

## ARMA and ARIMA MODELS in PT H. M Sampoerna Tbk

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### Abstract:

*The purpose of a financial analysis is to assist us in understanding what has happened in the company by analyzing a few specific pieces of historical data in a consistent framework and discipline. In the process of forecasting years to come, we make the assumption that a certain ratio are likely to remain in a certain boundaries, and then we estimate according to your needs we want.*

*Wide range of models that can be used to analyze the above financial ratio variables, one of which will be used by the author that is a model of ARMA and ARIMA. This research was conducted to see how the influence of financial ratio data in PT HM Sampoerna Tbk as the ratio of EPS, ROI, ROE, ROS, IGR, SGR which results from research conducted that financial ratio data visible in PT HM Sampoerna Tbk are stationary as well as on financial ratio data shows a two-way relationship. From the research that has been done can be concluded that on the model of forecasting the financial ratio data the results are not significant for the model ARMA and ARIMA made.*

**Key words:** financial ratios, ARMA, ARIMA, Root Test and Causality tests.

### I. Introduction

In the introduction we will collect a variety of relevant data for such a comparison as sales and net income. That became the key here is to make sure if we are going to use the relevant

comparison or use the report on the relevant date. As a rule of thumb, usually the researchers will try to use benchmarks in which the companies included. If a new company is not included in the analysis, using a model of analysis that we will use. It is also important to be consistent in the use of model analysis.

Just as was the case when we will calculate by using the methods of the relevant statistics about the company we will thoroughly, namely, sales revenue, price books, dividend yield, etc., industrial data providers provide the same information on an aggregate market, that is, indexes and net profit. However, instead of counting using the outstanding shares, researchers are more likely to use an aggregate company. For example, the total market capitalization divided by total revenue gives the same result as the price divided by earnings per share. Remember that the total market capitalization is the price of outstanding shares times and total revenue is the revenue per share outstanding shares times. So to get a market-level data, there are some adjustments that must be made.

In doing a comparison versus sales and net profit at PT HM Sampoerna Tbk., it is very important that we must understand the context index data which we will use. For example, which is the data provider? How is it calculated? Key questions include whether it includes dividend or not, whether it is on the grounds of before tax or after tax, the number of companies in the benchmark, how often the balance back, criteria of rebalancing. That's some model in the selection of data for analysis in research.

Note that the secondary data is simply an aggregation of enterprise information, and thus, can be treated with very similar to those of the company. The difference, however, is in the way aggregate data is calculated. Rather than to calculate net sales and profit analysis can by using data of financial statements published by the Indonesia stock exchange. Another case of calculating earnings per share for the index and get a market price for calculating Price Earnings, PE for the index is simply the sum of all market capitalization for all of the

company divided by the number of revenue for each company. Note also that just as the company has a year - end market index generally have year end also, generally December. If the company we will carefully have a year end other than December, and adjustments to be made.

For many companies, the company will predict the actual sales and profit for the market index. This can be found on the display "EE" from Bloomberg. If we are going to predict revenue growth to a sales or net profits, can be done by multiplying the latest December index profit for the end of the year (from historical data) with one plus a percentage of Your revenue growth. This will give an estimate of the revenue to date your first estimate. Then some profit this index with one plus your predictions for revenue growth for the year of 2 to get your earnings estimate for next year of 2. This is one example of this form of divination from or use the index numbers, with variable we will do forecasting financial ratios. But in this study we will use the model analysis or forecasting ARMA and ARIMA or commonly known as Box Jenkin.

## II. A Review of the Literature

Stages analysis company in fundamental analysis aims to find out the industry's most be prospect and most profitable. The prospect of the industry's most profitable companies or can be seen from the report of the finance functions such as a share price below face price (under valued) and expected to rise once owned or company that it is stock market price higher than face (over valued), so it would be profitable to sell. To find out if a company shares worth optioned investment conducted analysis on the company in question. From the analysis can give you an idea of the internal characteristics, quality and performance, as well as the prospects of the company in the future.

