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THE INFLUENCE OF ENVIRONMENTAL AND ECONOMIC EXTERNALITIES ON THE HAPPINESS INDEX IN INDONESIA IN 2023

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ABSTRACT

This study aims to analyze the influence of environmental and economic externalities on the happiness index at the provincial level in Indonesia. Using a quantitative approach with multiple linear regression methods, the study utilizes secondary data from the Central Bureau of Statistics. The analysis results show that environmental quality has a positive and significant effect on public happiness, while poverty has a negative but statistically insignificant effect. The control variable, population density, shows a positive yet also statistically insignificant effect. This research highlights the importance of environmental quality in enhancing people's subjective well-being and recommends the integration of sustainable environmental policies into national development planning.

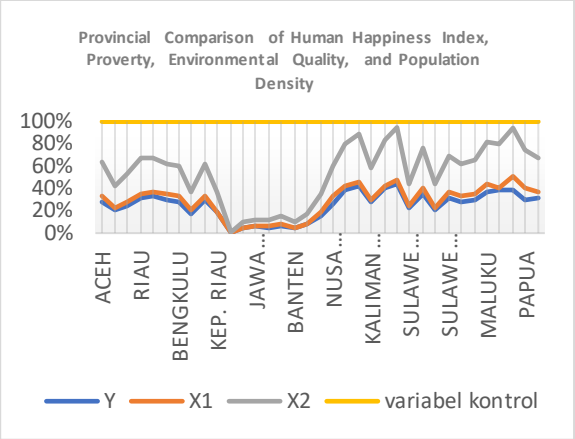
INTRODUCTION

Happiness among citizens has emerged as an important measure in evaluating social well-being, particularly in the face of increasingly complex economic and environmental developmentsFeng *et al*., (2024). The public happiness index reflects overall quality of life, shaped not only by financial aspects but also by environmental influences that directly affect personal well-being Richardson, (2023). In the context of Indonesia, the diverse social, economic, and ecological conditions across its provinces offer a valuable perspective for exploring how external economic and environmental factors contribute to a broader sense of public happinessOparina dan Clark, (2024).

In the environmental context, negative externalities such as air pollution, water contamination, deforestation, and climate change have become serious challenges for Indonesian society Waghmare *et al.,* (2024). According to the Journal of Health, Population, and Nutrition (2013), the rise in urban air pollution across Indonesia shows a negative correlation with the public happiness index. Hijau *et al*., (2013) state that air pollution not only endangers physical health but also affects mental well-being and subjective quality of life. In industrial areas such as West Java and Banten, increased carbon emissions from industrial activities continue to degrade air quality and pose a threat to the overall quality of life of local communities Nuraini *et al*., (2024).

In addition, water pollution caused by industrial and household waste has also become a serious environmental issue, indicating that poor water quality has a significant impact on public health, especially in densely populated areas Ramadanti *et al*., (2023). The decline in public health due to water pollution has the potential to lower the happiness index, particularly in coastal regions that heavily rely on access to clean water Agrawal *et al., (*2024).

Figure 1 : Provincial Comparison of Human Happiness Index, Proverty, Environmental Quality, and Population Density



Source: Processed data results,2025

This chart shows a comparison of the percentage values of variables Y, X1, X2, and the control variable across various provinces in Indonesia. In general, the line representing the control variable consistently remains at 100% in all regions, indicating a constant value. Meanwhile, variable X2 exhibits significant fluctuations, with the highest values observed in South Sulawesi and several other provinces in eastern Indonesia, while the lowest values appear in DKI Jakarta and Central Java. Variables Y and X1 tend to move in tandem with a more stable pattern compared to X2, although inter-provincial variations still exist. Overall, the values of Y and X1 are lower than those of X2, and the difference between Y and X1 is not particularly pronounced.

Overall, this chart highlights the differing characteristics of each variable across regions, with X2 being the most variable, while the control variable remains stable throughout the country.

