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ANALYSIS OF FUEL OIL PRICES AND MACROECONOMIC VARIABLES ON INDONESIA'S NATIONAL INCOME

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ABSTRACT

The purpose of this study is to ascertain how Indonesia's national income is impacted by macroeconomic variables and fuel oil prices. The Central Statistics Agency (BPS) and the Ministry of Mineral Resources (MEMR) provided time series data from 1970 to 2022, which were used in this study together with secondary data and quantitative methodologies. Using the eviews application, the ARDL (Auto Regressive Distributed Lagged) model was employed in this investigation. The study's findings demonstrate cointegration, with an Error Corection Term (ECT) value of -0.805066. Long-term inflation has a positive and significant impact, while short-term unemployment has a negative and significant impact on national income, while both short-term and long-term fuel oil prices have a positive and significant impact on national income.

Keywords: National Income, Fuel Oil Prices, Unemployment, Inflation.

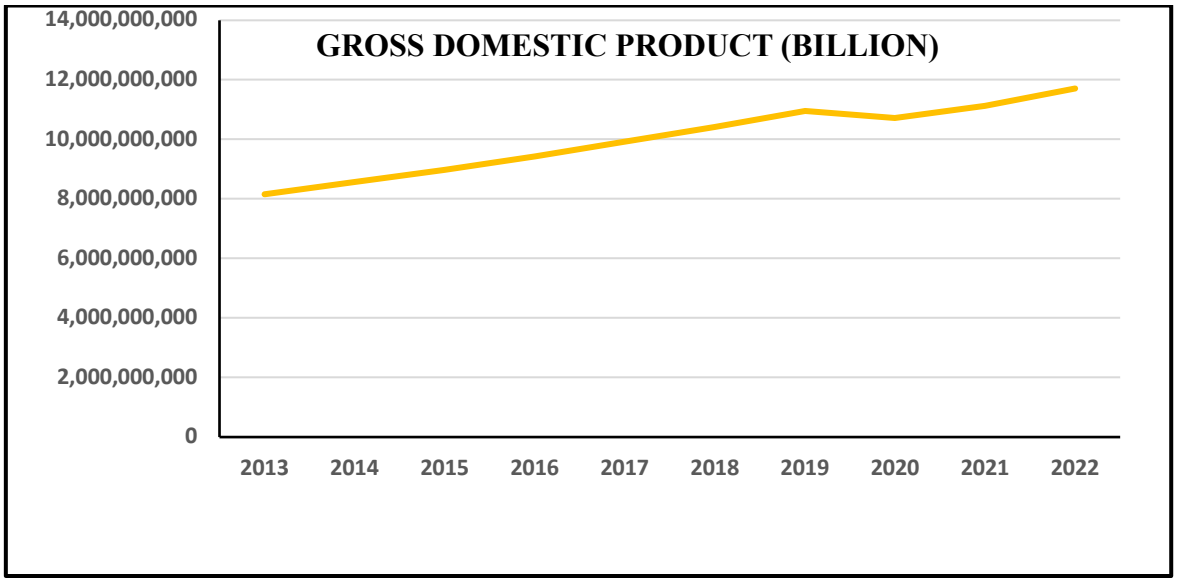
1. INTRODUCTION

A country's economic achievements are measured by its national income. The amount of national income can be used to determine the rate of economic growth in the nation. Because the calculation of national income can classify a country as an industrial, agricultural, service, or other country, it is very important to know and study the economic condition of a country. In view of this, it can likewise be resolved how much impact different monetary areas like industry, horticulture, mining and others (Budiman, 2013).

According to the Ministry Finance (2023), The Ministry of Finance estimates that Indonesia's national income is rising and that state spending is becoming more efficient by 2023. The acknowledgment of Indonesia's public income all through 2023 arrived at 103.66 percent of the state income and consumption spending plan target. Then again, state spending arrived at 84.55 percent of the state income and consumption financial plan target. Due to economic expansion, this will have a significant impact on enhancing people's well-being. This may result in the creation of new jobs, an increase in consumption, and an increase in investment. The biggest areas adding to public pay are the handling business, exchange, monetary administrations, protection and mining and different areas.

According to Andinata et al. (2018), state that a country's national income is a measure of its economic health. For this situation, GDP is an intermediary to decide public pay. In general, the national income of different nations can be used to compare conditions. The grouping of a country's gross domestic product helps even the World Bank distinguish between developed and developing nations. The graph below provides a comprehensive explanation of Indonesia's growth in national income as a function of gross domestic product.

Figure 1.
Movement of Indonesia's Gross Domestic Product (GDP)



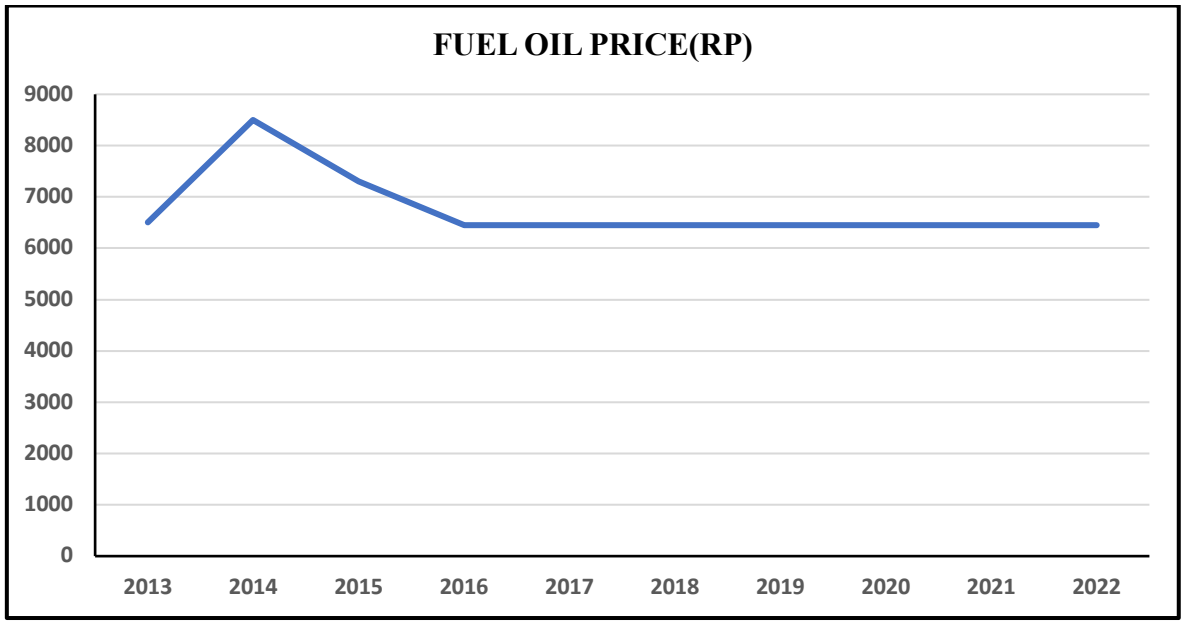
Data Source: Central Statistics Agency (2024)

The development of Indonesia's Gross Domestic Product (GDP) from 2013 to 2022 is depicted in Figure 1. GDP increased consistently throughout the decade, with the exception of 2020, when it declined. The Covid-19 pandemic was to blame for the drop in GDP in 2020. Nearly all GDP components, including household consumption, consumption of non-profit institutions serving households, investment, and exports and imports, experienced negative growth in the year as a result of government policies to contain the spread of Covid-19, such as lockdowns and isolation.