In the analysis of the main components of the company that became the framework he thought the same with the

industrial analysis i.e. Earning Per Share (EPS) and Price Earning Ratio ((P/E). Three main reasons to use these components are:

- Used to mengestimasi the intrinsic value of the stock. Do I multiply the EPS with the E/P and compared with market value. The results determine the decision to buy or sell shares.
- Calculate the dividend on the basis of earning.
- The relationship between the change of stock price changes with earning.

EPS information and E/P is contained in the financial statements of the company. After having analyzed the financial statement information will show the advantages and disadvantages in relation to the calculation of EPS.

### **EPS and information financial reports**

By using financial reports investor will be able to calculate how much growth the company has accomplished earning against the number of shares of the company. By comparing the amount of net profit between who are ready to be shared (earning) by the number of outstanding shares will be acquired Earning Per Share (EPS). However, sales information and the level of profits generated by the company, the information is also badly needed investors to illustrate the company's prospects for the coming period. Sales and net profit the company generated last is a measure of the form that can be obtained from earning any profits to be divided by the number of shares owned by an investor in the company. So it can be concluded that the financial statements are very useful for investors to determine the best investment decisions and profitably. By using the financial statements of the investor can figure out comparisons between the intrinsic value of the company's shares than the market price of the stock of the company concerned.

The financial statements consist of:

### **1. Balance sheet (Balance Sheet)**

Balance sheet (balance sheet) is a financial report that describes the company's financial condition at any given time that provides information on total assets, debt and capital used company. In the sense of balance can be interpreted as another report or summary table balance (debit and credit) submitted after the closing of the book accounting according to accepted accounting principles. This is only as far as accountants do, investors must accept nothing less and nothing more than this. Because the balance sheet does not contain the value of the investments or the value of its economy, which is more related to the financial flow and strength of the company. Things to note investors is that the balance sheet is usually prepared for year-end financial statements (December 31). Balance sheet position will change for a week, a month or even for next year. Balance sheet total must put the same numbers between assets with liabilities and equity.

The information sought from the analyst's balance sheet is:

a. financial resources used to reach the assets of the company:

- 1) long-term Funds, which invested creditors, shareholders and holders of common stock.
- 2) short term Funds provided by banks, commercial documents, trade creditors, etc.

Based on the above information, investors can calculate the proportions of investment capital provided by creditors, shareholders, and the shareholders preferred stock. In the calculation of this par value is typically used for public supply, such as the total capitalisation of the public in the market (market value multiplied by the number of shares)

b. capital strength the work of the company in question as indicated by the ratio of various jobs. The ratio indicates that

the company's forecasting abilities are matched with the last possession, which is expected to be paid by current assets.

c. the Assets of the company indicating the sources of income of the company and the attitude of the invested capital, such as providing the basis for estimating the total mix of assets and assets that support the expected operation level.

d. Data for an analysis of the balance sheet coupled with analyst income statement.

## **2. Income statement (Income Statement)**

Income statement (income statement) showing earnings and costs / burden of a company for a certain period. Financial report which contains summary information operational performance which includes sales (sales) or receipts (revenue) earned the company and costs incurred during the period, as well as elements of the shaper. The analysis must determine the actual revenue is based on actual income projection from base of its development. Income statement reflects the difference between receipts and expenses during a certain period so that making a profit (loss) net companies. The company's profit will be obtained if the total receipts of the company is greater than total costs incurred, nor other wise losses will arise if the total receipt less than the total cost of the company.