On the other hand, economic externalities also play a significant role in shaping public happiness Lane, (2017). Income inequality, poverty, and unemployment are economic issues that can trigger public dissatisfaction Jack *et al., (*2024). According to research conducted by Nuraini *et al*., (2024), Provinces in Indonesia with high levels of income inequality tend to have lower happiness

indexes. Income inequality creates social gaps and can increase the risk of social conflict Borrero *et al*., (2013).

Richard Easterlin (1974), through the "Easterlin Paradox," argued that increases in income do not necessarily lead to greater happiness Siagian et al., (2023). Even when income levels rise, the positive impact on well-being may diminish if income inequality also increases Saosee *et al., (*2022) This paradox is clearly visible in resource-rich provinces such as East Kalimantan and Riau. While extractive industries have significantly boosted per capita income in these areas, they have also caused severe environmental degradation, including air pollution, deforestation, and land disputesUlfa, (2022). As a result, despite improved economic indicators, the overall quality of life for local communities has declined Oparina & Clark, (2024).

At the global level, a study by Oparina & Clark, (2024) involving 40 countries found that countries with better environmental quality tend to report higher levels of happiness, regardless of their per capita income Barrett et al., (2016). This finding is consistent with the situation in Indonesia, where provinces with relatively well-preserved environments, such as Bali and Yogyakarta, tend to have higher happiness indexes despite having lower per capita incomes than resource-rich provinces Handoyono, (2021).

In addition to environmental and economic factors Chowdhury *et al., (*2021) dimension of environmental ethics also plays a crucial role in shaping sustainable happiness. Biocentric and altruistic values, as explained by Carron & Lioubimtseva, (2025) can serve as a bridge between individual well-being and care for nature. Eudaimonic happiness, which is rooted in life's meaning and moral responsibility, tends to align more closely with sustainability compared to hedonic happiness, which focuses on consumption Tian & Henseler, (2025). This perspective also resonates with local cultural values and Indigenous communities, which view humans as part of nature rather than as its rulers Agrawal *et al., (*2024).

From a policy perspective, the Indonesian government has launched various programs aimed at addressing environmental and economic externalities Saosee *et al*., (2022). Initiatives such as the Integrated Waste Management Program, the "City Without Slums" initiative, and the National Mental Revolution Movement are among the efforts designed to improve environmental quality Handoyo *et al*., (2020). However, the implementation of these programs still faces several challenges, particularly in terms of funding, inter-agency coordination, and active participation from local communities Handoyono, (2021).

This study aims to further analyze how environmental and economic externalities affect the happiness index across different provinces in Indonesia Setyari *et al*., (2022). Using a quantitative approach, the research seeks to identify the key factors influencing public happiness in each province and provide more effective policy recommendations to sustainably enhance the quality of life Natali *et al*., (2018). Through secondary data analysis and literature review, this study is expected to contribute to the development of more holistic, inclusive, and sustainable policy-making Terms, (2014).

This study aims to further examine how environmental and economic externalities influence the happiness index across various provinces in Indonesia Nugroho et al., (2022). Using a quantitative approach, the research seeks to identify the key factors that affect public happiness in each province and provide more effective policy recommendations to sustainably improve quality of life Pujiati et al., (2025). Through secondary data analysis and literature review, this study is expected to contribute to the formulation of more holistic, inclusive, and sustainable development policies Pertiwi et al., (2021). Based on the above description, this study further outlines the rationale behind the research through three main aspects: the significance of the study, existing research gaps, and the novelty of the investigation.

Research Significance This study holds substantial relevance due to the ongoing challenges Indonesia faces related to climate change, public health, and poverty. Investigating how environmental and economic externalities influence public happiness can provide valuable insights for the development of more effective public policies aimed at improving overall quality of life and reducing inequality. From an academic perspective, this research contributes to the discourse on well-being and sustainability, with the potential to enhance institutional credibility and attract academic interest and funding.

