A Quantitative Assessment of Price and Income Effects on Cooking Oil Demand

Fahrial
Universitas Islam Riau; Pekanbaru, Indonesia
E-mail: fahrial2018@agr.uir.ac.id

Alfando Syahputra Ginting
Universitas Islam Riau; Pekanbaru, Indonesia
E-mail: alfandosyahputraginting@student.uir.ac.id

Submitted:
MARCH 2025

Accepted:
JUNE 2025

ABSTRACT

Cooking oil is a vital household commodity in Indonesia, yet its demand faces challenges from rising prices, limited availability, varying income levels, and shifting market preferences. These factors influence consumption patterns, particularly in rural areas where economic and market conditions differ from urban settings. This study aims to examine household characteristics, explore the nature of cooking oil demand, and identify factors influencing this demand in Pematang Tebih Village, Ujungbatu Subdistrict, Rokan Hulu Regency, Riau Province. Using a survey method, data were collected from 86 households across five hamlets, selected via simple random sampling. Descriptive analysis outlined household profiles and consumption patterns, while multiple linear regression analysis determined key influencing factors. Findings reveal that households, with an average age of 32 to 36 years and three family members, earn approximately 5,701,163 Indonesian Rupiah monthly. Most prefer packaged cooking oil priced between 15,000 and 17,000 Indonesian Rupiah per liter, with Minyakita as the dominant brand, consuming up to 4 liters monthly. Key factors affecting demand include prices of palm, bulk, and coconut cooking oils, wheat flour price, population income, and population size, explaining 85.1 percent of demand variation. In conclusion, these insights highlight the need for stable pricing and supply strategies to enhance affordability and food security in rural communities.

Keywords: *Consumption Behavior, Consumption Patterns, Cooking Oil, Food Security.*

ABSTRAK

Minyak goreng merupakan komoditas rumah tangga yang vital di Indonesia, namun permintaannya menghadapi tantangan dari kenaikan harga, ketersediaan yang terbatas, tingkat pendapatan yang bervariasi, dan pergeseran preferensi pasar. Faktor-faktor ini memengaruhi pola konsumsi, khususnya di daerah pedesaan di mana kondisi ekonomi dan pasar berbeda dari lingkungan perkotaan. Penelitian ini bertujuan untuk mengkaji karakteristik rumah tangga, mengeksplorasi sifat permintaan minyak goreng, dan mengidentifikasi faktor-faktor yang memengaruhi permintaan ini di Desa Pematang Tebih, Kecamatan Ujungbatu, Kabupaten Rokan Hulu, Provinsi Riau. Dengan menggunakan metode survei, data dikumpulkan dari 86 rumah tangga di lima dusun, yang dipilih melalui pengambilan sampel acak sederhana. Analisis deskriptif menguraikan profil rumah tangga dan pola konsumsi, sementara analisis regresi linier berganda menentukan faktor-faktor utama yang memengaruhi. Temuan penelitian mengungkapkan bahwa rumah tangga, dengan usia rata-rata 32 hingga 36 tahun dan tiga anggota keluarga, memperoleh sekitar 5.701.163 Rupiah Indonesia per bulan. Sebagian besar lebih menyukai minyak goreng kemasan dengan harga antara 15.000 dan 17.000 Rupiah Indonesia per liter, dengan Minyakita sebagai merek dominan, yang mengonsumsi hingga 4 liter setiap bulan. Faktor-faktor utama yang memengaruhi permintaan meliputi harga minyak goreng kelapa sawit, curah, dan kelapa, harga tepung terigu, pendapatan penduduk, dan jumlah penduduk, yang menjelaskan 85,1 persen variasi

JIMKES

Jurnal Ilmiah Manajemen Kesatuan
Vol. 13 No. 4, 2025
pp. 2545-2556
IBI Kesatuan
ISSN 2337 – 7860
E-ISSN 2721 – 169X
DOI: 10.37641/jimkes.v13i4.3378

permintaan. Sebagai kesimpulan, wawasan ini menyoroti perlunya strategi harga dan pasokan yang stabil untuk meningkatkan keterjangkauan dan ketahanan pangan di masyarakat pedesaan.

Kata Kunci: *Perilaku Konsumsi, Pola Konsumsi, Minyak Goreng, Ketahanan Pangan.*

INTRODUCTION

Indonesia, endowed with vast natural resources, stands as a global leader in palm oil production, a cornerstone of its economy and a critical component of household consumption. In 2023, the palm oil industry contributed approximately 3.5% to Indonesia's Gross Domestic Product (GDP), with Riau Province alone producing 8.79 million tons, making it a key supplier of cooking oil, an essential household commodity (Statistics Indonesia, 2024). Cooking oil is integral to Indonesian culinary practices, used daily across diverse socio-economic groups for frying, sautéing, and other cooking methods, with palm oil dominating due to its affordability and availability (Siregar et al., 2022). In rural areas like Pematang Tebih Village, Ujungbatu Subdistrict, Rokan Hulu Regency, Riau Province, cooking oil demand is shaped by unique economic and market dynamics, including price volatility, income disparities, and limited access to modern retail (Wahyuni & Pratama, 2023). These factors create distinct consumption patterns compared to urban settings, where market access and consumer preferences differ significantly (Rahmawati et al., 2021). This study examines household characteristics, analyzes the nature of cooking oil demand, and identifies key influencing factors to address food security and inform market stabilization strategies.

