DIJEFA: Dinasti International Journal of Economics, Finance & Accounting
E-ISSN: 2721-303X
P-ISSN: 2721-3021
https://dinastipub.org/DIJEFA dinasti.info@gmail.com +62 811 7404 455

DOI: https://doi.org/10.38035/dijefa.v7i1.6294
https://creativecommons.org/licenses/by/4.0/
Received: 04 February 2026 | **Revised:** 16 February 2026 | **Accepted:** 06 March 2026

The Relationship Between Smoking and Poverty in Indonesia

Rasyidusman Hannamara Furqan Nur
Politeknik Negeri Lhokseumawe, Aceh, Indonesia, rhfnur9@pnl.ac.id

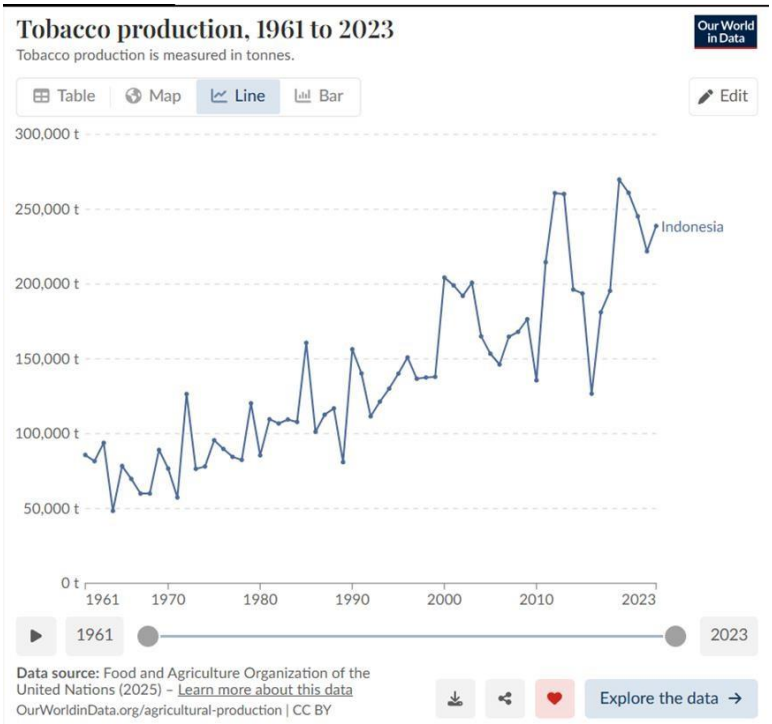
Corresponding Author: rhfnur9@pnl.ac.id

Abstract: This study aims to analyze the relationship between per capita cigarette expenditure and poverty levels in Indonesia based on the type of cigarette consumption. The method used is panel data analysis with the Common Effect Model (CEM) approach using data from 33 provinces during the 2019–2024 period sourced from the Central Statistics Agency (BPS). The dependent variable in this study is the poverty rate, while the independent variables include expenditure on cigarettes and tobacco (X_1), filtered kretek cigarettes (X_2), unfiltered kretek cigarettes (X_3), white cigarettes (X_4), tobacco (X_5), and other cigarettes and tobacco (X_6). The results show that simultaneously, all independent variables have a significant effect on poverty. Partially, unfiltered kretek cigarettes (X_3) have a positive and significant effect, indicating that increased consumption of this type worsens poverty conditions. Meanwhile, white cigarettes (X_4), tobacco (X_5), and other cigarettes and tobacco (X_6) have a negative and significant effect, indicating that these types are consumed more by people with high purchasing power. In general, cheap cigarettes consumed by low-income groups are a factor that exacerbates poverty.

Keywords: cigarette expenditure, poverty, kretek cigarettes, tobacco.

INTRODUCTION

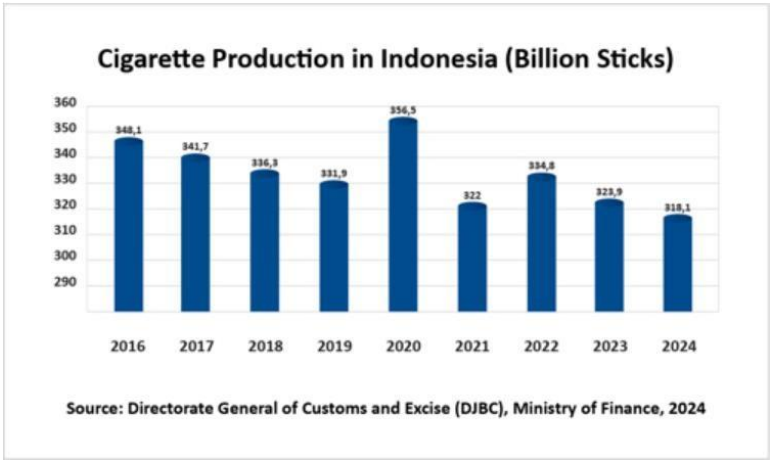
Nurhayati et al. (2024) shows that Indonesia is one of the world's largest tobacco producers and has one of the highest smoking rates in the world. Many Indonesian teenagers start consuming tobacco products, mostly driven by curiosity. Although the government prohibits the purchase of tobacco for those under the age of 18, in 2023 alone, the smoking rate in Indonesia has reached around 38 percent. It is estimated that this figure will continue to increase and reach around 38.6 percent by 2029.



