All investors have the same investment end.
4. Investors make investment decisions based on portfolio expected profits and profit standard deviations.
5. All investors have general expectations.

The formulation of the CAPM formula is as follows:

$$R_i = R_f + \beta_i(R_m - R_f)$$

Where:

- R_i = stock return i
- R_f = risk free investment return
- β_i = beta stock i (indicator of systematic risk)
- R_m = return market

In CAPM, there is a relationship between risk and the level of return on investment in financial assets expressed by market lines, which consist of two types, such as:

- Security Market Line (SML)

The relationship between the security risk and the expected return on the SML line which is described in the beta and expected return space. The SML equation connects the expected return with the beta as follows:

$$E(R_i) = R_f + \beta_i(R_m - R_f)$$

The market equilibrium situation of Security Market Line (SML) showed the tradeoff between risk and expected return for individual securities as a graphical representation of the CAPM model while the Capital Market Line (CML) is used to describe the tradeoff between risk and expected return for efficient portfolios, but not individual securities. For portfolios, additional expectation returns occur due to additional risk from the portfolio concerned. Individual securities for additional expectation returns are due to additional risk of individual securities measured by beta.

- Capital Market Line (CML)

Capital Market Line (CML) is a line that describes a relationship between expected return and total risk in an efficient portfolio in a balanced market condition. Some things are needed to be considered for CML.

2.2. Arbitrage Pricing Theory (APT)

Arbitrage Pricing Theory (APT) is a theory developed by Stephen A. Ross in 1976 [12], where Ross stated that various factors could influence the price of an asset. Where the CAPM price is only influenced by one factor, namely the market portfolio (R_m). APT as an alternative model to answer the problem of a relationship between income and risk of shares (β). Arbitrage Pricing Theory (APT) is useful for predicting the price of a stock in the future. In the APT return, the securities model is not only influenced by market portfolios because of the assumption that several other risk sources can influence the expected return from security. Arbitrage Pricing Theory (APT) primarily uses the idea that two investment opportunities that have identical characteristics cannot be sold at different prices (price one price) [22]. The concept used is one price law (the law of one price). If the same characteristic assets are sold at different prices, there will be an opportunity to arbitrage by buying low-priced assets and at the same time selling them at a high price so that they earn the profit without risk. Furthermore, this theory assumes that the level of profit can be influenced by various factors in the economy and industry. The correlation between the two securities levels of profit occurs because these securities are affected by the same factors.

There are 3 (three) assumptions underlying the Arbitrage Pricing Theory (APT) such as:

- Capital Market in perfect competition market conditions.
- Investors always prefer more than less wealth with certainty.
- The result of the stochastic process means that asset income can be considered as a factor K model.

The formula of APT is:

$$R_i = \alpha_i + \beta_i R_m + e_i$$

Where:

R_i = return stock i

α_i = alpha stock i

β_i = beta stock i

R_m = market return

e_i = random error

The APT two-factor model formula is:

$$R_i = \alpha_i + \beta_{i1}F_1 + \beta_{i2}F_2 + \dots + \beta_{in}F_n + e_i$$

Where:

R_i = rate of return securities i;

α_i = rate of return for securities i if systematic risk is zero

$B_{1,2,\dots,n}$ = sensitivity of securities i to factors is considered

$F_{1,2,\dots,n}$ = surprise for a factor (actual value-expected value)

e_i = term random error

3. METHODOLOGY

This test is conducted to find out whether there is a simultaneous (interrelated) relationship between variables, as an exogenous variable and an endogenous variable by entering a time element (lag). This model can make predictive patterns of financial market integration in the short, medium and long-term from the simultaneity effect between variables.

VAR testing with the formula:

$$\begin{aligned}
 Rf_t &= \beta_{10}Rf_{t-p} + \beta_{11}Beta_{t-p} + \beta_{12}JUB_{t-p} + \beta_{13}INF_{t-p} + \beta_{14}KURS_{t-p} + \beta_{15}RS_{t-p} + e_{t1} \\
 Beta_t &= \beta_{16}Beta_{t-p} + \beta_{17}JUB_{t-p} + \beta_{18}INF_{t-p} + \beta_{19}KURS_{t-p} + \beta_{20}RS_{t-p} + \beta_{21}Rf_{t-p} + e_{t2} \\
 JUB_t &= \beta_{22}JUB_{t-p} + \beta_{23}INF_{t-p} + \beta_{24}KURS_{t-p} + \beta_{25}RS_{t-p} + \beta_{26}Rf_{t-p} + \beta_{27}Beta_{t-p} + e_{t3} \\
 INF_t &= \beta_{28}INF_{t-p} + \beta_{29}KURS_{t-p} + \beta_{30}RS_{t-p} + \beta_{31}Rf_{t-p} + \beta_{32}Beta_{t-p} + \beta_{33}JUB_{t-p} + e_{t4} \\
 KURS_t &= \beta_{34}KURS_{t-p} + \beta_{35}RS_{t-p} + \beta_{36}Rf_{t-p} + \beta_{37}Beta_{t-p} + \beta_{38}JUB_{t-p} + \beta_{39}INF_{t-p} + e_{t5} \\
 RS_t &= \beta_{40}RS_{t-p} + \beta_{41}Rf_{t-p} + \beta_{42}Beta_{t-p} + \beta_{43}JUB_{t-p} + \beta_{44}INF_{t-p} + \beta_{45}KURS_{t-p} + e_{t6}
 \end{aligned}$$