The palm oil sector's economic significance extends beyond production to its role in household food security. Cooking oil prices have experienced notable fluctuations, with an average annual increase of 9.05% from 2001 to 2015, driven by supply-demand imbalances and global market trends (Astuty et al., 2018). In 2022, Indonesia faced a cooking oil scarcity crisis, with prices for packaged oil rising by up to 40% in some regions, exacerbating affordability challenges in rural areas (Pratiwi et al., 2023). Traditional markets offer a range of cooking oils, from bulk options priced at IDR 11,000 per liter to premium brands like Tropical at IDR 21,000 per liter (Pematang Tebih Market, 2024). These price variations influence household purchasing decisions, often leading to a preference for affordable brands like Minyakita, supported by government subsidies to enhance accessibility (Fitriani & Syaifuddin, 2023). Rural households, constrained by lower incomes averaging IDR 5,701,163 monthly in the study area, exhibit selective purchasing behavior, balancing cost, quality, and availability, a pattern amplified by limited bargaining power in traditional markets (Kembaren, 2024; Susanti & Raharjo, 2022).

Socio-economic factors further shape cooking oil consumption patterns. Income levels directly affect purchasing power, with higher-income households opting for packaged oils, while lower-income households may reuse oil or choose cheaper bulk alternatives, often compromising nutritional quality (Jusuf et al., 2023; Lestari & Nugroho, 2023). In rural settings, where agriculture and small-scale trade dominate, economic constraints amplify the impact of price increases, potentially compromising dietary practices and food security (Nugroho et al., 2022). For instance, larger families in Pematang Tebih, typically comprising three to four members, require more cooking oil, increasing demand sensitivity to price changes (Setiawan & Hartono, 2024). Additionally, market access plays a critical role, as some hamlets in the village rely solely on traditional markets due to their distance from modern retail outlets like Indomaret or Alfamart, limiting brand variety and increasing reliance on local suppliers (Mulyana et al., 2024; Pratomo & Widodo, 2023). These dynamics highlight the need to understand localized consumption patterns to develop targeted interventions for rural communities.

Despite extensive research on cooking oil demand, significant gaps persist in understanding rural-specific patterns. Urban-focused studies, such as Putra et al. (2019) in Denpasar, emphasize price and substitution effects but overlook rural socio-economic

constraints and market structures. Similarly, Mawardati et al. (2023) analyzed price impacts on food consumption in Aceh Province but provided limited insights into rural household adaptations. The 2022 cooking oil crisis, as discussed by Pratiwi et al. (2023), highlighted supply chain disruptions but lacked focus on how rural households navigate price spikes and brand availability (Aditya & Santoso, 2022). Recent studies underscore the role of agricultural information systems in enhancing rural market efficiency, yet they rarely address cooking oil specifically (Santoso et al., 2024; Widjaja & Kurniawan, 2023). These gaps indicate a need for region-specific research that captures the interplay of price, income, and market access in shaping rural demand, informing policies to enhance food security and market stability in rural Indonesia.

This study addresses these gaps by focusing on a rural area with diverse socio-economic conditions and reliance on traditional markets. The research has three objectives: first, to examine household characteristics, including age, family size, and income; second, to investigate the nature of cooking oil demand, including price, type, and consumption volume; and third, to identify key factors influencing demand, such as prices of palm, bulk, coconut, and olive oils, wheat flour, chicken meat, rice, population income, and population size. By grounding the analysis in a rural context, this study draws on economic theories of consumer behavior, particularly the theory of demand, which posits that consumption is influenced by price, income, and substitute goods. The findings aim to contribute to a deeper understanding of household resilience and inform policies to enhance food security and market stability in rural Indonesia.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Price Effects and Cooking Oil Demand

Cooking oil prices are a critical determinant of household demand, particularly in rural Indonesia where economic constraints shape purchasing decisions. Astuty et al. (2018) found that in Gampong Lamtimpeung, Aceh Besar, a rise in bulk cooking oil prices led to a significant reduction in demand, as households shifted to cheaper alternatives or reduced consumption. In Pematang Tebih Village, similar price sensitivity is observed, with packaged cooking oil prices (IDR 15,000–17,000 per liter) driving preferences for affordable brands like Minyakita, supported by government subsidies (Fitriani & Syaifuddin, 2023). Putra et al. (2019) noted in Denpasar that higher packaged oil prices increase demand for bulk oil, indicating a substitution effect relevant to rural markets where bulk oil is widely available. Coconut cooking oil, often used as an alternative to palm oil, influences demand when its price fluctuates, as households weigh cost against availability (Jusuf et al., 2023). Olive oil, however, is rarely used in rural areas due to its high cost, suggesting minimal impact on palm oil demand (Kembaren, 2024). The theory of price elasticity of demand (Mankiw, 2020) posits that an increase in the price of a good reduces its demand, especially when substitutes are accessible, which is critical in rural contexts with limited market options. These price dynamics highlight the need for stable pricing to ensure affordability and food security in rural households.

H1: Price of packaged oil has a positive effect on demand.
H2: Price of bulk cooking oil has a positive effect on demand.
H3: Price of coconut cooking oil has a positive effect on demand.
H4: Price of olive cooking oil has a positive effect on demand.