Graph 1. Tobacco Production in Indonesia 1961 - 2023

On the other hand, according to Jeffrey Drope, PhD, Research Professor at Johns Hopkins University, Director of Economic Research for Health, and Principal Investigator at tobaccoatlas, it is estimated that 225,579 tons of tobacco were produced in Indonesia in 2022, where 204,933 hectares of tobacco farmland were cultivated. This high-quality agricultural land could actually be used to grow staple foods for the poor (Drope et al., 2025).

Based on FAO data, tobacco production in Indonesia has increased dramatically from less than 100,000 tons in 1961 to nearly 250,000 tons in 2023. The trend is fluctuating but generally positive throughout the period from 1961 to 2023. A sharp increase in tobacco production in Indonesia occurred in the 2000s and 2010s. Production also declined abruptly around 2015. However, production increased again afterwards. The tobacco industry certainly benefits significantly from the production and sale of tobacco in Indonesia. It is estimated that around 282,482,600,000 cigarettes were produced in Indonesia in 2023 alone from tobacco grown on high-quality agricultural land (Atlas, 2018).



Graph 2. Cigarette Production in Indonesia 2016 - 2024

The data from the Ministry of Finance above, as shown in Figure 2, shows a dominant downward trend in cigarette production in Indonesia from 2015 to 2023. However, there was a significant increase in 2019. Nevertheless, cigarette production declined significantly in the following year (Ahsan et al., 2020). In 2023, production reached its lowest level in Indonesia, at around 318.1 billion sticks. This decline reflects the impact of tobacco consumption control policies and a shift in public preference due to the negative health effects of smoking (CRIFASIA, 2024).

Smoking in Indonesian culture is closely linked to masculinity. This culture has been exploited by cigarette companies that emphasize the correlation between cigarettes and characteristics traditionally considered masculine in Indonesia, such as strength, heroism, and self- control (Florenta et al., 2022). Tobacco marketing techniques then use these characteristics to associate tobacco products with traits traditionally considered masculine, such as strength, heroism, and self- control. This is why Indonesia is considered one of the world's largest tobacco producers and has the highest smoking rate in the world, as previously mentioned by Holipah et al. (2020).

However, there are significant negative impacts on Indonesian citizens at the same time. The more tobacco produced in Indonesia, the greater the economic costs that must be paid. The economic cost of smoking in Indonesia is estimated to reach 288,054,294,795,929 rupiah. This price level includes direct costs related to health expenditures as well as indirect costs related to lost productivity due to illness and premature death. In addition, spending on tobacco diverts funds that families could otherwise use to escape poverty. On average in Indonesia, a smoker must spend 5.0% of GDP per capita to buy 100 packs of the most popular cigarettes in a year. Not to mention that there are 268,614 deaths due to smoking (Gan et al., 2022).

Tobacco consumption can be seen as one of the factors that has the potential to worsen poverty through two main mechanisms: first, spending on tobacco reduces household allocation for basic needs such as food, education, and health; second, the burden of disease and lost productivity affects the economic capacity of households and communities at the same time (Nkomo & Adanlawo, 2025).

Thus, high cigarette production and consumption, coupled with the economic burden they cause, make cigarettes an important concern in the context of poverty. Significant cigarette expenditure by low-income households shifts the allocation of funds from productive needs to non-productive consumption, hindering welfare improvement and reinforcing the cycle of poverty (PKJS-UI, 2021) .

Based on the results of research conducted by the University of Indonesia on the analysis of the influence of socioeconomic factors, income, and cigarette prices on cigarette consumption in Indonesia, it is known that socioeconomic factors such as gender and age do not significantly affect cigarette consumption in Indonesia. In addition, income and cigarette prices also do not significantly affect the level of cigarette consumption among Indonesians. According to (Aditya et al., 2025), the Labor Force Participation Rate (LFPR) and smoking behavior have a positive and significant effect on poverty rates, while the growth rate of the Gross Regional Domestic Product (GRDP) has a negative and significant effect on poverty on the island of Java.

Based on the results of the study (Swarnata et al., 2024) tobacco consumption has a significant impact on poverty in Indonesia. Household expenditure on tobacco and health costs due to smoking are considered wasteful expenditure, so the national poverty rate increases by between 2.84 and 3.2 percentage points, or the equivalent of an additional 7.5 to 8.77 million poor people. According to the results of the study (Lubis et al., 2022), cigarette consumption in Indonesia has a positive and significant effect on poverty levels, meaning that the higher the cigarette consumption, the greater the incidence of poverty.

This article aims to identify the relationship between cigarette consumption and poverty, given the significant negative impact on economic costs for the poor, both direct costs related to health expenditures and indirect costs due to reduced productivity caused by illness and premature death.

METHODS

This study examines the relationship between smoking and poverty in Indonesia. It uses a quantitative approach with panel data analysis methods that combine two dimensions of data, namely cross-section and time series. This approach was chosen because it is able to capture inter- provincial variations in Indonesia as well as the dynamics of change over time during the 2019–2024 period. The panel data method is considered relevant for explaining the relationship between cigarette consumption and poverty levels, given the heterogeneity of socioeconomic characteristics between regions and significant temporal trends.

