ANALYSIS OF THE INFLUENCE OF GRDP, TOTAL POPULATION, WAGES, AND INFLATION ON TOTAL CONSUMPTION IN SUMATRA PROVINCE IN 2020-2023

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Abstract

Consumption is the activity of using goods and services to meet the needs and desires of individuals or households. This study aims to analyze the effect of Gross Domestic Product, population size, minimum wage, and inflation on total consumption in North Sumatra province from 2020 to 2023. The analytical tool used is panel data regretion using secondary data obtained from the Central Bureau of Statistics during the period 2020-2023. The best model selected is the fixed effect model (FEM). Regression results show that GDP affects total consumption in North Sumatra from 2020 to 2023. Meanwhile, population size, minimum wage, and inflation do not affect total consumption in North Sumatra from 2020 to 2023.

Keywords: GRDP; Population; Minimum Wage; Inflation and Consumption Third Word, Fourth Word (written in Capitalize Each Word format)

INTRODUCTION

Economy is closely related to humans because every individual is definitely involved in economic activities throughout their lives. One of the activities included in economics is consumption. Total consumption becomes a very important indicator in assessing the economy of a region, as it can illustrate the extent of people's spending and the level of economic activity in that area. Consumption refers to household expenditure to purchase various goods and services, both consumables such as food, and durables such as cars, houses, or furniture (Mankiw, 2007).

In Indonesia, consumption often contributes around 60 to 75 percent of total income. This expenditure includes the purchase of goods and services carried out by individuals or families to meet their daily needs, such as food, clothing, transportation, and various other services. The way people spend their money can indicate the social and economic conditions of a region or country. Information about household expenditure distribution can be utilized to assess the prosperity of the population. The lower the proportion of food costs compared to total expenditure, the better the economic conditions in that region.

BPS has used the assumption that "expenditure is directly proportional to household income." This means that as income increases, expenditure also increases. Especially in large cities, expenditure is higher compared to rural areas because wages are generally higher in cities than in villages. This factor encourages people to move to cities with the hope of improving their financial situation by earning more money. The average monthly expenditure of Indonesian people for food increased by 9.12 percent, while expenditure for non-food items increased more significantly, namely 12.64 percent per year. In September 2022, monthly per capita expenditure for food was recorded at 700,966 rupiah per capita per month, while for non-food items it was recorded at 692,026 rupiah per capita per month (Statistik, 2022).

Medan is a city in North Sumatra with the highest average per capita expenditure, namely 1,851,065 rupiah per person per month. As a large city, the need for housing, household facilities, food and ready-to-eat beverages constitute a large part of people's expenditure. For just these two categories (food and beverages), Medan residents spend 846,285 rupiah per person per month, which reaches 45.72% of total household expenditure (Figure 1).

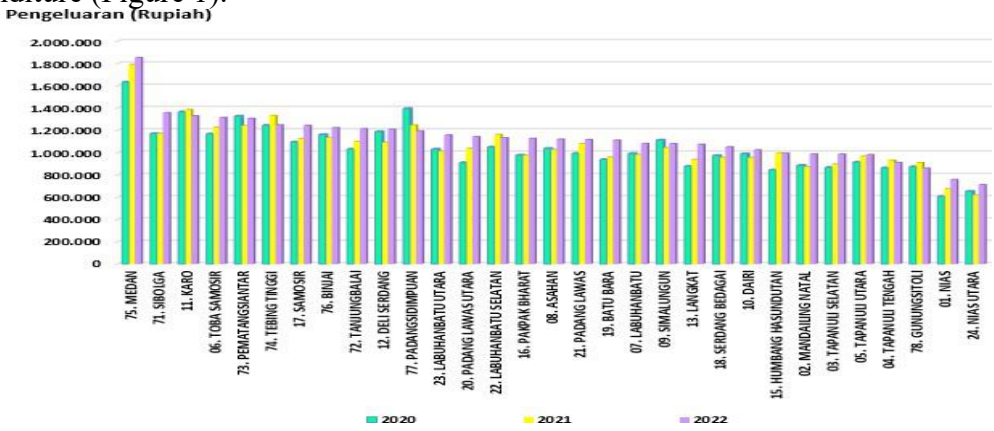

Figure 1.
Average Value of Per Capita Expenditure per Month (Rp) in Each Regency/City in North Sumatra Period 2020–2022
Source: Susenas 2022, BPS North Sumatra Province