Fuel Oil prices are the costs that must be paid by consumers to buy fuel used for motor vehicles, such as gasoline and diesel. Fuel Oil has a very dominant role in meeting national energy needs (Kholiq, 2015). The increase in fuel prices is caused by various factors, especially the increase in world crude oil prices and *Indonesian Crude Price* (ICP). So that this condition will result in an increase in the amount of state budget subsidy burden. In addition, the facts on the ground turned out that the provision of fuel suspension was considered not on target. The Ministry of Finance's (MoF) data indicate that, out of the total compensation for fuel oil, 93.5 trillion, 80.4 trillion is enjoyed by households and 13.1 trillion by the business world. However, of the 80.4 trillion enjoyed by the household, only 16.1 trillion enjoyed by the underprivileged households (Wibawa, 2022).

Based on figure 2. The development of fuel oil prices from 2013 to 2022 tends to be stagnant. Where the highest fuel price in 2014 was Rp. 8,500 while the lowest fuel price in 2016 was Rp. 6,400 then stagnant until 2022. The Minister of Energy and Mineral Resources says that the government's decision not to raise prices or stabilize prices during that time is to keep people's purchasing power strong and not put more pressure on the public, on the other hand, the government also reduces the premium distribution quota to direct people to consume cleaner fuel, namely higher octane. Although the revocation of premium fuel as subsidized fuel since 2015 the price has not been fully handed over to the market, the government still determines the price through the Ministry of Energy and Mineral Resources. The following is a picture of the development of fuel oil prices in Indonesia:

Figure 2.
Indonesian Fuel Oil Price Movements

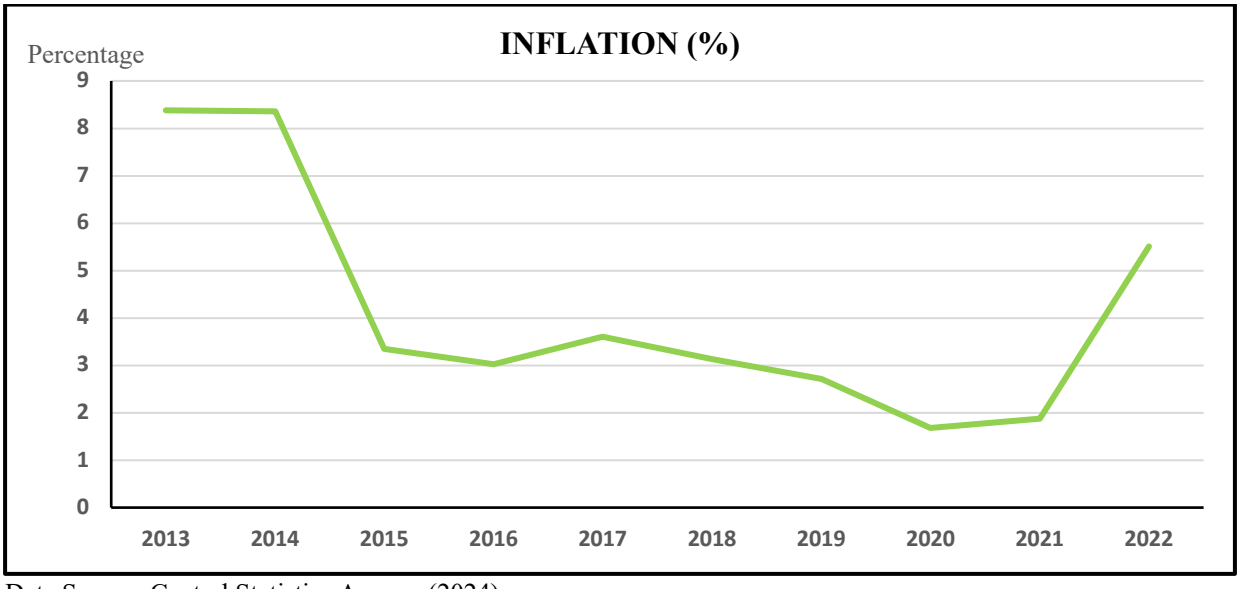


Data Source: Ministry of Energy and Mineral Resources (2024)

Inflation is one of the important indicators in the macroeconomy. The growth rate is always kept low and stable so as not to cause macroeconomic diseases that ultimately cause economic instability. Inflation is caused by an excessive amount of money supply (Singh, 2018).

According to Rahardja & Manurung in Silitonga (2021), a high inflation rate will worsen the value of a country's national income. Inflation shakes the economy by lowering the expectations of economic actors. Chronic inflation raises expectations about sustainable prices for goods and services. From the perspective of the customer, this assessment results in a further rise in the number of products and services purchased. These estimates encourage consumers to purchase more goods and services than they should. The objective is to conserve consumer cash. In addition, the expectation of rising prices of goods and services tempts producers to postpone sales in order to get higher profits. The supply of goods and services is reduced. The explanation above clearly shows the influence of inflation on national income. The development of inflation in Indonesia is presented in the following figure:

Figure 3.
Indonesia's Inflation Movement



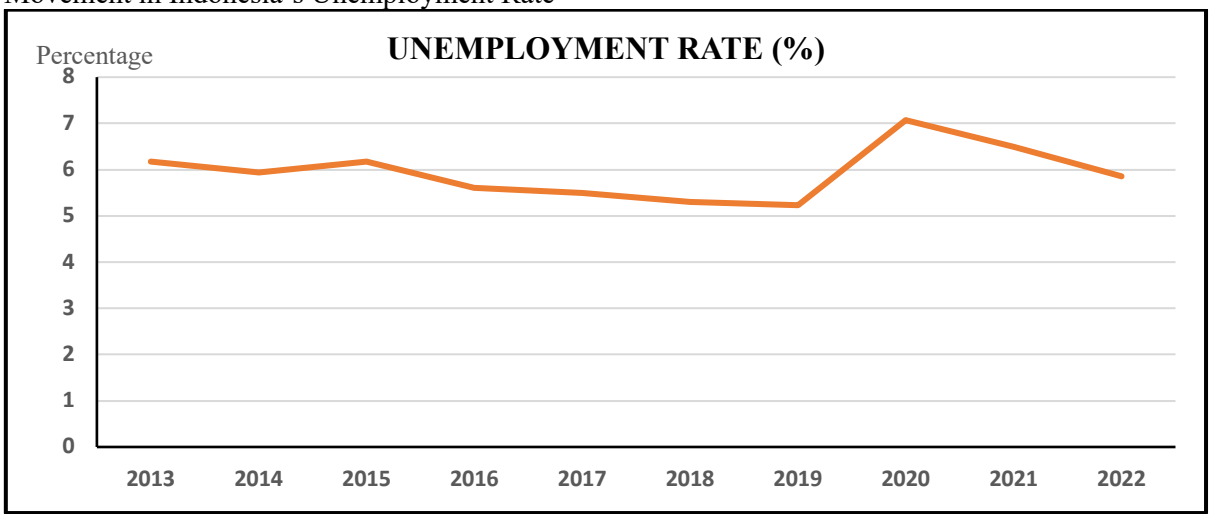
Data Source: Central Statistics Agency (2024)

Inflation in Indonesia from 2013 to 2022 tends to decrease. For a decade, inflation fluctuated at a relatively low rate. A significant occasion happened in 2020 when the Coronavirus pandemic hit Indonesia, causing inflation to reach the lowest level in history, which was 1.68%. Economic conditions hit by the pandemic cause people to tend to hold back their spending, thereby weakening people's purchasing power.

Globalization, disruptive technology and digitalization, changes in lifestyles and consumer preferences cause jobs and professions to change rapidly, and the pace of progress is accelerating. This provides a wide range of opportunities, as well as risks. Government policies should focus on using resources to improve the employability of graduates rather than retaining resources that will eventually be excessive. Must organize a comprehensive and rooted way of handling capacity improvement. Adaptability, flexibility and a hunger for learning must be instilled in what is taught and how to display it through a training framework. Today, every developing country faces the problem of unemployment among its graduates. Like the development and economy of a country, it is especially affected if unemployment is high (Seng, 2018).

High unemployment means that many human resources are unproductive or *underutilized*. People who want to work but don't have a job don't make any money for the country. In this way, joblessness influences the creation of labor and products, which thus influences financial development. At the point when a nation keeps every one of its laborers working, the country's public pay will be higher (Pascual et al. 2020)

Figure 4.
Movement in Indonesia's Unemployment Rate

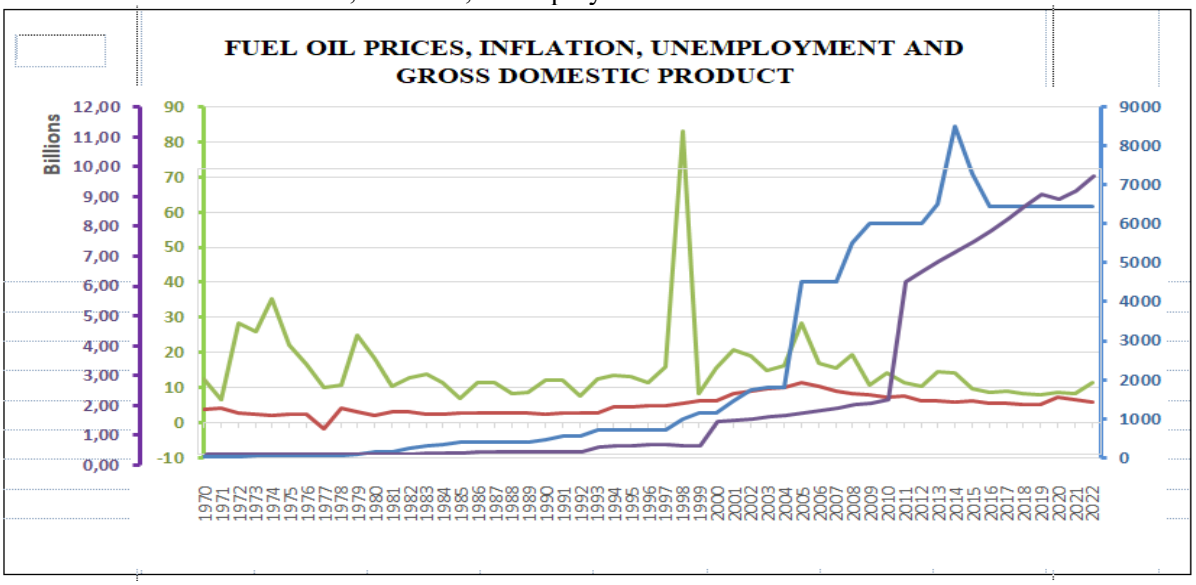


Data Source: Central Statistics Agency (2024)

Based on figure 4. The development of the unemployment rate from 2013 to 2022 fluctuated and tended to decrease. Where the lowest unemployment rate in 2019 was 5.23% while the highest unemployment rate was in 2020. The Covid-19 pandemic will contribute to Indonesia's high unemployment rate in 2020. Large-Scale Social Restrictions (PSBB) have been implemented as a result of this pandemic, which has an effect on the economy. Many companies were affected and had to stop operating, causing mass layoffs. In addition, the rapid and widespread transmission rate of Covid-19 has caused many people to lose their jobs. This condition is reflected in a significant increase in the unemployment rate in 2020.

This study focuses on the variables of Fuel Oil Prices, Inflation, and Unemployment and their effects on Indonesia's National Income. A theoretical review will then be discussed in the second section of this study. In the third section, the research method will be discussed. In the fourth section, the research and discussion's findings will then be presented. In the fifth section, recommendations and conclusions will be presented.

Figure 5.
Movements in Fuel Oil Prices, Inflation, Unemployment and GDP



Data Source: Central Statistics Agency and Ministry of Energy and Mineral Resources (2024)

Gross domestic product for the period 1970 to 2010 showed a slow increase. Since the 1970s, Indonesia has experienced volatility in economic growth due to the global economic crisis and internal events such as political crises and social conflicts have slowed down the growth of gross domestic product in that period. However, in 1998 the gross domestic product declined. Based on CNBC Indonesian The factors that caused the decline in the gross domestic product figure that year were due to the occurrence of the monetary crisis which caused a contraction in the components of gross domestic product such as household consumption, investment, and export-import.