The data used in this study is secondary data obtained from official publications of the Central Statistics Agency (BPS). The data includes the total poverty rate by province and the average per capita expenditure of the cigarette and tobacco group per province. The study period covers 2019-2024 with 33 provinces as cross-sectional units and six years of observation as time series units. All data are compiled in panel format and processed using EViews software.

The variables used in this study consist of one dependent variable, five main independent variables, and one control variable. The dependent variable is the total poverty rate, which is measured based on the percentage of poor people to the total population in each province. The main independent variables consist of five types of per capita cigarette expenditure, namely expenditure on cigarettes and tobacco (X_1), filtered kretek cigarettes (X_2), unfiltered kretek cigarettes (X_3), white cigarettes (X_4), tobacco (X_5), and other cigarettes and tobacco (X_6). This research model can be written in logarithmic function form as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Where Y is the total poverty rate, a is a constant, and β_1 to β_6 are regression coefficients that indicate the direction and magnitude of the influence of each independent variable on the poverty rate. X_1 is expenditure on filtered kretek cigarettes, X_2 is expenditure on unfiltered kretek cigarettes, X_3 is expenditure on white cigarettes, X_4 is expenditure on tobacco, X_5 is expenditure on other cigarettes and tobacco, and X_6 is GRDP per capita as a control variable. Meanwhile, e is an error term that includes other factors outside the model that also influence the poverty rate. The expected coefficient signs in this study are positive for all cigarette expenditure variables ($\beta_1 - \beta_5 > 0$), which means that an increase in cigarette consumption has the potential to increase poverty levels, and negative for the per capita income variable ($\beta_6 < 0$), which indicates that an increase in income will reduce poverty levels in Indonesia.

RESULTS AND DISCUSSION

Table 1. Lagrange Multiplier (LM) Test

	Test Hypothesis		
	Cross-section	**Time**	**Both**
Breusch-Pagan	1.623400	17.72439	19.34779
	(0.2026)	(0.0000)	(0.0000)

Based on the data obtained from the LM test presented in Table I, it shows that the Breusch- Pagan value is 0.2026, which is greater than the threshold of 0.05. Therefore, it can be concluded that the best model selected is the Common Effect Model (CEM).

Panel Data Regression Test

$$Y = 1719.06898344 + 0.0164308128058*X_1 - 0.0881905532524*X_2 + 0.269635296574*X_3 - 0.252373688316*X_4 + 0.0353789867538*X_5 - 0.0341713491367*X_6$$

The regression analysis shows that the constant value of 1719.07 represents the estimated poverty rate when all independent variables are assumed to be zero. This constant reflects the baseline level of poverty that exists independently of cigarette and tobacco expenditure as well as per capita income. In other words, it describes the underlying poverty condition that is not directly influenced by the explanatory variables included in the model.

With regard to cigarette expenditure, spending on filter kretek cigarettes (X_1) has a positive coefficient of 0.0164, indicating that an increase in expenditure on this type of cigarette is associated with an increase in the poverty rate, holding other variables constant. Similarly, expenditure on non-filter kretek cigarettes (X_3) also shows a positive relationship with poverty, with a coefficient of 0.2696. These results suggest that higher spending on certain types of cigarettes may place an additional financial burden on households, potentially contributing to higher poverty levels.

In contrast, expenditure on filter cigarettes (X_2) demonstrates a negative coefficient of −0.0882, implying that a one-unit increase in spending on this category is associated with a decrease in the poverty rate. A similar pattern is observed for white cigarette expenditure, which has a negative coefficient of −0.2524. These negative coefficients indicate that not all cigarette consumption is associated with higher poverty and may reflect differences in consumer socioeconomic characteristics or spending capacity across cigarette types.

Furthermore, tobacco expenditure (X_5) shows a positive coefficient of 0.0354, suggesting that increased spending on tobacco products is associated with a higher poverty rate. This finding reinforces the notion that tobacco-related expenditures can reduce disposable income available for essential needs. Conversely, cigarettes and other tobacco products (X_6), which are closely related to GRDP per capita, exhibit a negative coefficient of −0.0342. This indicates that an increase in per capita income is associated with a reduction in the poverty rate, highlighting the important role of income growth in poverty alleviation.

Overall, these results demonstrate that the relationship between cigarette and tobacco expenditure and poverty is heterogeneous. Certain categories of cigarette consumption are associated with increased poverty, while others show an inverse relationship, likely reflecting underlying differences in income levels and consumption behavior. These findings underscore the importance of considering the type of tobacco consumption and broader economic conditions when analyzing the impact of cigarette expenditure on poverty.