Elements of cost/load appears in the income statement are:

a. the production costs (direct load). The cost is directly related to the production activities or services produced by the company, such as: the burden of the wages, the cost of raw materials, auxiliary materials and others.

b. the cost of administration and General (loads of effort). Is the cost/load is not directly related to production and services, such as overhead costs, salary burden, the burden of marketing and others.

c. the cost of depreciation. Is the cost / burden associated with allocating the acquisition price of the company's fixed assets used in operations directly or indirectly the company.

such as the burden of the depreciation of buildings, vehicles, machinery and others.

d. interest charges. Is the cost/burden related to the burden of the company must be issued as a consequence of the use of the company's debt, such as the burden of bank interest.

e. income tax Expenses. Is the cost/burden must be issued a company related to the obligations of the Corporation to pay a number of taxes to the Government.

Analysis of stocks looking for information from the income statement to answer the following questions:

a. What is the basis of the actual income that acts as a starting point to move the projection of the future.

b. How the company was acting for a long period (normally using data 10 years) and last period ? What are the factors affecting the revenue and cost / load?

c. Whether the development of consistent revenue or the company being in decline ? What is the income pattern from year to year is significant ? If so what gives ?

d. How the development of the company's revenue to be analyzed, compared to industrial aspects in an the company engaged ? How the company compared with its competitors?

e. If the company is seen to have good financial control?

The important point of the analysis is on the development of common stock and profits of the company. For investors, the company gained profit information can be relied upon to assess the level of profitability of the company. Some commonly used size is the Return on Equity (ROE) that indicates how large the value of return of capital invested in the company it self, or the Earning per Share (EPS) to assess how big the earning will be obtained from each of the shares owned by investors.

### **3. Report the profit on hold (Statement of Retained Earning)**

The report contains information about detained profit changes withheld the corporate profits led to changes in the company's own capital. The calculation of profit is net profit minus withheld dividends are distributed. Earnings re invested in detention in hopes of increasing the company's profits in the coming year. This report is used to evaluate the proposals of investors management company policy regarding dividends. Dividend distribution which is the shareholder entitlement subject to general meeting of shareholders (GMS) is usually not distributed entirely, but most used back to invest. Partly used to invest this is being withheld earnings of the company. The greater the profit the company will put on hold the larger company's assets, and it can be said the company is "healthy".

### **4. Cash Flow Report (Statement of Cash Flows)**

The cash flow report is a report that contains the incoming cash flow (cash inflow) and the flow of cash out (cash outflow) from three sources, namely the main company activity:

a. the company's operations, namely the ability of the company in generating cash flow from the day-to-day operations of the company to pay off debt, financing of the company's operations, including the payment of dividends to shareholders,

b. investment cash flow, is in and out with regard to the investment made the company to turn a profit in the coming,

c. financial activities and cash flow that is derived from the issuance of new shares or the issuance of bonds by the company

It should be understood though cash flow report format with the income statement is almost the same but there is a fundamental difference, namely:

i. Preparation of the balance sheet profit and loss report is done on the basis of accrual method (accrual basis), the



meaning is all the receipts and expenses are recorded based on transactions made good company cash transactions (cash) as well as credit. While the cash flow report is recorded based on the transactions actually occur (cash basis). For example sales with credit included in income, the entry by adding the element of accounts receivable in the balance sheet, while the cash flow report is not included, but will be recorded at the time of the payment of the receivables, assuming that cash transactions at a time when the company has not been accepted.

ii. The recording of depreciation (depreciation, depletion, and amortisation), are recorded in the profit and loss balance sheet report, because it is recognized as the burden of allocating the price gains for several years. Depreciation in the income statement will reduce corporate profits. In the report the cash flow depreciation is not recognized as a deduction on profits, because at the time there were no accounts payable transactions.

### **III. Research Methodology**

#### **Research Data**

The variable in this study i.e. variable financial ratios among these variables the variables, namely : IGR, SGR, EPS, ROI, ROE and ROS. IGR is variable internal growth rate, SGR is Sustainable variable growth Rate, variable EPS is Earning per share, return onequity ROE variables, variable ROI is Return on investment, the ROS variables retrun on sales. This research was conducted in PT HM Sampoerna Tbk. began in 1998 up to2012. The data is first analyzed before being processed by the author.