Where:

- Rf = risk free asset return
- Beta = beta
- INF = inflation (%)
- KURS = rupiah exchange rate against USD
- JUB = amount of Money in circulation (%)
- RS = stock return
- et = random disturbance
- p = lag length

4. RESULT AND DISCUSSION

Variance decomposition aims to measure the estimated error variance of a variable, namely how big the difference before and aftershocks, whether derived from the variables themselves or other variables.

4.1. Variance Decomposition BETA

Based on the results of the research, it is obtained that BETA results in the short term (period 1), the estimated variance error is 100% which is explained by BETA itself, while the other variables are INF, JUB, KURS, RF, RS does not respond at all, where the response of these variables only appeared in the second period.

Table 5. Variance Decomposition BETA

Variance Decomposition of BETA:							
Period	S.E.	BETA	INF	LOGJUB	LOGKURS	RF	RS
1	0.557148	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
20	0.709900	79.72597	4.563846	2.877304	4.502216	7.762166	0.568499
60	0.709913	79.72340	4.564179	2.879285	4.502363	7.762271	0.568507

In the medium and long-term (period 20-60) the estimated variance error is 79.72% which is explained by BETA itself. Other variables that most influence BETA as policy variables other than BETA itself are RF at 7.76%, then INF at 4.56%, while the smallest affects KURS at 4.50%, JUB at 2.87% and RS 0.57 does not affect BETA in the short term.

4.2. Variance Decomposition INF

Based on the results of the study shown in Table 4.18, the result is that INF in the short term (period 1), estimates the variance error is 89.82% which is explained by the INF itself. Another variable that most influences the INF as a policy variable is in addition to the INF itself is BETA of 10.18%, while other variables namely JUB, KURS, RF, and RS do not affect the INF in the short term.

Table 6 Variance Decomposition INF

Variance Decomposition of INF:							
Period	S.E.	BETA	INF	LOGJUB	LOGKURS	RF	RS
1	1.588035	10.17909	89.82091	0.000000	0.000000	0.000000	0.000000
2	2.087227	10.59479	85.13598	0.484413	0.051885	2.791343	0.941583
3	2.352786	8.489943	82.22246	0.646942	0.370705	7.490641	0.779311
4	2.533619	7.350987	77.51916	0.684708	0.981977	12.77586	0.687309
5	2.657061	6.841567	73.26287	0.622656	1.633621	17.01082	0.628472
20	3.100048	7.135698	55.85657	11.19259	3.205194	21.98835	0.621604
21	3.104525	7.119176	55.72355	11.38988	3.206154	21.94086	0.620379
22	3.107865	7.106277	55.62371	11.53433	3.208433	21.90785	0.619407
23	3.110319	7.096461	55.54986	11.63856	3.211235	21.88523	0.618657
24	3.112096	7.089151	55.49599	11.71275	3.214061	21.86995	0.618092
60	3.116190	7.071468	55.36920	11.87576	3.225822	21.84107	0.616685

In the long run (period 60) an estimated variance error of 55.36% is explained by the INF itself. The other variable that most influences INF as a policy variable other than INF itself is RF of 21.84%, then JUB is 11.87%, while the smallest affects BETA of 7.07%, KURS of 3.22% and RS amounting to 0.61%.

4.3. Variance Decomposition JUB

Based on the results of the study as shown in the previous table, the results obtained that JUB in the short term (period 1), estimates the variance error of 92.20% described by JUB itself. Another variable that most influences JUB as a policy variable is JUB itself is INF of 7.52% then BETA of 0.26%, while other variables, namely KURS, RF, and RS do not affect JUB in the short term.