T-test

Table 2. t-test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1719.069	330.9916	5.193693	0.0000
X_1	0.016431	0.074382	0.220899	0.8254
X_2	-0.088191	0.075635	-1.166004	0.2451
X_3	0.269635	0.076223	3.537447	0.0005
X_4	-0.252374	0.114559	-2.203007	0.0288
X_5	0.035379	0.287541	0.123040	0.9022

X_6	-0.034171	0.020043	-1.704944	0.0898

The partial regression results indicate that not all cigarette and tobacco expenditure variables have a statistically significant effect on poverty levels. The Cigarettes and Tobacco variable (X_1) shows a t-statistic value of 0.2209 with a probability value of 0.8254, which is greater than the 5% significance level. This result indicates that total expenditure on cigarettes and tobacco does not have a significant effect on poverty levels in Indonesia. In other words, variations in overall cigarette and tobacco spending are not sufficient to explain changes in poverty across provinces.

Similarly, expenditure on filter cigarettes (X_2) does not show a significant relationship with poverty. The t-statistic value of −1.1660 and a probability value of 0.2451 (> 0.05) indicate that the effect of filter cigarette consumption on poverty levels is statistically insignificant. Although the coefficient is negative, suggesting a potential inverse relationship, the effect is not strong enough to meaningfully explain interprovincial variations in poverty.

In contrast, expenditure on filterless kretek cigarettes (X_3) demonstrates a positive and statistically significant effect on poverty levels. This variable has a t-statistic value of 3.5374 with a probability value of 0.0005, which is well below the 5% significance threshold. This finding suggests that higher household expenditure on unfiltered kretek cigarettes is associated with higher poverty rates. The result implies that spending on this type of cigarette may impose a financial burden on households, reducing their ability to meet basic needs and thereby increasing poverty levels.

The White Cigarette variable (X_4) shows a negative and statistically significant relationship with poverty. With a t-statistic value of −2.2030 and a probability value of 0.0288 (< 0.05), the results indicate that increased expenditure on white cigarettes is associated with lower poverty levels. This relationship may reflect differences in socioeconomic characteristics among consumers, as white cigarette consumption is generally more common among higher-income groups, whose spending patterns are less constrained by poverty.

Meanwhile, the Tobacco variable (X_5) does not have a significant effect on poverty levels. The t-statistic value of 0.1230 and a probability value of 0.9022 (> 0.05) suggest that variations in tobacco expenditure alone do not significantly influence poverty differences across provinces. This indicates that tobacco spending, when considered separately, is not a decisive factor in explaining poverty dynamics.

Finally, the Cigarettes and Other Tobacco Products variable (X_6) shows a negative effect on poverty at the 10% significance level. The t-statistic value of −1.7049 with a probability value of 0.0898 (< 0.10) indicates that higher expenditure in this category tends to reduce poverty levels, although the effect is relatively weak. This finding suggests that this variable may be capturing broader economic conditions, such as higher per capita income, which are associated with lower poverty rates.

F-test

Table 2. F-test

R-squared	0.263926
Adjusted R-squared	0.240803
S.E. of regression	935.5594
Sum of squared residuals	1.67E+08
Log likelihood	-1631.933
F-statistic	11.41412
Probability of F-statistic	0.00000

Based on the analysis results, the F-Statistic Probability value is 0.000000 < 0.05, so it can be concluded that the variables Cigarettes and Tobacco (X_1), Filter Cigarettes (X_2), Unfiltered Cigarettes (X_3), White Cigarettes (X_4), Tobacco (X_5), and Other Cigarettes and Tobacco (X_6) simultaneously have a significant effect on the poverty rate (Y). This means that, collectively, all types of cigarette expenditure and per capita income variables are able to explain the variation in poverty levels in Indonesia.

Determination Test

Table 3. Determination Test

R-squared	0.263926
Adjusted R-squared	0.240803
Standard Error of Regression	935.5594
Sum of squared residuals	1.67E+08
Log likelihood	-1631.933
F-statistic	11.41412

In addition, the R-squared value of 0.263926 indicates that approximately 26.39% of the variation in poverty levels can be explained by the independent variables in the model, while the remaining 73.61% is explained by other factors outside the model, such as education, inflation, and employment opportunities. The Adjusted R-squared value of 0.240803 also reinforces that this model has moderate ability in explaining the relationship between cigarette expenditure and poverty levels between provinces in Indonesia during the research period.

Relationship between Cigarette and Tobacco Expenditures (X_1) and Poverty (Y)

Based on the results of the panel data regression model estimation using the Common Effect Model (CEM) approach, the Cigarettes and Tobacco (X_1) variable has a coefficient of 0.016431 with a t-statistic value of 0.220899 and a probability (significance) value of 0.8254 > 0.05. These results indicate that aggregate cigarette and tobacco expenditure does not have a significant effect on poverty levels in Indonesia. This means that changes in total expenditure on cigarettes and tobacco do not necessarily cause changes in poverty levels between provinces in the 2019–2024 period.

Economically, these results indicate that although spending on cigarettes and tobacco is an important component of household consumption in Indonesia, the magnitude of this spending variation is not strong enough to explain the variation in poverty rates between regions. This may occur for two main reasons. First, cigarette expenditure is relatively stable and inelastic to changes in income, especially among low-income groups. Even when income rises or falls, smoking habits are maintained, so fluctuations in cigarette expenditure do not reflect significant changes in household economic conditions.

