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ANALYSIS OF INFLATION, MONEY SUPPLY, TOTAL CREDIT AND POVERTY EFFECT ON GROSS REGIONAL DOMESTIC PRODUCT OF NORTH SULAWESI PROVINCE

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ABSTRACT

This research aims to analyze the effect of inflation, money supply, total credit and the poverty rate on the Gross Domestic Regional Product (GRDP) of North Sulawesi Province, and predict the conditions for the next 5 years of the variables that will most dominantly affect GRDP of North Sulawesi Province. The data used in this research are secondary data obtained from the Central Bureau of Statistics of North Sulawesi Province and online publications of Bank Indonesia. The analysis used in this research are multiple linear regression analysis and the Autoregressive Integrated Moving Average (ARIMA) method. The results of this research show that inflation, money supply, total credit, and poverty simultaneously affect the GRDP of North Sulawesi Province. Partially, the inflation and poverty variables have a significant negative effect on GRDP, while the money supply and total credit variables have a significant positive effect on GRDP. The most dominant variables affecting regional gross domestic product are the money supply and total credit. Forecasting results show that the money supply for the next 5 years has a trend that tends to show a fluctuating increase and total credit also shows an increasing condition from year to year for the next 5 year period.

Keywords : Regional Economy, Inflation, Money Supply, Total Credit, Poverty, GRDP
JEL Classification : E30, E50, E60, I30

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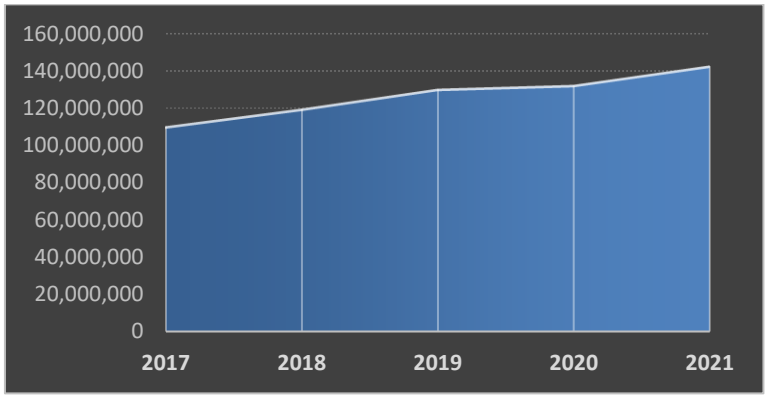
1. INTRODUCTION

Economic development is an attempt by how humans or a nation tries to improve their standard of living to a better level with a more even distribution of income without poverty and ignorance for the nation (Hasan and Azis, 2018). Regional development is an inseparable part of national development. one of the benchmarks for regional development is regional economic growth (Suoth, Kaunang and Sondak, 2015). The success of economic development and progress of an area in a macroeconomic approach is determined by the level of community welfare. The level of community welfare can be seen from the regional production capacity which is reflected in the Gross Regional Domestic Product (GRDP). GRDP data is calculated according to two types of measurement, namely on the basis of constant prices with the 2010 base year and on the basis of current prices. GRDP based of constant prices is used to determine economic growth from year to year while GRDP based of current prices is used to see shifts and economic structure.

The prevailing price in an area cannot be separated from inflation conditions in that area. Inflation arises due to pressure from the supply side (cost push inflation), from the demand side (demand pull inflation), and from inflation expectations. Inflation in North Sulawesi, as reflected in the CPI of Manado City, increased in the second quarter compared to the previous period. Manado City's annual inflation in the second quarter was 3.49% (yoy), higher than the previous quarter which was recorded at 1.59% (yoy) (Bank Indonesia, 2022). In order to maintain economic stability, a monetary policy was implemented which was directed at efforts to control the money supply where by controlling the money supply it was hoped that the target of economic stability could be achieved which at the same time supported economic growth.