Excessive expenditure without long-term financial planning can cause financial stress. This makes it difficult to focus on larger financial goals. However, everyone has a different financial situation. People who like shopping tend to spend their money rather than saving a portion. This can make it difficult for them to achieve financial goals such as providing emergency funds (Jefri, 2021).

Gross regional domestic product (GRDP) is the total added value of all production of goods and services produced in a region in one period (usually one year), or the total final value of all economic units in that area (Statistik, 2020). The higher the GRDP, the greater the income generated and received by that region. Usually, when GRDP increases, the average income of people in that area also increases. People's purchasing power increases in line with income increases. When income increases, people tend to buy more goods and services.

GRDP based on expenditure describes the final value of all production processes that occur outside the boundaries of a region. Various final goods and services will be used to complete final demand (consumption), both by domestic economic actors and by economic actors within the country as well as by economic actors from outside the region and even internationally. Final consumption means these goods and services are completely used and not stored or processed further. Final consumption includes final consumption expenditure by households (PK-RT) and non-profit organizations that provide services to households, known as PK-LNPRT (Sukirmo, 1994).

Population is defined as every individual who has settled in the territory of the Republic of Indonesia for one year or more, or who lives less than one year but intends to settle for one year or more (Statistik, 2020). Along with population growth, the need for goods and services such as food, clothing, housing, transportation, and other services also increases. To meet increasingly high demand, producers need to increase the number of products and services. Ultimately, the increase in production and availability of products and services will strengthen people's expenditure (Mankiw, 2018).

Minimum wage is the lowest limit set by employers in providing salaries to workers, which includes wages and fixed allowances, determined by the governor (Statistik, 2020). An increase in minimum wage will directly raise workers' income, especially those with low incomes. This income increase will enhance their ability to purchase goods and services, thereby encouraging increased consumption. An increase in minimum wage can trigger an increase in production costs for companies, especially companies that employ many low-wage workers. Companies may raise the selling price of their products to offset higher costs, thereby reducing consumer purchasing power and potentially suppressing consumption. The minimum wage set must consider the decent living needs (KHL) in a region. If the minimum wage is insufficient to meet basic needs, then wage increases may not have a significant impact on consumption (Yana, 2017).

Inflation refers to a general increase in the prices of goods and services that occurs continuously over a certain period (Statistik, 2020). Inflation causes the prices of goods and services to increase, while people's income generally remains constant or its increase is not proportional to the inflation rate. This results in a decrease in people's purchasing power. Because their purchasing power decreases, people cannot buy goods and services in the same amount as before inflation occurred. When inflation is high, people tend to be more careful with their expenditure. They will be more selective in choosing the goods and services purchased, often choosing lower-priced goods or basic necessities. Purchases of non-urgent or luxury goods may be postponed, due to concerns that prices will continue

to rise. Inflation can cause changes in expenditure patterns, where some people prefer to keep their money in assets that are relatively stable in value during inflation, such as gold or property, rather than using it for consumption (Rahardja & Manurung, 2017).

