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APPLICATION ARMA (3,2) IN GDP INDONESIA

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Abstract

BACKGROUND.- *This study aims to see the implementation of the model ARMA (3.2) in the variable GDP Indonesia.*

LITERATURE.- *Some literature as the basis for this study is from Chu (2008a), Lee et al. (2008), Coshall (2008), Wong et al. (2007), Sense (2004), Preez and Witt (2003); and Kulendran and Witt (2001) and others.*

RESEARCH METHOD.- *Model data analysis used in this study is a model ARMA (3,2).*

FINDINGS. - *ARMA model (3.2) can be made in an analysis model in forecasting, especially those related to economic variables, in because the results of the forecasting process can adjust the level of reality.*

Keyword : Forecasting, ARMA, GDP.

1.INTRODUCTION

According Gheyas, I. A. and Smith, L. S. (2011) and Lemke, C., et al. (2010) The main objective analysis of time series as a research domain that is considered a plus as well as the analysis model is dynamic, in which the analysis of time series has a wide application in the application, especially with regard to practical matters. By developing a model that is both mathematically and little, then make sure the results approximate baseline data generation process can be

maintained with regard to the statistical norm data in the form of a time series. And can be sure that the estimates of the observations for the future period, will be realized through the model analysis of time series data that we make. Some issues related to the analyzer test data time series, one of which is a test stationery and nonstationarity. This test is done to see how the process occurs a fluctuation of data in the form of time series analysis. Where data were analyzed could become irregular or sometimes may be seasonal, as well as in the prediction of data in the analysis has properties slightly deviate from the form of the specification time series that we need, or in other words, the data that we will do the analysis has multicolinearity nature of several time series analysis will be undertaken.

To do this is something that is very difficult and requires some expertise, to create a series of modeling and forecasting over time that is considered to approach the actual results. This relates especially to some of the properties and characteristics of a time series that we do not want, then any data in the form of time series to be connecting with a series of tests on the data in the form of the time series. By using several alternatives that can be considered combining some forecast models of several different models of structural forms, of the process of adoption by using only modeling alone. Model of a combination of forecasts made, should be based on the form and format that is considered quite rational and accepted in theory. Models are created and proposed also to be more specific, consistent and can do an estimate that is considered to provide an actual forecasting a sharp and reliable. A consistently achieve the best estimates for a class of time series, but some models together can provide a very close estimate of the actual data generation process. In the literature created by Terui, N., et al. (2002) and Gooijer, J. G., et al. (2006) some more research in areas that represent a process combination of a forecast that there could eventually make a much better accuracy, so that forecasting is made will affect the parts of each model were made. And also model on the proposal is expected to make an approach substantially, without reducing the size of the associated risks, one of which is by choosing an individual forecasting models separately. In this study is divided into five sections, the first is an introduction, part 2 deals with literature, section 3 the research methods used, and chapter 4 the contents of the discussion, and the last section 5 of the conclusions of the study.

2.LITERATUR REVIEW

In recent years the study of forecasting has been progressing, from simple forecasting model up to a little more complicated. As described in Kulendran and Witt (2001), Preez and Witt (2003); Intellect (2004), Wong et al. (2007), Chu (2008a), Lee et al. (2008), Coshall (2008), which can be made as literature material modeling, forecasting and demand, has made various shades of empirical analysis. Most researchers view it is a cross-section of data, but some other researchers believe and use it as a series of pure-analytic models. From that described by the author, can be seen in the form of modeling forecasting of the series between the time of the call with ARIMA. This modeling is considered as a statute, which can be made of modeling with the

standard method of box-Jenkins. This model is also considered a model that is very known, particularly with regard to the problem of forecasting and budget. Could not be sure how many researchers who use this forecasting model.

This study aims to see how the application of the use of the ARMA model, which is based on the model and its usefulness in many research world as a tool that can be made in material estimates to generate forecasting mechanisms, especially with regard to the economy, finance and budget. This study is almost bit the same with some other research, using the forecasting economic variables in Indonesia. Using the model is applied can identify forecasting model that will be able to see the behavior, so with this research could make other models like ARFIMA growing in its use. Models are made in the base in this study by the authors, based on the model of Chu (2008b), in which Chu conduct research using ARIMA model-based methods. The use of the algorithm model in the study done by Chu, can make the process of forecasting is done less accurate, so it coud be made in reference materials and input in decision-making in the economy. ARIMA forecasting model with other empirical done by Mustafa (2004), and grown again in the study became the ARMA model with variable exogenus. The study was done by Mustafa on economic variables in the country of Turkey. ARMAX models is still the basis of ARIMA modeling approach. Mustafa believes that the model in the proposal may make an estimate forecasts closer to the real figure.