In an effort to increase economic growth and social welfare, credit provided by the banking sector also plays an important role for financing and as a driving force for the economy in a region. To achieve good economic growth, sources of funding are needed to encourage the business world. Poverty, which is also closely related to social welfare, is one of the problems that is often faced by developing countries and the regions within them. Basically poverty and unemployment are two important problems faced by many countries, including Indonesia (Murwiati, 2013). Central Bureau of Statistics data (2022) shows that the percentage of poor people in North Sulawesi Province in 2021 is 7.36%, only a decrease of 0.42% from the previous year.



Gambar 1. North Sulawesi GRDP Based of Current Prices Trends for 2017-2021
Source: Processed from Central Bureau of Statistics Publication (2022)

In the midst of an increase in the inflation rate and poverty rate which is still stagnant, fluctuating money supplies and credit continues to grow, the trend of GRDP Based of Current Prices in North Sulawesi Province has actually tended to show an increase over the last 5 years. The development of GRDP which continues to grow positively along with credit provided by banks while inflation is recorded to be higher and the money supply fluctuates and the stagnancy in poverty rate made the author interested in examining how inflation, total credit, money supply, and poverty affects the regional economic conditions reflected in GRDP in North Sulawesi Province to obtain a comprehensive approach to how inflation, total credit, money supply, and poverty can significantly affect GRDP in North Sulawesi Province.

2. LITERATURE REVIEWS

2.1. Economic Development

According to Amalia, *et al.* (2022) Economic development has a qualitative dimension which requires fundamental structural changes. Economic development is a way of changing the poor economy based on the agricultural sector towards an economy based on sustainable city life. Contrary to the opinion of Amalia, *et al*., according to Arsyad (2014), economic development is multidimensional which includes various aspects of people's lives. Economic

development can be defined as any activity carried out by an area to develop economic activities and the standard of living of the people in that area. In addition, economic development, especially in developing countries, is also highly dependent on the agricultural sector which is resistant to economic shocks both from outside and within the country.

2.2. Regional Economics

Basically regional economics is a branch of micro and macro economics with special characteristics in the form of incorporating elements of location and space into the analysis of traditional economics (Sjafrizal, 2008). According to (Hoover and Giarratani, 2020), the regional economy is a framework in which the spatial character of the economic system can be understood. Regional economics identifies the factors that govern the distribution of economic activity over space and recognizes changes in this distribution that can have consequences for individuals or society.

2.3. Gross Regional Domestic Product

According to Bank Indonesia (2022), GRDP is the income of a region that reflects the results of economic activities in a certain area. The Central Bureau of Statistics explained in more detail that domestic product is all goods and services as a result of economic activities operating in the domestic area, regardless of whether the factors of production come from or are owned by residents of the area while regional products are domestic products. plus income from factors of production received from outside the region/country minus income from factors of production paid outside the region/country.

2.4. Inflation

According to Priyono and Chandra (2016) inflation is a situation where there is a tendency for prices to increase in general and continuously. In line with the opinion of Priyono and Chandra, Bank Indonesia defines inflation as a tendency to increase prices for goods and services in general and is persistent. Changes (rate) of inflation are generally measured by looking at changes in the prices of a number of goods and services consumed by the public, as reflected in developments in the Consumer Price Index (CPI). Inflation is a very important macroeconomic indicator because it can affect the value of money and the impact can be felt directly by the public.

2.5. Money Circulation

Based on the type, money in circulation can be divided into :

1. Currency or cash and coins circulating in the community and circulated by Bank Indonesia.
2. Demand deposits, namely money in current accounts at commercial banks.
3. Quasi-money is money kept in savings accounts and long-term deposits.

Bank Indonesia as the central bank in Indonesia regulates money circulation in Indonesia with monetary policy. Monetary policy is the policy of the monetary authority or central bank in the form of controlling monetary amounts (money supply or bank credit) and interest rates to achieve economic stability and achieve the desired development of economic activity (Warjiyo and Solikin, 2003).

2.6. Banking Credit

Etymologically, "credit" comes from the Greek word "credere" which means "trust". According to Law no. 10 of 1998 concerning Banking, credit is the provision of money or equivalent claims, based on a loan agreement or agreement between the bank and another party that requires the borrower to pay off the debt after a certain period of time with the provision of interest.