#### **Method Study of Library**

This method is done by reading the literature is pleased with this research topic, research data as well as data in the form of research concerning macroeconomic and microeconomic

analysis conducted in Indonesia and abroad. Data and the literature used is derived and based from the internet as well as materials from the library. The literature made reference not only print books but also electronic media, and soft copy research.

### **Methods of Data Analysis**

After all data is obtainable, then processed using the software-assisted statistics, the usual process data model with ARMA and ARIMA. After the results obtained, it will be the top of this study conclude. As for the causal, shaped the research regarding the time dimension of research is 1998-2012 for financial ratio variable data in PT HM Sampoerna Tbk.

### **Technique of Data Analysis Research**

Research data before being used for the estimation of a series of stages of testing needs to be done, namely: stationary test, and test causality. As for the simultaneous viewing of variables with ARMA and ARIMA. To test the Normality of data Heteroskedasticity data and will not be done by the author, since the author has considered research data has met both the classical assumptions of the test condition.

#### ***A. Unit Roots Test (Unit Root Tests)***

A series is said to be stationary, if the whole moment from the series (on average, variance and covariance) constant over time. Phillips - Perron (PP Test) test is a standard procedure. But here researchers using the root test tests with model ADF (augmented dickey fuller test).

#### ***B. The Test For Granger Causality (Granger Causality)***

Granger Causality test intended to see the influence of each variable against other variables in one by one. With Granger causality hypothesis is based on.

### ***C. Empirical Model of ARMA and ARIMA***

Autoregressive model – moving average (ARMA)

Often the behavior of a time series data can be explained by either through an interaction between AR and MA. The combined model called autoregressive – moving average (ARIMA). For example the value of the dependent variable  $Y_t$  is affected by the first lag  $Y_t$  and lag the first residual then called this model with the model ARMA(1,1). ARMA (1,1) model can be written in the form of the equation as follows:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \alpha_0 \epsilon_t + \alpha_1 \epsilon_{t-1} + \alpha_2 \epsilon_{t-2} + \dots + \alpha_q \epsilon_{t-q}$$

*Autoregressive integrated moving average models (ARIMA)*

Model AR, MA and a previous requirement that ARMA time series data has observed the nature of the stationary. Data time series is said to be stationary if it meets three criteria, namely: If the data time series had an average of kovarian variants and the constant temperatures. But in reality the data time series are often not stationary but stationary on the process of differensi (difference).

Diferensi process is a process of looking for the difference between a period of data with other periods respectively. The resulting data is called a data diferensi the first level. If we then do the first level of data diferensi then it will generate the data diferensi the second level, and so on.

If the data time series are not stationary in a level, then the data likely become stationary through the process of diferensi or if the data is not stationary at level it needs to be made stationary at a rate of diferensi. Models with stationary data through the process of differencing is called a model of ARIMA. Thus if a stationary data on proses differencing  $d$  times and apply the arima  $(p, q)$ , then this model of ARIMA  $(p, d, q)$  where  $p$  is the rate of AR,  $d$  level the process of making data become stationary and  $q$  is the rate of MA.

For example : ARIMA (2, 1, 2) means shows AR (2), differencing process 1 to make data stationary and MA level

at level 2. Model AR (2) therefore there is another model of ARIMA (2, 0.0)

#### IV. Results of the Research and Discussion

Before a model of ARMA and ARIMA built test done first then the data above variable will do research, especially using the root test causalitas test test and granger.

##### Root Test

Although it can be identified in fisual, often formal test to find out the kestationerandata. The root test is done usually to do at level differensi 1 or differensi 2, is entering the intercept, intercept and trend or none. Here the author uses intercept and trend,with a maximum of 3 as well as the significant level lags the trust is 1% & 5%.