In another study Greenidge (2001) and Chong et al. (2003) using the forms and methods of a more general nature, but is a little specific. Research using data from the country's economic variables Hong Kong in 2001-2008, against several countries relating to foreign tourists visit. The model is known by the term ADLM or abbreviation of auto-article distributed lag model, which is part of the econometric model. Country of origin into success factor that is considered very important as the Hong Kong exchange income in the country, and thus can make the level of tourism in hongkong can encourage economic growth rate indirectly. In a study on the country Barbados, Greenidge using multivariate modeling and ARDL. With a series of structural modeling approach in a study done, to evaluate the demand figures indirectly on tourism in the country of Barbados. In addition to using the basic structure modeling, the model also can include any of the common structural form, or commonly called by seasonal effects. So it can be made in bidding tool on the disclosure of the facts relating to tourism or economic behavior and provide reliable out-of-sample forecasts of tourism demand.

3.RESEARCH METHOD

Time and Data Research

The research was conducted by the author at the time in April 2016. The data used in this study is the country's GDP figures Indonesia began the period of 1967-2014. Data in the can by the

author's web site world bank, the central statistical agency web site and other web sites. Data prior to analysis first in if the author.

Analisys of Data Technique

In this study the authors used analysis techniques of modeling ARMA box Jenkin (3.2), in addition to forecasting analysis using graphs of the results of the modeling ARMA (3,2). In this study the authors did not use a test analysis of time series data before hand as stationary test, lags a long test, and other tests. Because the authors consider the data to be analyzed, has been appropriate and qualified to do that in a test of a time series data.

4.RESULT AND DISCUSSION

In some statitsik analysis and econometric tools are much in use, it offers automatic model of forecasting of a time series of data that allow us to be able to determine the specifications of the model that will be done the analysis, such as ARMAX models and ARIMAX. In research analysis tool that is used by the present writer, providing three types of information to determine the criteria of estimation methods such as; Akaike information criterion (AIC), Schwarz criterion (SIC or BIC) and Hannan-Quinn criteria (HQ). The model used by the NII writer today is slightly different from that in use by Sowell (1992a), where Sowell using the model of the natural logarithm of the postwar US quarterly real GDP of 1947q1 to 1989q4, while the authors did logaritmatic process. Model estimates of Sowell's use AIC and SIC, with a focus on models ARMA (3, 2) and ARFIMA (3, 2) Specifications (Table 2, p. 288 and Table 3, page 289). Here are the results for the model that is used by the author, without using logaritmatic.

Table 1 : Result ARMA Model (3,2)
Dependent Variable: DLOG(GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.102219	0.034742	2.942230	0.0055
AR(1)	0.031153	0.163307	0.190762	0.8497
AR(2)	-0.886272	0.064264	-13.79110	0.0000
AR(3)	0.229043	0.161907	1.414655	0.1653
MA(1)	0.106635	0.055603	1.917786	0.0627
MA(2)	0.943270	0.029943	31.50263	0.0000
R-squared	0.189618	Mean dependent var		0.102771

Adjusted R-squared	0.082989	S.D. dependent var	0.190353
S.E. of regression	0.182283	Akaike info criterion	-0.440383
Sum squared resid	1.262636	Schwarz criterion	-0.197085
Log likelihood	15.68843	Hannan-Quinn criter.	-0.350157
F-statistic	1.778293	Durbin-Watson stat	2.005118
Prob(F-statistic)	0.140726		

Inverted AR Roots	.24	-.11-.96i	-.11+.96i
Inverted MA Roots	-.05-.97i	-.05+.97i	

Sources : Proceed by author

The top output displays information about methods of estimation, optimization and calculation of covariance. The next section contains the estimated coefficients, standard errors, t-statistics and corresponding p-values. (It's worth pointing out that the coefficient ARMA reported using the sign convention differently than in Sowell so that all the ARMA coefficients have opposite signs). Note that because we estimated the model using the ML, EViews displays the estimated variance of the error as one of the coefficient estimates. But we must realize that the tools of analysis that the authors use today can be reported p-values SIGMASQ the two sides of the test, despite the fact that SIGMASQ should be valued non-negative.

From the summary table above also shows that of the model in the proposal, showing the automatic detection of transformation ruled that logging in the series that did make the base, which may provide a better model.