Research Gap Although previous studies on happiness in Indonesia have primarily focused on economic and social determinants, there has been no comprehensive research exploring the impact of environmental externalities on happiness. Furthermore, limited attention has been given to the interactive effects between environmental and economic factors in shaping subjective well-being. This study aims to address this gap by offering a more integrated analytical perspective.

Research Novelty This study introduces a new approach by examining the combined effects of environmental and economic externalities on the happiness index across all provinces in Indonesia. Using multiple linear regression analysis based on secondary data from the national statistical agency, this research aims to provide more accurate, data-driven insights. Moreover, by exploring the interaction between environmental quality and economic conditions, the study offers new empirical evidence to the existing body of knowledge on sustainable development and public well-being.

LITERATURE REVIEW
HAPPINESS INDEX

Happiness, often referred to as subjective well-being, reflects an individual's personal evaluation-either positive or negative-of various aspects of life Angner, (2010) In Pranoto, (2025a). It encompasses not only feelings of happiness but also overall life satisfaction Pranoto, (2025). In contrast, objective well-being is assessed through measurable indicators such as welfare metrics and poverty thresholds, differing from subjective well-being which focuses on personal feelings of happiness and satisfaction Frey, (2018).Pranoto, (2025).

Happiness is commonly used as a proxy for life satisfaction in research Denant-Boemont *et al*., (2025). Many studies on well-being rely on survey responses regarding general life satisfaction to measure levels of happiness Pranoto, (2025a). The happiness index plays an important role in human development as it helps identify what people truly need (Chen & Hsu, 2024). When happiness or satisfaction levels are low, policy interventions can be implemented to address them Chen & Hsu, (2024). When happiness or satisfaction levels are low, policy interventions can be implemented to address them Dolan et al., (2008); Pranoto, (2025). This index also enables governments to better understand public preferences regarding infrastructure, facilities, and essential goods and services Anand, (2016) in Pranoto, (2025a). Gaining insights into subjective well-being supports the improvement of health and education services, which contributes to overall human development, (2022); Deaton, (2008) dalam Pranoto, (2025a).

THE CONCEPT OF THE HAPPINESS INDEX

The Happiness Index has emerged as an increasingly important alternative indicator for measuring societal well-being, going beyond conventional economic parameters such as Gross Domestic Product (GDP) Butarbutar, (2023). This concept was developed in response to the limitations of traditional economic indicators in capturing the true state of human well-being. J. F. Helliwell *et al*., (2024). The World Happiness Report, published by the United Nations Sustainable Development Solutions Network, has become a global reference for assessing national happiness levels based on six key dimensions: per capita income, social support, healthy life

expectancy, freedom to make life choices, generosity, and perceptions of corruption.J. F. Helliwell *et al.*, (2024).

In the context of Indonesia, research shows that despite consistent economic growth, Indonesia's happiness index remains relatively stagnant, indicating the influence of non-economic factors on public happiness Ardiyanto & Sukartini, (2020). A recent study by Fitriana & Fatimah, (2023), using panel regression analysis, found that environmental and social factors are just as influential as economic factors in determining happiness levels in Indonesia Barrett *et al*., (2016).

ENVIRONMENTAL EXTERNALITIES AND HAPPINESS

Environmental externalities refer to the impacts of economic activities on the environment that are not reflected in market mechanisms but affect public well-being. Hasan *et al*., (2021). In their study analyzing the relationship between air quality and public health, found that long-term exposure to air pollution affects not only physical health but also the psychological well-being of communities Wijaya *et al*., (2021).

Air quality, as an environmental indicator, has a direct relationship with the level of happiness Ramalho *et al*., (2025). A study by Yuniar dkk., (2023) in Indonesia revealed that increasing concentrations of air pollutants significantly reduce the happiness index among urban residents Yamamura *et al.,* (2015). This study, which utilized provincial panel data in Indonesia, found that poor air quality—mainly caused by industrial and transportation activities—has a significant negative impact on public happiness Rand, (2013).