A significant increase in gross domestic product occurred in 2011. According to Indonesia Investments (2023) The factors that contributed to the significant increase were the increase in household consumption, the increase in consumer purchasing power and the explosion in commodity prices that occurred in the 2000s (*2000s commodities boom*). After that, in the period from 2012 to 2019 the gross domestic product continued to increase significantly. According to Sari (2021), the increase was influenced by the industrial sector, especially the non-oil and gas processing industry (manufacturing) subsector. The manufacturing sector contributes the most to Indonesia's national economy each year, or it could be said that the manufacturing sector is the highest source of growth. However, Indonesia's gross domestic product fell in 2020 as a result of the Covid-19 pandemic. After that, until 2022, gross domestic product increased significantly again, indicating a stronger economy.

The price of fuel oil changed relatively little between 1970 and 2004. According to Setiono, (2014) says that the Indonesian government gave fuel oil huge subsidies during this time, which helped keep fuel oil prices relatively low in the country. In addition, Indonesia has emerged as one of the world's largest producers of petroleum since 1970. Indonesia joined OPEC and became one of the world's largest petroleum exporters. However, since 2004 until now, it has switched to becoming a net importer of oil to cover domestic oil needs.

The significant increase in fuel prices occurred in 2005. According to the Ministry Energy and Mineral Resources, the price surge that year was due to the adjustment of subsidized fuel oil prices which aimed to make the allocation of susbsidi funds can be used for more productive purposes such as education programs, health, and the expansion of development infrastructure so that it can absorb labor for the community. After that, the price of fuel oil fluctuated quite high from 2005 to 2022. According to CNBC Indonesian, fluctuations in fuel oil prices are caused by various factors, including rising world oil prices, the global economic crisis, and government policies related to subsidies. The government is also trying to control the increase in fuel oil prices by reducing consumption.

During the period 1970 to 1997 inflation showed a significant downward trend but inflation also experienced a high increase at a certain time. According to Suseno & Astiyah (2009), economic stability policies that have been implemented since 1968 such as carrying out a balanced state revenue and expenditure budget policy (*balance budget*), changing the costs of a few labor and products that

had recently been raised extremely high, executing another framework in food obtainment by BULOG. This approach contributed essentially to the descending pattern of expansion in that period. After that, inflation skyrocketed significantly in 1998. CNBC Indonesia claims that the Asian Financial Crisis was to blame for the rise in inflation that year. In July 1997, Thailand abandoned a fixed exchange rate policy against the US dollar, triggering the crisis. This approach made many organizations default because of the debilitating of the cash. The crisis then reached countries in Southeast Asia, including Indonesia. The rupiah exchange rate fell from Rp 2,500 to Rp 16,900 per US dollar as a result.

The inflation rate in Indonesia from 2000 to 2022 has fluctuated which can basically be suppressed at a relatively low level due to a number of factors. Based on data from the Bank Indonesian, the inflation target during the period tends to be stable, despite fluctuations in actual inflation. For example, in 2001, the inflation target was 4% - 6%, but the actual inflation reached 12.55%. Something similar happened in the following years. Despite the fluctuations, the data shows that inflation tends to be able to be suppressed at a relatively low level. In addition, inflation control efforts carried out by monetary authorities such as Bank Indonesia also contribute to relatively low inflation fluctuations.

The development of the unemployment rate in Indonesia during the period 1971 to 1993 showed relatively low fluctuations. According to Harfina (2009), the relatively low open unemployment rate indicates that the population of Indonesia cannot be unemployed like in developed countries, where the unemployed receive benefits from the state. In Indonesia, people are forced to work to support their families. Being completely unemployed is a high-value economic activity and requires financial support. Therefore, only a small part of the ketja generation is able to be unemployed. In addition, the large number of job opportunities in the informal sector in Indonesia makes it very easy for people to get a job even with low working hours and income.

Fluctuations in the unemployment rate in Indonesia in the period 1994 to 2005 tended to increase quite sharply. According to Zamzami et al. (2020), This phenomenon is due to the increase in the number of people who cannot be absorbed in employment, causing many Indonesians to become unemployed. The highest increase in unemployment occurred in 2005, according to the media Detikfinance (2005) The factor causing high unemployment in that year was due to the increase in fuel prices which resulted in Termination of Employment (PHK), especially in labor-intensive industrial sectors, such as small industries, fishermen and small businesses that use fuel.

From 2006 to 2022, Indonesia's unemployment rate is expected to decrease. According to Ragimun (2010), this phenomenon is influenced by the increasing absorption of labor in line with government programs and policies in increasing investment through infrastructure improvements and various other policies.

A country's economy is influenced by many interconnected factors. National income, which indicates a nation's level of economic activity, is one very important factor. Prices of fuel oil also have a significant impact on inflation and unemployment rates. Expansion, characterized as an expansion in costs as a general rule, can be brought about by different variables, remembering an increment for creation costs coming about because of an expansion in fuel costs. Unemployment, which occurs when the number of workers looking for work is greater than the number of available jobs, can also be affected by inflation and rising fuel prices.

2. LITERATURE REVIEW

National Income

National Income is an indicator to assess the level of welfare or prosperity of a nation. The concept was first introduced by Sir William Petty of the United Kingdom in 1665 when he was trying to estimate his country's national income. Modern economists, on the other hand, disagree with Petty's method. They argue that measuring a nation's annual production of goods and services is more important. As a result, national income is defined as the total value of a nation's annual production of goods and services in dollars. One of the most important measures of a nation's economic health is its national income, which reflects the nation's capacity to produce goods and services and distribute wealth.

The purpose of calculating national income is to get an idea of the economic level that has been achieved in a country. The national income data that has been achieved can be used to make forecasts

about the country's economy in the future.