Substitute Goods and Cooking Oil Demand

The prices of substitute goods, such as wheat flour, chicken meat, and rice, significantly influence cooking oil demand by altering household consumption patterns. Mawardati et al. (2023) reported that in Aceh Province, rising cooking oil prices prompted households to shift to boiling or steaming, increasing reliance on rice and wheat flour-based dishes to reduce oil usage. In Pematang Tebih Village, wheat flour price affects cooking oil demand, as households adjust recipes to manage expenses, favoring flour-

based foods when oil prices rise (Kembaren, 2024). Chicken meat, commonly fried with cooking oil, may see reduced demand when oil prices increase, but rural households often use alternative cooking methods like boiling, diminishing its impact (Jusuf et al., 2023). Rice, a staple in Indonesian diets, competes with cooking oil for budget allocation, potentially reducing oil consumption when rice prices rise, as households prioritize staple foods (Santoso et al., 2024). The theory of cross-price elasticity by Varian (2010) explains that the price of substitute goods affects the demand for a primary good, with higher substitute prices either increasing or decreasing demand based on consumption habits. In rural areas, where budgets are constrained, these substitution effects are pronounced, necessitating a deeper understanding of how substitute goods shape cooking oil consumption to inform food security strategies.

H5: Price of wheat flour has a positive effect on demand.
H6: Price of chicken meat has a positive effect on demand.
H7: Price of rice has a positive effect on demand.

Socio-Economic Influences on Cooking Oil Demand

Socio-economic factors, such as household income and population size, play a pivotal role in shaping cooking oil demand in rural Indonesia. Simanjuntak (2000) argued that productive-age individuals (15–55 years) are more open to market innovations, influencing brand choices based on price and availability, as seen in Pematang Tebih Village where housewives, typically aged 32–36 years, prefer affordable brands like Minyakita. Household income directly affects purchasing power, with higher-income households opting for packaged oils, while lower-income households choose bulk options to manage costs (Jusuf et al., 2023). Larger family sizes, common in the study area with three to four members, increase cooking oil consumption due to greater food preparation needs, amplifying demand sensitivity to price changes (Santoso et al., 2024). The theory of consumer choice by Varian (2010) suggests that income and household characteristics determine consumption decisions within budget constraints, with rural households prioritizing affordability over brand loyalty (Mawardati et al., 2023). These socio-economic dynamics are critical in rural settings where agriculture dominates, and income disparities heighten price sensitivity, necessitating localized research to address food security and market stability.

H8: Population income has a positive effect on demand.
H9: Number of residents has a positive effect on demand.

The research framework integrates the factors influencing household cooking oil demand in Pematang Tebih Village, as depicted in Figure 1. The dependent variable, cooking oil demand (Y), is hypothesized to be influenced by nine independent variables: prices of packaged (X1), bulk (X2), coconut (X3), and olive (X4) cooking oils; prices of wheat flour (X5), chicken meat (X6), and rice (X7); population income (X8); and number of residents (X9). These variables are grounded in the theories of price elasticity, cross-price elasticity, and consumer choice (Mankiw, 2020; Varian, 2010).

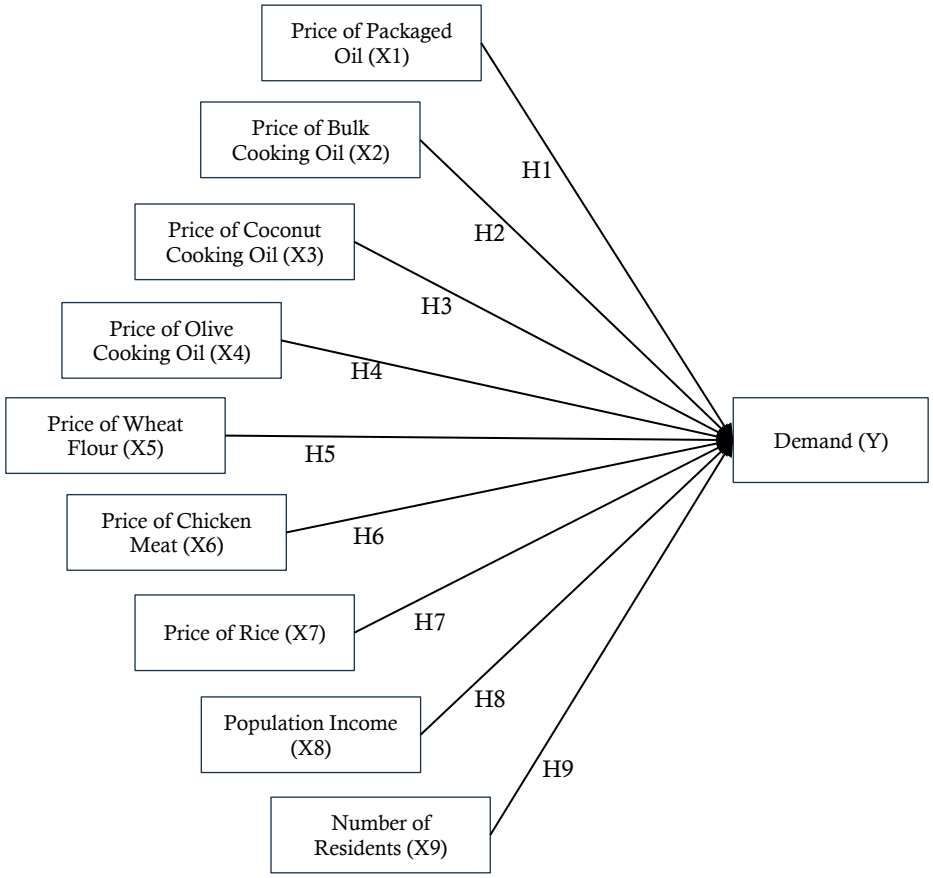

Figure 1. Research Framework

RESEARCH METHOD

This quantitative study investigates household cooking oil demand in Pematang Tebih Village, Ujungbatu District, Rokan Hulu Regency, Riau Province. The village was selected for its diverse socio-economic conditions and access to traditional markets offering various cooking oil brands. Conducted from October 2023 to March 2024, the research involved questionnaire design, structured interviews, and statistical analysis. The population includes households across five hamlets, with two located near modern retail outlets (Indomaret, Alfamart) and three farther away, providing a comparative view of market access and consumption. A total of 86 households were selected using simple random sampling, representing about 3% of the population. This meets the minimum threshold suggested by Djarwanto and Subagyo (1993) for valid statistical analysis. Data collected covered household demographics (age, income, family size) and details on cooking oil use (price, type, volume). Interviews with housewives, the primary decision-makers, ensured accuracy in capturing consumption behavior and influencing factors.

