

ANALYSIS OF WHEAT FLOUR DEMAND IN MEDAN CITY

Ummul Hikmah Saragih¹⁾, Dian Hafizah²⁾

Faculty of Agriculture Universitas Andalas, Padang, Indonesia

Corresponding E-mail: ummulhsaragih1511@gmail.com¹⁾, dianhafizah@agr.unand.ac.id²⁾

Abstract

This study analyzes the demand for wheat flour in Medan City, with the aim of determining the effect of wheat flour prices and income on demand. Using the Marshallian Linear Demand model, the data used covers the period 2018-2023. The results of the analysis show that wheat flour prices have a significant effect on demand, with a coefficient of 0.165, while the effect of income is not significant with a coefficient of 0.016. The regression model used shows an R-squared value of 0.842, indicating that this model is able to explain 84.2% of the variation in wheat flour demand. The classical assumption test shows that there are no problems of multicollinearity, heteroscedasticity, and autocorrelation, and the data is normally distributed. These findings provide insight into the dynamics of wheat flour demand and its implications for marketing strategies in the agricultural sector.

Keywords : Demand, Wheat Flour, Price, Revenue and the Marshallian Model

1. INTRODUCTION

Indonesia is an agricultural country where most of its population lives from farming or livelihoods in the agricultural sector. Until now, the majority of the Indonesian population has utilized natural resources to support their lives and depend on the agricultural sector. The agricultural sector has a very important role because it is a producer of food for the population whose numbers continue to increase every year, as a provider of raw materials for industry and for export trade (Suparta, 2010). In Indonesia, the consumption of wheat flour-based foods is increasing. Wheat flour is used to make various types of food, such as bread, biscuits, cakes, instant noodles, and so on. This increase is caused by several factors, including the government's aggressive push for food diversification and the possibility of cheaper wheat flour prices (Food Security Agency).

Demand can be simply defined as the purchase of a certain amount of goods and services at various levels. This is because the term "demand" differs from the conventional definition which means the activity of asking for something (goods and services) for free or without sacrifice. In the context of economics, demand is defined as the activity of buying something that requires sacrifice, namely the power or ability to buy financially. This means that in this demand analysis, there are two keywords: price and income. The demand function usually describes the relationship between the quantity demanded and the variables that affect it at a particular point in time. The demand function can be derived in two ways. The first is by maximizing the consumer's satisfaction with the constraints of the budget quantity and the price of the good. The Marshallian demand function is a result of this principle. The British economist Alfred Marshall first introduced this function in 1890, believing that the consumer's income is fixed.

Medan City as one of the areas with a very dense population and the population in general has increased every year. The demand for wheat flour has a positive impact on the people of Medan City, especially as a raw material for making cakes and other typical souvenirs of Medan City. The price of wheat flour products that are affordable for the community so that demand will always increase as the needs of community demand. According to Adnyana (2006) in Sanim (2014), the diversity of wheat-based processed products causes wheat production and wheat demand to increase in proportion to the level of community consumption related to the level of income and the rate of population growth which is always increasing. The increasing consumption of wheat flour

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processed products has caused an increase in wheat imports by Indonesia to meet the needs of its people.

Wheat flour is one of the most commonly used types of flour in the culinary world. This flour is made from wheat grains that are processed and sifted to produce a soft and smooth texture. Wheat flour has a high protein content and is widely used to make bread, cakes, noodles, and various other dishes. The use of wheat flour in Indonesia was first introduced by European traders in the 19th century when they brought wheat flour from the European continent. At that time, wheat flour was still imported and the price was very expensive so that only a few people could afford it. However, over time, wheat flour became more affordable and became a very popular food ingredient in Indonesia. Judging from the capacity of demand and price of wheat flour in Medan City is still very far from expectations, meaning that the demand for wheat flour in Medan City is still largely imported from other countries so that to meet consumer needs can be seen from the income and price as well as the demand for the goods. For more details can be seen in Table 1.

Table 1 Demand for Wheat Flour in Medan City for the Period 2017-2022

Year	Demand for Wheat Flour in Medan City (Kg) / Year
2017	8,358
2018	7,686
2019	6,762
2020	7.308
2021	9,870
2022	10,835

The table above shows that the demand for wheat flour has decreased significantly. In 2017, demand was recorded at 8,358 kg, dropping to 7,686 kg in 2018, and reaching 6,762 kg in 2019. In 2020, there was a slight increase in demand to 7,308 kg. Then the demand for wheat flour jumped significantly in 2021, reaching 9,870 kg, and continued to increase to 10,835 kg in 2022. This increase indicates a shift in consumption patterns, where people are adapting to new habits and may also increase food preparation activities at home. This study aims to determine the effect of wheat flour prices and income on the demand for wheat flour in Medan City using the Marshallian Linear Demand Function model. In the study it is assumed that the demand for wheat flour is influenced by the price of wheat flour. The development of the average price of wheat flour in Medan City from 2017-2022 is:

Table 2 Wheat Flour Prices in Medan City 2017-2022



The price level of wheat flour in 2017-2022 fluctuated. The highest price of wheat flour was in 2022 and the lowest price of wheat flour was in 2019. One of the most important economic activities is demand; if divided equally, demand contributes 33.3% of economic activity, with production and distribution contributing the largest share. In addition, demand activities have a

large effect or multiplier. This means that if demand increases, sellers will make a profit. On the other hand, a number of manufacturers will increase their production, which generates income such as wages, rent, and interest for owners of production factors. This process of added value to income will occur throughout the operation, starting from the procurement of raw materials, processing, transportation, and finally selling products to customers. Consumer purchasing power depends on the amount of income received, what is ready to be spent and the desired price level. If there is a change in income or price, then the amount of goods demanded will also change. The effect of changes on the amount of goods demanded can be analyzed through mathematical and graphical approaches. In this case, Marshall uses the assumption that other things besides the price of the goods demanded do not change/are constant. So what is meant by demand is the various amounts demanded at various price levels. The mathematical formula is X_d is the quantity of goods X demanded, and P_x is the price of goods X.

Marshall's framework of thought is partial, because it still uses the concept of *ceteris paribus*. A new, more general thought emerged, namely that developed by Walras (Samuelson, 2006). Walras' concept of thought regarding this demand can be formulated as follows:

$$X_j = f(P_{X1}, P_{X2}, \dots, Y, E)$$

Where :

- X_j = Quantity of goods X_j requested
- P_{X1} = Price of item X_1
- Y = Consumer income available for spending
- E = Taste or other unobserved factors
- $P_{X2} \dots P_{Xn}$ = Price of other goods

Demand theory is an economic theory that aims to examine the variables that influence demand that originate from individual consumer behavior. Market demand is the sum of all individual consumer demand for the same goods and time. Individual consumer demand is a relationship that shows the various amounts of goods that are requested and can be purchased by consumers at changing prices if other factors are considered constant.

2. IMPLEMENTATION METHOD

Analysis of the demand for wheat flour in Medan City, the variables in this study are limited to the variable of wheat flour price, income as an independent variable and the variable of wheat flour demand as a dependent variable. The data used is data from 2018-2023. The analysis model used is the Marshallian Linear Demand Function (Brenan and Carrole, 2007) which is formulated as follows:

$$Q_{da} = f(P_{ta}, Y_t)$$

Where :

- Q_{da} = Demand for wheat flour
- P_{TA} = Price of wheat flour
- Y_t = Income

From this model, multiple linear regression analysis tools are used (*Multiple Regression*).

The data analysis method used to determine the effect of income and price on demand uses an econometric model with multiple linear regression equations, as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + e$$

Where :

- Y = Demand for wheat flour
- X_1 = Price of wheat flour
- X_2 = Wheat flour income
- β_0 = Constant
- $\beta_1 \beta_2$ = Coefficient to be estimated
- e = prediction error

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Next, the Classical Assumption test is performed. This includes tests for normality, multicollinearity, heteroscedasticity, and autocorrelation. Data distribution is required for a good regression model to be normal or nearly normal. If the data distribution is not normal, then data transformation is needed, then a good regression model is a regression model that does not occur which combines heteroscedasticity, multicollinearity, and has its own correlation (Ndruru, Situmorang, & Tarigan, 2014).

3. RESULTS AND DISCUSSION

The results of the Marshallian linear demand function model for wheat flour commodities in Medan City are as follows:

Table 3 Regression Calculation Results

	Coefficient	t-ratio	P-Value/Sig
(Constant)	-1316.811	-1,049	0.371
Wheat Flour Price	0.165	3,507	0.039
Income	0.016	0.208	0.848
F-Ratio	7,966		
R-square	0.842		
R-square adjusted	0.736		

Source: Processed data (2024)

From the research results, the final estimator/model equation was obtained, namely:

$$Y = -1316.811 + 0.165 + 0.016 + e$$

- a) At constant (- 1316.811), this is the demand value when all independent variables (price and income) are equal to zero. This negative value indicates that without these factors, the model cannot provide realistic demand.
- b) The coefficient of wheat flour price is 0.165, this shows that with the increase in the price of wheat flour, demand also increases. This indicates that even though the price increases, consumers still buy wheat flour, indicating the inelasticity of demand for basic necessities.
- c) This coefficient shows that every one unit increase in income will increase the demand for wheat flour by 0.016. However, the p-value (0.848) shows that the effect of income is not statistically significant in this model. This can be interpreted that changes in income do not have a significant effect on the demand for wheat flour, perhaps because wheat flour is a staple item that is purchased regardless of income fluctuations.
- d) For the price of wheat flour, the t-ratio is 3.507, which shows that the effect is statistically significant (p-value 0.039 < 0.05). This means that the price of wheat flour has a strong effect on demand.
- e) In contrast, the t-ratio for income is 0.208, which indicates that the effect is not significant (p-value 0.848 > 0.05).
- f) This F-ratio (7.966) shows that the overall regression model is significant. This indicates that at least one of the independent variables (in this case, the price of wheat flour) explains the variance in the demand for wheat flour.
- g) The R-squared shows that 84.2% of the variance in the demand for wheat flour can be explained by the price and income variables. This high value indicates that the model is quite good at explaining demand. The lower adjusted R-squared (73.6%) indicates that when adding variables, the model is not too complicated to explain the variance.

