The Influence of Inflation and Unemployment on Consumption Levels in Indonesia

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Abstract

This study aims to determine the relationship and interaction of the influence of inflation variables, and interest rates on national income. This research was conducted in the context of international trade using time series data covering a period of 36 years, starting from 1986 to 2021. Indonesia was chosen as the object of research. This data is obtained from official sources such as the World Bank. The data is then processed to obtain test results with the ARDL (Autoregressive Distributed Lag) method. The method used is ARDL (Autoregressive Distributed Lag). Based on the results of the analysis, it can be concluded that the variables of national income, inflation, and interest rates affect each other in the long run. Within the framework of the analysis that has been done. This study provides insight into the dynamics of the Indonesian economy and its relevance in the global context. However, it should be noted that these results may differ depending on the method of analysis and the time period chosen.

Introduction

Exporting goods or services increases the credit on the balance of payments, while importing them increases the debit. If the debits exceed the credits, the balance of payments will be in deficit. A condition where imports are greater than exports indicates the country's economic instability (Syukri, 2020). Countries that import goods tend not to be independent in producing their internal needs, Indonesia, with its natural resources, should be able to meet its own needs. At present, the economies of various countries have entered the era of globalization, where the limitations in meeting the needs of society are the main reasons for interdependence between countries. This phenomenon is reflected in export and import activities. an open economy includes trade in goods and services as well as international capital market activities. Exports and imports create a mutually influential relationship between countries. These activities have a major impact on a country's balance of payments (Athukorala & Patunru, 2023).

Despite this, Indonesia is still dependent on importing products from other countries. Factors that cause Indonesia to be unable to meet its own needs and have to import from outside are poor management, limited labor skill level, lack of technology, and lack of capital (Rosyadi, Mulyo, Perwitasari, & Darwanto, 2021). A country's import activity can be affected by national income, inflation rate, and exchange rate. A country's national income will affect its import activities. National income is the total income received by a country in a certain period. An increase in a

country's national income will be accompanied by an increase in the consumption of goods. If public consumption increases but the domestic supply of goods is insufficient, people will import goods from abroad (Ilmas, Amelia, & Risandi, 2022).

The national income highlighted is the Gross Domestic Product (GDP), which is considered the best indicator to measure the welfare of society. GDP is the total market value of all final goods and services produced by a country. Indonesia's GDP shows an increasing trend from year to year (Sasongko, Harnani, & Bawono, 2022). The inflation rate referred to is the Consumer Price Index (CPI), an index that records changes in the average prices of goods and services consumed by households over a period of time. Changes in the CPI over time reflect the inflation or deflation rate of these goods and services. The rate of change of the CPI in Indonesia continues to fluctuate from year to year. These fluctuations need to be considered in the context of a country's economy. Inflation rates in Indonesia tend to be higher than in other developing countries (Jaravel & O'Connell, 2020). The purpose of studying national income is to assess the level of progress and growth of a country, to obtain the maximum thought of the value of goods and services produced by the people within one year, and to conceptualize a long-term development program. The benefits of studying national income are to find out about the composition of a country's economy, to be able to compare economic conditions between regions or between provinces, and also to be able to compare the economic conditions of one country with other countries.

Literature Review

Inflation as an increase in the overall price level, where prices rise synchronously. Inflation can be measured by analyzing a wide range of goods and services and calculating the average price increase over a given period. Inflation occurs when the general level of prices rises. In other words, inflation occurs when overall prices tend to rise. Inflation is a continuous process of rising general prices of goods. However, this does not mean that all prices rise by the same percentage. In general, inflation can be defined as a continuous rise in the prices of goods and services over a period of time (Szafranek, 2021).