The analysis combined descriptive and quantitative methods to provide a comprehensive understanding of cooking oil demand. Descriptive analysis summarized household profiles and consumption patterns, presenting data on income, expenditure, and consumption volumes in a narrative format based on field observations. For quantitative analysis, multiple linear regression was applied using SPSS and Microsoft Excel to identify factors influencing demand, with data transformed into logarithmic form for linearity, as recommended by Gujarati (2015). The regression model is expressed as:

$$Y = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 + b8X8 + b9X9 + e$$

The demand for cooking oil (Y), measured in liters per month, is influenced by a number of independent variables analyzed through a linear regression model. In this model, a is the intercept or constant, while b1 to b9 are regression coefficients that indicate the level of influence of each independent variable on demand. These variables include: X1, the price of packaged cooking oil (IDR/liter), X2 the price of bulk cooking oil (IDR/liter), X3 the price of coconut oil (IDR/liter), X4 the price of olive oil (IDR/liter), X5 the price of wheat flour (IDR/kg), X6 the price of chicken meat (IDR/kg), X7 the price of rice (IDR/kg), X8 the population income (IDR/month), and X9 the population (people). In addition, there is e which represents a confounding variable (error term) that reflects other factors outside the model that can affect the amount of demand for cooking oil.

The study's empirical approach ensured robustness through statistical tests. A multicollinearity test confirmed the independence of variables, with Variance Inflation Factors (VIF) below 10 and tolerance values above 0.10. Heteroscedasticity and autocorrelation tests verified the model's assumptions, showing random residual distribution and a Durbin-Watson statistic of 1.984, indicating no serial correlation. These tests enhance the reliability of the regression results, supporting the analysis of factors influencing cooking oil demand in Pematang Tebih Village and their implications for rural food security and market stability.

RESULTS

The characteristics of a person describe the condition or state and status of the person. The characteristics of the respondent's household are observed from several variables that can provide an overview of the demand for household cooking oil, including age, family members, household income, and household expenditure.

The survey conducted in Pematang Tebih Village from October 2023 to March 2024 provides detailed insights into household characteristics and cooking oil demand, based on responses from 86 households across five hamlets. Table 1 summarizes the socio-economic profile and cooking oil consumption patterns of these households. Most housewives, the primary decision-makers for household purchases, are aged 32–36 years (22.09%), with the smallest group aged 22–26 years (5.81%), indicating a predominantly productive population capable of making informed purchasing decisions. Family sizes are typically small, with 40.70% of households having three members and only 1.16% having six. Household heads are primarily farmers (25.58%) or drivers (18.60%), while housewives are mostly homemakers (46.51%) or self-employed (17.44%). The average household income is IDR 5,701,163, with 60.47% earning between IDR 4,000,000 and IDR 6,500,000 monthly. In terms of cooking oil, 37.21% of households prefer packaged oil priced IDR 15,000–17,000 per liter, with Minyakita being the top brand (39.53%) due to its affordability, while Sania is least preferred (8.14%). Monthly consumption peaks at 4 liters (37.21%), reflecting significant reliance on cooking oil for daily culinary needs.

Table 2 presents the results of the multiple linear regression analysis identifying factors influencing household cooking oil demand. The price of palm cooking oil negatively affects demand, with a coefficient of -0.10408, indicating that a IDR 1,000 price increase reduces demand by 0.10408 liters ($p = 0.00367$, significant at 10%). Bulk cooking oil price, however, positively influences demand (coefficient 0.23231, $p = 0.02237$), suggesting households switch to packaged oil when bulk prices rise. Coconut cooking oil price (coefficient -0.01139, $p = 0.00048$) and wheat flour price (coefficient -0.04576, $p = 0.03590$) also significantly reduce demand. Olive oil price ($p = 0.85911$) and chicken meat price ($p = 0.32919$) show no significant effect, while rice price ($p = 0.20555$) is also insignificant. Population income (coefficient 0.00013, $p = 0.00161$) and population size (coefficient 3.56645, $p = 0.00000$) positively drive demand, consistent with findings that higher income enhances purchasing power. The R^2 value of 0.851 indicates that 85.1% of demand variation is explained by these variables, with the F-test ($F = 48.112$, $p = 0.000$) confirming model significance.