The following are the types of national income, according to Yoshanda (2020):

1. Gross Domestic Product
   The amount of goods and services produced by production units within a nation's (domestic) borders over a given time period is its gross domestic product. It is essential to keep in mind that there should never be a double accounting or calculation when determining the market GDP. The idea of Gross domestic product incorporates labor and products created by residents in a country, both abroad and locally.
2. Gross National Product
   The value of goods and services produced by a nation's population over a single period is included in its gross national product (GNP). When determining the GNP amount using market prices, it is important to keep in mind that there should not be any double calculations. The production of goods and services by citizens residing in the country or abroad, but not by foreign businesses operating on the country's territory, is excluded from this GNP.
3. Net National Product
   The GNP less capital goods as a replacement is the Net National Product (NNP). Depreciation for equipment used to produce goods in the production process is generally interpretive, so it can cause errors even if it is relatively small. Depreciation is the reduction of items that have been used for a long time due to use.
4. Net National Income
   Net National Income (NNI) is income calculated from the amount of remuneration received by the people as owners of production factors. The amount of NNI can be obtained from NNP minus indirect taxes and subsidies. Indirect taxes are taxes whose weight can be shifted to other parties, for example sales tax, import tax, export duties, and excise. Meanwhile, subsidies are assistance from the government to the community.
5. Personal Income
   Individual income is the amount of income received by each resident in the community, including income obtained without providing any other activity.
6. Disposable Income
   Disposable income is income that is ready to be spent or utilized. Disposable income is obtained from personal income after deducting direct taxes. Direct taxes are taxes whose weight cannot be transferred to other parties or directly borne by taxpayers. Example of income tax.

Fuel Oil Prices

Fuel Oil is a type of fuel obtained from a mill crude oil. This crude oil comes from the bowels of the earth and is then processed in refining first to make oil products one of which is Fuel Oil (Yuliarti et al., 2023). In accordance with the Oil and Gas Act of 2001, Law No. 22. Petroleum is produced naturally as hydrocarbons in the form of liquid or solid phases under atmospheric pressure and temperature, such as asphalt, mineral wax, or ozokerite, which are obtained from oil and gas industry activities. Meanwhile, fuel oil is a fuel that is derived and/or processed from petroleum and mixed with vegetable oil and determined by octane levels according to needs. Those included in fuel commodities are: Avgas, Avtur, Petrol, Premium, Pertalite, Pertamax, Pertamax Plus, Kerosene, Diesel Oil and others (Putri, 2020). Fuel oil has a high mobility function in human life in this modern era. Many people depend on fuel for their livelihood on economic processes at all levels of society.

Inflation

Expansion is utilized to evaluate financial strength, where changes in monetary markers will influence monetary development, including macroeconomic factors, for example, monetary development, cash supply, products, and imports (Nugroho, 2016). Inflation is the continuous rise in the cost of goods and services over a set amount of time. Unless the increase is widespread and leads to an increase in the price of other goods, an increase in the price of just one or two goods is not considered inflation. Deflation is the opposite of inflation (Bank Indonesia, 2023).

Classical economics holds that public deficits' monetary emissions lead to inflation, which in turn drives up demand and drives up prices. Currency emissions must be stopped if inflation is to be controlled. This can be accomplished by reducing public spending or attracting private sector demand through tax increases. In contrast, Keynesian and neoclassical theories assert that inflation is the result of monetary emissions rather than excess demand caused by monetary emissions. In this manner,

expansion can be controlled without a downturn strategy, yet by freezing wages and costs (Malenković, 2023).

A price increase that is consistent across the majority of commodity groups is another definition of inflation. Inflation is not regarded as sporadic increases in prices. According to Nopirin (2000) quoted in Widiarsih & Romanda (2020), the following elements make up the definition of inflation:

1. The actual price may fall or rise at a particular time but still show an upward trend because there is a tendency for prices to rise.
2. The price increase is ongoing, which means that it does not just happen once, like when fuel oil prices went up at the beginning of the year.
3. It incorporates the meaning of the general degree of costs, and that implies that cost increments don't just happen in one or a few wares.

Unemployment

According to Sukirno in Suaidah et al. (2013), A condition known as unemployment occurs when a person who is employed actively seeks employment at a certain wage level but is unsuccessful. Samuelson in Harjanto (2014), providing a definition of unemployment is a person who is not working but is actively looking for a job or is being called back to work in his company. In other words, a person is said to be unemployed if he has not worked and has been trying to find a job for the past four weeks, has just been dismissed from his job and is waiting to be called back or is preparing a job application for the next month or month. The term "unemployment" generally refers to a situation in which a person who has the potential to work but does not currently hold a job actively searches for one. In economic terms, unemployment is a situation in which there is more labor available than there is demand for it. It is essential to keep in mind that a nation's economic climate and business cycle can both have an impact on the unemployment rate. A high joblessness rate can show a lopsidedness in the work market and demonstrate low monetary movement, while a low joblessness rate can demonstrate a decent degree of financial development or an absence of a quality work supply.

3. METHODOLOGY

3.1 Research Design

This study focuses on national income, measured by gross domestic product (GDP), fuel prices based on premium rates, as well as macroeconomic variables like inflation and unemployment, with Indonesia as the research location. The research utilizes quantitative analysis to explore the impact of fuel prices, inflation, and unemployment on GDP over the period from 1970 to 2022, employing the ARDL (Autoregressive Distributed Lag) model.

3.2 Data Collection

This study uses auxiliary information as time series information gathered from 1970 to 2022. Written information is obtained from the websites of the Central Statistics Agency and the Ministry of Energy and Mineral Resources.

3.3 Data Analysis

The dependent variable in this study is Indonesia's national income from 1970 to 2022. The independent variables are fuel oil prices, inflation, and unemployment. *The Autoregressive Distributed Lag* (ARDL) regression model is used to examine this relationship.

The general steps to be taken in econometric analysis using the Eviews application with this method include testing the stationarity of variable data, both at the level and first difference. This will be followed by the Optimal Lag Determination Test, Cointegration Test, ARDL Model Estimation, ARDL Model Stability Test, Normality Test, Autocorrelation Test, and Heteroscedasticity Test. The model of the equation in this research is:

$$\boldsymbol{\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_1 + \Delta y_{t-1} + \sum_{i=0}^{n} \delta_1 \Delta X_{t-1} + \varphi_1 y_{t-1} + \varphi_2 y_{t-1}} + \mu_t$$

Information:

β_t, δ_1 = Koefisien Jangka Pendek
φ_1, φ_2 = Koefisien ARDL Jangka Panjang
μ_t = *Disturbance Error (White Noise)*

4. RESULTS AND DISCUSSION

4.1Result

Data Stationary Test

Table 1.