Inflation is the tendency of prices to increase generally and continuously over a long period of time. An increase in the price of just a few goods is not considered inflation, unless the increase extends to most of the prices of other goods. According to Karim, inflation generally means an increase in the overall price level of goods and services over a period of time. Inflation is a consistent problem in the economy and the inflation rate is often used as an indicator to measure how severe the economic problems are. Inflation also indicates whether a country's economy is experiencing difficulties or not. It can be defined as a continuous increase in prices over time, so a one-off increase in prices cannot be called inflation (Hasenzagl, Pellegrino, Reichlin, & Ricco, 2022).

The interest rate is the cost that must be paid to use investment funds (loanable funds). Interest rates are an important factor that influences a person's decision to invest or save. When there are individuals who have more income than needed for their consumption, they tend to keep the excess income in the form of savings. The supply of loanable funds is formed from the total savings of the society in a certain period. On the other hand, at the same time, there are other members of society who need funds for their business operations or expansion. Interest rates can also be understood as the cost of using money over a certain period of time. The meaning of interest rate as a "price" is expressed as the cost to be paid when there is an "exchange" between a unit of currency now and a unit of currency in the future (Jayawarsa, Wulandari, Saputra, & Saputri, 2021).

The fundamental definition of interest rate theory in a macroeconomic context is the cost of using money for a certain period of time. Interest is compensation for the loss or inconvenience of transferring ownership of money, so interest can be thought of as the price of credit. Interest rates affect the role of time in economic activity. Interest rates arise because of the tendency to hold money in the present. The classical theory states that interest rates are the price of loanable funds, so interest is the market price of investment. Interest rates are a monetary phenomenon, meaning that interest rates are determined by the interaction between the supply and demand for money in the financial markets (Bauer & Rudebusch, 2020).

The interest rate is the cost of obtaining a loan, which is determined by the preferences and sources of borrowed funds of various economic actors in the market. Interest rates are affected not only by changes in preferences for borrowing and lending, but also by changes in the purchasing power of money. Market interest rates may change from time to time. Sometimes, banks set disguised interest rates, i.e. higher deposit rates than those officially announced through the mass media, in the hope that the increase in interest rates will encourage people to save more rather than spend, resulting in less money in circulation. Conversely, if interest rates are too low, the amount of money in circulation in society will increase because people are more likely to invest their money in sectors that are considered productive. High interest rates will encourage investors to place their funds in banks rather than allocating them for investment in the production sector or industries that have greater risks. Therefore, the inflation rate can be controlled through interest rate policy (Kassegn & Endris, 2022).

H1 : Inflation has a positive effect on national income
H2 : Interest rate has a positive effect on national income

Research Method

The data source used in this study is secondary data, sourced from the World Bank. The data collected is annual data from 1986 to 2021, so the data is in the form of time series. The application program used in the data processing stage is Eviews 12. The method we use in this research is a quantitative method and is the ARDL (Autoregressive Distributed Lag) method. As well as the data processing we use is Microsoft Excel 2019 and Eviews 12.

The following is a variable description table involving Inflation, Interest Rates, and National Income:

Table 1. Variable Description

Variables	Description	Unit Count
Inflation	The general rate of price increase in the economy.	Percentage (%)
Interest Rate	The interest rate charged by financial institutions on loans or deposits.	Percentage (%)
National Income	The total income generated by the entire population of a country in a given period.	Percentage (%)

The data stationarity test in ARDL analysis with EViews can use several tests, one of which is most often used is the Augmented Dicky Fueller (ADF).The unit root test is a test used to see the stationarity of a data. In statistics and econometrics, a frequently used unit root stationarity test method is the Augmented Dickey-Fuller (ADF) test. This test indicates the existence of a unit root as a null hypothesis (Dickey, David A & Wayne A. Fuller. 1979).

The cointegration test uses the Johansen Test. If the results of the analysis show that it is not stationary, then the analysis can be continued. ARDL analysis to produce Optimum Lag output is based on certain parameters such as Akaike Information Criterion (AIC). The ARDL analysis used is an analysis using lags that match the results of the Lag Optimum analysis. 4. Short-term Analysis or Error Correction Model (ECM)

Long Run Equation Analysis. Test the stability of the model using the Cusum Test. If it is stable then the prediction model using ARDL can be used or which means valid.