Table 1. Household and Cooking Oil Demand Characteristics

Category	Variable	Freq.	Percentage (%)
Age of Housewives	22–26 years	5	5.81
	27–31 years	15	17.44
	32–36 years	19	22.09
	37–41 years	15	17.44
	42–46 years	6	6.98
	47–51 years	6	6.98
	52–56 years	8	9.30
	57–61 years	12	13.95
Family Members	2	22	25.58
	3	35	40.70
	4	26	30.23
	5	2	2.33
	6	1	1.16
Head of Family Occupation	Bike shop	2	2.33
	Plantation Foreman	6	6.98
	Civil Servant	4	4.65
	Employees	5	5.81
	Sales	9	10.47
	Builder	14	16.28
	Farmer	22	25.58
	Teacher	2	2.33
	Driver	16	18.60
	Self-employed	6	6.98
Housewife Occupation	Housewife	40	46.51
	Laundry	7	8.14
	Photocopy	2	2.33
	Mobile Phone Counter	4	4.65
	Teacher	4	4.65
	Self-employed	15	17.44
	Wholesale Spare Parts	1	1.16
	Farmer	4	4.65
	Tailor	2	2.33
	Midwife	4	4.65
	Civil Servant	3	3.49
Household Income (Rp/Month)	1,000,000–3,500,000	10	19.23
	4,000,000–6,500,000	52	60.47
	7,000,000–10,000,000	22	25.58
	>10,000,000	2	2.33
Cooking Oil Price (Rp/Liter)	15,000–17,000	32	37.21
	18,000–20,000	28	32.56
	>20,000	26	30.23
Cooking Oil Brand	Minyakita	34	39.53
	Bimoli	11	12.79
	Sunco	12	13.95
	Tropical	11	12.79
	Fortune	11	12.79
	Sania	7	8.14
Consumption (Liters/Month)	2	21	24.42
	3	26	30.23
	4	32	37.21
	5	1	1.16
	6	6	6.98

Table 3 displays the results of the multicollinearity test, ensuring the regression model's variables are independent. All tolerance values exceed 0.10, with the lowest being 0.32716 for coconut cooking oil price, and all VIF values are below 10, with the highest at 3.05658 for coconut cooking oil price. These results confirm the absence of multicollinearity, indicating that the independent variables—prices of palm, bulk, coconut, and olive

cooking oils, wheat flour, chicken meat, rice, population income, and population size—do not exhibit problematic correlations. This ensures the reliability of the regression coefficients for interpreting the factors affecting cooking oil demand in Pematang Tebih Village.

Table 2. Dominant Factors Affecting

Variables	Estimation Parameters	T-value	Sig
Constants	1877.84223	1.21411	0.22846
Palm Oil Cooking Oil Price	-0.10408	-2.99846	0.00367*
Bulk Cooking Oil Prices	0.23231	2.33159	0.02237*
Coconut Cooking Oil Price	-0.01139	-3.64814	0.00048*
Olive Cooking Oil Price	-0.00059	-0.17811	0.85911
Wheat Flour Price	-0.04576	-2.13593	0.03590*
Chicken Meat Price	-0.03613	-0.98204	0.32919
Rice Price	-0.09218	-1.27683	0.20555
Population Income	0.00013	3.27149	0.00161*
Total population	3.56645	17.39653	0.00000*
R-Square (R^2)	0.851		
F count	48.112		
F sig	0.000		

Description: *confidence level of α = 10 percent

Table 3. Multicollinearity Test Results

Variable	Tolerance	VIF
Price of Palm Cooking Oil (X_1)	0.64771	1.54391
Bulk Cooking Oil Price (X_2)	0.46032	2.17243
Coconut Cooking Oil Price (X_3)	0.32716	3.05658
Olive Cooking Oil Price (X4)	0.46203	2.16434
Wheat Flour Price (X5)	0.83444	1.19841
Chicken Meat Price (X6)	0.58055	1.72251
Rice Price (X7)	0.61350	1.62999
Population Income (X8)	0.77040	1.29803
Population (X9)	0.80415	1.24355

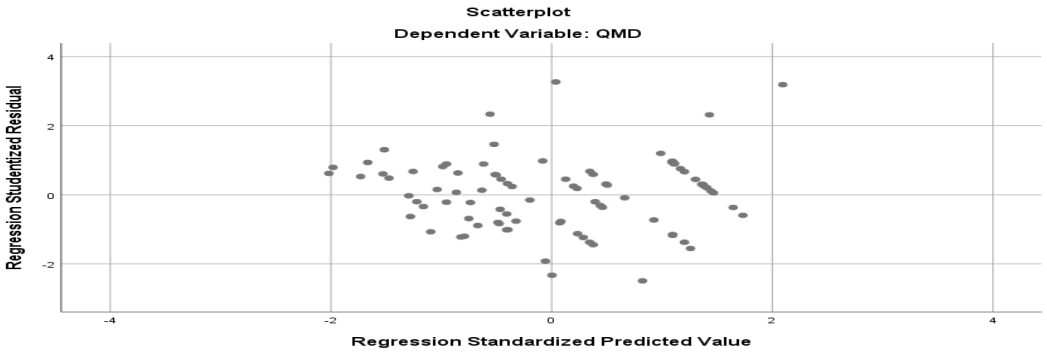

Figure 2. Heteroscedasticity Test Results

Figure 2 illustrates the heteroscedasticity test results, conducted to verify the regression model's assumption of constant variance. The scatterplot shows points distributed randomly without forming a specific pattern, indicating no heteroscedasticity in the model (Ghozali, 2011). This randomness confirms that the variance of residuals is consistent across the range of predicted values, supporting the model's suitability for analyzing cooking oil demand. The absence of heteroscedasticity enhances confidence in the regression results, ensuring that the estimated effects of price and socio-economic factors are unbiased.

Table 4 presents the autocorrelation test results, assessing whether the regression model's residuals are free from serial correlation. The Durbin-Watson statistic of 1.984 falls between the upper critical value (dU = 1.8853) and 4-dU (2.1147), indicating no

autocorrelation in the model. This result validates the independence of residuals, ensuring that the regression model accurately captures the relationship between independent variables and cooking oil demand without time-series bias. The model's robustness is thus confirmed, supporting its use for policy and market analysis in Pematang Tebih Village.