Data Stationary Test Results

Variable	Unit Root	ADF T – Statistic	Critical Value (5%)	Probability ADF	Information
Gross Domestic Product	Level	-1.189532	-2.918778	0.6724	Not Stationary
	1st *Difference*	-9.486686	-2.919952	0.0000	Stasioner
Fuel Oil Prices	Level	-2.164761	-2.918778	0.2213	Not Stationary
	1st *Difference*	-7.009912	-2.919952	0.0000	Stasioner
Inflation	Level	-6.376670	-2.918778	0.0000	Stasioner
	1st *Difference*	-8.650383	-2.921175	0.0000	Stasioner
Unemployment	Level	-1.727636	-2.918778	0.4117	Not Stationary
	1st *Difference*	-10.16452	-2.919952	0.0000	Stasioner

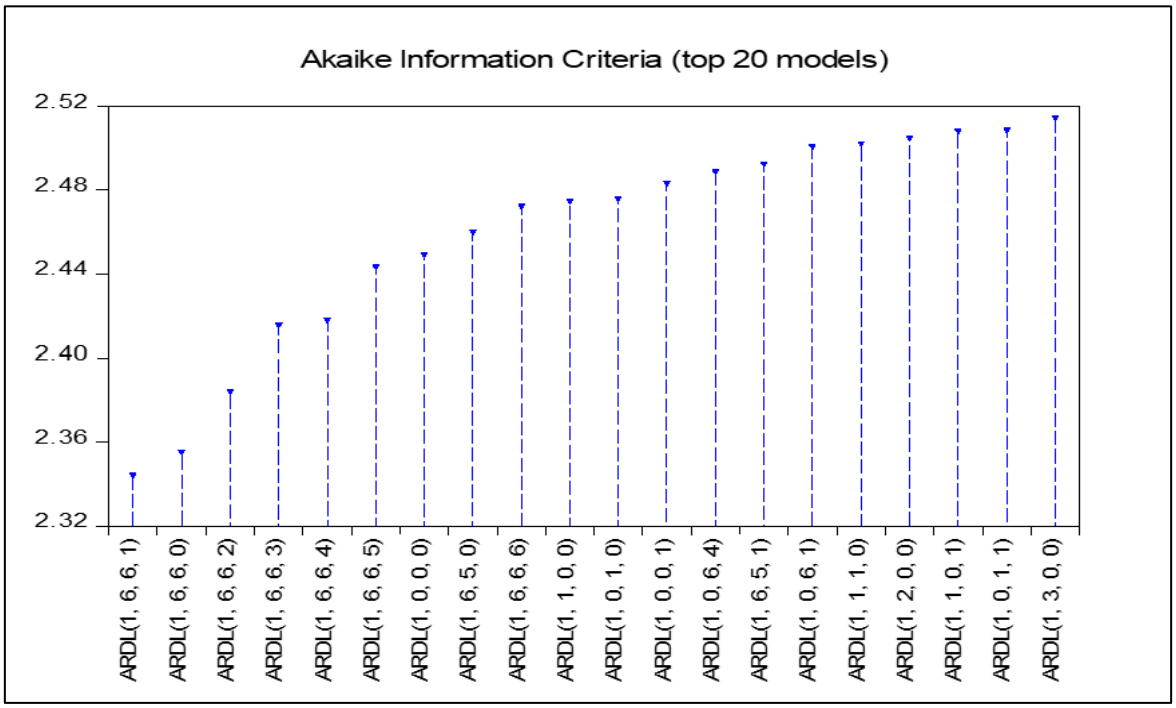
Source: Data processed, 2024

On the basis of table 1. it is evident that the stationarity test results with *Augmented Dickey-Fuller* (ADF) on significant or stationary inflation variables at level a: 5%. Meanwhile, the variables of gross domestic product, fuel oil prices and stationary unemployment are at *the first difference*.

Optimal Lag Determination Test

Figure 6.

Test Results for Determining Optimal Lag



Source: Data processed, 2024

The estimation of the lag selection criteria's outcomes is depicted in Figure 5 by looking at *the smallest Akaike Information Criteria* (AIC) value of the best 20 models. The best criterion is ARDL (1,6,6,1) meaning Y or national income amounting to 1 lag, X1 or fuel oil price amounting to 6 lag, X2 or inflation amounting to 6 lag, X3 or unemployment amounting to 1 lag.

Co-Integrity Test

Table 2.
Co-Integration Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	8.545154	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
		Finite Sample:		
Actual Sample Size	47	n=50		
		10%	2.538	3.398
		5%	3.048	4.002
		1%	4.188	5.328

Source: Data processed, 2024

The cointegration test results based on the Bound Test technique are displayed in Table 2. where the F-statistic value is 8.545154 larger than the bound value of I0. A positive result is defined as the F-statistic > I0 Bound at a confidence level of 10%, 5%, 2.5%, or 1%. Consequently, variable cointegration in the tested model produces a balance between the short and long term.

ARDL Estimation

Table 3.
Results of Short-Term ARDL Model Estimation

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGFOP)	1.363856	0.615137	2.217159	0.0346
D(LOGFOP (-1))	-0.165797	0.598561	-0.276993	0.7838
D(LOGFOP (-2))	-1.096817	0.602699	-1.819842	0.0791
D(LOGFOP (-3))	-0.796220	0.643134	-1.238031	0.2256
D(LOGFOP (-4))	-1.552607	0.580221	-2.675892	0.0121
D(LOGFOP (-5))	-1.962916	0.644640	-3.044979	0.0049
D(INFLATION)	0.001826	0.009250	0.197438	0.8449
D(INFLATION(-1))	-0.117158	0.018841	-6.218091	0.0000
D(INFLATION(-2))	-0.108485	0.018778	-5.777384	0.0000
D(INFLATION(-3))	-0.090308	0.016938	-5.331732	0.0000
D(INFLATION(-4))	-0.064509	0.013428	-4.804063	0.0000
D(INFLATION(-5))	-0.027983	0.008735	-3.203436	0.0033
D(UNEMPLOYMENT)	-0.288176	0.078264	-3.682111	0.0009
CointEq(-1)*	-0.805066	0.115459	-6.972731	0.0000
R-squared	0.642215	Mean dependent var		0.205077
Adjusted R-squared	0.501270	S.D. dependent var		0.900181
S.E. of regression	0.635715	Akaike info criterion		2.173972
Sum squared resid	13.33641	Black criterion		2.725080
Log likelihood	-37.08834	Hannan-Quinn criter.		2.381358
Durbin-Watson stat	1.693209			

Source: Data processed, 2024

The value of CointEq(-1) is -0.805066 and is significant at the alpha level of 5% based on the outcomes of the tests that were conducted. This implies that this model has short-term cointegration. The "speed of adjustment," or the rate at which the model adapts to change, will be measured using the CointEq coefficient. It may be inferred from this study that the model will return to equilibrium at an 80.50% adjustment speed.

The coefficient for the fuel price variable is 1.363856, which indicates that the national income will rise by 1.36 percent for every 1% increase in inflation. With a probability value that is less than 0.05, fuel prices have a positive and significant effect on national income. This effect is less than 0.05. Be that as it may, in the past 1 to 3 years time span, fuel costs showed a negative and unimportant impact with a likelihood esteem more noteworthy than 0.05. In contrast, the effect was negative and significant with a probability value of less than 0.05 over the previous four to five years. The coefficient for the expansion variable is 0.001826, which shows that any 1% increment in expansion will increment public pay by 0.001%.