Forecast or data forecasting.

Results and Discussion

The unit root test analysis results you provided refer to the Levin, Lin & Chu (t*) and Im Pesaran and Shin W-stat methods. Let's interpret the results:

Levin, Lin & Chu (t) Test*:

○ Test statistic: -8.17536

○ P value: 0.0000 (less than 0.05 significance level)

○ Conclusion: Reject the null hypothesis. This means that the national income variable has a unit root and is not stationary in first order (I(1)).

○ Interpretation: National income has a trend that fluctuates over time.

Im Pesaran and Shin W-stat Test:

○ Test statistic: -7.93420

○ P value: 0.0000 (less than 0.05 significance level)

○ Conclusion: Reject the null hypothesis. This also indicates that the national income variable has a unit root and is not stationary in the first order (I(1)).

○ Interpretation: National income has components that change over time.

ADF - Fisher Chi-square Test:

○ Test statistics: 59.9078

○ P value: 0.0000 (less than 0.05 significance level)

○ Conclusion: Reject the null hypothesis. The national income variable has a unit root and is non-stationary in first order (I(1)).

○ Interpretation: National income has continuous fluctuations.

PP - Fisher Chi-square Test:

○ Test statistics: 64.1512

○ P value: 0.0000 (less than 0.05 significance level)

○ Conclusion: Reject the null hypothesis. The national income variable also has a unit root and is not stationary in the first order (I(1)).

○ Interpretation: National income has continuous changes over time.

Thus, the analysis shows that the national income variable has a unit root and is stationary in the first order (I(1)).

The Johansen cointegration test results show that there are three cointegrating equations at the 0.05 significance level. Let us interpret these results:

Three Cointegrating Equations: These results show that the national income, inflation, and interest rate variables have a stable relationship in the long run. In other words, there is a long-run equilibrium between these three variables.

Eigenvalue: The eigenvalue is a measure of the importance of the cointegrating equation. A larger eigenvalue indicates that the cointegration equation is stronger. In this case, the first

eigenvalue (0.601613) is greater than the second eigenvalue (0.284205) and the third eigenvalue (0.148498).

Statistics: The test statistic indicates whether there is significant cointegration. A statistical value greater than the critical value indicates rejection of the null hypothesis (no cointegration). In this case, the statistical values for all three cointegration equations exceed the critical value, so we can reject the null hypothesis.

Interpretation: Based on these results, we can conclude that national income, inflation and interest rate variables affect each other in the long run. A change in any one variable can affect the others. Therefore, in ARDL analysis, we need to consider these three variables together.

The results of the analysis of determining the optimum lag of the inflation variable show several things that need to be considered. Let us interpret these results:

Regression Coefficient:

X1 INFLATION(-1) has a coefficient of 0.863675, with a t-statistic of 4.747479 and a probability (p-value) of 0.0001. This indicates that inflation in the previous period (lag 1) has a positive effect on national income.

○ X1 INFLATION(-2) has a coefficient of 0.181923, with a t-statistic of 2.503491 and a probability (p-value) of 0.0206. This indicates that inflation in the previous two periods (lag 2) also has a positive effect on national income.

○ X1 INFLATION(-3) has a coefficient of -0.480975, with a t-statistic of -3.451008 and a probability (p-value) of 0.0024. This indicates that inflation in the previous three periods (lag 3) negatively affects national income.

○ X1 INFLATION(-4) has a coefficient of 0.127814, with a t-statistic of 1.568878 and a probability (p-value) of 0.1316. This indicates that inflation in the previous four periods (lag 4) has a lower influence on national income.

Other Variables:

X2 INTEREST RATE has a coefficient of 0.181187, with a t-statistic of -1.350925 and a probability (p-value) of 0.139038. This indicates that interest rates have no significant effect on national income.

○ Y1 NATIONAL INCOME(-1) and Y1 NATIONAL INCOME(-2) have positive coefficients, but are not statistically significant.