Table 7 Variance Decomposition JUB

Variance Decomposition of LOGJUB:							
Period	S.E.	BETA	INF	LOGJUB	LOGKURS	RF	RS
1	0.021414	0.263501	7.529855	92.20664	0.000000	0.000000	0.000000
2	0.028282	0.213738	5.833842	93.12918	0.000256	0.822705	0.000277
3	0.033061	0.901923	4.521662	93.00375	0.000463	1.524831	0.047374
4	0.036596	1.284854	3.690202	92.82160	0.001198	2.119393	0.082758
5	0.039485	1.814618	3.254308	92.42581	0.001120	2.373295	0.130845
20	0.051655	2.787432	4.497735	90.07688	0.326846	2.060587	0.250523
21	0.051711	2.782722	4.504852	90.04755	0.339639	2.075006	0.250228
22	0.051750	2.779213	4.509404	90.02547	0.349562	2.086352	0.249999
23	0.051778	2.776653	4.512256	90.00910	0.357112	2.095055	0.249825
24	0.051797	2.774819	4.514007	89.99714	0.362757	2.101582	0.249697
60	0.051836	2.770799	4.516370	89.96890	0.376852	2.117679	0.249396

In the long run (period 60) the estimated variance error is 89.97% which is explained by JUB itself. Another variable that most influences JUB as a policy variable other than JUB itself is the INF of 4.52%, BETA of 2.77%, RF of 2.11%, then the smallest affecting JUB is KURS of 0.38%, and RS is 0.25.

4.4. Variance Decomposition KURS

Based on the results of the study shown in Table 4.18, the results of the KURS are in the short term (period 1), the estimated variance error is 36.08% which is explained by KURS itself. Other variables that most influence KURS as a policy variable are beside KURS itself is JUB of 50.79% then BETA of 6.78%, INF of 6.34%, and JUB while other variables namely RF and RS do not affect KURS in short-term.

Table 8 Variance Decomposition KURS

Variance Decomposition of LOGKURS:							
Period	S.E.	BETA	INF	LOGJUB	LOGKURS	RF	RS
1	0.027889	6.782178	6.343871	50.78955	36.08440	0.000000	0.000000
2	0.036810	4.954082	6.551200	60.60855	27.81902	0.007934	0.059220
3	0.043101	4.797644	6.338882	67.21113	21.52013	0.031925	0.100287
4	0.047747	4.409864	6.277415	71.41354	17.72636	0.055283	0.117540
5	0.051431	4.255834	6.226038	73.99635	15.28163	0.102458	0.137690
20	0.063702	3.533056	6.529048	78.44357	10.53135	0.790424	0.172551
21	0.063736	3.529691	6.529488	78.44023	10.52806	0.800071	0.172462
22	0.063760	3.527302	6.529631	78.43733	10.52613	0.807215	0.172394
23	0.063776	3.525626	6.529616	78.43493	10.52505	0.812428	0.172342
24	0.063787	3.524463	6.529526	78.43304	10.52449	0.816182	0.172304
60	0.063810	3.522062	6.528900	78.42783	10.52429	0.824708	0.172215

In the medium and long-term (period 20 and period 60) the estimated variance error is 10.53% which is explained by KURS itself. Other variables that most influence KURS as a policy variable besides KURS itself are JUB of 78.42%, INF of 6.53%, BETA of 3.52%, then the smallest affecting RF of 0.82% and RS of 0.17%.

4.5. Variance Decomposition RF

Based on the results of the research shown in Table 4.48, the results of RF in the short term obtained (period 1), estimated the RF itself explains the variance error of 75.88%. The most significant variable affecting RF as a policy variable is BETA of 13.74% then KURS 9.89%, INF of 0.45%, JUB 0.038% and whereas RS does not affect RF in the short term.

Table 9 Variance Decomposition RF

Variance Decomposition of RF:							
Period	S.E.	BETA	INF	LOGJUB	LOGKURS	RF	RS
1	0.365674	13.74189	0.454634	0.037666	9.886977	75.87884	0.000000
2	0.483449	16.86582	2.010697	1.576530	11.18031	67.27686	1.089788
3	0.543444	16.94997	3.926126	4.562870	11.55434	61.85950	1.147203
4	0.585991	17.28943	5.647105	8.729678	11.10885	55.99879	1.226147
5	0.617484	16.88623	7.115928	13.06578	10.46128	51.24632	1.224456
20	0.737400	13.39476	9.889800	30.86673	7.862434	36.96935	1.016927
21	0.737616	13.38692	9.887062	30.88719	7.864897	36.95759	1.016342
22	0.737754	13.38191	9.885151	30.89987	7.866778	36.95032	1.015966
23	0.737842	13.37875	9.883848	30.90764	7.868157	36.94588	1.015728
24	0.737896	13.37679	9.882980	30.91233	7.869135	36.94318	1.015579
60	0.737980	13.37379	9.881452	30.91900	7.871101	36.93931	1.015349

In the medium term (period 20) the estimated variance error is 36.97%, which is explained by the RF itself. Another variable that most influences RF as a policy variable other than RF itself is JUB of 30.87%, BETA of 13.38% and KURS of 7.87%, then the smallest affecting JUB of 9.87% and RS of 0.15%.