2.7. Poverty

Etymologically, "poverty" comes from the word "poor" which according to the Indonesian Dictionary means wealthless and completely deprived or low income. According to Indonesia Central Bureau of Statistics, poverty is the inability from an economic standpoint to meet basic food and non-food needs which are measured from the expenditure side.

Residents are categorized as poor if they have an average expenditure per capita per month below the poverty line.

3. RESEARCH METHOD

3.1. Time and Place of Research

This research was conducted at the North Sulawesi Central Bureau of Statistics and at Bank Indonesia. This research was carried out for 4 months, from October 2022 to January 2023 from the data collection stage to the processing and preparation of research results..

3.2. Type and Data Source

The type of data used in this research is secondary data obtained from the Central Bureau of Statistics of North Sulawesi Province and online publications of Bank Indonesia. The data taken in this research is in the form of inflation data, money supply, total credit, poverty rate, and Gross Regional Domestic Product based on Current Prices for 10 years from 2012-2021

3.3 Variable Measurement Concept

Variabel yang diukur dalam penelitian ini adalah :

1. Inflation in North Sulawesi Province, namely the month to month (mtm) inflation rate represented by Manado City inflation for 10 years from 2012-2021, obtained from the Central Bureau of Statistics of North Sulawesi Province (%).
2. The amount of money in circulation in North Sulawesi Province is in the form of currency coming out of BI through the process of withdrawing commercial bank cash from demand deposits at BI or cash payments through BI in 2012-2021 from published data on Regional Economic and Regional Financial Studies by the Bank Indonesian (IDR).
3. Total credit provided by banks in North Sulawesi Province in 2012-2021 from published data for Regional Regional Economic and Financial Studies by Bank Indonesia (IDR).
4. Poverty in North Sulawesi Province, namely the percentage of the poor population in 2012-2021 obtained from the Central Bureau of Statistics of North Sulawesi Province (%).
5. Gross Regional Domestic Product based on current prices used to see shifts and economic structure for 10 years, from 2012-2021 obtained from the Central Bureau of Statistics of North Sulawesi Province (IDR).

3.4. Hypotheses

Hypotheses are basically arranged deductively by taking premises from previously known scientific knowledge (Syahrum and Salim, 2012). The description of the hypothesis in this research is as follows :

H_0 : Inflation, money supply, total credit, and poverty have no effect on GRDP;

H_1 : Inflation, money supply, total credit and poverty have an effect on GRDP

3.5. Metode Analisis Data

The data analysis method used in this research is multiple linear regression analysis and the Auto Regressive Moving Average (ARIMA) method. The regression analysis model in this research is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \; \acute{\varepsilon}$$

Dimana :

Y = GRDP

X_1 = Inflation

X_2 = Money Supply

X_3 = Total Credit

X_3 = Poverty Rate

$\beta_{1,2,3,4}$ = Regression Coefficient

4. RESULTS AND DISCUSSIONS

4.1. Results

4.1.1 Multiple Linear Regression Analysis

The results of multiple linear regression analysis in this research can be seen in the table of processed results of the SPSS 22 program below:

Table 1. Hasil Analisis Regresi Linier Berganda

Coefficients[a]					
Model		Unstandarized Coefficients B	Standarized Coefficients Beta	t	Sig.
1	(Constant)	5039397.619		1.572	,137
	Inflation_X1	-400345.404	-,077	-2,170	,046
	Money Supply_X2	1758.283	,214	4,941	,000
	Total Credit_X3	740.907	,782	15,635	,000
	Poverty_X4	-723450.121	-,097	-2,379	,031

Source: Secondary data processed with SPSS, 2022

Based on these results, a multiple linear regression model is formulated as follows:

$$\mathbf{Y = 5.039.397,619 – 400.345,404\ X_1 + 1.758,283\ X_2 + 740.907\ X_3 – 723.450,121\ X_4}$$

The regression model shows that the inflation variable and poverty variable have a negative effect on North Sulawesi's GRDP. Money supply variable and total credit have a positive influence on GRDP in North Sulawesi.

