The Effect of Interest Rates, Consumption, Investment, and Inflation on GDP in Indonesia

Putri Valentine, Rusiadi, Lia Nazliana Nasution

Abstract

This study aims to determine the effect of interest rates, consumption, investment, and inflation on gross domestic product (GDP) in Indonesia. The variables in this study are interest rates, consumption, investment, and inflation as independent variables, while the Gross Domestic Product (GDP) variable is the dependent variable. The research period is from 1993-2023. The data analysis technique used is the Autoregressive Distributed Lag (ARDL) panel. When viewed from the short run and log run, the Interest Rate variable at lag-0, lag-2 Interest Rate and lag-3 Interest Rate have a significant effect on GDP, while lag-1 Interest Rate has no significant effect on GDP in the short term. Interest Rate variable has no significant effect on GDP in the long run. Consumption lag-2 variable has a significant effect on GDP. while Consumption lag-0 and Consumption lag-1 have no significant effect on GDP in the short term, Consumption variable has no significant effect on GDP in the long term. Investment lag-0 and Investment lag-3 variables have a significant effect on GDP, while Investment lag-1 and Investment lag-2 have no significant effect on GDP in the short term. In the Investment variable has a significant effect on GDP in the long term. Inflation variable has a significant effect on GDP in the short term, while Inflation variable has no significant effect on GDP in the long term.

Keywords: *Interest Rate, Consumption, Investment, Inflation, Gross Domestic Product*

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Introduction

Economic growth is a benchmark in the success of a country's economic development. This is because economic growth reflects the impact of development policies carried out by the government. Because high economic growth is a requirement for the ongoing development of the economic system and can make a more suitable policy in economic development. High economic growth indicates that the level of economic performance of a country is good. (Nugroho et al., 2022).

Economic growth in Indonesia has also undergone changes. During the 1970s and 1980s the development process in Indonesia experienced many obstacles, mainly caused by external factors such as the decline in international crude oil prices towards the middle of the 1980s and the emergence of a world economic recession. Because Indonesia since the middle of the New Order had an open economic system, these shocks had a significant impact on the rate of national economic growth (Tambunan, 2001).

The following is a table of GDP Growth by Business Field Quarter 1-2024:

Table 1. GDP Growth by Business Field in the First Quarter of 2024 (%)

GDP	GROWTH (%)
Agriculture, Forestry and Fisheries	-3,54
Mining and Quarrying	9,31
Processing Industry	4,13
Electricity and Gas Procurement	5,35
Water, Garbage, Waste and Recycling Procurement	4,44
Construction	7,59
Trade	4,58
Transportation and Warehousing	8,65
Provision of Accommodation & Meals	9,39
Information and Communication	8,39
Financial and Insurance Services	3,91
Real Estate	2,54
Company Services	9,63
Adm. Government and Defense	18,88
Education Services	7,34
Health and Social Services	11,64
Other Services	8,92

Source: (BPS, 2024)

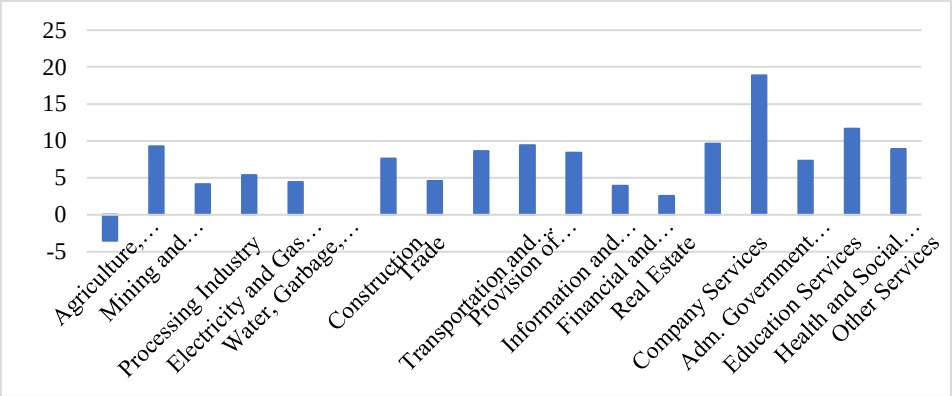

Figure 1. Graph of GDP Growth by Business Field in the First Quarter of 2024

Based on the table and graph above, it can be seen that there are three business fields with the highest growth. Government administration at 18.88% which was driven by an increase in employee expenditure (THR and salary increases. Health Services business field of 11.64% which was supported by an increase in employee spending on government health institutions. Corporate Services business field of 9.63% which was driven by an increase in revenue for event organizers *(Event Organizer)*, and various other corporate service activities in line with the 2024 General Election (election) such as billboard services, billboards, banners, and others.