REVIEW OF LITERATURE

Research by Dewi (2024) examined the influence of gross regional domestic product (GRDP) and inflation rate on household expenditure patterns in Bandung Regency, West Java using multiple linear regression analysis methods. Findings from Dewi's research indicate that GRDP does not contribute to household expenditure in Bandung Regency, West Java. Conversely, inflation shows a significant positive relationship with household consumption, where an increase in inflation will be followed by an increase in household expenditure, and a decrease in inflation will have the opposite effect. There are several aspects that can be identified as research gaps with the author's research. Dewi (2024) research data uses secondary data covering a five-year period, namely 2017 to 2021. Meanwhile, in my research, I added two independent variables, namely population and minimum wage, to expand the analysis of their influence on household consumption, using panel regression analysis methods, which is a combination of time series data from 2020 to 2023 and cross-section data. Thus, the main purpose of this research is to evaluate the influence of GRDP, population, minimum wage, and inflation on total consumption in North Sumatra during the period 2020 to 2023. It is hoped that the findings from this study can contribute to a comprehensive understanding of consumption and become a reference for other researchers in similar studies in the future.

RESEARCH METHOD

This research aims to examine the impact of GRDP, population, minimum wage, and inflation rate on total consumption in North Sumatra between 2020 and 2023. This research uses a quantitative approach, which according to Machali (2021) involves the use of numerical data at every stage, from data collection, analysis, to conclusion. This research utilizes secondary data taken from the Central Statistics Agency (BPS). The data analyzed includes total consumption as the dependent variable, as well as GRDP, population, minimum wage, and inflation as independent variables.

This research uses a panel data regression approach. According to Gujarati (2003), panel data is a combination of data recorded over time and data collected simultaneously from various entities. Time data includes observations made annually for four years, between 2020 and 2023, while cross-sectional data involves information from 33 regencies/cities. Thus, the total amount of data analyzed is 132, the result of multiplying 4 years by 33 regions.

The econometric model of panel data regression is as follows:

$$\text{LogPKT}_i t = \beta_0 + \beta_1 \text{logPDRB}_i t + \beta_2 \text{logJP}_i t + \beta_3 \text{logUMK}_i t + \beta_4 \text{INF}_i t + e_i t$$

Where:

- PKT : Consumption (Rp/year)
- PDRB : Gross regional domestic product (billion/year)
- JP : Population (persons/year)
- UMK : Minimum wage (million/year)
- INF : Inflation (percent/year)
- e : Error term

- β_0 : Constant
- $\beta_1 \cdots \beta_4$: Regression coefficients
- I : observation i
- T : year t

There are three types of estimation models used in panel data regression, namely Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). Next, it is important to determine the most appropriate model by utilizing the Chow test and Hausman test. The Chow test aims to assess the comparison between Pooled Least Square (PLS) and Fixed Effect Model (FEM) based on probability values or F statistics. If the test results show that the null hypothesis is accepted, then Pooled Least Square (PLS) is the model that should be chosen. However, if the null hypothesis is rejected, then the model that should be chosen is the Fixed Effect Model (FEM). Meanwhile, the Hausman test functions to compare Fixed Effect Model (FEM) with Random Effect Model (REM) based on Chi-Squares testing. If the results show rejection of the null hypothesis, then Fixed Effect Model (FEM) is the choice. Conversely, if the null hypothesis is accepted, then Random Effect Model (REM) should be chosen. After determining the best model, the next step is to conduct statistical testing to evaluate the selected model, which includes t-test, F-test, and coefficient of determination (R^2). The t-test is used to assess the significance of the impact of independent variables on the dependent variable individually, while the F-test evaluates the model's suitability or the influence of independent variables as a whole on the dependent variable. The coefficient of determination (R^2) indicates the extent to which the model can predict expected results.

RESULTS AND DISCUSSION

Results of Best Model Selection Analysis

Analysis of the econometric panel data regression model using Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM) methods, along with model selection test results, can be found in Table 1.