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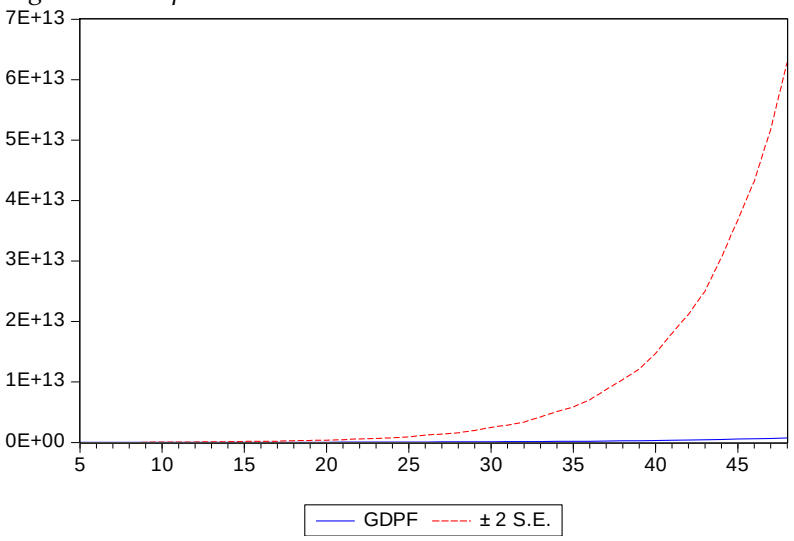
Figure 1 : Graphics Forecast GDP

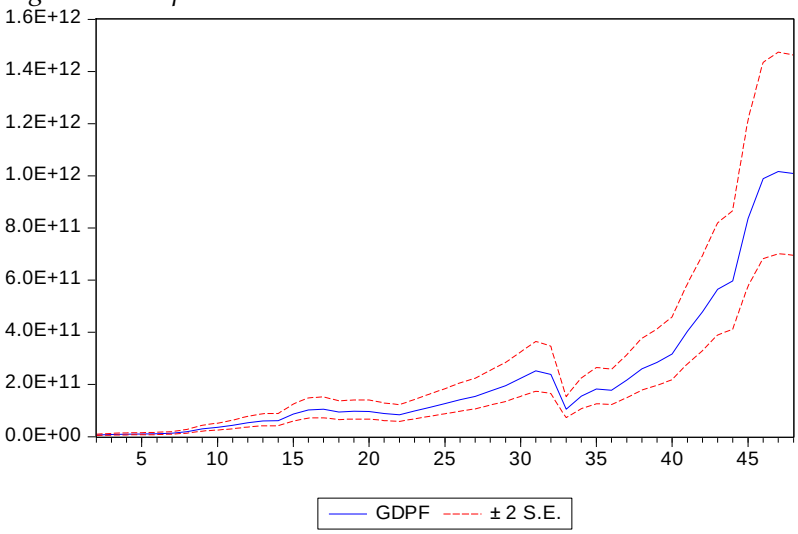


Forecast: GDPF	
Actual: GDP	
Forecast sample: 1 48	
Adjusted sample: 5 48	
Included observations: 44	
Root Mean Squared Error	1.04E+11
Mean Absolute Error	6.93E+10
Mean Abs. Percent Error	38.10899
Theil Inequality Coefficient	0.170933
Bias Proportion	0.355254
Variance Proportion	0.377174
Covariance Proportion	0.267571

Sources : Proceed by author

Actual and forecast chart indicates that the model predicted value selection was actually quite good. Approximate comparison chart shows that each model was patterned after the same cycle pretty well.

Figure 2 : Graphics Forecast GDP



Forecast: GDPF	
Actual: GDP	
Forecast sample: 1 48	
Adjusted sample: 2 48	
Included observations: 47	
Root Mean Squared Error	4.36E+10
Mean Absolute Error	2.32E+10
Mean Abs. Percent Error	12.39174
Theil Inequality Coefficient	0.063882
Bias Proportion	0.004085
Variance Proportion	0.031127
Covariance Proportion	0.964788

Sources : Proceed by author

Estimation Command:
==========
LS(COV=WHITE,DERIV=AA) DLOG(GDP) AR(1 TO 3) MA(1 TO 2) C

Estimation Equation:
==========
DLOG(GDP) = C(1) + [AR(1)=C(2),AR(2)=C(3),AR(3)=C(4),MA(1)=C(5),MA(2)=C(6)]

Substituted Coefficients:
==========
DLOG(GDP) = 0.102218874035 + [AR(1)=0.0311527413905,AR(2)=-0.886271981206,AR(3)=0.229043003842,MA(1)=0.106634752805,MA(2)=0.943270111872]

5.CONCLUSION

In this study, the proposed methodology by using ARMA (3.2) in the empirical analysis has achieved accuracy is consistently better than models or other methods according to the authors. So that all components of the model as well as a combination of several mechanisms of forecasts and forecasting processes in this study can be justified, by incorporating the results of the analysis in the study. The author hopes that this research in the future, the model ARMA (3.2) this can work and be a combination of the proposed approach to be followed up, and in doing roaming with other varieties, the forecasting model of economic variables to analyze a variety of time series dataset.

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