Table 2. GDP Growth by Expenditure Quarter 1 2024 (%):

GDP	Growth (%)
Household Consumption Expenditure	0,64
LNPRT Consumption Expenditure	4,18
Government Consumption Expenditure	-36,69
Gross Domestic Fixed Capital Formation	-4,84
Export of Goods and Services	-6,26
Less Imported Goods and Services	-4,11

Source: (BPS, 2024)

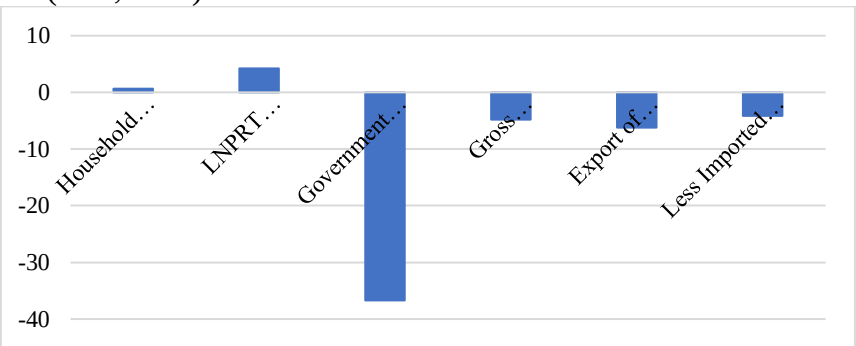

Figure 2. Chart of GDP Growth by Expenditure Quarter 1 2024

Based on the table and graph above, it can be seen that the highest GDP growth by expenditure is LNPRT Consumption Expenditure of 4.18% which is driven by production costs incurred in order to carry out service activities to the public, members of organizations, or certain community groups such as general election activities (elections) and Ramadan moments. Household Consumption of 0.64% was driven by expenditure on goods and services by households, both individuals and groups of individuals living together in a residential building. The factors are Food and Beverages, Health and Education, Housing and Household Supplies.

In research conducted by Aprileven (2017) stated that the interest rate here is determined by the Central Bank, namely through the BI rate. When the BI rate drops, public interest in taking loans becomes high. For business people, this will be able to encourage economic improvement, which in turn will increase people's purchasing power. As a result, the demand for goods will increase. Furthermore, the prices of goods in general will increase and result in inflation. In a test conducted by Hakim (2023) Interest rates have a significant effect on economic growth, if interest rates rise, then the desire of people to save their money or invest increases. If interest rates fall, people will be more dominant in making loans to banks than saving and will ultimately affect economic growth which will increase.

In research conducted by Pramesthi (2012) inflation has a positive and significant effect on economic growth. Whereas in research conducted by Subekti (2023) inflation has a negative and significant impact on economic growth, if there is an increase in inflation it tends to reduce the level of economic growth. Likewise, conversely, if there is a decrease in inflation, it will increase economic growth. Although the relationship that occurs in the very weak category, the role of inflation in influencing economic growth is also quite large. Because the high inflation that occurs will hamper economic development and economic activity in the community so as to slow down economic activity and ultimately reduce economic growth.

Literature Review

Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is one of the mirrors of the level of welfare of the people of a region because it is used to measure the economic growth of a country, which is one of the important indicators to analyze economic development that occurs. The greater the

GDP of a country, the higher the level of development progress in that country. (Bustam, 2016) According to Nasution et al. (2021) Growth can be described as a transformation process. Whether one examines an economy that is already modern and industrialized or an economy at an earlier stage of development, one finds that the growth process is uneven and unbalanced. Economic historians have attempted to develop a theory of the stages that each economy must go through as it grows.

Interest Rate

The interest rate is the amount of rupiah paid for using funds as a reward. Changes in interest rates represent changes in the demand for money (credit). An increase in interest rates may result in a decrease in aggregate demand/investment spending. Conversely, an increase in interest rates will result in an increase in aggregate demand (Aryaningsih, 2008). (Aryaningsih, 2008). Classical theory says that the interest rate is the rate of return on capital. In classical theory, capital stock is mixed up with money and both are considered to have a substitutive relationship. The scarcer the capital, the higher the interest rate. Conversely, the more capital, the lower the interest rate. (Nasution, 2001).