Table 1.
Econometric Panel Data Regression Model Estimation Results - Cross section

Variable	Regression Coefficientresi		
	PLS	FEM	REM
C	14.78042	9.768777	15.24147
LOG(PDRB)	0.326457	0.879447	0.414595
LOG(JP)	- 0.324902	- 0.349369	- 0.416506
LOG(UP)	0.007874	0.004824	0.002155
INF	0.000922	- 0.008261	- 0.023114
R^2	0.443960	0.984580	0.489871
Adjusted. R^2	0.408656	0.965562	0.457482
Statistik *F*	12.57529	51.77076	0.378998
Prob. Statistik *F*	0.000000	0.000000	1.919659
Uji Pemilihan Model			
(1) Chow			
Cross- Section $F(33,30) = 31.872307$; Prob. $F(33,30) = 0,0000$			
(2) Hausman			
Cross-Section random $\chi^2(4) = 15.869556$; Prob. $\chi^2 = 0.0032$			

Source: Processed secondary data

Based on the Chow Test results shown in Table 1, the probability value or significance of F statistic is 0.0000, which is lower than alpha 0.01, so the null hypothesis is rejected. This means the chosen model is the Fixed Effect Model (FEM). Furthermore, the Hausman test shows a probability value or significance of χ^2 statistic of 0.0032, which is also smaller than $\alpha = 0.10$, so the null hypothesis is again rejected. Therefore, the chosen model is the Fixed Effect Model (FEM). From the results of the Chow test and Hausman test, it can be concluded that the best model is the Fixed Effect Model (FEM).

Table 2.
Fixed Effect Model (FEM) Estimation

$$LogPKT_{it} = \underset{(0,0007)}{9,768777} - \underset{(0,7086)}{0,879447\ logPDRB_{it}} - 0,349369\ logJP_{it} + \underset{(0,5475)}{0,004824\ logUP_{it}} - \underset{(0,3752)}{0,008261 INF_{it}}$$

R^2 = 0.443960; *DW* = 0.231770; *F.* = 12.57529; Prob. *F* = 0,0000

Source: Processed secondary data

Notes:
* Significant at α = 0.01
** Significant at α = 0.05
*** Significant at α = 0.10 Numbers in parentheses are t-statistic probability values

In Table 2, it can be seen that the estimated Fixed Effect Model (FEM) has a probability value or significance of F statistic of 0.0000, which is smaller than alpha 0.10. Thus, the alternative hypothesis (Ha) is accepted, meaning the model is valid.

Independent Variable Validity Test

Through the validity test shown in Table 3, it is apparent that of the four independent variables in the model, only GRDP significantly influences total consumption at the significance level α = 0.01. Meanwhile, the other three variables, namely population, minimum wage, and inflation, do not show significant influence on total consumption at α = 0.10.

Table 3.
Independent Variable Validity Test Results

Variable	t	Sig. t	Criteria	Conclusion
PDRB	0,8794470	0,0007	< 0,01	Has a positive significant effect at α = 0,01
JP	-0,3493690	0,7086	<0,01	Has no significant effect at α = 0,01
UMK	0,0048240	0,5475	>0,05	Has no significant effect at α = 0,05
INF	-0,0082611	0,3752	< 0,01	Has no significant effect at α = 0,01

Source: Processed secondary data

The regression coefficient for the GRDP variable shows a positive value of 0.879447 with a linear relationship. This means that every 1% increase in GRDP will cause total consumption to rise by 0.879447%. Conversely, a 1% decrease in GRDP will reduce total consumption by 0.004207%.

Since the t-test results show that the population, minimum wage, and inflation variables do not have significant influence at α = 10%, economic interpretation is not performed for these three variables.

Interpretation of coefficient of determination and constant

The coefficient of determination value, R^2 of 0.443960 indicates that 44.40% of the variation in total consumption variable can be explained by GRDP, population, minimum wage and inflation variables. The remaining 55.60% is explained by other independent variables not included in this model.