Table 4. Autocorrelation Test Results

Metric	Value
R	0. 922
R Square	0.851
Adjusted R Square	0.833
Std. Error of the Estimate	594.25
Durbin-Watson	1.984

Table 5. Hypothesis Testing Results for Cooking Oil Demand

Hypothesis	Coefficient	p-value	Result
H1	-0.10408	0.00367	Supported
H2	0.23231	0.02237	Supported
H3	-0.01139	0.00048	Supported
H4	-0.00059	0.85911	Not Supported
H5	-0.04576	0.03590	Supported
H6	-0.03613	0.32919	Not Supported
H7	-0.09218	0.20555	Not Supported
H8	0.00013	0.00161	Supported
H9	3.56645	0.00000	Supported

Table 5 shows results of hypothesis testing. The significant variables' directions and implications are as follows. The price of packaged cooking oil (H1, coefficient = -0.10408, p = 0.00367) negatively affects demand, indicating that a IDR 1,000 increase reduces demand by 0.10408 liters. This suggests that higher prices push households toward cheaper alternatives, necessitating stable pricing to maintain affordability. Conversely, the price of bulk cooking oil (H2, coefficient = 0.23231, p = 0.02237) positively affects demand, as households switch to packaged oil when bulk prices rise, highlighting substitution effects critical for market strategies. Coconut cooking oil price (H3, coefficient = -0.01139, p = 0.00048) negatively impacts demand, suggesting that its role as a substitute reduces palm oil consumption when prices increase, requiring balanced pricing of alternative oils. Wheat flour price (H5, coefficient = -0.04576, p = 0.03590) negatively affects demand, as households shift to flour-based foods to manage costs, indicating the need for integrated food pricing policies. Population income (H8, coefficient = 0.00013, p = 0.00161) positively influences demand, as higher incomes enable greater expenditure on cooking oil, underscoring the importance of economic empowerment for food security. The number of residents (H9, coefficient = 3.56645, p = 0.00000) strongly increases demand, reflecting higher consumption needs in larger households, suggesting that population growth drives market demand. Non-significant variables—olive oil price (H4, p = 0.85911), chicken meat price (H6, p = 0.32919), and rice price (H7, p = 0.20555)—do not affect demand, likely due to olive oil's limited use, alternative cooking methods for chicken, and rice's staple status in budgets. These findings inform policies to stabilize prices and enhance rural household access to affordable cooking oil.

DISCUSSION

The findings provide significant insights into household cooking oil demand, revealing the interplay of price, substitute goods, and socio-economic factors in a rural context. The regression analysis, with an R^2 of 0.851, indicates that 85.1% of demand variation is explained by the prices of packaged (H1), bulk (H2), and coconut (H3) cooking oils, wheat flour (H5), population income (H8), and number of residents (H9). The negative effect of packaged cooking oil price (coefficient = -0.10408, p = 0.00367) aligns with Astuty et al. (2018), who found that price increases in Aceh Besar reduced bulk oil demand as

households shifted to cheaper alternatives. Similarly, the positive effect of bulk oil price (coefficient = 0.23231, p = 0.02237) supports Putra et al. (2019), who observed in Denpasar that higher bulk oil prices drive demand for packaged oil, reflecting substitution effects in Pematang Tebih where households prefer Minyakita when bulk prices rise. Coconut oil's negative impact (coefficient = -0.01139, p = 0.00048) is consistent with Jusuf et al. (2023), indicating that rural households switch to coconut oil when palm oil becomes costly, highlighting the need for competitive pricing of alternative oils to stabilize consumption.

Unexpectedly, the price of rice (H7, p = 0.20555) was not significant, despite rice being a staple in Indonesian diets. Mawardati et al. (2023) found that rising cooking oil prices in Aceh led to increased reliance on rice-based dishes, suggesting that rice price might influence oil demand indirectly through budget allocation. In Pematang Tebih, rice's staple status may prioritize its consumption over oil, diluting its direct impact on demand, which warrants further investigation into dietary preferences. Similarly, olive oil price (H4, p = 0.85911) and chicken meat price (H6, p = 0.32919) were not significant, aligning with Kembaren (2024), who noted olive oil's limited use in rural Sumatra due to its high cost and cultural unfamiliarity. Chicken meat's lack of impact may stem from rural households' preference for boiling over frying, reducing reliance on cooking oil (Jusuf et al., 2023). These findings suggest that rural consumption patterns differ from urban contexts, where substitute goods may play a larger role, emphasizing the need for region-specific studies.

The significant positive effects of population income (H8, coefficient = 0.00013, p = 0.00161) and number of residents (H9, coefficient = 3.56645, p = 0.00000) corroborate Simanjuntak (2000), who highlighted that higher incomes and larger family sizes increase consumption of staples like cooking oil. In Pematang Tebih, households with an average income of IDR 5,701,163 and three members consume up to 4 liters monthly, reflecting higher demand driven by economic capacity and family size. Wheat flour's negative effect (H5, coefficient = -0.04576, p = 0.03590) aligns with Mawardati et al. (2023), as households shift to flour-based foods when oil prices rise, indicating dietary adaptation to manage costs. These findings underscore the importance of economic empowerment and stable supply chains to enhance purchasing power and meet growing demand in rural areas with increasing populations.