Consumption

Consumption can be defined as the spending on goods and services by households. The meaning of goods here includes household spending on durable goods, such as vehicles, household appliances, and on non-durable goods, such as food and clothing. As for the meaning of services, it includes intangible goods, such as haircuts and health care. In addition, household spending on education is also included in the consumption of services (Mankiw, 2013).

Investment

Investment is the second component that affects the level of aggregate expenditure and is one of the important and main factors in economic development that has been recognized by many economists, even saying that there is no development without investment. (Nujum & Rahman, 2019). Economic theory interprets or defines investment as "expenditures to purchase capital goods and production equipment with the aim of replacing and especially adding to capital goods in the economy that will be used to produce goods and services in the future".

Inflation

Inflation is the tendency of prices to rise generally and continuously. An increase in just one or two goods is not called inflation, unless the increase is widespread and affects most of the prices of other goods. If inflation fluctuates, then economic activities will tend to adjust to the conditions that occur. The impact of rising inflation leads to a decrease in people's purchasing power. Because the real value of the currency has decreased (Susanto et al., 2018).

Research Methodology

This research was conducted in Indonesia. The data used in this research is quantitative data, which is data that is measured or calculated directly, expressed in numbers or in the form of numbers taken and processed from the World Bank and BPS (Central Bureau of Statistics). The period of 1993 - 2023. This research uses the ARDL model. ARDL is one form of method in econometrics. The estimation results for each individual characteristic are obtained through the use of regression.

$GDPt=\alpha+\beta_1 SBt+\beta_2 KSt+\beta_3 INVt+\beta 4\ INFt+e$

Results

By using Eviews 10 software, analysis with Auto Regressive Distributed Lag (ARDL). The initial stage that really needs to be considered before analyzing data with time series data is to apply pre-estimation tests. This test includes data stationarity test, determination of the optimum lap, and cointegration test.

Stationarity Test

The unit root test was conducted with the Dicky Fuller (DF) model. The test aims to determine the stationarity of GDP, SB, KS, INV, INF data from 1993 to 2023. The following are the results of the data stationarity test:

Table 3. Augmented Dickey Fuller Unit Root Test

Variables	***Level***		***First Difference***	
	t-statistic	**Probability**	***t-statistic***	**Probability**
Gross Domestic Product	-4,106669	0,0034	-6,870911	0,0000
Interest Rate	-6,069991	0,0000	-6,443787	0,0000
Consumption	-1,078460	0,7110	-5,809868	0,0000
Investment	-2,133385	0,2337	-5,176641	0,0002
Inflation	-2,523009	0,1233	-5,359195	0,0003

Source: Results processed with Eviews 10

The test results at the first difference level obtained that all variables, both dependent and independent, are stationary at the first difference level at y = 5%, which means that the probability value is smaller than y = 5%. The data above is stationary at first differential so it is assumed that there will be cointegration or long-term relationship. Thus the next test can be forwarded to the cointegration test.

Optimum Lag Test

In the study of determining the optimal lag length with the Akaike Info Criterion (AIC) approach, the following results were obtained:

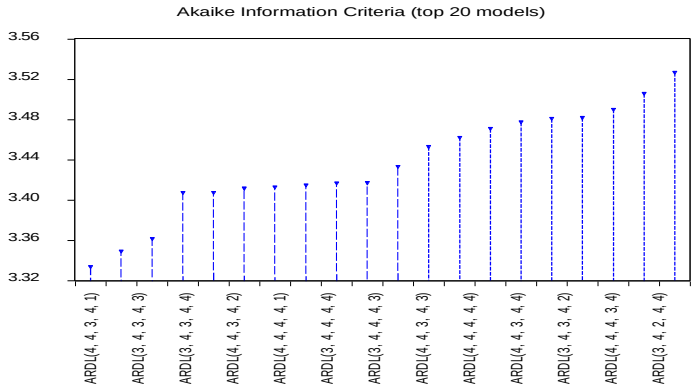

Figure 3. Optimum Lag Test

Based on Figure 1. there are 20 best models but the model suitable for ARDL estimation in this study is the ARDL (4,4,3,4,1) model.