Access to green open spaces has also been proven to enhance psychological well-being.Kurniawan, D., & Budiantoro, (2023), through spatial analysis conducted in Indonesia, found that the availability of urban green open space per capita is positively correlated with the happiness index at the provincial level. Their study showed that for every additional 1 square meter of green open space per capita, the happiness score increases by 0.15 points Fitriani *et al.*, (2020).

ECONOMIC EXTERNALITIES AND HAPPINESS

Economic externalities encompass the spillover effects of economic activities that influence societal well-being Society & Benny, (2019). The Easterlin Paradox, which posits that beyond a certain threshold, increases in income do not necessarily lead to proportional increases in happiness, has been reaffirmed by numerous recent studies.Poirier *et al*., (2020)

Poirier *et al*., (2020) found that income inequality has a negative impact on public happiness. Their meta-analysis, using data from 150 countries, revealed that rising income inequality adversely affects average happiness levels Khadjavi *et al.*, (2021). In Indonesia, research by Ardiyanto dan Sukartini (2020) demonstrated that interregional income inequality has a significantly negative impact on the provincial happiness index, with a coefficient of -0.312 Fadilla *et al.*, (2024).

Other macroeconomic factors such as unemployment and inflation also influence public happiness N. S. Rahayu & Barika, (2024). Widyaningsih dkk. (2021), who analyzed panel data from 34 Indonesian provinces between 2014 and 2019, found that regional unemployment rates are negatively correlated with the provincial happiness index, with a coefficient of -0.187, while price stability is positively correlated with higher happiness levels States & America, (1996).

INTERACTION BETWEEN EVIRONMENTAL AND ECONOMIC EXTERNALITIES

Environmental and economic externalities often interact and create complex impacts on public happiness Nugroho *et al*., (2022). developed the Human Sustainable Development Index, which integrates environmental and economic dimensions to measure sustainable development Chestnutt, (2020). Their study found a non-linear relationship between economic growth and

environmental quality in influencing societal well-being Khasanah & Suryanto, (2023).

Ahmed *et al*., (2022), in their research, analyzed the role of environmental regulation and democracy in sustainable development. The study revealed that countries with strict environmental regulations while maintaining economic growth tend to have higher levels of happiness compared to those that neglect environmental issues Kyllerman, (2005).

A study by Hadi dkk. (2021) in Indonesia showed that negative externalities from industrial activities can reduce public happiness, even when such activities result in increased regional income Scroll & For, (2003). This indicates the existence of a trade-off between economic benefits and environmental costs, which must be carefully considered in policy analysis related to happiness *Fadilla et al.*, (2024).

THEORY OF HAPPINESS

Happiness is one of the central concepts in positive psychology and has become the focus of numerous studies on subjective well-being Communities, (2019). Broadly, there are two main approaches to understanding happiness: the hedonic and eudaimonic approaches. Each offers a distinct perspective on how individuals evaluate a happy life.Peiró *et al*., (2019)

HEDONIC HAPPINESS THEORY

The hedonic approach is based on the view that happiness is derived from the pursuit of pleasure and the avoidance of pain Agusriana et al., (2024). According to this theory, an individual is considered happy if they experience more positive affect, less negative affect, and high levels of life satisfaction. In their journal articles, Russo-Netzer & Atad, (2024) And Peiró *et al*., (2019). state that subjective well-being represents hedonic happiness, which includes individual evaluations of life, encompassing life satisfaction and a positive emotional affect balance Mulyo *et al*., (2024). This theory is commonly used to measure happiness through life satisfaction scales and emotional affect indicatorsSutawi et al., (2021).