Second, these results may also be due to differences in consumption patterns between urban and rural areas. In urban areas, people tend to consume higher-priced manufactured cigarettes, while in rural areas, local tobacco or hand-rolled cigarettes are more commonly used because they are cheaper. As a result, when cigarette and tobacco expenditure data are aggregated into a single variable (X_1), the specific effect on poverty becomes statistically insignificant because the different types of consumption cancel each other out.

These results differ from several studies (Darden et al., 2025; Jin & Cho, 2021; Lal et al., 2022; Lichner & Ostrihoň, 2025; Lubis et al., 2022). However, this difference can be explained by the difference in the focus of the variables: previous studies mostly used cigarette expenditure as a proportion of total household income, while this study used the nominal value of weekly per capita expenditure, so that the direct relationship with poverty became weaker.

Although not statistically significant, the positive direction of the coefficient indicates a tendency that an increase in total expenditure on cigarettes and tobacco has the potential to increase poverty levels. This is in line with the opportunity cost of consumption theory, which states that every rupiah allocated to unproductive consumption (such as cigarettes) will reduce the household's ability to meet basic needs or make productive investments. If this habit continues, its impact could slow down welfare improvement and increase the risk of long-term poverty.

Thus, although the relationship between total spending on cigarettes and tobacco and poverty has not been statistically proven to be significant, the direction of the influence still provides an important signal for policymakers. The government needs to pay attention to household consumption patterns of cigarette and tobacco products as a whole, not only from a health perspective but also from a household economic perspective. Public education and more inclusive tobacco consumption control policies at the local level can help reduce unproductive spending, especially among low-income communities.

The Relationship between Filter Cigarette Expenditures (X_2) and Poverty (Y)

Based on the estimation results using the Common Effect Model (CEM), the Filter Cigarette (X_2) variable has a coefficient of −0.088191 with a t-statistic value of −1.166004 and a probability (significance) of 0.2451 > 0.05. These results indicate that filter kretek cigarette expenditure has a negative but insignificant effect on poverty levels in Indonesia. This means that changes in public expenditure on filter kretek cigarettes have not been statistically proven to affect variations in poverty levels between provinces during the 2019–2024 research period.

Economically, the negative sign on the coefficient indicates that an increase in spending on filtered kretek cigarettes tends to correlate with a decrease in poverty levels, although the relationship is not significant. This may be because filtered kretek cigarettes are consumed more by the middle class, not the poor. In middle- to upper-income communities, increased consumption of filter kretek cigarettes does not reduce the ability to meet basic needs, so it does not have a direct impact on poverty. Thus, this negative relationship illustrates differences in consumption patterns based on community income levels.

In addition, the characteristics of filter kretek cigarettes, which are industrial products with relatively higher prices compared to hand-rolled or non-filter cigarettes, may also explain why their expenditure is not strongly correlated with poverty. Poor people tend to consume cheaper types of cigarettes such as hand-rolled tobacco or non-filter cigarettes, so that variations in expenditure on filter kretek cigarettes better reflect the consumption behavior of groups with higher purchasing power.

The results of this study are in line with the findings Nasrudin et al. (2013) and Yurekli et al. (2016). Therefore, although cigarette consumption in general has the potential to worsen welfare conditions, certain types of cigarettes, such as filtered kretek cigarettes, are not always the main determinant of poverty at the aggregate level.

Thus, it can be concluded that expenditure on filtered kretek cigarettes (X_2) does not have a significant relationship with poverty in Indonesia. However, the negative coefficient direction still indicates that consumption of this type tends not to be the main burden for poor households. Tobacco control policies should continue to be directed at types of consumption that are more dominant among low-income communities, such as unfiltered cigarettes or rolled tobacco, so that their impact on poverty alleviation is more effective.

The Relationship between Unfiltered Kretek Cigarette Expenditures (X_3) and Poverty (Y) Based on the estimation results using the Common Effect Model (CEM), the Unfiltered Kretek Cigarette variable (X_3) has a coefficient value of 0.269635, a t-statistic value of 3.537447, and a probability (significance) of 0.0005 < 0.05. These results indicate that expenditure on unfiltered kretek cigarettes has a positive and significant effect on poverty

levels in Indonesia. Thus, the higher the household expenditure on unfiltered kretek cigarettes, the more poverty levels tend to increase significantly.

Economically, these results confirm that unfiltered kretek cigarettes are the most widely consumed type of cigarette among low-income communities. These cigarettes are generally sold at more affordable prices and are easily accessible in rural areas and small towns. Poor communities tend to maintain this smoking habit despite their limited income, so that most household expenditures are diverted from productive needs (such as nutritious food, education, or health) to cigarette consumption. This phenomenon is known as the "crowding-out effect," where cigarette consumption displaces the allocation of expenditures for basic needs.

This significant positive correlation also shows that smoking habits among low-income groups can worsen economic welfare. The greater the proportion of income allocated to cigarette consumption, the less able households are to meet other productive needs. As a result, these households tend to remain poor or find it difficult to escape long-term poverty.