Bound Test Cointegration Test

Bound Test Cointegration Test if the F-statistic value is below the lower limit value, it can be concluded that there is no cointegration. If the F-statistic value is above the upper limit value, it can be concluded that cointegration occurs. However, if the F-statistic is between the lower limit and upper limit values, the results cannot be concluded. The following are the results of the cointegration test:

Table 4. Bound Test Cointegration Test

Test Statistic	***Value***	**K**
F Statistic	4,341347	4
Critical Value Bounds		
Significance	*I(0) Bounds*	*I(1) Bounds*
10%	2,2	3,09
5%	2,56	3,49
2,5%	2,88	3,87
1%	3,29	4,37

Source: Results processed with Eviews 10

The cointegration test results based on the tied test approach in the table above show that the F-statistic value is above the limit of 5% 4.341347>3.49. This means that there is cointegration between the variables studied because the F Statistic Value is greater than the value of 5% (1).

Error Correction Term (ECT) Test

The following are the results of the Error Correction Term Test:

Table 5. Error Correction Term Test

Variables	***Coefficient***	***t-Statistic***	***Prob.***
CointEq(-1)	-0,898948	-6,910486	0.0005

Source: Results processed with Eviews 10

In the table, the Error Correction Term estimation results show that the error correction variable which is the error of the previous period is shown by the CointEq (-1) variable of - 0.898948 with significant at α = 1%. The negative and significant value of the error variable indicates that the Error Correction Term model is valid and indicates the existence of short- term cointegration between the independent variable and the dependent variable during the period 1993 - 2023.

Normality Test

The normality test is said to be normal if it is greater than 0.05. In this study, the significant probability value is 0.528223> 0.05, this states that the data is normally distributed.

Autocorrelation Test

The autocorrelation test in this study uses the Breusch-Godfrey Serial Correlation LM Test method.

Table 6. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.194204	*Prob. F(2,4)*	0.8308
*Obs*R-squared*	2.389706	*Prob. Chi-Square(2)*	0.3027

Source: Results processed with Eviews 10

Based on the table. The *Chi-Square* probability value is greater than the significant level, namely 0.3027> 0.05. It can be stated that the data in the regression model does not have a case of autocorrelation so that the assumption of non-autocorrelation has been fulfilled.

Heteroscedasticity Test

The method used in the heteroscedasticity test is Breusch-Pagan-Godfrey.

Table 7. Heteroscedasticity Test Results

Breusch-PaganGodfrey			
F-statistic	0.519933	*Prob. F(20,6)*	0.8736
*Obs*R-squared*	17.12115	*Prob. Chi-Square(20)*	0.6451
Scaled explained SS	0.781681	*Prob. Chi-Square(20)*	1.0000

Source: Results processed with Eviews 10

ARDL Estimation Results

After conducting stationarity tests and bound tests, as well as selecting the optimum lag, the next step is to regress the ARDL model. ARDL regression is used to see the long-term and short-term relationships of the research variables.

Table 8. ARDL regression results

Variables	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
GDP(-1)	0.953836	0.288716	3.303712	0.0163
GDP(-2)	0.285084	0.222666	1'.280321	0.2477
GDP(-3)	-0.912717	0.238930	-3.820014	0.0088
GDP(-4)	-0.225151	0.186307	-1.208499	0.2723
SB	-1.037.202	0.263923	-3.929935	0.0077
SB(-1)	0.527552	0.152121	3.467977	0.0133
SB(-2)	0.361126	0.098025	3.684031	0.0103
SB(-3)	-0.151000	0.063978	-2.360186	0.0563
SB(-4)	-0.230690	0.074986	-3.076435	0.0218
KS	130.6534	70.41168	1.855565	0.1129
KS(-1)	-81.38048	66.09775	-1.231214	0.2643
KS(-2)	-280.1429	79.32064	-3.531778	0.0123
KS(-3)	279.7691	100.4365	2.785533	0.0318
INV	2.416715	0.594685	4.063861	0.0066
INV(-1)	0.848422	0.566089	1.498743	0.1846
INV(-2)	-0.207599	0.465973	-0.445516	0.6716
INV(-3)	-2.139165	0.532666	-4.015963	0.0070
INV(-4)	1.997524	0.446337	4.475368	0.0042
INF	-0.624124	0.156684	-3.983323	0.0073
INF(-1)	1.087517	0.261164	4.164110	0.0059
C	-161.0567	125.8489	-1.279763	0.2479