Policy implications are critical for addressing these dynamics. The preference for Minyakita (39.53%) highlights the effectiveness of government subsidies, as noted by Fitriani and Syaifuddin (2023), in ensuring affordability during price spikes, such as the 2022 scarcity (Pratiwi et al., 2023). Policymakers should expand subsidized oil distribution to rural traditional markets, where access to modern retail is limited, to enhance food security. Additionally, integrating pricing policies for substitute goods like wheat flour could stabilize household budgets, preventing shifts away from cooking oil. The regression model's robustness is supported by multicollinearity tests (VIF < 10, tolerance > 0.10), heteroscedasticity tests (random residual distribution), and a Durbin-Watson statistic of 1.984, indicating no autocorrelation. However, model limitations include its focus on a single village, potentially limiting generalizability, and the exclusion of factors like health awareness or supply chain disruptions, which could influence demand. Future research should incorporate these variables and expand to multiple rural areas to capture broader dynamics, informing comprehensive strategies for market stability and household resilience.

CONCLUSION

This study enriches the understanding of household cooking oil demand by revealing how price, substitute goods, and socio-economic factors shape rural consumption. By explaining 85.1% of demand variation through variables like packaged, bulk, and coconut oil prices, wheat flour price, household income, and family size, it highlights the economic constraints and adaptive strategies of rural households. Unlike urban-centric research, this work emphasizes the challenges of limited market access and reliance on

traditional markets, contributing to knowledge on food security and rural economics. The preference for affordable brands like Minyakita and an average consumption of 4 liters monthly underscore household resilience amid price volatility, offering a foundation for policy and research to address rural needs.

To enhance food security, policymakers should expand subsidized oil programs to traditional markets in remote areas, ensuring affordability for households with modest incomes. Coordinated pricing for substitute goods like wheat flour can prevent dietary shifts that compromise nutrition, while improved rural supply chains will address access disparities. Strengthening partnerships with suppliers to maintain quality and competitive pricing can support households preferring moderately priced oil, mitigating the impact of market fluctuations. Future research should build on these insights by studying multiple rural areas to improve generalizability, overcoming the limitation of a single-village focus. Exploring variables like health awareness or supply chain disruptions could uncover additional demand drivers, while longitudinal studies would track consumption changes over time. Combining quantitative regression with qualitative methods, such as interviews, can provide deeper insights into household decision-making, informing strategies to strengthen rural food systems and ensure sustainable access to cooking oil.

Acknowledgement

This article needs support for business cooking oil because the supply and demand production cooking oil and potential production, income, and population to the demand for cooking oil is 85.1%. in Pematang Tebih Village, Ujungbatu District, Rokan Hulu Regency, Riau Province.

REFERENCES

[1] Andini, R., Lubis, S. N., & Ayu, S. F. (2018). Analysis of beef demand in Medan City. *Journal of Agriculture and Agribusiness Socioeconomics, 2*(12), 15173.

[2] Antriyandarti, E., Melati, N. S. K., & Maulana, R. A. (2024). Understanding factors affecting rice purchasing decisions in Indonesia: Does rice brand matter?. *Open Agriculture*, *9*(1), 282-303.

[3] Astriwati, A., Arifin, A., Tambunan, R., & Nur, M. (2024). Analysis of factors that affect the understanding of MSME players in preparing financial reports. *Jurnal Ilmiah Manajemen Kesatuan*, *12*(2), 329–336.

[4] Astuty, D. E., Mustafa, U., & Teuku, F. (2018). Analysis of factors affecting household consumer demand for bulk cooking oil in Gampong Lamtimpeung, Darussalam District, Aceh Besar. *Scientific Journal of Agricultural Students, Unsyiah, 3*(2), 145–159.

[5] Bergmann, D., O'Connor, D., & Thümmel, A. (2016). An analysis of price and volatility transmission in butter, palm oil and crude oil markets. *Agricultural and Food Economics*, *4*(1), 1-23.

[6] Djarwanto, P. S., & Subagyo, P. (1993). *Inductive statistics* (4th ed.). Yogyakarta: BPFE.

[7] Ebrahim, Z., Inderwildi, O. R., & King, D. A. (2014). Macroeconomic impacts of oil price volatility: mitigation and resilience. *Frontiers in Energy*, *8*(1), 9-24.

[8] Eka, M. D. (2023). *Pengaruh harga minyak goreng dan panic buying terhadap keputusan pembelian dalam perspektif bisnis syariah (Studi pada konsumen minyak goreng di Bandar Lampung)* (Doctoral dissertation, Lampung: UIN Raden Intan Lampung).

[9] Ezeaku, H. C., Asongu, S. A., & Nnanna, J. (2021). Volatility of international commodity prices in times of COVID-19: Effects of oil supply and global demand shocks. *The extractive industries and society*, *8*(1), 257-270.

[10] Fitriani, Q., & Syaifuddin, T. (2023). Grocery store in Simpar Village (Case study on Munir Grocery Store). *Sahmiyya Journal, 2*(1), 133–142.

[11] Ghozali, I. (2011). *Application of multivariate analysis with SPSS program*. Semarang: Diponegoro University Publishing Agency.

[12] Gujarati, D. (2015). Factors influencing consumer research process: Target market, purchasing behavior and market demand (Literature review of consumer behavior). *Journal of Applied Management Science, 3*(5), 504–514.

[13] Hanjra, M. A., & Qureshi, M. E. (2010). Global water crisis and future food security in an era of climate change. *Food policy*, *35*(5), 365-377.

[14] Hapsa, H., Baidawi, A., & Salmia, S. (2022). Responsibilitas Pemerintah Daerah dalam Mengatasi Ketidak Stabilan Harga Minyak Goreng di Provinsi Jambi. *Jurnal Sains Sosio Humaniora*, *6*(1), 1160-1168.

[15] Heydari, J., Govindan, K., & Jafari, A. (2017). Reverse and closed loop supply chain coordination by considering government role. *Transportation Research Part D: Transport and Environment*, *52*, 379-398.