Table 4 shows the constant for each regency or city in North Sumatra province. The highest constant is Phapat Bharat regency at 3.100894, second highest is Toba regency at 1.111226, and third highest is Tebing Tinggi city at 1.443204. This means the influence of GRDP, population, minimum wage and inflation on total consumption in Phapat Bharat regency, Toba regency, and Tebing Tinggi city is highest in North Sumatra province in 2020-2023. Meanwhile, the lowest constant value is held by Pematang Siantar regency at 0.42117, second lowest is Padanglawas regency at -0.01473, and third lowest is Serdang Berdagai regency at -0.90888. This means the influence of GRDP, population, minimum wage, and inflation on total consumption in Pematang Siantar, Padang Lawas, and Serdang Berdagai regencies is the lowest in the 2020-2023 period.

Table 4.
Regional Effects and Constants

No.	Region	Effect	Constant
1	Nias	0.510989	1.0219878
2	Mandailing Natal	0.015028	0.030056
3	South Tapanuli	-0.155572	-0.311144
4	Central Tapanuli	0.145754	0.291508
5	North Tapanuli	0.387767	0.775534
6	Toba	0.555613	1.111226
7	Labuhan Batu	-0.665113	-1.330226
8	Asahan	-0.595468	-1.190936
9	Simalungun	-0.496717	-0.993434
10	Dairi	0.324297	0.648584
11	Karo	-0.024991	-0.049982
12	Deli Serdang	-1.087697	-2.175394
13	Langkat	-0.632362	-1.264724
14	South Nias	0.203337	0.406674
15	Humbang Hasundutan	0.511998	1.023996
16	Pakpak Bharat	1.550447	3.100894
17	Samosir	0.788970	1.57794

No.	Region	Effect	Constant
18	Serdang Bedagai	-0.454444	-0.90888
19	Batu Bara	-0.745060	-1.49012
20	North Padang Lawas	0.053479	0.106958
21	Padang Lawas	-0.007365	-0.01473
22	South Labuhan Batu	-0.607374	-1.214748
23	North Labuhan Batu	-0.469692	-0.939384
24	North Nias	0.500747	1.001494
25	West Nias	0.773165	1.54633
26	Sibolga City	0.524558	1.049116
27	Tanjung Balai City	0.257534	0.515068
28	Pematang Siantar City	0.210585	0.42117
29	Tebing Tinggi City	0.721602	1.443204
30	Medan City	-1.296897	-2.593794
31	Binjai City	0.258938	0.517876
32	Padangsidimpuan City	0.652520	1.30504
33	Gunungsitoli City	0.422820	0.97764
34	North Sumatra	-2.131399	-4.262798

Source: Processed secondary data

Discussion

The regression coefficient of the GRDP variable has a positive sign, with a probability value of 0.0007, which is smaller than $\alpha = 0.01$, as shown by the t-test results shown in Table 3. This indicates that GRDP benefits overall consumption. A study by Rizki (2022) supports these findings by stating that GRDP has a positive impact on expenditure made by every household involved in the economy. Their consumption will increase along with income increases. Keynes argued that income received by society is the main component affecting the level of household consumption. There is a positive relationship between GRDP and consumption where when income increases, household consumption will also rise, but the increase in consumption is not always proportional to the increase in income. Changes in income can affect people's purchasing power. If income increases, consumers will tend to buy more goods, while a decrease in income will make consumers buy goods in smaller quantities. These findings are consistent with studies conducted by Alitasari & Murjana (2021), which revealed that GRDP as a measure of income has a positive and significant impact on household expenditure in Indonesia. Other research conducted by Nurhayati & Rachman (2003) also indicates that GRDP has a positive and significant influence on public consumption in Central Java in 2000. Additionally, research by Akekere and Yousuo (2012) shows that income measured by GDP has a positive influence on household consumption in Nigeria during the period

1981-2010. The increase in GRDP in a region reflects better economic growth. This reflects an increase in overall economic activity, including income increases in various employment sectors and businesses. The increase in GRDP directly affects household income increases. When the regional economy develops in line with income, this will increase people's purchasing power, giving them more money to use for purchases. This increase in purchasing power then encourages them to spend more money on goods and services, which ultimately increases consumption.

