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THE IMPACT OF THE NATIONAL ECONOMIC RECOVERY PROGRAMME IMPLEMENTATION ON INDONESIA GROSS DOMESTIC PRODUCT GROWTH

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ABSTRACT

Covid-19 Pandemic strikes almost all the economies in the world. The World Economy plumes out and grows negatively. Each country tries to cope with this problem by introducing several policies, such as lockdowns and economic aid. This paper tries to study the impact of the Indonesia policy to resolve the economy (Economic Recovery Program) to the Gross Domestic Product (GDP) Growth. Using Eviews application to create ARIMA model, this study forecasts Indonesia's GDP Growth without an economic recovery program. In addition, this paper compares the condition between GDP Growth with and without economic recovery policy. The result shows GDP Growth is higher when there is an economic recovery program compared to GDP Growth (prediction) without the recovery policy.

Keywords: *Covid-19, economic recovery program, GDP Growth, ARIMA.*

INTRODUCTION

In early 2020, the world was shocked by an extraordinary event in the health sector, namely the global pandemic caused by CoronaVirus Disease 2019 (Covid-19). WHO declared this pandemic to be an extraordinary event on March 11, 2020 (Ministry of Finance, tt). Covid-19 cases were first reported in Indonesia on March 2, 2020 and continued to show an increasing trend with the first case totaling 533 patients on May 9, 2020. One of the highest daily increases in Covid-19 cases occurred on July 22, 2021 which reached 49,509 (Alam, 2021).

To prevent the increase of Covid-19 cases, the Government of Indonesia enacted several regulations that limit human movement such as large-scale social restrictions (PSBB), the implementation of restrictions on community activities (PPKM) Java-Bali, micro PPKM, Emergency PPKM, and Level 4 PPKM (Nurita, 2022). As a causality of this Covid-19 spread prevention policy, trade-offs between the health sector and the economic sector inevitably must occur. The decline in Indonesia's economic performance can be seen in the slowdown in economic growth, which fell from 5.02 percent in 2019 to 2.97 percent in 2020 (BPS, 2021). This slowdown in economic growth was also followed by a surge in the country's unemployment rate, which increased from 5.28 percent in 2019 to 7.07 percent in 2020 (Melati, 2023). Various economic shocks due to the Covid pandemic-19 This also marks the worst performance of the Indonesian economy since 1998 with Indonesia plunging into the brink of recession in 2020 (Rohmah, 2020). To address the problems that occurred, the Indonesian government initiated the National Economic Recovery Program (PEN) to mitigate economic shocks due to Covid-19.

With reference to Government Regulation Number 23 of 2020, the PEN Program is intended as a step by the Indonesian government in overcoming economic conditions from a rapidly deepening fall. From an economic perspective, government spending is one of the tools to provide a stimulus in moving the wheels of a country's economy. Quoted from Djkn.kemenkeu.go.id (2020), the government spending side (including PEN spending) continues to grow in order to stem the shocks caused by Covid- 19.

Implemented from 2020-2022, the total PEN budget reaches approximately 1.6 trillion Rupiah. Thus, the PEN program can show the magnitude of the government's commitment to economic recovery efforts due to Covid-19. Implemented from 2020-2022, the total PEN budget reaches approximately 1.6 trillion Rupiah. Thus, the PEN program can show the magnitude of the government's commitment to economic recovery efforts due to Covid-19.

Figure 1. Percentage of PEN Realization as of 18 November 2022

Source: pen.kemenkeu.go.id (2022)

However, the practice of realizing the PEN budget still has problems. The large amount of PEN funds allocated does not in fact make efforts to restore the national economy a necessity. The large PEN budget allocated each year has not been able to be absorbed optimally (Figure 1). This non-optimal absorption of funds did not only occur in a particular year, but for three consecutive years from the beginning of the PEN initiation until the end of the program period. In more detail, PEN budget realization only reached 83.4% of the target in 2020; 88.4% of the target in 2021; and 87% of the target in 2022 (Widodo & Ardhiani, 2022; Maesaroh, 2023). Therefore, an evaluation of the success of the PEN program in maintaining national economic stability is needed.

The scope of this research is a comparison of predicted and real GDP growth values during the Covid-19 pandemic. The imposition of restrictions on the movement of people causes a decrease in economic activity. This will lead to a decrease in the production of goods and services or GDP. The national economic recovery program is intended to help restore the economic activities of people affected by the decline in community economic activity. For this reason, it is necessary to know how effective the PEN program is in helping the community's economy.