4.1.2 Classical Assumption Test

a. Multicollinearity Test

The multicollinearity test used in this research uses a measurement of the Variance Inflation Factor (VIF) level and is seen from the Tolerance value (*Tol.*). The results of the multicollinearity test from the model in this research are as follows:

Table 2. Multicollinearity Test Results

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Inflation_X1	,881	1,135
	Money Supply_X2	,585	1,708
	Total Credit_X3	,441	2,270
	Poverty_X4	,659	1,517

Source: Secondary data processed with SPSS, 2022

The table above shows that the VIF value of each independent variable in this research is less than 10, namely the VIF value for inflation is 1.135, money supply is 1.708, total credit is 2.270, and poverty is 1.517. Furthermore, the Tolerance value of each independent variable is greater than 0.10. The test results indicate that there is no multicollinearity in the regression model in this research.

b. Heteroscedasticity Test

The heteroscedasticity test used in this research is the scatterplot graph and the Glesjer test.

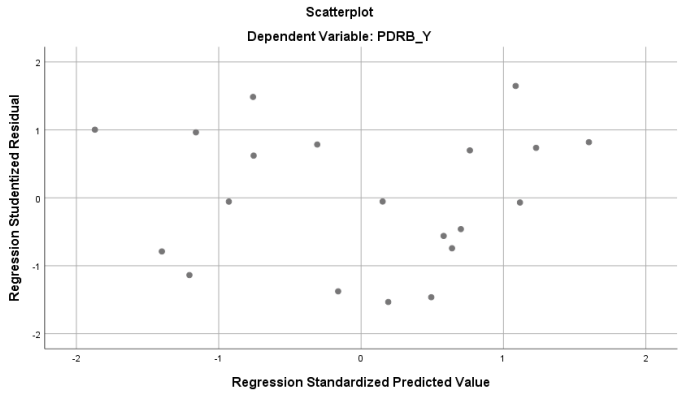


Figure 2. The results of the heteroscedasticity test using scatterplot

Based on the graph, it is known that the data points are spread above and below 0. The points do not just gather above and below, but are spread evenly and do not have a pattern.

Table 3. Heteroscedasticity Test With Glesjer Test

	Model	Sig.
1	(Constant)	,765
	Inflation_X1	,867
	Money Supply_X2	,935
	Total Credit_X3	,821
	Poverty_X4	,341

Source: Secondary data processed with SPSS, 2022

The Glesjer test also shows that the significance value of all variables in this research is greater than 0.05 so it can be concluded that there are no symptoms of heteroscedasticity in the regression model in this research.

c. Autocorellation Test

The autocorrelation test in the multiple linear regression model in this research was seen from the Durbin-Watson values from the test results and then compared with the values in the Durbin-Watson table.

Table 4. Hasil Uji Autokorelasi

Model Summary[b]				
Model	**R**	**R Square**	**Adjusted R Square**	**Durbin-Watson**
1	,992[a]	,983	,979	1,915

Sumber : Data Sekunder diolah dengan SPSS, 2022

From the test results table above it is known that the Durbin-Watson value is 1.915. With the number of samples (n) = 20 and the number of independent variables as much as 4 (k = 4) it is obtained from the Durbin Watson table dL = 0.8943 and dU = 1.8283 and 4-dU = 2.1717. From these values, because dU ≤ D-W ≤ 4-dU or 1.8283 ≤ 1.915 ≤ 2.1717, it can be concluded that there is no autocorrelation in the multiple linear regression model in this research.

4.1.3 Hypothesis Test

a. F Test

To find out simultaneously how much the significance level of inflation, total credit, money supply, and poverty is to North Sulawesi's GRDP, an F test is carried out. The criterion for a significant test level (α) used is 0.05.