**Table 1 : Result root test**

Null Hypothesis: EPS has a unit root

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.904528	0.0001
Test critical values:		
1% level	-4.800080	
5% level	-3.791172	

Null Hypothesis: IGR has a unit root

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.268615	0.0234
Test critical values:		
1% level	-4.800080	
5% level	-3.791172	

Null Hypothesis: ROE has a unit root

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.262673	0.0083
Test critical values:		
1% level	-5.124875	
5% level	-3.933364	

Null Hypothesis: ROI has a unit root

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.865288	0.0000
Test critical values: 1% level	-4.800080	
5% level	-3.791172	

Null Hypothesis: ROS has a unit root

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.814838	0.2231
Test critical values: 1% level	-5.124875	
5% level	-3.933364	

Null Hypothesis: SGR has a unit root

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.857903	0.2082
Test critical values: 1% level	-4.992279	
5% level	-3.875302	

Source : By author

Visible from the display of the results of the out put with alpha 5% value of the augmented dickey-fuller test of 4.0452 (Yt stationer) because the value of the ADF the ADF test statistics " statistics of  $> -3.875$  there in the rejection of  $H_0$ . So it can be concluded that the data sales and net profit of stationer.

### Causality Test

Regression equations are built more to focus on a one-way relationship, but in reality the economic behavior not only had a one-way relationship, but also shows the existence of a two-way relationship, known as the concept of causality. Testing causality is testing to determine the causal consequences variables in a system var. this causal Relationship can be tested using the test kasualitas granger. The following results display output to test causality granger over the variable sales and net profit ranging from 1-4 lag lag.

**Table 2 : Result causality test**

Pairwise Granger Causality Tests

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
IGR does not Granger Cause EPS	14	9.09967	0.0117
EPS does not Granger Cause IGR		17.2988	0.0016
ROE does not Granger Cause EPS	14	22.5698	0.0006
EPS does not Granger Cause ROE		36.1440	9.0005
ROI does not Granger Cause EPS	14	17.3861	0.0016
EPS does not Granger Cause ROI		40.4073	5.0005
ROS does not Granger Cause EPS	14	7.15170	0.0216
EPS does not Granger Cause ROS		11.0582	0.0068
SGR does not Granger Cause EPS	14	7.71301	0.0180
EPS does not Granger Cause SGR		6.38213	0.0282
ROE does not Granger Cause IGR	14	3.45947	0.0898
IGR does not Granger Cause ROE		6.86413	0.0238
ROI does not Granger Cause IGR	14	3.72899	0.0796
IGR does not Granger Cause ROI		7.52690	0.0191
ROS does not Granger Cause IGR	14	9.58497	0.0102
IGR does not Granger Cause ROS		2.06889	0.1782
SGR does not Granger Cause IGR	14	7.49191	0.0193
IGR does not Granger Cause SGR		6.86841	0.0238
ROI does not Granger Cause ROE	14	3.01985	0.1101
ROE does not Granger Cause ROI		3.09855	0.1061
ROS does not Granger Cause ROE	14	7.87015	0.0171
ROE does not Granger Cause ROS		0.03767	0.8496
SGR does not Granger Cause ROE	14	13.2527	0.0039
ROE does not Granger Cause SGR		7.38070	0.0200
ROS does not Granger Cause ROI	14	16.7202	0.0018
ROI does not Granger Cause ROS		0.67655	0.4282
SGR does not Granger Cause ROI	14	14.1566	0.0031
ROI does not Granger Cause SGR		7.98879	0.0165

SGR does not Granger Cause ROS	14	29.1277	0.0002
ROS does not Granger Cause SGR		1.22979	0.2911

Sources : Process By author

At lag 1 visible if variable sales and net profit significantly with the level of  $\alpha$  5%, ensured both variables have a two-way relationship, but when lag raised to lag 2 and 3 second lag variable visible start not significant and do not have a two – way relationship, only one direction only, even on a lag of 3, not significant at all. Enter lag4, only to have a direct relationship. This can be ensured between variable one choice. One-way and two-way at lag 1.