The formulation of this research problem is whether the National Economic Recovery Program (PEN) affects the value of Indonesia's GDP growth? And how is the difference between the real condition of GDP growth and the forecasting value if the government does not carry out the PEN Program?

Based on the explanation above, this study aims to determine the effect of the implementation of the National Economic Recovery (PEN) program on national economic stability as reflected in Gross Domestic Product (GDP) in 2015-2022. Previous research related to the effect of the implementation of the National Economic Recovery (PEN) program on Gross Domestic Product (GDP) tends to focus on the scope of certain regions and sectors (Purnomoratih, 2021; Marginingsih, 2021; Abidin, 2021; Rapitasari, 2021; Tobing, 2021; Zahro, 2021). The study related to the effect of the implementation of the National Economic Recovery (PEN) program on Gross Domestic Product (GDP) in the national scope is found in the writing of Widodo and Ardhiani (2020) which uses data sources for the Indonesian economy in the 2010-2020 period and PEN program proxies in the form of consumption levels, FDI, DDI, government spending, interest rates, and tax revenues, while the level of the Indonesian economy is proxied by the level of GDP. The novelty of this research is a more comprehensive presentation of the effect of the PEN program on GDP using economic data for 2015-2022 accompanied by a review of research results as a basis for evaluating Indonesia's PEN policy.

This research has several contributions. This research is expected to add to the literature regarding the relationship between the National Economic Recovery (PEN) program and Gross Domestic Product (GDP) in a more comprehensive and evaluative manner. By using the t-test and ARIMA analysis methods, this research also contributes to expanding the approach methods that can be used in similar research in the future. In addition, this research can be used by the government in evaluating the policies that have been running. The research results can provide policy makers with considerations in designing more effective policies in the future.

RESEARCH METHODS

This research uses quantitative research methods. This method is used because there are variables that have definite values. The data that has been collected will be processed and analyzed. Quantitative research results are expected to provide a high level of accuracy.

Research Data

This study uses secondary data, namely data on the growth of Indonesia's gross domestic product (GDP). The GDP growth data to be used is quarterly GDP growth data. This data is obtained from the Central Statistics Agency (BPS). The data population used is GDP growth data from 2010 to 2023. So that the total data used in this study is 50 quarterly GDP data. In addition, researchers will also pay attention to data availability at the time of research.

Research Model

This research will utilize a time series data approach on the value of GDP growth obtained from BPS. The data processing that will be used is ARIMA. ARIMA analysis will be carried out using the eviews program.

There have been many studies using ARIMA models for forecasting, one of which is in the economic field. GDP growth analysis will be done by creating a time series graph, this is needed to see the trend of existing data. George Box and Gwilym Jenkins developed the ARIMA (Autoregressive Integrated Moving Average) Method since 1976. This model is commonly used for forecasting. ARIMA will use past to present values to get a relatively precise forecast of the future. This model will use the time series data itself. This research uses ARIMA because it combines autoregressive (AR) and Moving Average (MA) and can be used on stationary or non-stationary time series data.

There are three ARIMA models, namely the Autoregressive (AR) model, the moving average (MA) model, and the Autoregressive Moving Average (ARMA) mixed model. The AR model is expressed AR (p) or ARIMA (p,0,0) model,

Xt = μ'+ Ø1Xt-1 + Ø2Xt-2 + ... + ØpXt-p

where: μ' = a constant

Ø p = pth autoregressive

parameter et = error value at time t

while the MA model, expressed as MA(q), or ARIMA (0,0,q), is:

Xt = μ'+ et - Ø1et-1 - Ø2et-2 + ... + - Øqet-k where: μ' = a constant

Øq = moving average parameter et-k

= error value at time t - k

ARMA is used for pure AR(p) and MA(q) processes with stationary data in levels, which is expressed:

Xt = μ'+ Ø1Xt-1 + et - Ø1et-1

A simple equation in the ARIMA (p,d,q) model for example in ARIMA (1,1,1) is stated: (1- B)(1-Ø1B)Xt = μ'+(1-Ø1B)et

This research will perform the following processing steps:

a. Identification

   The researcher will look at the data plot to look for data trends. Then test the stationarity of the data. Data stationarity is tested using the unit root test. The method to be used is augmented dickey fuller (ADF).

b. Estimation

   We will simulate the variance models using the obtained average moderation.

c. Evaluation

At this stage, the results will be evaluated with respect to indicators, including the normal distribution of errors and autocorrelation.

d. Forecasting

Researchers will perform forecasting by entering parameters into the equation.