Table 5. F Test Result

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.739E+14	4	2.435E+14	222.951	.000b
	Residual	1.638E+13	15	1.092E+12		
	Total	9.903E+14	19			

Source: Secondary data processed with SPSS, 2022

The results of the F test show a significance value (Sig.) of 0.000 <0.05, so according to the basis for decision making it can be stated that H1 is accepted, which means that all independent variables in this research (inflation, total credit, money supply, and poverty) simultaneously affect GRDP in North Sulawesi.

b. t Test

The t test was conducted to determine the effect individually (partially) of the inflation, money supply, total credit, and poverty variables on North Sulawesi's GRDP. The results of the t test can be seen in the following table:

Tabel 6. t Test Reult

Coefficients[a]

Model		Unstandarized Coefficients B	Standarized Coefficients Beta	t	Sig.
1	(Constant)	5039397,619		1,572	,137
	Inflation X1	-400345,404	-,077	-2,170	,046
	Money Supply_X2	1758,283	,214	4,941	,000
	Total Credit_X3	740,907	,782	15,635	,000
	Poverty_X4	-723450,121	-,097	-2,379	,031

Source: Secondary data processed with SPSS, 2022

Dari hasil pengujian tersebut didapatkan bahwa :

i. The results of the analysis for the inflation variable show the t-value (-2.170) > t-table (1.72472) and the Sig. (0.046 <0.05). This means that H_1 is accepted and H_0 is rejected, which means that inflation (X_1) has a significant effect on GRDP in North Sulawesi (Y).

ii. The results of the analysis for money supply (X_2) show the t-value (4.941) > t-table (1.72472) or the Sig. (0.000 <0.05). This means that H_1 is accepted and H_0 is rejected, which means money supply (X_2) has a significant effect on GRDP in North Sulawesi (Y).

iii. The results of the analysis for total credit (X_3) show the t-value (15.635) > t-table (1.72472) or Sig. (0.000 <0.05). This means that H_1 is accepted and H_0 is rejected, which means that total credit (X_3) has a significant effect on GRDP in North Sulawesi (Y).

iv. The results of the analysis for poverty (X_4) show t-value (-2.379) > t-table (1.72472) or Sig. (0.031 <0.05). This means that H_1 is accepted and H_0 is rejected, which means poverty (X_2) has a significant effect to GRDP in North Sulawesi (Y).

c. Coefficient of Determination (R^2)

Testing the coefficient of determination was carried out to determine the ability of the inflation, money supply, total credit, and poverty variables to explain the North Sulawesi GRDP variable or to what extent the model's ability to explain the dependent variable.

Table 7. Coefficient of Determination Test Result

Model Summary[b]			
Model	**R**	**R Square**	**Adjusted R Square**
1	,992[a]	,983	,979

Source: Secondary data processed with SPSS, 2022

Based on the SPSS output, it shows an R Square value of 0.983 (98.3%). This means that the contribution of the independent variables in the model is 98.3 percent of the dependent variable. Or the magnitude of the contribution of the independent variable in this research is 98.3% while the remaining 1.7% is influenced by other factors that are not included in the regression model in this research. This value illustrates that the regression model is appropriate.

4.1.4 Forecasting

a. Money Supply

To identify the model to be used in forecasting, a stationarity test was carried out using the Augmented Dickey-Fuller (ADF) unit root test.

Table 8. Stationarity Test of Money Supply Variable

Level **Null Hypothesis: JUB has a unit root**			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-2.372546	0.1625
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10% level	-2.660551	

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

In the level ADF test, the data to be predicted is not stationary, seen from the Prob value. 0.1625 > from the value of α 0.05 so proceed to testing at the first difference level.