## ARMA and ARIMA models

### The Methodology Box Jenkin

Measures to be taken in analyzing the data by using the technique of Box – Jenkin:

1. identification of the Model. In this step we find the value of p, d and q with use correlogram.

2. Parameter estimation. After getting the values of p and q, then the next we observe parameters of ARIMA model that we chose in the first step. Parameter estimation can be made through the smallest squares method or methods of estimation such as maximum likelihood.

3. test the diagnosis. After getting estimator model ARIMA, will choose a model that is able to explain the data properly. How to look at whether the residual are random so it is a relatively small residual. If not then we have to go back to the first step and choose the model of the other.

4. Prediction. After getting a good model, then the model can be used for produce.

## Estimasi ARMA Model

**Table 3 : Result ARMA Model**

Dependent Variable: EPS  
 Method: Least Squares  
 Date: 08/01/15 Time: 09:14  
 Sample (adjusted): 2 15  
 Included observations: 14 after adjustments  
 Failure to improve SSR after 8 iterations  
 MA Backcast: 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.77468	16.08237	1.043047	0.3371
IGR	-2.643496	2.231200	-1.184786	0.2809
ROE	-0.011917	0.007663	-1.555099	0.1709
ROI	0.078419	0.052374	1.497292	0.1850
ROS	-4.843368	2.191688	-2.209880	0.0692
SGR	16.07686	15.12548	1.062900	0.3287
AR(1)	-0.067663	0.542098	-0.124816	0.9047
MA(1)	0.999315	0.384351	2.600004	0.0407
R-squared	0.937522	Mean dependent var		0.035150
Adjusted R-squared	0.864630	S.D. dependent var		0.271045
S.E. of regression	0.099725	Akaike info criterion		-1.477249
Sum squared resid	0.059670	Schwarz criterion		-1.112074
Log likelihood	18.34075	Hannan-Quinn criter.		-1.511053
F-statistic	12.86191	Durbin-Watson stat		1.110481
Prob(F-statistic)	0.003124			
Inverted AR Roots	-.07			
Inverted MA Roots	-1.00			

Sources : procees by author

This example shows how to use the shorthand `arima(p,D,q)` syntax to specify the default ARMA(p, q) model, By default, all parameters in the created model object have unknown values, and the innovation distribution is Gaussian with constant variance. Specify the default ARMA(1,1) model:

Seen from the table above for the ARMA model shows the following terms: the value of the constant  $c$  of 16.774688 has a value smaller than the  $t$  Statistics 1.96 so in significant, it is also indicated by the value of the probability 0.3371 far greater



than  $\alpha = 5\%$ , the same as the value of the coefficients of the AR (1) and the value of the coefficient of MA (1), and thus concluded was not significant.

### ARMA Model with Known Parameter Values

This example shows how to specify an ARMA(p, q) model with known parameter values. You can use such a fully specified model as an input to simulate or forecast.

Specify the ARMA(1,1) model, where the innovation distribution is Student's t with 8 degrees of freedom, and constant variance 0.15.

Estimation Equation:

```
=====
EPS = C(1) + C(2)*IGR + C(3)*ROE + C(4)*ROI + C(5)*ROS + C(6)*SGR +
[AR(1)=C(7),MA(1)=C(8),BACKCAST=2,ESTSMPL="2 15"]
```

Substituted Coefficients:

```
=====
EPS = 16.7746763816 - 2.64349577371*IGR - 0.0119170766299*ROE +
0.0784187872828*ROI - 4.84336822636*ROS + 16.0768644816*SGR + [AR(1)=
0.0676626627605,MA(1)=0.999314528673,BACKCAST=2,ESTSMPL="2 15"]
```