The results of the classical assumption test consisting of the multicollinearity test, heteroscedasticity test, and autocorrelation test are as follows:

1) Multicollinearity Test

Table 4 Multicollinearity Test Results

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Harga (X1)	.727	1.376
	Pendapatan (X1)	.727	1.376

a. Dependent Variable: Permintaan (Y)

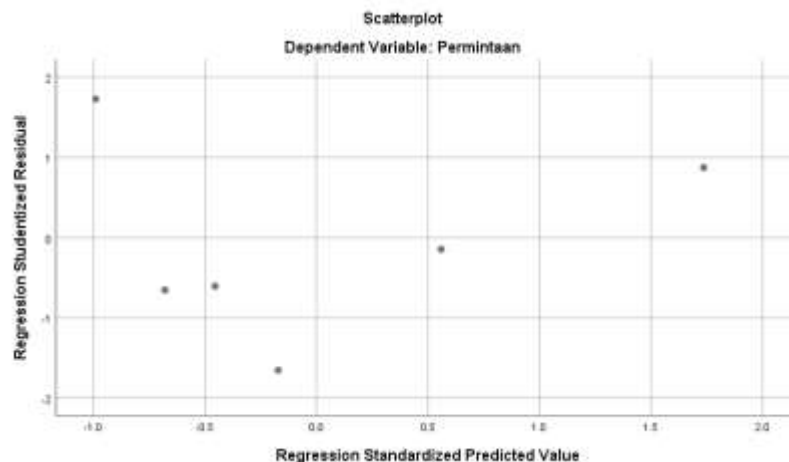
Source: Processed data (2024)

A model is said to have no symptoms of multicollinearity if it has a tolerance value of 0.1 and a VIF value of 10. The results of the multicollinearity test show that price has a tolerance value of 0.727 and a VIF of 1.376 and income has a tolerance value of 0.727 and a VIF of 1.376. So it can be concluded that the two independent variables, namely Income and Price, show a Tolerance value of 0.727 and a VIF of 1.376. Because the VIF value is far below 10, this indicates that there is no significant multicollinearity between these variables. Tolerance of more than 0.1 also indicates that each independent variable is not very related to each other, so we can trust the results of the regression coefficient estimation.

2) Heteroscedasticity Test

In the results of the multiple regression analysis of the wheat flour demand factor, the resulting pattern is that the points are spread above and below the number 0 on the y-axis, so there is no heteroscedasticity.

Table 5 Heteroscedasticity Test Results



Source: Processed data (2024)

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3) Autocorrelation Test

Autocorrelation test is a relationship that occurs between residuals from one observation with another observation. The results of the autocorrelation test can be seen from the DW value obtained of 1.514 where DW between DL 1.743 and DU 1.514, it can be concluded that there are symptoms of autocorrelation so that using the run test value with the provision of a significant value of > 0.05 , there is no autocorrelation. The results obtained from the multiple linear regression analysis, the run test value is 0.648, so there is no autocorrelation.

Table 6 Run Test Results

	Unstandardized Residual
Test Value ^a	-29.20758
Cases < Test Value	3
Cases \geq Test Value	3
Total Cases	6
Number of Runs	3
Z	-.456
Asymp. Sig. (2-tailed)	.648

Source: Processed data (2024)

4) Normality Test

Based on the SPSS output table, it is known that the significance value of Asymp.Sig (2-tailed) is 0.200 which is greater than 0.05. So it can be concluded that the data is normally distributed.

Tabel 7 Normality Test Results

		Unstandardized Residual
N		6
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	76.50502067
Most Extreme Differences	Absolute	.229
	Positive	.229
	Negative	-.197
Test Statistic		.229
Asymp. Sig. (2-tailed)		.200 ^{c,d}

Source: Processed data (2024)

4. CONCLUSION

- The results of the study indicate that the price of wheat flour has a significant effect on demand. The positive coefficient of price (0.165) indicates that even though the price increases, the demand for wheat flour remains high. This reflects the inelastic nature of

demand for staple goods, where consumers tend to continue buying even though prices increase.

- The effect of income on demand is not significant (coefficient 0.016 and p-value 0.848). This shows that changes in income do not directly affect the demand for wheat flour, perhaps because of its nature as a staple food that is still purchased despite income fluctuations.
- The R-squared value of 0.842 indicates that this model can explain 84.2% of the variation in the demand for wheat flour, indicating that this regression model is quite good. The results of the classical assumption test indicate that there is no significant multicollinearity, heteroscedasticity, and autocorrelation, supporting the validity of the model.
- Based on Marshallian theory, this analysis confirms that demand for goods is influenced by price and income, although in this context, price has a stronger impact than income. This shows the importance of considering external factors that influence people's consumption patterns, especially in the context of basic goods such as wheat flour.
- This study suggests further monitoring of other factors that may influence the demand for wheat flour, such as changes in consumer tastes and overall economic conditions.

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