EUDAINMONIC HAPPINESS THEORY

In contrast to the hedonic approach, the eudaimonic theory emphasizes that true happiness is achieved through a meaningful life, goal fulfillment, and self-actualization Kuswanto & Irzal, (2023). This approach argues that a person's quality of life is not only assessed by pleasurable feelings but also by the extent to which individuals feel their life has purpose and contributes to greater values. Huta & Ryan, (2010) and Peiró *et al*., (2019) explain that eudaimonic well-being emphasizes meaning and self-realization, reflecting the extent to which a person lives in accordance with their values and personal identity Mustofa, (2022). Thus, the eudaimonic approach views happiness as a process of psychological growth and deep engagement in lifePurnomo *et al*., (2023).

EMPIRICIAL STUDIES

REVIOUS RESEARCH

The study conducted by Ibrahim *et al*., (2024), showed that there was no significant relationship between Gross Regional Domestic Product (GRDP) and the happiness index in Indonesia in 2014 and 2017. Interestingly, in 2021, a strong negative correlation between the two was found, reinforcing the Easterlin Paradox theory, which posits that economic growth does not always align with increases in public happiness. This finding is consistent with the results of Stone *et al*., n.d. which demonstrate that economic growth does not necessarily correlate with societal happiness. Furthermore, Graham, (2011) dan Jiang *et al*., (2019) and Jiang et al. (2019) emphasize that additional income beyond a certain threshold does not significantly contribute to happiness. Similar findings were also supported by d AEasterlin, (1995) who showed that increases in national income do not raise the average happiness of citizens due to habituation effects and social comparison.

Several other studies have highlighted social and non-material aspects as key determinants of happiness. For

example, Arlinkasari *et al*., (2025), emphasize the importance of psychological and social factors in urban environments for children, T. P. Rahayu, (2016) shows that social contributions such as zakat and charity play a significant role in enhancing public happiness. Furwanti *et al*., (2021) identify that although macroeconomic indicators such as inflation and unemployment negatively correlate with happiness, sociocultural factors and religiosity have a greater influence. Similar findings are presented by Indriana *et al*., (2024) who state that non-material factors such as health and social capital are more dominant than absolute income. Nie *et al.*, (2021) also support this view by demonstrating the importance of trust and meaningful work in building psychological security among healthcare workers. Additionally, Abdel-Khalek, (2006) reveals that gender differences also affect happiness, with male university students reporting higher levels of happiness in Kuwait.

The environment also plays a critical role in happiness. Studies by Limayani & Tanur, (2024), Hübler *et al*., (2022) and Park *et al*., (2021) consistently show that air quality and environmental awareness significantly affect public happiness. Furthermore, Ogunbode *et al*., (2021),and Clark *et al*., (2008) highlight the negative impacts of environmental anxiety and climate change on psychological well-being. Soedomo, (2012) and Pedro Bom, (2023) ; Ferronato & Torretta, (2019) also note that waste management and pollution significantly influence subjective well-being. In crisis contexts such as the pandemic, Kumar *et al*., (2021) emphasize the importance of life cycle assessments (LCA) for personal protective equipment (PPE) to avoid larger environmental impacts from unsustainable disposal methods.

Economic inequality and related factors remain important concerns. Titisari *et al*., (2025) dan Nugraha, (2024) report that inequality and unemployment have negative impacts, while education and per capita spending positively affect happiness. Li & Kanazawa, (2016), serta Alfiah *et al*., (2019) emphasize that education, health, and social capital are more consistent determinants of happiness. Research by Torshizian & Mehrara, (2011) and Bruno *et al*., (2000) tates that while income increases happiness, its effect tends to diminish at higher income levels or can be offset by unemployment. Dwi *et al*., n.d. also add that economic growth and infrastructure development significantly contribute to improvements in the Human Development Index (HDI), which indirectly supports increased well-being.

Policy and institutional roles also cannot be overlooked. Frey & Stutzer, (2000) and Diaz-Serrano & Rodríguez-Pose, (2021) demonstrate that political participation and fiscal decentralization can increase happiness by enhancing satisfaction with public services. Research by Veenhoven,(2018) even emphasizes that economic freedom plays a crucial role in fostering happiness, particularly in developing countries. On the other hand, Sihombing, (2022) stresses that local government spending should be directed toward sectors that directly address public needs, such as education and health, to significantly impact happiness.