Table 9. Stationarity Test at First Difference Level of Money Supply Variable

First Difference **Null Hypothesis: D(JUB) has a unit root**			
		t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic		-12.50983	0.0000
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10% level	-2.660551	

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

Tests at the first difference level show that the data is stationary at the first difference level. Furthermore, by using the e-views program, the ARIMA model obtained is as follows:

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Number of estimated ARMA models: 6
Number of non-converged estimations: 0
Selected ARMA model: (1,0)(0,0)
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Figure 3. Determination of Money Supply Forecasting Model

From the 6 models tested by the software, it was found that the right model to proceed to the forecasting stage was model (1, 1, 0). Forecasting results from the money supply variable for 2022-2026 are as follows:

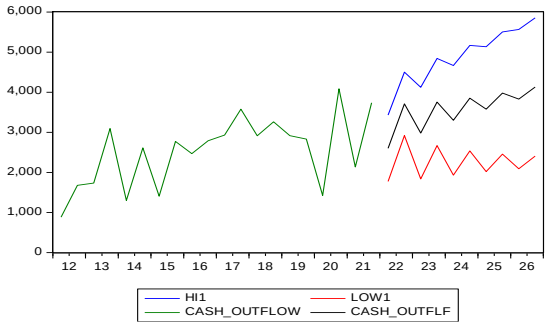

Figure 4. Money Supply Forecast Result

The results of the forecast indicate that there will be an increasing yet fluctuating trend in the money supply in North Sulawesi..

b. Total Credit

To identify the model to be used in forecasting, a stationarity test is carried out with the ADF test.

Tabel 10. Stationarity Test of Total Credit Variable

Level		
Null Hypothesis: TOTALKREDIT has a unit root		
	t-Statistic	**Prob.***
Augmented Dickey-Fuller test statistic	-3.277807	0.0309
Test critical values: 1% level	-3.857386	
5% level	-3.040391	
10% level	-2.660551	

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

Based on the test results at the level ADF test, it shows that the Prob. < of the value α = 0.05, which means that the total credit data is stationary at the level. Then determine the model that will be used to forecast total credit for the next 5 years.

Number of estimated ARMA models: 100
Number of non-converged estimations: 0
Selected ARMA model: (4,2)(1,1)

Figure 5. Determination of Total Credit Forecasting Model

Dari 100 model yang telah diuji oleh komputer, ditemukan bahwa model yang paling tepat untuk dilakukan peramalan adalah model (4, 0, 2) (1, 0, 1). Menggunakan model tersebut dilakukan peramalan menggunakan program e-views dengan hasil sebagai berikut :

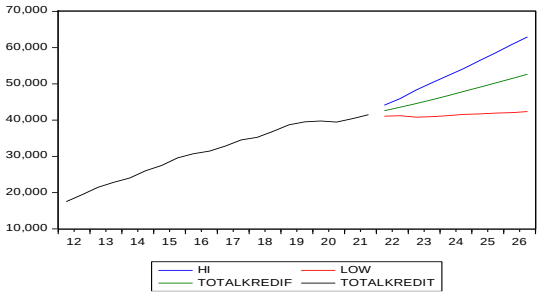

Figure 6. Total Credit Forecast Result

The graph shows that the total loans disbursed over the next 5 years shows an increasing trend from year to year.

4.2. Discussions

4.2.1 Inflation Effects on GRDP of North Sulawesi

The results of this research show that inflation has a negative effect on North Sulawesi's GRDP in 2012-2021. The regression coefficient of the inflation variable is -400,345.404 indicating that if there is an increase in inflation of 1% there will be a reduction in GRDP of -400,345.404. The coefficient of the independent variable which is negative means that there is a negative influence from the independent variable on the dependent variable, in this research it means that the increasing inflation rate will reduce the GRDP in North Sulawesi.

In the t test, the probability value for inflation is 0.046 < from the value $\alpha = 0.05$. This value indicates that inflation partially has a significant effect on North Sulawesi's GRDP. The results of this research are in line with the theory of Sugiyanto and Romadhina (2020) that increased inflation will reduce people's purchasing power which will ultimately harm the economy. In addition, an increase in inflation can lead to speculative investment, reduced investment in an area and a decline in the level of social welfare.