R-squared and Adjusted R-squared:

The R-squared value of 0.834484 indicates that the model can explain about 83.45% of the variation in national income.

○ The Adjusted R-squared of 0.755667 takes into account the number of independent variables in the model.

Durbin-Watson Statistic:

The Durbin-Watson value of 2.134478 indicates positive autocorrelation in the model. Care should be taken in the interpretation of the results.

Cointegration bound test on ARDL with Eviews

The results of the Bound Cointegration test analysis show several things to note. Let us interpret these results:

F-Bounds Test:

Test Statistic: The F test statistic is 2.338307.

○ F-statistic: The F-statistic value shows the relationship between the variables in the model.

○ k: The number of variables in the model is 2.

○ Actual Sample Size: The actual sample size is 222.

Null Hypothesis: No Relationship Levels:
The null hypothesis states that there is no long-run relationship between variables.
○ The Signif. value indicates the level of significance.
Interpretation:
At 10% significance level, the F-statistic value is 2.63, which is lower than the critical value of 3.35. Therefore, we cannot reject the null hypothesis at this level of significance.
○ At the 5% significance level, the F-statistic value is 3.1, which is also lower than the critical value of 3.87. We still cannot reject the null hypothesis at this level of significance.
○ At 1% significance level, the F-statistic value is 4.13, which is higher than the critical value of 5. We reject the null hypothesis at this significance level.
Based on the results of the Bound Cointegration test, there is a longrun relationship between the variables in the model at the 1% significance level.
○ Inflation, money supply (JUB), exchange rate, total deposit interest rate (TB), and total savings position (JTAB) have a mutual influence in the long run.
The results of the normality test analysis of the national income variable show some important information. Let's interpret the results:
Mean: The mean value of the residuals is about -7.22e-16. This shows that overall, the residuals tend to be close to zero, which is a good thing in regression analysis.
Median: The median of the residuals is about -0.148464. This median gives an idea of the center of the residual distribution. A value close to zero indicates that the residual distribution is relatively symmetrical.
Maximum: The maximum value of the residual is 9.177018. This indicates the presence of some significant outliers. You may want to examine the data further to identify the cause.
Minimum (Minimum Value): The minimum value of the residual is -11.53206. Like the maximum value, this minimum value also indicates the presence of outliers. Note that these values may affect the regression results.
Std. Dev. (Standard Deviation): The standard deviation of the residuals is 3.999942. It measures how dispersed the residual data is around the mean.
The higher the standard deviation, the greater the variation in the residuals.
Skewness (Asymmetry): The asymmetry value is about -0.380088. A negative value indicates that the residual distribution is slightly skewed to the left. However, this value is close to zero, so the asymmetry aspect is not significant.
Kurtosis: The kurtosis value is about 5.055113. This value measures the "twistedness" of the residual distribution. A higher value indicates a more tail-heavy (leptokurtic) distribution. Note that this value also indicates the presence of outliers.
Jarque-Bera: The Jarque-Bera statistic is 6.401809, with a probability of about 0.040725. The low probability value indicates that the residual distribution does not follow a normal distribution. You may need to consider data transformation or alternative methods.
In conclusion, the results of this normality test analysis provide insight into the distribution of residuals and potential problems in your regression model.
Null Hypothesis: No Serial Correlation The null hypothesis states that there is no serial correlation in up to 2 lags prior.The Prob. $F(2,19)$ is 0.1897, which is greater than the significance level of 0.05. Therefore, we cannot reject the null hypothesis at this level of significance.
The F-statistic value is 1.816741. The Obs*R-squared value is 5.137143.

Interpretation The test results show that there is no strong evidence to suggest that there is serial correlation up to 2 lags earlier in the regression model. In other words, the confounding error in period t has no significant correlation with the errors in periods t1 and t-2.

Conclusion Based on these results, we can conclude that your regression model does not suffer from serious problems due to autocorrelation.