4.6. Variance Decomposition RS

Based on the results of the research shown in the previous table, the results show that the RS is in the short term (period 1), the estimated variance error of 40.78% is explained by the RS itself. The most significant variable affecting RS as a policy variable is RF of 35.80% then KURS 12.94%, BETA of 6.51%, INF of 3.94% and JUB of 0.03%.

Table 10 Variance Decomposition RS

Variance Decomposition of RS:							
Period	S.E.	BETA	INF	LOGJUB	LOGKURS	RF	RS
1	0.020113	6.507640	3.938380	0.025140	12.94665	35.80010	40.78209
2	0.021879	6.245411	5.934162	0.535367	19.30876	33.29773	34.67857
3	0.022796	7.660510	8.071163	0.721741	19.58874	31.47064	32.48720
4	0.023165	7.536070	9.909027	1.003378	19.53721	30.52339	31.49093
5	0.023410	7.578157	10.98581	1.174966	19.40440	29.98396	30.87270
20	0.024477	7.353540	11.48739	5.443996	18.21811	29.22250	28.27446
21	0.024493	7.346606	11.48550	5.546400	18.19677	29.18766	28.23707
22	0.024506	7.340852	11.48373	5.624347	18.18100	29.16187	28.20820
23	0.024515	7.336226	11.48212	5.682678	18.16956	29.14313	28.18628
24	0.024522	7.332612	11.48071	5.725657	18.16141	29.12972	28.16989
60	0.024540	7.322721	11.47542	5.829346	18.14396	29.10003	28.12852

In the medium term (period 20) the estimated variance error is 28.27% which is explained by RS itself. Other variables that most influence RS as policy variables other than RS itself are RF of 29.22%, KURS of 18.22%, and INF of 11.47%, then the smallest affects BETA of 7.35% and JUB of 5.44%. In the long run (period 60) the estimated variance error is 28.12% which is explained by RS itself. Other variables that most influence RS as policy variables other than RS itself are RF of 29.10%, KURS of 18.14%, and INF of 11.48%, then the smallest affects BETA of 7.32% and JUB of 5.83%.

Table 11 Variance Decomposition Result

Method	Variable	Short	Medium	Long	Return Saham
CAPM	BETA	6,508	7,353	7,322	-
	RF	35,80	29,22	29,10	-
APT	INF	3,938	11,49	11,46	-
	JUB	0,025	5,444	5,83	-
	KURS	12,94	18,22	18,14	-

Based on the explanation of the results of variance decomposition it is known that in the short term the Capital Asset Pricing Model (CAPM) through RF (Return Risk-Free Assets) is more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. In the medium term, the CAPM (Capital Asset Pricing Model) method through RF (Return Risk-Free Assets) is more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. In the long run, the CAPM (Capital Asset Pricing Model) method is also more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method.

5. CONCLUSION

Estimation results using Vector Autoregression (VAR), shows the results of the relationship between BETA, INF, JUB, EXCHANGE, RF and RS with lag 1. It can be concluded that by observing the t-statistics of each coefficient, the reciprocal relationship between Beta, Inflation variables, Amount of Money Supply, Exchange Rate, Free Asset Return, and Stock Return are statistically significant. Other variables besides the variables that have the most significant contribution to BETA are KURS. The variables that have the most significant contribution to INF are RS. The variable that has the most significant contribution to JUB besides JUB itself is RF. Variables that have the most substantial contribution to KURS in addition to KURS itself are JUB. The variable that has the most significant contribution to RF is KURS. The variable that has the most significant contribution to RS is JUB. Based on the results of the Impulse response function, it is known that the stability of all variables is in the 20th or medium-term period, this implies that even though there are short-term variables that do not affect but in the medium and long-term; they will influence each other. The results of Variance Decomposition Analysis in the short term CAPM method (Capital Asset Pricing Model) through RF (Return Risk-Free Assets) are more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. In the medium term, the CAPM (Capital Asset Pricing Model) method through RF (Return Risk-Free Assets) is more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method. In the long run, the CAPM (Capital Asset Pricing Model) method is also more accurate in predicting stock returns than the APT (Arbitrage Pricing Theory) method.

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