4.2.2 Money Supply Effects on GRDP of North Sulawesi

Based on the results of multiple linear regression tests, it is known that the money supply has a positive effect on North Sulawesi's GRDP in 2012-2021. The variable coefficient of the money supply is 1,758.283 indicating that an additional 1% in the money supply increases GRDP in North Sulawesi by 1,758.283. The increasing money supply in North Sulawesi increases the GRDP in North Sulawesi.

Furthermore, from the t test value, the probability value for the money supply variable is 0.000 < from the value $\alpha = 0.05$. Based on this value, it is known that partially the money supply has a significant influence on North Sulawesi's GRDP. The standardized coefficient beta value of 0.214 also shows that the money supply is one of the variables with the most significant influence compared to other variables.

The results of this researcg are supported by research results from Tambunan (2015) and Ambarawati and Azis (2021). The increasing amount of money in circulation encourages people to allocate some of their funds for consumption and encourages producers to produce more goods or services to meet consumer demand. This will encourage the movement of the economy in an area due to potentially open employment opportunities and increased per capita income and lead to an increase in GRDP.

The forecasting results in this research indicate that in the next 5 years the money supply will show a fluctuating trend of increasing. This trend follows the seasonal pattern in previous years where the money supply will increase at the end of the year, namely during the Christmas and New Year. The increase in the money supply was also driven by an increase in per capita income, and infrastructure development that required more money to circulate in the area.

4.2.3 Total Credit Effects on GRDP of North Sulawesi

It is known from the research results that the total credit variable also has a positive influence on North Sulawesi's GRDP in 2012-2021. The total credit variable coefficient value is 740.907 indicating that a 1% increase in total credit will increase North Sulawesi's GRDP by 740.907. This shows that the increasing total credit extended in North Sulawesi will increase GRDP in North Sulawesi. Furthermore, the probability value of the t test is 0.000 < from the value of $\alpha = 0.05$ indicating that partially total credit has a significant effect on North Sulawesi's GRDP. The standardized coefficient beta value of 0.782 also shows that total credit is one of the variables with the most significant influence compared to other variables.

In line with the theory of the credit function according to Hasan (2014), credit distribution acts as a tool for economic stability and increases economic activity in a region. Simultaneously with the role of the money supply, credit provided by banks is used for consumption as well as capital for business expansion and can move producers and consumers and increase economic activity in a region.

Based on the forecasting results in this research, it can also be seen that bank loans are expected to continue to grow positively over the next 5 years. This growth forecast is also supported by statements from the governor of Bank Indonesia Perry Warjiyo and Chairman of the Board of Commissioners of the Financial Services Authority Mahendra Siregar at a press conference the Financial System Stability Committee projecting that credit will continue to grow supported by banking supply and demand factors (Damara, 2022).

4.2.4 Poverty Effects on GRDP of North Sulawesi

The results of this research show that poverty has a negative effect on North Sulawesi's GRDP in 2012-2021. The poverty variable coefficient is -723,450.121 indicating that an increase in poverty of 1% reduces the amount of GRDP by -723,450.121. The increasing percentage of poverty in North Sulawesi will reduce North Sulawesi's GRDP. The t-test also shows a probability value of 0.031 < from the value of $\alpha = 0.05$ so that it is known that partially poverty has a significant influence on North Sulawesi's GRDP.

The results of this research are in accordance with research conducted by Wijayanto, Rumagit, and Suzana (2016) which found that poverty has a negative effect on economic growth. Poverty in North Sulawesi is still below the national poverty rate, but this figure must still be considered to maintain people's welfare and economic stability in North Sulawesi.

5. CONCLUSION

1. Based on the results of the analysis that has been carried out in this research, it can be concluded that inflation, the money supply, total credit, and poverty all have an effect on North Sulawesi's GRDP. Inflation and poverty partially have a negative and significant effect on GRDP, while the money supply and total credit have a positive influence on North Sulawesi's GRDP.
2. Based on the research results, forecasting for the next 5 years is carried out on 2 variables, namely the money supply and total credit with the conclusion that the money supply and total credit are expected to have an increasing trend for the next 5 years even though the money supply pattern of increase is fluctuating and influenced by seasonal factors, namely national religious holidays.

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