These results are in line with the findings Melinda et al. (2025); Swarnata et al. (2024); and Welker (2024). Thus, it can be concluded that expenditure on unfiltered kretek cigarettes (X_3) has a positive and significant effect on poverty, meaning that increased consumption of this type of cigarette actually worsens poverty levels in Indonesia. This finding has important implications for public policy: controlling cigarette consumption among low-income communities needs to focus on unfiltered kretek cigarettes through policies such as excise tax increases, health education, and household economic awareness campaigns. These policies are expected to reduce the economic burden caused by unproductive cigarette consumption while accelerating the decline in the national poverty rate.

Relationship between White Cigarette Expenditure (X_4) and Poverty (Y)

Based on the estimation results using the Common Effect Model (CEM), the White Cigarette variable (X_4) has a coefficient value of −0.252374, a t-statistic value of −2.203007, and a probability (significance) value of 0.0288 < 0.05. These results indicate that the White Cigarette variable has a negative and significant effect on poverty levels in Indonesia. This means that an increase in household expenditure on white cigarettes is correlated with a decrease in interprovincial poverty levels during the 2019–2024 research period.

Economically, the negative coefficient sign indicates that white cigarette consumption is generally dominated by middle- to high-income groups. White cigarettes are known as premium cigarette products with relatively higher prices compared to kretek or rolled tobacco cigarettes. Therefore, increased spending on white cigarettes does not reflect an increase in the economic burden on poor households, but rather illustrates the higher purchasing power of middle-income communities. In other words, regions with higher white cigarette spending tend to have lower poverty rates because the consumer group does not come from the poor segment of society.

These results are also in line with the theory of income elasticity of demand, which explains that consumer goods such as white cigarettes have positive income elasticity; the higher a person's income, the greater their ability to consume high-priced goods. In this context, an increase in white cigarette consumption is an indirect indicator that people's purchasing power has increased and poverty levels have decreased.

Empirically, these findings support the view of Darden et al. (2025); Lubis et al. (2022); Ma et al. (2025); and Pramita & Khoirunurrofik (2025). Poor communities tend to consume unfiltered kretek cigarettes or rolled tobacco because they are cheaper, while the middle and upper classes prefer white cigarettes, which are considered more modern and classy. Therefore, an increase in spending on white cigarettes in a region reflects better economic conditions rather than worsening poverty.

However, these results do not mean that white cigarette consumption has no negative social or economic impact. In the long term, spending on cigarettes, regardless of type, has the potential to reduce welfare if it is not balanced with increased productivity or public health awareness. However, statistically and economically, spending on white cigarettes (X_4) in the context of this study shows a significant negative relationship with poverty levels, indicating that white cigarettes are consumed more by people with high purchasing power and do not worsen poverty conditions in Indonesia.

Relationship between Tobacco Expenditures (X_5) and Poverty (Y)

Based on the estimation results using the Common Effect Model (CEM), the Tobacco variable (X_5) has a coefficient value of −0.252374, a t-statistic value of −2.203007, and a probability (significance) value of 0.0288 < 0.05. These results indicate that tobacco expenditure has a negative and significant effect on poverty levels in Indonesia. In other words, an increase in per capita expenditure on tobacco is correlated with a decrease in interprovincial poverty levels during the 2019–2024 period.

Economically, the negative sign on the coefficient indicates that tobacco consumption may not fully represent the burdensome consumption behavior of poor households. Instead, tobacco is often consumed as a substitute for more expensive manufactured cigarettes. People in rural or low- income areas generally buy rolled tobacco or shredded tobacco because the price per stick is much cheaper than manufactured cigarettes. Thus, when tobacco expenditure increases, it may reflect an increase in community economic activity in the agricultural or local tobacco trade sectors, rather than an increase in the consumption burden of poor households.

In addition, increased tobacco consumption may also indicate the existence of a productive economic role in tobacco-producing areas. In several provinces, such as East Java, Central Java, and West Nusa Tenggara, the tobacco industry is still one of the sources of community income. An increase in spending in this sector may indicate an increase in income for farmers or tobacco workers, which contributes to a reduction in poverty rates. In other words, this negative relationship is not solely due to consumption behavior , but also because of the role of tobacco as a local economic commodity that absorbs labor and generates income.

These findings are consistent with the research of (Lubis et al., 2021) , (Swarnata et al., 2022) , (Setiyani & Kristiyanto, 2023) , and (Marianti & Prayitno, 2020) . However, this negative relationship must be interpreted with caution, as increased tobacco consumption still has long-term adverse effects on health and labor productivity, which could ultimately worsen welfare conditions.

Thus, the results of this study can be interpreted as indicating that tobacco expenditure (X_5) has a negative and significant effect on poverty, meaning that in the short term, increased economic activity related to tobacco contributes to a decline in poverty rates in Indonesia. However, in the long term, the government needs to balance the economic benefits of the tobacco sector with the socio-economic risks posed by high consumption of tobacco products. Economic diversification programs in tobacco-producing regions can be an effective policy strategy to reduce dependence on this commodity without sacrificing the welfare of local communities.

The Relationship between Cigarette and Other Tobacco Expenditures (X_6) and Poverty (Y) Based on the estimation results using the Common Effect Model (CEM), the Cigarettes and Other Tobacco Products (X_6) variable has a coefficient value of −0.034171, a t-statistic value of −1.704944, and a probability (significance) value of 0.0898 < 0.10. These results indicate that spending on cigarettes and other tobacco products has a negative and significant effect at the 10% level on poverty rates in Indonesia. In other words, an increase in per capita spending on cigarettes and other tobacco products tends to correlate with a decrease in poverty rates, although the strength of the effect is relatively weak.