In addition, findings from Mulyani & Setiawan, (2024) and Dwipayana *et al*., (2024) reveal variations in happiness levels across provinces in Indonesia, indicating the need for spatially responsive policies. Rahmizal *et al.*, (2023) and Pranoto, (2025) also emphasize the importance of social capital and family support as key factors in subjective well-being, particularly among the elderly. Oria & Hashemy, (2021) support these findings by showing that assets, income, education, and health play a significant role in shaping individual happiness.

Finally, Mayuzumi, (2023) observed that rural communities exhibited stronger psychological resilience during the pandemic compared to urban populations, illustrating that social conditions, locality, and community resilience all contribute to overall happiness.

Overall, previous studies show that happiness is not solely influenced by economic factors, but also strongly depends on interrelated social, environmental, political, and psychological dimensions that must be considered holistically in the formulation of development policies.

RESEARCH METHODOLOGY

This study employs a quantitative method with an associative approach aimed at examining the influence of economic and environmental externalities on the happiness index at the provincial level in Indonesia. The quantitative method is chosen because it allows data to be processed in numerical form and analyzed using statistical techniques, enabling relationships between variables to be assessed objectively and systematically. The population in this study includes all 34 provinces in Indonesia. Due to the relatively small population size and the availability of complete data across all provinces, the sampling technique used is a census, meaning the entire population is used as the research sample. The data used are secondary data obtained from official publications by Statistics Indonesia (BPS), including data on the happiness index, poverty rates, environmental quality index, and population density at the provincial level. The research model uses multiple linear regression to analyze the simultaneous and partial effects of independent variables on the dependent variable. The regression model is formulated as follows:

$$IA_i = \beta_0 + \beta_1 POVERTY_i + \beta_2 IKLH_i + \beta_3 DENSITY_i + u_i$$

Explanation:

IA_i = Happiness Index of province *i* (based on BPS 2023 data)

$Poverty_i$= Poverty rate (in percentage) → independent variable X_1

$IKLH_i$ = Environmental Quality Index → independent variable) X_2 (environmental externality

$DENSITY_i$ = Population density (people /km^2) → control variable

β_0 = Constant/intercept

$\beta_1, \beta_2, \beta_3$ = Regression coefficients (measuring the influence of each variable on the Happiness Index))

u_i = Eror term (other unobserved factors)

In this model, the Happiness Index serves as the dependent variable, while the poverty rate and the Environmental Quality Index (EQI) are the independent variables. Population density functions as the control variable. The coefficients β_0, β_1, β_2, and β_3 represent the regression parameters, while ε (epsilon) denotes the error term.

Data analysis is conducted using STATA software to ensure accurate estimation of the coefficients and the validity of the results. The analysis includes classical assumption tests such as tests for normality, multicollinearity, and heteroskedasticity, followed by hypothesis testing using the F-test for overall model significance, the t-test for partial significance of individual predictors, and the coefficient of determination (R^2) to assess the explanatory power of the model.

RESULTS AND DISCUSSION

MULTIPLE LINEAR REGRESSION TEST

STATISTICAL TEST

Table 1. Multiple Linear Regression Test

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. reg y x1 x2 z1
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Source	SS	df	MS	Number of obs	=	34
				F(3, 30)	=	9.74
Model	71.6459771	3	23.8819924	Prob > F	=	0.0001
Residual	73.5519062	30	2.45173021	R-squared	=	0.4934
				Adj R-squared	=	0.4428
Total	145.197883	33	4.39993586	Root MSE	=	1.5658

y	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
x1	-.1332162	.0675305	-1.97	0.058	-.2711319	.0046995
x2	.3195101	.063362	5.04	0.000	.1901076	.4489126
z1	.1344365	.1082795	1.24	0.224	-.0866996	.3555727
_cons	41.32453	11.12237	3.72	0.001	18.60963	64.03944