[16] Jusuf, C. I., Indriani, R., & Adam, E. (2023). Socio-economic factors of the community and cooking oil consumption patterns in Pulubala Village, Gorontalo City. *Scientific Journal of Village and Agriculture Development, 8*(6), 223–233.

[17] Kembaren, E. T. (2024). Analysis of household income impact on packaged palm cooking oil consumption in Sumatra, Indonesia. *Asian Economic and Financial Review*, *14*(12), 958-971.

[18] Lestari, T., & Nugroho, A. (2023). Nutritional impacts of cooking oil reuse in low-income rural households in Indonesia. *Journal of Food Security Studies*, *6*(1), 78–92.

[19] Liu, X., Li, J., Wu, J., & Zhang, G. (2017). Coordination of supply chain with a dominant retailer under government price regulation by revenue sharing contracts. *Annals of Operations Research*, *257*(1), 587-612.

[20] Mankiw, N. G. (2020). *Principles of Economics*. Boston: Cengage Learning.

[21] Mawardati, Jullimursyida, Azhar, I., Mayada, & Juwita, E. (2023). The impact of increasing cooking oil prices on food consumption patterns in various household income groups in Aceh Province. *International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration, 3*(1), 289–295.

[22] Mulyana, S., Wulandari, J., & Liani, F. (2024). Pengaruh pasar modern terhadap keberlangsungan pasar tradisional di Indonesia. *Jurnal Kolaboratif Sains*, *7*(12), 4689-4695.

[23] Najifaturrahmi, N., & Aisyah, S. (2023). Influencing factors on the quality of financial statements in Micro, Small, and Medium Enterprises: Accounting understanding and work experience. *Jurnal Ilmiah Manajemen Kesatuan*, *11*(2), 545–554.

[24] Nugroho, H. Y. S. H., Indrawati, D. R., Wahyuningrum, N., Adi, R. N., Supangat, A. B., Indrajaya, Y., ... & Hani, A. (2022). Toward water, energy, and food security in rural Indonesia: A review. *Water*, *14*(10), 1645-1666.

[25] Pratiwi, D. S., Arkusi, F., & Wardani, K. H. J. (2023). Analisis faktor–faktor yang menyebabkan kelangkaan minyak goreng Indonesia tahun 2022. *Jurnal Economina, 2*(12), 3688–3696.

[26] Pratomo, D., & Widodo, T. (2023). Market access constraints and food commodity availability in rural Indonesia. *Journal of Development Studies*, *59*(5), 672–689.

[27] Putra, I. M. A. D., Susrusa, K. B., & Artini, N. W. P. (2019). Analysis of household consumer demand for bulk cooking oil in Denpasar City. *Journal of Agribusiness and Agritourism, 8*(2), 195.

[28] Putri, N. S., Sitepu, U. B., & Ningtias, Y. A. (2025). Dampak perubahan permintaan dan penwaran terhadap harga keseimbangan di pasar Indonesia. *Jurnal Manajemen Bisnis Modern*, *7*(1), 59-68.

[29] Rahmawati, D., Susilo, Y., & Hartono, D. (2021). Urban-rural disparities in cooking oil consumption patterns in Indonesia. *Journal of Consumer Behavior Studies*, *7*(2), 112–125.

[30] Santoso, A. B., Girsang, S. S., Raharjo, B., Pustika, A. B., Hutapea, Y., Kobarsih, M., ... & Sudarmaji. (2024). Assessing the challenges and opportunities of agricultural information systems to enhance farmers' capacity and target rice production in Indonesia. *Sustainability*, *15*(2), 1097-1114.

[31] Scott, G. J., & Vigo, E. (2023). Growth, innovation, and policy for chicken in Latin America 1961–2019. *Development Policy Review*, *41*(1), 612-631.

[32] Setiawan, B., & Hartono, S. (2024). Family size and food consumption patterns in rural Indonesian households. *Asian Journal of Agricultural Development*, *21*(2), 134–149.

[33] Simanjuntak, P. J. (2000). *Labor productivity*. Jakarta: Grafindo.

[34] Siregar, H. H., Suryana, A., & Arifin, B. (2022). Palm oil as a dominant cooking oil in Indonesia: Production and consumption trends. *Journal of Agricultural Economics and Development*, *10*(3), 215–228.

[35] Statistics Indonesia. (2024). *Indonesian palm oil statistics 2022*. Jakarta: Statistics Indonesia.

[36] Susanti, R., & Raharjo, B. (2022). Bargaining power and household purchasing decisions in rural Indonesian markets. *Journal of Rural Economics*, *9*(4), 301–314.

[37] Varian, H. R. (2010). *Intermediate Microeconomics: A Modern Approach*. W.W. New York: Norton & Company.

[38] Wahyuni, S., & Pratama, A. (2023). Economic dynamics of cooking oil demand in rural Riau: A case study of traditional markets. *Indonesian Journal of Rural Studies*, *5*(1), 45–58.

[39] Wahyuningtyas, A. S. H., Abidin, Z., Putri, W. D. R., Maligan, J. M., Berlian, G. O., & Ningrum, P. F. W. (2024). Consumer's willingness to try new microalgae-based food in Indonesia. *Journal of Agriculture and Food Research*, *18*(1), 151-167.

[40] Yuniar, P. (2024). *Analisis marketing mix terhadap keputusan pembelian melalui minat beli (studi persepsi konsumen minyak goreng minyakita di Kabupaten Pasangkayu): analysis of marketing mix on purchasing decisions through purchase intention (study of consumer perceptions of minyakita cooking oil in Pasangkayu district)* (Doctoral dissertation, Makassar: Universitas Hasanuddin).