### Estimasi model ARIMA

**Table 4 : result ARIMA Model**

Dependent Variable: D(EPS)  
 Method: Least Squares  
 Date: 08/01/15 Time: 09:18  
 Sample (adjusted): 3 15  
 Included observations: 13 after adjustments  
 Convergence achieved after 18 iterations  
 MA Backcast: 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.066436	0.049532	1.341263	0.2375
D(IGR)	0.506463	1.247494	0.405984	0.7015
D(ROE)	-0.000127	0.004530	-0.028052	0.9787
D(ROI)	-0.012567	0.033078	-0.379911	0.7196
D(ROS)	-0.592031	1.907087	-0.310437	0.7688
D(SGR)	2.010775	7.278955	0.276245	0.7934
AR(1)	0.303126	0.321988	0.941422	0.3897

Sumarno- ARMA and ARIMA MODELS in PT H. M Sampoerna Tbk

MA(1)	0.999977	0.582322	1.717224	0.1466
R-squared	0.766174	Mean dependent var		0.054501
Adjusted R-squared	0.438817	S.D. dependent var		0.075967
S.E. of regression	0.056908	Akaike info criterion		-2.619496
Sum squared resid	0.016193	Schwarz criterion		-2.271835
Log likelihood	25.02673	Hannan-Quinn criter.		-2.690956
F-statistic	2.340484	Durbin-Watson stat		0.770100
Prob(F-statistic)	0.183135			
Inverted AR Roots	.30			
Inverted MA Roots	-1.00			

Sources : Procees by author

Based on the identification of the model, the tentative model differensi 1 (at) models ARIMA (1, 1, 0) ARIMA (0, 1, 1) and ARIMA (1, 1.1). So the tentative model of ARIMA can be follow equation as follows :

$$D1_t = \beta_0 + \beta_1 AR(1) + e_t$$

$$D1_t = \beta_0 + \beta_1 MA(1) + e_t$$

$$D1_t = \beta_0 + \beta_1 AR(1) + MA(1) + e_t$$

D1 is the difference (differentiation) first

After we had a tentative model of ARIMA model estimation we tentatively the equation. At this stage of this estimation will be tested the feasibility of a model by searching the best model. The best model is based on goodness of fit that is the level of significance of independent variables included constant through t- test, F- test as well as the value of the coefficient of determination (R2)

Models of ARIMA in the table above shows the following: the value of the constant cof 0.066436 has a value of the t statistic is less than the 1.341263 so it is not significant, it is also the case with the demonstrated value of probability 0.2375 far greater than  $\alpha = 5\%$ , the same as the value of the coefficients of the AR (1) and the value of the coefficient of MA (1), and thus concluded was not significant.

Estimation Equation:

$$D(\text{EPS}) = C(1) + C(2)*D(\text{IGR}) + C(3)*D(\text{ROE}) + C(4)*D(\text{ROI}) + C(5)*D(\text{ROS}) + C(6)*D(\text{SGR}) + [\text{AR}(1)=C(7),\text{MA}(1)=C(8),\text{BACKCAST}=3,\text{ESTSMPL}="3\ 15"]$$

Substituted Coefficients:

$$D(\text{EPS}) = 0.0664356411414 + 0.506462712266*D(\text{IGR}) - 0.000127077339099*D(\text{ROE}) - 0.0125666706067*D(\text{ROI}) - 0.592030918945*D(\text{ROS}) + 2.01077537552*D(\text{SGR}) + [\text{AR}(1)=0.303126315847,\text{MA}(1)=0.999977427564,\text{BACKCAST}=3,\text{ESTSMPL}="3\ 15"]$$

## V. Conclusion

From the research that has been done can be concluded that the data analysis of financial ratios EPS, ROI, ROE, ROS, IGR, SGR are stationary filmed and again not filmed. As for causality test results almost had a two way relationship, this can be seen from the results of out put almost the entirety is significant. While the conclusion to the ARMA and ARIMA models can be inferred for the study that there is no significant results for ARMA and ARIMA forecasting model were made.

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