Source: Results processed with Eviews 10, 2024

Short-term and Long-term Estimation Results

1. ARDL Estimation in the Short Term

Table 9. ARDL Estimation in the Short Term

Variables	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
D(GDP(-1))	0.852784	0.348391	2.447780	0.0499
D(GDP(-2))	1.137868	0.324451	3.507058	0.0127
D(GDP(-3))	0.225151	0.186307	1.208499	0.2723
D(SB)	-1.037202	0.263923	-3.929935	0.0077
D(SB(-1))	0.020564	0.102244	0.201125	0.8472
D(SB(-2))	0.381690	0.110170	3.464542	0.0134
D(SB(-3))	0.230690	0.074986	3.076435	0.0218
D(KS)	130.6534	70.41168	1.855565	0.1129
D(KS(-1))	0.373750	81.29943	0.004597	0.9965
D(KS(-2))	-279.7691	100.4365	-2.785533	0.0318
D(INV)	2.416715	0.594685	4.063861	0.0066
D(INV(-1))	0.349240	0.581608	0.600473	0.5702
D(INV(-2))	0.141641	0.405385	0.349398	0.7387
D(INV(-3))	-1.997524	0.446337	-4.475368	0.0042
D(INF)	-0.624124	0.156684	-3.983323	0.0073

Source: Results processed with Eviews 10

From the table above, the variables that have a significant effect on GDP are interest rates, lag-2 interest rates, lag-3 interest rates, lag-2 consumption, lag-3 investment, and inflation. While the variables that have an insignificant effect on GDP are Interest Rate lag-1, Consumption, Consumption lag-1, Investment lag-1, Investment lag-2.

2. ARDL Estimation in the Long Run

Table 10. ARDL Estimation in Long Term

Variables	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
SB	-0.589816	0.425165	1.387264	0.2147
KS	54.39604	55.14362	0.986443	0.3620
INV	3.243677	1.010609	3.209627	0.0184
INF	0.515484	0.293776	1.754683	0.3612

Source: Results processed with Eviews 10

The variable that has a significant effect on GDP is Investment. Meanwhile, variables that have an insignificant effect on GDP are interest rates, consumption, and inflation.

Stability Test

The stability test serves to detect how the stability of parameters in long-term and short-term relationships. The stability test in this study, using the Cusum test and Cusum of Square, is useful for testing the stability of the coefficients and ascertaining whether there is a structural break in the model or not as a result of the analysis. If the value of the cumulative recursive residual lies within the band¸ then it can be stated that the estimated parameters in the study period are stable. Vice versa, if the cumulative recursive residual value is located outside the band, then this indicates that the estimated parameters in the study period are unstable. (Sovia Zahrianti & Wirawan Fadly, 2022).

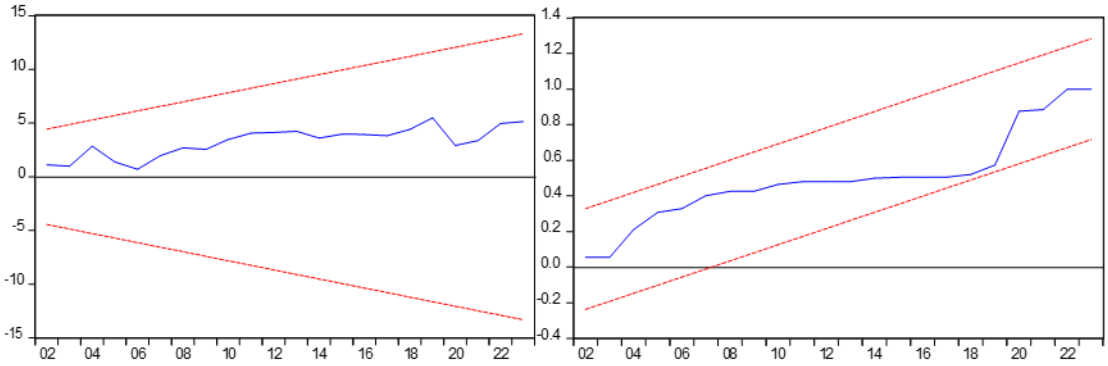

Figure 4. Cusum and Cusum Q Test Results

Based on Figure. It can be seen that in both the Cusum and Cusum Q models, the blue line in the model does not leave the red line boundary which remains between the 5% (0.05) significant line.