With a probability value of 0.8449, which is greater than 0.05, inflation has a positive but insignificant effect on national income. With a probability value of less than 0.05, inflation had a negative and significant effect over the previous one to five years. The unemployment variable has a coefficient of -0.288176, indicating that an increase in the unemployment rate will result in a decrease in national income of 2.88 percent. With a probability value of 0.0009, which is less than 0.05, unemployment has a negative and significant effect on national income.

Table 4.
Estimation Results of the Long-Term ARDL Model

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGFOP	2.900656	0.283806	10.22056	0.0000
INFLATION	0.134252	0.046000	2.918483	0.0067
UNEMPLOYMENT	-0.525847	0.132283	-3.975161	0.0004
C	-2.363175	1.884151	-1.254239	0.2198
EC = LOGPDB - (2.9007*LOGHBBM + 0.1343*INFLASI -0.5258*UNEMPLOYMENT -2.3632)				

Source: Data Processed, 2024

Constant (*Intercept*): With a constant value of -2.363175, if fuel prices, inflation, and unemployment remain unchanged in the long term, then the national income will remain at a value of -2.36%. Fuel Price Coefficient: A coefficient of 2.900656 indicates that every increase in fuel prices of 1 Rupiah will cause an increase in national income by 2.90%. Fuel prices are positively and significantly correlated with national income, according to this data, and the result is highly significant (less than 0.05) with a probability value of 0.0000.

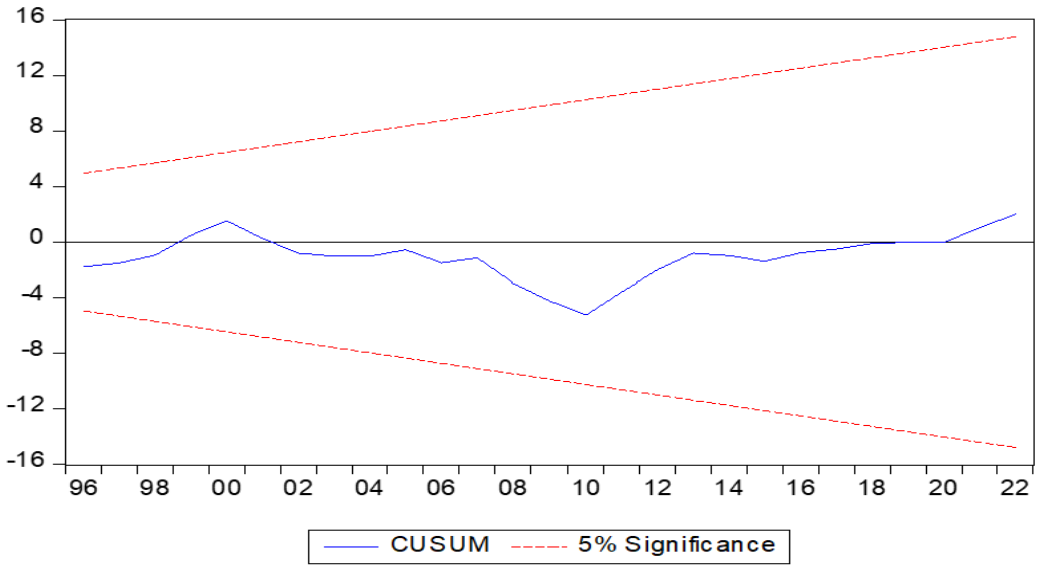
The national income will rise by 0.13% for every 1% increase in inflation, according to the inflation coefficient of 0.134252. At a probability value of 0.0067, inflation has a significant and positive impact on national income, indicating significance (less than 0.05).

The unemployment coefficient, which stands at -0.525847, indicates that a one percent rise in unemployment will result in a 0.52% drop in national revenue. The probability value of 0.0004 suggests a significant outcome (less than 0.05) indicating that unemployment has a negative and significant impact on national income.

ARDL Stability Test

Figure 7.

QUSUM

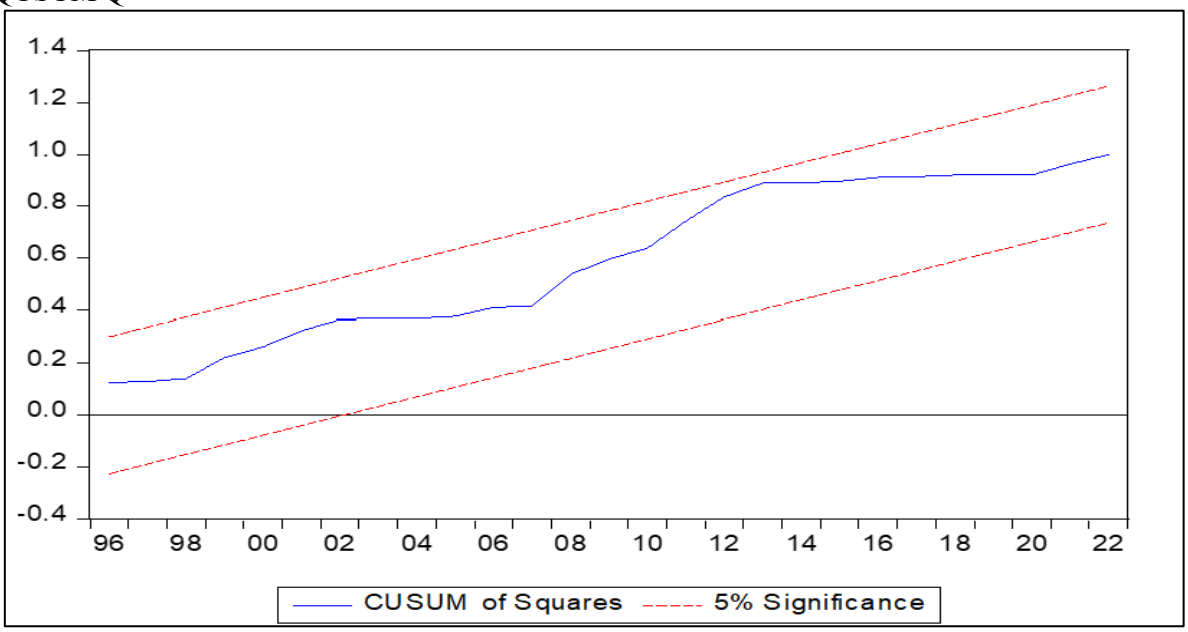


Source: Data processed, 2024

The results of the CUSUM test, which are shown in Figure 7, indicate that the Wr quantity plot does not exceed the borderline at a significance level of 5%. This indicates that the plot forms a linear line, which indicates that there are no significant structural changes in the model at that level of significance.