RESEARCH RESULTS

a. Overview of Research Objects

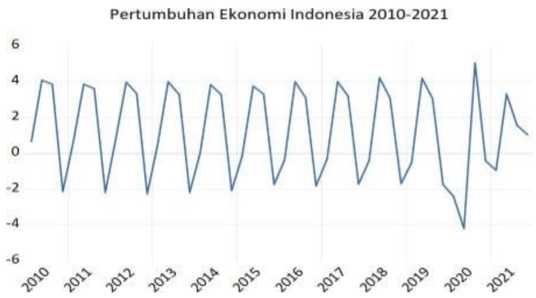
In this study, the data used is quarterly Gross Domestic Product growth data from 2010 to 2023. Gross Domestic Product is the total production of goods and services of a country at a certain time. In this study, the value of Indonesia's GDP growth over time will be used.

The GDP growth value is obtained by subtracting the current GDP value from the GDP of the previous time and then dividing by the previous GDP and multiplying by 100%. The calculation of GDP growth can be calculated according to the following equation:

$$\Delta Y = \frac{Yt - Y(t-1)}{Y(t-1)} \times 100\%$$

b. The impact of PEN policy implementation on Gross Domestic Product growth patterns

To determine the growth pattern of Gross Domestic Product (GDP), GDP growth data from 2010 to 2023 is used. Indonesia's economic growth data from 2010 to 2021 (Figure 3) shows that there is a growth pattern that shows similarities from year to year. This pattern shows that there are repeated periods of increase and periods of decrease, but this pattern changes slightly in 2020-2021.



Augmented Dickey-Fuller Unit Root Test on R

Null Hypothesis: R has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.86008	0.0000
Test critical values:	1% level	-3.581152	
	5% level	-2.926622	
	10% level	-2.601424	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(R)
Method: Least Squares
Date: 11/21/23 Time: 21:27
Sample (adjusted): 2010Q3 2021Q4
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R(-1)	-1.734870	0.146278	-11.86008	0.0000
D(R(-1))	0.719548	0.102816	6.998410	0.0000
C	2.023454	0.318156	6.359937	0.0000

R-squared	0.771075	Mean dependent var	-0.065652
Adjusted R-squared	0.760428	S.D. dependent var	3.673488
S.E. of regression	1.798029	Akaike info criterion	4.074253
Sum squared resid	139.0151	Schwarz criterion	4.193512
Log likelihood	-90.70782	Hannan-Quinn criter.	4.118928
F-statistic	72.41742	Durbin-Watson stat	2.193434
Prob(F-statistic)	0.000000		

Figure 3 Economic Growth 2010-2021

Based on Figure 3, the quarterly GDP growth value ranges from -2% to 4%, but this value changes in 2020 with the lowest value of GDP growth reaching -4% and the highest increase in GDP growth reaching 5%. The value of GDP growth in 2020 to 2021 also shows a different pattern from the 2010-2010 pattern.

This significant pattern difference indicates that the shock in 2010 (Covid-19) had a significant effect on Indonesia's GDP growth pattern. For this reason, the PEN program aimed at overcoming the problem of economic shocks due to Covid-19 can improve Indonesia's GDP growth conditions.

c. Forecasting GDP growth data

This research will analyze forecasting of time series data. The data used is GDP growth data for the period 2010 to 2021. After the forecasting data is obtained, the next process is to compare the real data with the forecasting data. The data is the quarterly GDP growth value. This data is obtained from the Central Bureau of Statistics (BPS). The forecasted value will be compared with the real value of GDP growth.

The first step in analyzing time series data is to conduct a stationary test. This test can be done by observing the time series plot in the graph, or doing the dickey fuller test. In this study, the dickey fuller test was conducted at the level and first difference. The results of testing GDP growth data with the dickey fuller test at the level level can be seen in table 1

Table 1 Data Stationary Test Results at Level

Augmented Dickey-Fuller Unit Root Test on R

Null Hypothesis: R has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.86008	0.0000
Test critical values:	1% level	-3.581152	
	5% level	-2.926622	
	10% level	-2.601424	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(R)
Method: Least Squares
Date: 11/21/23 Time: 21:27
Sample (adjusted): 2010Q3 2021Q4
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R(-1)	-1.734870	0.146278	-11.86008	0.0000
D(R(-1))	0.719548	0.102816	6.998410	0.0000
C	2.023454	0.318156	6.359937	0.0000

R-squared	0.771075	Mean dependent var	-0.065652
Adjusted R-squared	0.760428	S.D. dependent var	3.673488
S.E. of regression	1.798029	Akaike info criterion	4.074253
Sum squared resid	139.0151	Schwarz criterion	4.193512
Log likelihood	-90.70782	Hannan-Quinn criter.	4.118928
F-statistic	72.41742	Durbin-Watson stat	2.193434
Prob(F-statistic)	0.000000		