The t-test results show that the regression coefficient for the population variable has a probability value of 0.7086, which is higher than $\alpha = 0.01$, meaning population does not affect total consumption. Research by Al Adha, R. M., & Astuti, I. P. (2024) also reveals that population does not significantly influence the level of food consumption in Central Java Province. Although population is often considered the main factor affecting food consumption in a region, in reality this relationship is not always direct. Other factors, such as minimum wage, access to food, and uneven food distribution, also influence the level of food consumption. When wages are low, consumption needs are limited, especially if food distribution is uneven. In areas with large populations but low minimum wages, the level of food consumption can be low, because people must divide their income to meet primary and secondary needs.

The t-test results show that the regression coefficient for the minimum wage variable has a probability value of 0.5475, which is higher than $\alpha = 0.05$, indicating that minimum wage does not have a significant impact on total consumption. These findings are consistent with research by Iskar et al. (2024), which uses the ECM model and shows that the influence of minimum wage on consumption in the short term is positive but not significant, with a coefficient value of 0.2829 at a significance level of 5%. Meanwhile, the coefficient for minimum wage in that study shows a positive value of 1.096488, meaning if minimum wage increases by 1%, household consumption is expected to increase by 1.09%. Therefore, we can conclude that minimum wage does not affect household consumption in Kendari city because the minimum wage in Kendari city is still not too high, which causes people's purchasing power to decrease so that the amount of consumption decreases because they prefer to save rather than spend. Minimum wage is often considered a policy tool aimed at improving worker welfare by setting a minimum salary limit that must be paid by employers. However, in some regions, especially those with low minimum wage levels or high inflation, increases in minimum wage may not significantly affect household consumption. In regions with high inflation, minimum wage increases often cannot keep pace with overall rises in consumer goods prices. In this situation, even though minimum wage increases, workers' purchasing power may not increase significantly, so household consumption remains stagnant or even decreases. Some regions, especially Kendari city, implement subsidies or social assistance to reduce the impact of price increases on low-income households. Minimum wage increases compared to the existence of subsidies that can better help maintain household purchasing power effectively, so the influence of minimum wage increases on household consumption is not too significant. Research by Wibawa & Purbadharmaja (2019) on the influence of minimum wage and investment on employment opportunities and consumption in regencies/cities in Bali province shows that although minimum wage at the regency level has a positive impact, its influence on consumption is not significant.

The t-test results for the inflation variable regression coefficient show a probability of 0.3752, which is greater than $\alpha = 0.01$, meaning inflation does not

significantly affect total consumption. Research by Maulina (2022) also reveals that inflation does not directly affect public consumption. This is due to the fact that consumption is a basic need that must still be met, whether inflation is high or low. Although high inflation can reduce consumption of luxury goods, consumption of staple goods (primary, and sometimes secondary) must still be done, even though prices increase. Thus, in the context of a country's economy, high inflation does not always reduce the level of consumption. People still continue to consume needed goods, such as food, clothing, and other necessities, even though overall goods prices rise.

CONCLUSION

Based on the research results entitled 'Analysis of the Influence of GRDP, Population, Minimum Wage, and Inflation on Total Consumption in North Sumatra Province in 2020–2023' it can be concluded that through the Chow test and Hausman test, the most appropriate model to use in this research is the Fixed Effect Model (FEM). Through t-test analysis of that model, it was found that GRDP has a positive influence on total consumption at the significance level $\alpha = 0.01$. While population and inflation do not affect total consumption at $\alpha = 0.01$, minimum wage also has no effect at $\alpha = 0.05$. The F-test results show that at $\alpha = 0.01$, the variables GRDP, population, minimum wage, and inflation simultaneously influence total consumption in North Sumatra in the period 2020-2023. The coefficient of determination (R^2) is 0.443960, which means 44.40% of the variation in total consumption can be explained by these independent variables, while the remaining 55.60% is explained by other independent variables not included in this model.

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