Null Hypothesis: Homoskedasticity The null hypothesis states that there is no nonuniformity of variance of the residuals in the regression model (homoscedasticity).The value of Prob. F(10.21) is 0.1156, which is greater than the significance level of 0.05. Therefore, we cannot reject the null hypothesis at this level of significance.

The F-statistic value is 1.836620. The Obs R-squared value is 14.92952.

Interpretation The test results show that there is no strong evidence to say that there is a variance non-uniformity of the residuals in the regression model. In other words, the confounding error in period t does not have a significant variance non-uniformity.

Conclusion Based on these results, we can conclude that your regression model meets the assumption of homoscedasticity.

Regression coefficient X1 INFLATION(-1) has a coefficient of 0.863675, with a t-statistic of 2.839678 and a probability (p-value) of 0.0098. This indicates that inflation in the previous period (lag 1) has a positive effect on national income.X1 INFLATION(-2) has a coefficient of -0.480975, with a t-statistic of -3.835254 and a probability (p-value) of 0.0010. This indicates that inflation in the previous two periods (lag 2) has a negative effect on national income.

X1 INFLATION(-3) has a coefficient of 0.319982, with a t-statistic of 3.755834 and a probability (p-value) of 0.0012. This indicates that inflation in the previous three periods (lag 3) has a positive effect on national income.X1 INFLATION(-4) has a coefficient of 0.181187, with a t-statistic of 1.826998 and a probability (p-value) of 0.0819. This indicates that inflation in the previous four periods (lag 4) has a lower influence on national income.

Other Variables X2 INTEREST RATE has a coefficient of 0.063805, with a tstatistic of 1.491297 and a probability (p-value) of 0.1508. This indicates that interest rates have no significant effect on national income.Y1 NATIONAL INCOME(-1) and Y1 NATIONAL INCOME(-2) have positive coefficients, but are not statistically significant.

R-squared and Adjusted R-squared The R-squared value of 0.834484 indicates that the model can explain about 83.45% of the variation in national income.Adjusted R-squared of 0.755667 takes into account the number of independent variables in the model.Durbin-Watson Statistic The Durbin-Watson value of 2.134478 indicates the presence of positive autocorrelation in the model. Care should be taken in the interpretation of the results.

Conclusion Based on these results, we can conclude that inflation and national income have a significant relationship in the long run.

National Income Variable (Y) The coefficient associated with the national income variable shows the impact of changes in national income on other variables in the model. If the coefficient is positive, it means that an increase in national income contributes positively to other variables (e.g. inflation or interest rates). Conversely, if the coefficient is negative, an increase in national income is negatively related to other variables.Significance: Be sure to check if the coefficient is statistically significant. A low p-value indicates that the coefficient has a significant impact.

Inflation Variable (X1) The coefficient associated with the inflation variable illustrates how changes in inflation affect national income. If the coefficient is positive, it means that inflation contributes positively to national income. If the coefficient is negative, inflation is negatively

related to national income.Significance: Be sure to check the significance of the inflation coefficient. A low p-value indicates that the coefficient has a significant impact.

Interest Rate Variable (X2)The coefficient associated with interest rates illustrates how changes in interest rates affect national income. If the coefficient is positive, it means that interest rates contribute positively to national income. If the coefficient is negative, interest rates are negatively related to national income.

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Interest Rate Variable (X2)The coefficient associated with interest rates illustrates how changes in interest rates affect national income. If the coefficient is positive, it means that interest rates contribute positively to national income. If the coefficient is negative, interest rates are negatively related to national income.Significance: Check if the coefficient of interest rate is statistically significant.
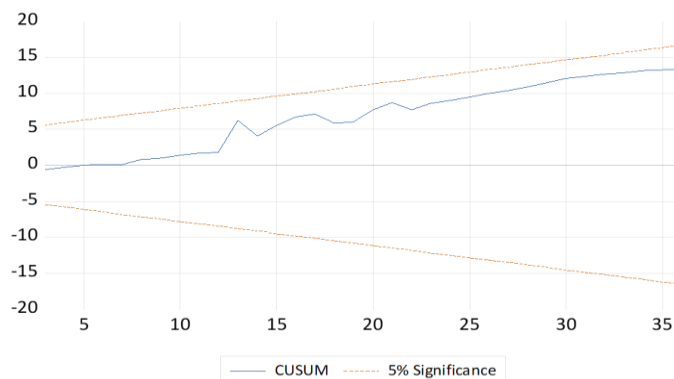