Table 2 Stationary Test Results on First Difference

Augmented Dickey-Fuller Unit Root Test on D(R)

Null Hypothesis: D(R) has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.943409	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(R,2)
Method: Least Squares
Date: 11/21/23 Time: 21:12
Sample (adjusted): 2012Q1 2021Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(R(-1))	-7.533659	1.267565	-5.943409	0.0000
D(R(-1),2)	5.526456	1.200326	4.604129	0.0001
D(R(-2),2)	4.504594	1.105471	4.074817	0.0003
D(R(-3),2)	3.487146	0.928223	3.756797	0.0007
D(R(-4),2)	2.458951	0.657413	3.740346	0.0007
D(R(-5),2)	1.680710	0.408581	4.113528	0.0003
D(R(-6),2)	0.804151	0.207502	3.875385	0.0005
C	-0.200221	0.246233	-0.813137	0.4221

R-squared	0.940241	Mean dependent var	0.131750
Adjusted R-squared	0.927168	S.D. dependent var	5.644834
S.E. of regression	1.523392	Akaike info criterion	3.856613
Sum squared resid	74.26319	Schwarz criterion	4.194389
Log likelihood	-69.13226	Hannan-Quinn criter.	3.978742
F-statistic	71.92574	Durbin-Watson stat	1.935827
Prob(F-statistic)	0.000000		

Table 2 shows the ADF test values at the first difference level. Both test results show that GDP growth has a p-value of 0.000 for the level and first difference. This indicates that GDP growth is stationary at the level of level and first difference. so it can be concluded that the data is stationary at first difference. Then the appropriate ARIMA is the (p,1,q) model.

The next procedure is to identify the AR and MA orders using correlograms to obtain the ACF and PACF plots. These results are used to estimate the best ARIMA model. The correlogram results can be seen in table 3

Correlogram of D(R)

Date: 11/21/23 Time: 21:13
Sample (adjusted): 2010Q2 2021Q4
Included observations: 47 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.148	-0.148	1.0916	0.296
		2	-0.692	-0.730	25.610	0.000
		3	-0.017	-0.661	25.626	0.000
		4	0.666	-0.258	49.389	0.000
		5	0.054	0.050	49.549	0.000
		6	-0.633	-0.057	72.065	0.000
		7	-0.111	-0.297	72.771	0.000
		8	0.655	-0.075	98.081	0.000
		9	0.070	-0.091	98.379	0.000
		10	-0.572	-0.085	118.76	0.000
		11	-0.120	-0.129	119.68	0.000
		12	0.580	0.023	141.84	0.000
		13	0.078	-0.099	142.25	0.000
		14	-0.499	-0.065	159.62	0.000
		15	-0.122	-0.049	160.69	0.000
		16	0.498	0.006	179.08	0.000
		17	0.093	-0.074	179.75	0.000
		18	-0.434	-0.030	194.67	0.000
		19	-0.125	-0.020	195.96	0.000
		20	0.431	-0.006	211.79	0.000

Table 3 Correlogram of First Difference GDP Growth Data

Table 4 Arima Automatic Forecasting Results

Automatic ARIMA Forecasting
Selected dependent variable: R
Date: 11/21/23 Time: 21:14
Sample: 2010Q1 2021Q4
Included observations: 48
Forecast length: 0
Model maximums: (2,2)1(1,1)
Regressors: C

Number of estimated ARMA models: 36
Number of non-converged estimations: 0
Selected ARMA model: (2,2)(0,0)
AIC value: 3.78873314795

The correlogram results show autocorrelation and partial autocorrelation. Then the ARIMA model estimation is carried out using the automatic forecasting feature of eviews software. The forecasting results can be seen in table 4.

The results of automatic forecasting after testing 36 models, it is known that the best model is the ARMA model (2,2) for the first difference data. To test that the model used is the best model, the Correlogram Q statistic is performed. The correlogram results show that the autocorrelation and partial autocorrelation values are below normal and have a p-value> 0.05.

Next, forecasting is carried out using the ARIMA (2,1,2) model to predict GDP growth after the implementation of the PEN program. The forecasting period is 8 quarters after 2022 to 2023. This forecasting is done by taking into account that after the PEN program, the Indonesian economy takes time to have a maximum effect. The ARIMA model is considered suitable for forecasting in the short term, so the selection of 8 quarters is in accordance with the characteristics of the test tool.