Conclusion

This research is to see the relationship between variables, namely Interest Rates, Consumption, Investment, and Inflation to Gross Domestic Product (GDP). The analysis model used by the author is the Autoregressive Distributed Lag (ARDL) model. The research data is annual in nature taken from the World Bank and the Central Statistics Agency (BPS) which provides information on variable indicators.

After going through several stages of testing, the author can draw conclusions from the theme of this research, among others: In the short term, interest rates at lag-0, lag-2 interest rates and lag-3 interest rates have a significant effect on GDP, while lag-1 interest rates have no significant effect on GDP. Interest rate variable has no significant effect on GDP in the long run.

In the short term, lag-2 consumption has a significant effect on GDP. while lag-0 consumption and lag-1 consumption have no significant effect on GDP, consumption variables have no significant effect on GDP in the long term.

In the short term, lag-0 investment and lag-3 investment have a significant effect on GDP, while lag-1 investment and lag-2 investment have no significant effect on GDP. Investment variables have a significant effect on GDP in the long run.

In the short term, inflation has a significant effect on GDP, while the inflation variable has no significant effect on GDP in the long term.

References

(BPS), B. P. S. (2024).

Afdol, A., Mardiana, M., & Widayatsar, A. (2022). Analysis of Interest Rate Through Credit Channel and The Amount of the Money Circulation on Indonesian Economic Growth 2005 - 2019. *Journal of Finance and Banking (KEBAN)*, *1*(2), 47-58.

Aprileven, P. H. (2017). The Effect of Economic Factors on Inflation Mediated by Money Supply. *Economics Development Analysis Journal*, *4*(1), 32-41.

Aryaningsih, N. N. (2008). The Effect of Interest Rates, Inflation, and Total Income on Loan Demand at PT BPD Kediri Sub-Branch. *Journal of Research and Development of Science & Humanities*, 59.

Bustam, N. H. (2016). The Effect of Number of Units, GDP and Investment on Indonesian Labor Absorption for the Period 2009-2013. *Kutubkhanah: Journal of Social and Religious Research*, *19*(2), 250-261.

Hakim, A. (2023). The Effect of Inflation and Interest Rates on Economic Growth in Indonesia. *Economics, Finance, Investment and Sharia (EKUITAS)*, *4*(4), 1283-1291.

Hartati Nani. (2020). The Effect of Inflation and Unemployment on Economic Growth in Indonesia for the Period 2010-2016. *Pelita Bangsa Journal of Sharia Economics*.

Mankiw (2013). *Introduction to Macroeconomics*. Publisher of Salemba Empat.

Nasution. (2001). *Integrated Quality Management*. Ghalia Indonesia.

Nasution, L. N., Novalina, A., & Ardela. (2021). *Economic Growth & Poverty Rate*.

Nugroho, P., Syahnur, S., & Suriani. (2022). The Impact of Real Government Spending in Physical and Social Infrastructures on Economic Growth. *Indonesian Treasury Review Journal of State Finance Treasury and Public Policy*, *7*(4), 287-300.

Nujum, S., & Rahman, Z. (2019). The Effect of Investment and Inflation on Economic Growth in Makassar City. *Journal of Economic Resource*, *1*(2), 117-129.

Pramesthi, R. N. (2012). The Effect of Unemployment and Inflation on Economic Growth in Trenggalek Regency. *Surabaya State University*, 1-20.

Simanungkalit, E. F. B. (2020). The Effect of Inflation on Economic Growth in Indonesia.
JEB17: Journal of Economics and Business, *7*(02), 119-132.

Sovia Zahrianti, E., & Wirawan Fadly. (2022). The Effect of Inflation and Exchange Rate on Indonesian Halal Product Exports for the 2016-2020 Period. *Journal of Economics, Law, and Humanities*, *1*(2), 1-15.

Subekti, A. T. (2023). Analysis of the Effect of Inflation on the Rate of Economic Growth in Jambi City. *Journal of Intellectual Khazanah*, *7*(2), 1750-1763.

Sudirman, S., & Alhudhori, M. (2018). The Effect of Household Consumption, Investment on Economic Growth in Jambi Province. *ECONOMICS: Journal of Economics and Business*, *2*(1), 81.

Susanto, E., Rochaida, E., & Ulfah, Y. (2018). The effect of inflation and education on unemployment and poverty. *Innovation*, *13*(1), 19.

Tambunan. (2001). *Indonesian Economy Theory and Empirical Findings*