Figure 1. Model Stability Test Using the Cusum Test

The result of the CUSUM test analysis shows that your prediction model is stable. CUSUM Test Interpretation The CUSUM graph shows the accumulative change of your model residuals over time.If the CUSUM line stays within the 5% significance limit, then the model is considered stable.In your case, the CUSUM line appears to fluctuate but stays within the significance limit, indicating that your model is stable.Conclusion Based on the CUSUM test results, your prediction model is reliable and stable.
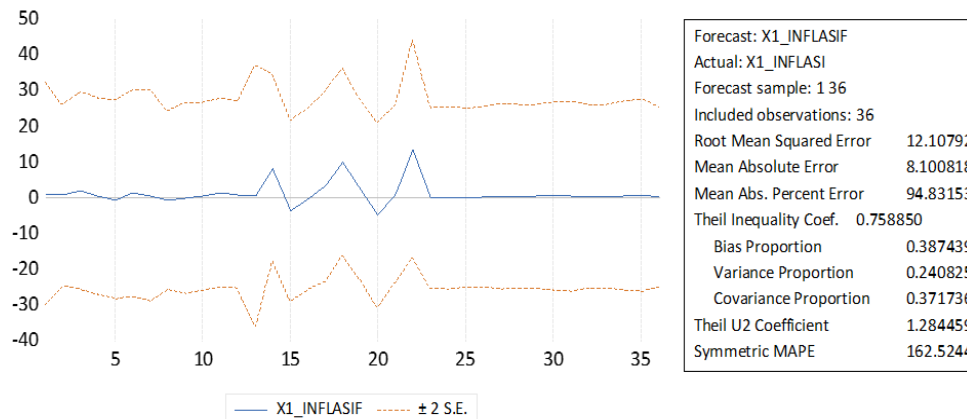
Figure 2. Forecast or Forecasting Based on ARDL With Eviews

The results of forecasting analysis based on ARDL using EViews show several things that need to be considered. Variable X1 INFLATIONThe ARDL model takes into account the effect of inflation (X1 INFLATION) on national income (Y NATIONAL INCOME) in the long run.The coefficient for the inflation variable is 0.863675, with a t-statistic of 2.839678 and a probability (p-value) of 0.0098. This indicates that inflation in the previous period (lag 1) has a positive effect on national income.

Other Variables X2 INTEREST RATE has a coefficient of 0.063805, with a tstatistic of 1.491297 and a probability (p-value) of 0.1508. This indicates that interest rates have no significant effect on national income.R-squared and Adjusted Rsquared:The R-squared value of 0.834484 indicates that the model can explain about 83.45% of the variation in national income.Adjusted R-squared of 0.755667 takes into account the number of independent variables in the model.Based on these results, we can conclude that inflation and national income have a significant relationship in the long run.

Conclusion

Based on various tests using the ARDL model, it was found that the national income variable is stationary at the first order. This suggests that national income, inflation, and interest rates influence each other in the long run. The Bound Cointegration test results indicate a long-term relationship between the variables in the model. Inflation, money supply, exchange rate, total deposit interest rate, and total savings position mutually influence each other over time. The model can explain a significant portion of the variation in national income, and there is positive autocorrelation present. Inflation and national income have a significant long-term relationship. The forecasting analysis results show that previous period inflation has a positive effect on national income, while interest rates do not significantly affect national income. Therefore, it can be concluded that inflation and national income have a significant long-term relationship.

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