Correlogram of Residuals

Date: 11/21/23 Time: 21:15
Sample (adjusted): 2010Q2 2021Q4
Q-statistic probabilities adjusted for 4 ARMA terms

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.058	-0.058	0.1679	
		2	0.204	0.202	2.3035	
		3	-0.114	-0.097	2.9866	
		4	-0.062	-0.118	3.1953	
		5	-0.099	-0.067	3.7375	0.053
		6	-0.216	-0.211	6.3575	0.042
		7	-0.157	-0.184	7.7821	0.051
		8	0.146	0.210	9.0331	0.060
		9	-0.042	-0.018	9.1396	0.104
		10	-0.047	-0.238	9.2773	0.159
		11	-0.120	-0.172	10.196	0.178
		12	0.135	0.159	11.401	0.180
		13	-0.028	-0.047	11.456	0.246
		14	-0.029	-0.143	11.516	0.319
		15	-0.100	-0.078	12.238	0.346
		16	0.099	0.032	12.969	0.371
		17	-0.011	-0.106	12.979	0.449
		18	-0.039	-0.079	13.097	0.519
		19	-0.095	-0.031	13.834	0.538
		20	0.110	0.003	14.856	0.535

Table 5 Correlogram Results Q Statistic

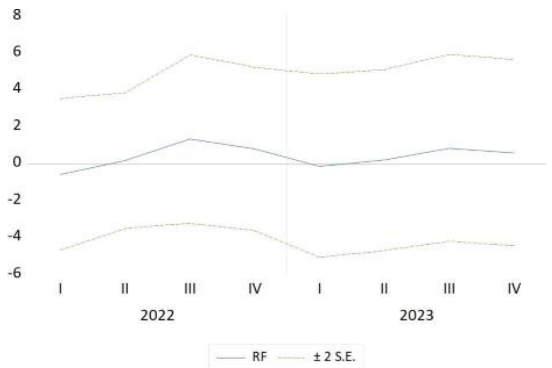


Figure 4 Forecasting results for the period 2022-2023

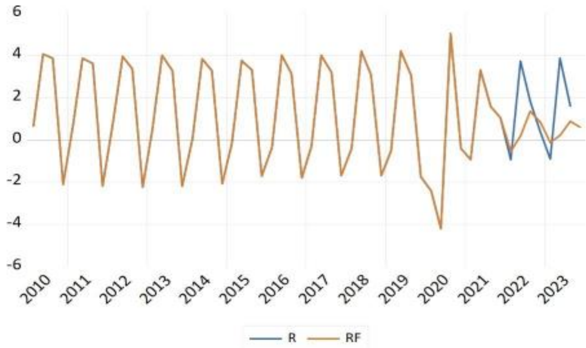


Figure 5 Comparison of Forecasting results with actual data

Based on Figure 4 and Figure 5, it is known that forecasting for the period after the implementation of the PEN Program shows that real GDP growth is above forecasting GDP growth. The forecast GDP value is the GDP value that is predicted to occur if the PEN program was not implemented. It can be seen that as early as 2022 and 2023, the forecast value is above the Real GDP value, but beyond that, the forecast value is below the real value.

The results of the forecasting show that the average GDP growth has a smaller number than the actual number. It can be concluded that the implementation of the PEN program has succeeded in increasing Indonesia's GDP growth. If the government does not make efforts to implement the PEN program, then the GDP growth condition is predicted to grow smaller than the current real condition according to Figure 5.

CONCLUSIONS

Based on the results of the analysis, it is known that the implementation of the National Economic Recovery (PEN) program to overcome the effects of the Covid-19 pandemic has an influence on Indonesia's Gross Domestic Product

(GDP) growth. The real GDP growth value is higher than the forecasted GDP value. Over a period of 8 quarters, the real GDP value was higher by 6 times and lower by 2 times.

From the ARIMA analysis, it is concluded that the best model for GDP growth is the ARIMA (2,1,2) model. The forecasting results show that the actual GDP growth value is above the forecasting GDP growth value. This shows that the PEN Program has succeeded in increasing Indonesia's GDP growth value to overcome the economic decline caused by the Covid-19 pandemic.

Suggestions for policy makers related to this research are that government intervention in the form of greater government spending can help overcome the problem of declining GDP growth. The forecasting results show that if the government does not provide assistance, the value of GDP growth will be smaller than the real condition. However, it takes time for government intervention to achieve optimal results so that the timing of intervention needs to be better considered.

This study still has limitations in that the object of research is only Indonesia's GDP growth and sees the impact in the short term. Future researchers can conduct research by looking at the effect of the PEN Program on other sectors and seeing the impact in the long term.

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