Economically, the negative sign indicates that consumption of cigarettes and other types of tobacco is likely not dominated by poor communities. Products in this category include processed tobacco or alternative types of cigarettes that are relatively more expensive, such as electronic cigarettes, cigars, or tobacco products with special blends. Therefore, an increase in spending on this category reflects an increase in purchasing power and welfare of the community in certain areas, rather than an increase in economic burden.

These results can also be explained by differences in consumption behavior between income groups. Low-income communities tend to consume conventional cigarettes such as unfiltered kretek, while middle- and high-income communities are shifting to alternative products that fall under the category of "cigarettes and other tobacco products." Thus, the negative correlation found does not mean that consumption of these types of products directly reduces poverty, but rather reflects higher welfare indicators in regions with greater spending in this category.

These findings are in line with research (Lubis et al., 2021) , (Swarnata et al., 2022) , (Setiyani & Kristiyanto, 2023) , and (Marianti & Prayitno, 2020) . However, it is important to note that this negative effect does not mean that the consumption of other types of cigarettes does not have negative social or economic impacts. In the long term, tobacco consumption remains risky in terms of reducing labor productivity and increasing the burden on health. Therefore, public policy should not only focus on controlling conventional cigarette consumption, but also pay attention to shifts in consumption patterns toward alternative cigarette products that can cause new health problems among the middle class.

Overall, the analysis results show that spending on cigarettes and other tobacco products (X_6) has a negative and significant effect on poverty. This indicates that increased consumption in this category tends to occur in regions with higher economic welfare. Nevertheless, from a policy perspective, the government still needs to monitor consumption trends of alternative tobacco products so that they do not develop into new forms of tobacco dependence that could impact the social and health aspects of society in the future.

CONCLUSION

Based on the results of panel data analysis of 33 provinces in Indonesia during the 2019–2024 period using the Common Effect Model (CEM) approach, this study concludes that the relationship between per capita cigarette expenditure and poverty levels in Indonesia varies depending on the type of cigarette consumed. Simultaneously, all cigarette and tobacco expenditure variables were found to have a significant effect on poverty levels, indicating that cigarette consumption is closely related to community welfare. However, partial analysis revealed variations in the direction and level of influence between cigarette types.

The cigarette and tobacco variable (X_1) and filtered kretek cigarettes (X_2) did not have a significant effect on poverty, indicating that spending on these two types was not strong enough to explain the variation in poverty levels between provinces ( ). Conversely, the variable of unfiltered kretek cigarettes (X_3) has a positive and significant effect on poverty, indicating that consumption of this type of cigarette is prevalent among low-income groups and has the potential to worsen their economic conditions. White cigarettes (X_4), tobacco (X_5), and other cigarettes and tobacco (X_6) show a negative and significant effect on poverty, indicating that consumption of these types is more prevalent among high-income groups and therefore does not exacerbate poverty.

These results show that the type of cigarette consumed plays a major role in determining the relationship between cigarette consumption and poverty in Indonesia. Cheap cigarettes such as unfiltered kretek worsen poverty, while more expensive cigarettes or processed tobacco tend to be consumed by middle- to high-income groups. Therefore, tobacco consumption control policies need to focus on the poor segment of society through measures such as increasing

selective excise taxes on cheap cigarettes, restricting the distribution of retail cigarettes in low-income areas, and educational campaigns on the economic and health impacts of tobacco consumption.

On the other hand, the government also needs to pay attention to economic balance in tobacco-producing areas by encouraging diversification of the agricultural sector so that it does not depend entirely on the tobacco industry. Overall, the results of this study confirm that cigarette expenditure, especially among the poor, remains a factor hindering poverty alleviation in Indonesia. Therefore, integrated policies combining economic, health, and social approaches are needed to reduce people's dependence on cigarette consumption and strengthen efforts to reduce poverty in a sustainable manner.

REFERENCES

Aditya, T., Yuniarti, D., & Abdulkarim, F. M. (2025). Smoking and poverty: Empirical study of districts and cities in Indonesia. *JAMPE (Journal of Asset Management and Public Economy), 4*(1), 46–64.

Ahsan, A., Wiyono, N. H., Veruswati, M., Adani, N., Kusuma, D., & Amalia, N. (2020). Comparison of tobacco import and tobacco control in five countries: Lessons learned for Indonesia. *Globalization and Health, 16*(1), 65. https://doi.org/10.1186/s12992-020-00594-8

Atlas, T. (2018). *Country profile: Indonesia*. Tobacco Atlas. https://tobaccoatlas.org/wp-content/uploads/pdf/Indonesia-Country-Facts.pdf

CRIFASIA. (2024). *The tobacco processing industry in Indonesia: Growth dynamics and the impact of Government Regulation No. 28/2024*. https://www.id.crifasia.com/resources/industry-insights/the-tobacco-processing-industry-in-indonesia-growth-dynamics-and-the-impact-of-government-regulation-no-28-2024/