Figure 8.

QUSUM Q



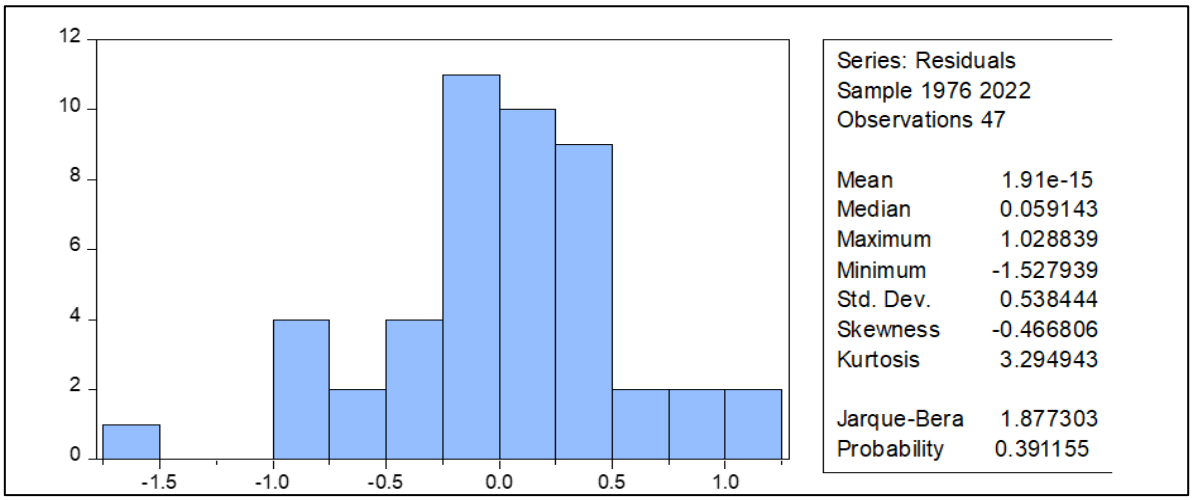
Source: Data processed, 2024

At a significance level of 5%, the results of the CUSUMQ test depict in Figure 8 indicate that the Sr quantity plot is not above the borderline. The model has not undergone significant structural changes at that level of significance, as these plots form a linear line. With the consequences of these two security tests, it very well may be reasoned that the relapse coefficient in the model is steady.

Classic Assumption Test

Figure 9.

Normality Test



Source: Data processed, 2024

Figure 9. shows the results of the normality test using the Jarque-Bera method (JB-Test). The test results show a probability value of 0.391155, which is greater than 0.05. Thus, it can be concluded that the data in this model is normally distributed.

Table 5.

Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.463881	Prob. F(2,27)	0.6338
Obs*R-squared	1.561342	Prob. Chi-Square(2)	0.4581

Source: Data processed, 2024

Table 5. Prob values for the results of the autocorrelation test. *The Breusch-Godfrey Serial Correlation* LM test has a Chi-Square (2) value of 0.4581. because of Prob's value. Since this Chi-Square (2) is greater than the 5% (0.05) significance level, the model does not have any autocorrelation issues.

Table 6.

Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.682312	Prob. F(17,29)	0.7941
Obs*R-squared	13.42799	Prob. Chi-Square(17)	0.7071
Scaled explained SS	5.866151	Prob. Chi-Square(17)	0.9940

Source: Data processed, 2024

The heteroscedasticity test's findings are shown in Table . The P-value (Prob. Chi-Square) has a value that is greater than or equal to 0.05 (0.7071/0.05). The used model does not have a heteroscedasticity issue, as can be concluded.

4.2Discussion

Extensive experiments demonstrating the beneficial and large impact of fuel oil prices on Indonesia's national GDP have been conducted. This is due to the fact that rising fuel oil prices will result in higher manufacturing costs for goods made using fuel oil, which will raise the selling price of such goods.

According to Simanungkalit in Saefulloh et al. (2023), The increase in prices will stimulate entrepreneurs to increase their production because the profits expected by them will be greater. Increasing production means increasing national income. This study's findings are consistent with those of Masrum (2014) study, which found that fuel oil prices have a significant impact on GDP.

According to the findings of the tests that were carried out, inflation has a positive but insignificant effect on national income in the short term. As a result, inflation has no immediate impact on national income in the short term. Temporarily, numerous different variables influence public pay development like products, venture, and government spending. However, inflation has a positive and significant long-term impact on national income. Inflation is not always bad for a country. However, it depends on the inflation rate experienced by the country. Inflation will have a good impact on a country if inflation is at a relatively low and stable level because it shows that the country has good economic health. High inflation can cause a decrease in people's purchasing power so that people's quality of life will decrease. In addition, high inflation will also hamper the rate of economic growth of a country. Likewise, inflation that is too low also has a bad impact on the economy because entrepreneurs are less encouraged to increase their production because prices are too low so that it will have an impact on the value of national income (Saefulloh et al., 2023).

The tests that were done show that the unemployment rate has a negative and significant effect on national income in the short and long term. A country's GDP will significantly decrease by 2% for every percentage point increase in the unemployment rate. The more prominent the interest, the more prominent the labor and products they will understand. The use of labor will rise as a result of the increased production. As a result, Indonesia's national income and labor productivity are closely linked (Ariefta, 2014). The higher Indonesia's national income, the more labor productivity in the economy, which in turn lowers the unemployment rate.

According to Okun's law, which states that there is a negative relationship between the unemployment rate and national income, this study's findings are in line with this. This demonstrates that changes in national income are significantly affected by variations in the unemployment rate from year to year. A country's national income will decrease by 2% for every percentage point increase in unemployment. Production in a nation will also decrease if its national income falls. This means that the level of production in the country will decline due to declining public consumption and labor use will also fall, as a result of reduced company production.

5. CONCLUSION

The following inferences can be made based on the regression results in this study:

1. It demonstrates that fuel oil prices have a major and favorable impact on Indonesia's national income both in the short and long terms.
2. The short-term impact of inflation on national income is negligible and positive. On the other hand, over time, inflation significantly and favorably affects national income.
3. It demonstrates that the unemployment rate has a negative and substantial impact on the country's GDP both in the short and long terms.
4. Indonesia's national income is positively and significantly impacted by fuel oil prices, inflation, and unemployment.

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