Darden, M. E., Hebert, R. B., Pesko, M. F., & Sturm, S. (2025). *Cigarette taxes and the household budget*. National Bureau of Economic Research. https://www.nber.org

Drope, J., & Hamill, S. (Eds.). (2025). *Country profile: Indonesia*. In *The tobacco atlas*. Vital Strategies & Economics for Health. https://tobaccoatlas.org/country/indonesia/

Florenta, S., Wahyudi, A. B., & Sabardila, A. (2022). Representation of masculinity in advertising text on YouTube as teaching material for Indonesian class VIII. In *Proceedings of the International Conference on Learning on Advanced Education (ICOLAE 2021)* (pp. 446–453). Atlantis Press. https://doi.org/10.2991/assehr.k.220108.081

Gan, H., Hou, X., Zhu, Z., Xue, M., Zhang, T., Huang, Z., Cheng, Z. J., & Sun, B. (2022). Smoking: A leading factor for the death of chronic respiratory diseases derived from Global Burden of Disease Study 2019. *BMC Pulmonary Medicine, 22*(1), 149. https://doi.org/10.1186/s12890-022-01937-8

Holipah, H., Sulistomo, H. W., & Maharani, A. (2020). Tobacco smoking and risk of all-cause mortality in Indonesia. *PLOS ONE, 15*(12), e0242558. https://doi.org/10.1371/journal.pone.0242558

Jin, H. J., & Cho, S. M. (2021). Effects of cigarette price increase on fresh food expenditures of low-income South Korean households that spend relatively more on cigarettes. *Health Policy, 125*(1), 75–82. https://doi.org/10.1016/j.healthpol.2020.10.010

Lal, A., Mohebi, M., White, S. L., Scollo, M., & McCaffrey, N. (2022). Household expenditure of smokers and ex-smokers across socioeconomic groups: Results from a large nationwide Australian longitudinal survey. *BMC Public Health, 22*(1), 1706. https://doi.org/10.1186/s12889-022-14145-6

Lichner, I., & Ostrihoň, F. (2025). *Estimation of own-price and expenditure elasticities of*

cigarette demand by income groups (Tobacconomics Working Paper). Tobacconomics. https://tobacconomics.org

Lubis, A., Ahmad, M. R. B., Wibowo, M. G., & Zahra, A. N. (2022). The impact of smoking on poverty: Evidence from Indonesia. *Jurnal Ekonomi Pembangunan, 19*(2), 243–256. https://doi.org/10.23917/jep.v19i2.18745

Ma, S., Yang, Q., Ahn, S., Park, H., He, Y., Bridges, J. F. P., & Shang, C. (2025). Cost comparison and spending on tobacco products: Evidence from a nationally representative sample of adult e-cigarette users. *Nicotine & Tobacco Research, 27*(8), 1367–1375. https://doi.org/10.1093/ntr/ntad191

Melinda, G., Kamilah, F. Z., & Amalia, B. (2025). *The path to excise tax reform: Ending preferential treatment for hand-rolled kretek cigarettes*. Center for Indonesia's Strategic Development Initiatives (CISDI).

Nasrudin, R., Trialdi, L., Hartono, D., & Ahsan, A. (2013). *Tobacco economics of Indonesia: Poor households' spending pattern, tax regressivity and economy-wide impact of tax simplification* (Working Paper). Faculty of Economics and Business, Universitas Indonesia.

Nkomo, N. Y., & Adanlawo, E. F. (2025). The relationship between smoking and household expenditure: A quantile regressions analysis. *E-Journal of Humanities, Arts and Social Sciences, 6*(2), 136–146.

Nurhayati, Hanadian, & Wolff, P. (2024). *The tobacco industry in Indonesia: Statistics and facts*. Statista. https://www.statista.com/topics/5728/tobacco-industry-in-indonesia/

PKJS-UI, CISDI, & Kementerian Kesehatan Republik Indonesia. (2021). *Towards the optimization of tobacco consumption control in Indonesia* (pp. 1–22). Universitas Indonesia.

Pramita, S. D., & Khoirunurrofik, K. (2025). The relationship between cigarette consumption and poverty: Analysing the role of price. *Ekomabis Review: Jurnal Ilmiah Ekonomi dan Bisnis, 13*(2), 1563–1578. https://doi.org/10.37676/ekombis.v13i2.4092

Swarnata, A., Kamilah, F. Z., Melinda, G., & Adrison, V. (2024). The impoverishing effect of tobacco use in Indonesia. *Nicotine & Tobacco Research, 26*(10), 1331–1338. https://doi.org/10.1093/ntr/ntae040

Welker, M. (2024). *Kretek capitalism: Making, marketing, and consuming clove cigarettes in Indonesia*. University of California Press.

Yurekli, A., Nargis, N., Goodchild, M., Visaruthvong, C., Delipalla, S., Blecher, E., Perucic, A.-M., Hu, T.-W., Lee, A., & Chaloupka, F. (2016). Economics of tobacco control and health. In *World scientific handbook of global health economics and public policy* (Vol. 2, pp. 191–283). World Scientific. https://doi.org/10.1142/9789813140493_0007