Source: Processed STATA data, 2025

The regression analysis results indicate that the model, which includes the

independent variables x1, x2, and control variable z1, is able to explain the variation in the dependent variable y reasonably well. This is reflected in the R-squared value of 0.4934, meaning that approximately 49.34% of the variation in y can be explained by the three variables. The remaining 50.66% is accounted for by other factors outside the model. The Prob > F value of 0.0001 also indicates that the regression model is statistically significant, meaning that the three variables jointly have a significant effect on y.

Individually, variable x2 has a positive and significant effect on y, with a coefficient value of 0.3195 and a p-value of 0.000. This means that for every one-unit increase in x2, the value of y is expected to increase by 0.3195 units, assuming other variables remain constant. Since the p-value is less than 0.05, the effect of x2 on y is statistically significant at the 95% confidence level.

Meanwhile, variable x1 has a negative coefficient of -0.1332, indicating that x1 tends to decrease the value of y. However, the p-value of 0.058 shows that the effect of x1 is not statistically significant at the 5% level, but is approaching significance and can be considered marginally significant. This suggests that x1 still deserves attention in the analysis, as there is a tendency for it to have a negative influence on y.

The control variable z1 has a positive coefficient of 0.1344, but its p-value is 0.224, indicating that it is not statistically significant. Nevertheless, the inclusion of a control variable like z1 remains important in the model, as it helps reduce bias and ensures that the effects of x1 and x2 on y are not confounded by unmeasured external variables. The constant value (_cons) of 41.32 indicates that if all independent variables are zero, the baseline value of y is estimated to be 41.32.

NORMALITY TEST

Table 2 Normality Test

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
resid	34	0.96844	1.102	0.203	0.41975

Source : Processed STATA data, 2025

The results of the Shapiro-Wilk test show a Prob > z value of 0.41975, indicating that the model residuals are normally distributed, as the value is greater than the threshold of 0.05. Therefore, the normality assumption in regression is met, and the model estimation results can be considered statistically valid.

MULTICOLLINEARITY TEST

Table 3: Multicollinearity Test

. vif

Variable	VIF	1/VIF
z1	2.45	0.408732
x1	1.80	0.556280
x2	1.67	0.598783
Mean VIF	1.97	

Source: Processed STATA data, 2025

The VIF calculation results show that all independent variables in the model have values below 10, with the highest VIF found in variable z1 at 2.45 and an average VIF of 1.97. These values indicate that no multicollinearity exists among the variables in the model, as none of the variables exhibit a strong linear relationship with the others. Therefore, the regression model can be considered free from multicollinearity issues, ensuring that the coefficient estimates remain stable and that the interpretation of the relationships between variables can be carried out more accurately.

HETOROSKEDATICITY TEST

Table 4 Heteroskedasiticity Tes

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Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of y

         chi2(1)      =     0.03
         Prob > chi2  =   0.8524
```

Source : Processed STATA data, 2025

The results of the Breusch-Pagan/Cook-Weisberg test show a chi-square value of 0.03 with a probability of 0.8524. Since the probability value is well above 0.05, the null hypothesis stating that the residual variance is constant cannot be rejected. This means that there is no evidence of heteroskedasticity in the model. This indicates that the distribution of errors is relatively stable across predicted values, thus the regression model meets the assumption of homoskedasticity and the estimation results can be considered reliable.

PARTIAL TEST (T-TEST)

Tablel 5 Partial test (t- test)

Number of obs	=	34
F(3, 30)	=	9.74
Prob > F	=	0.0001
R-squared	=	0.4934
Adj R-squared	=	0.4428
Root MSE	=	1.5658

Source : Processed STATA data, 2025

Based on the regression output, the first variable has a coefficient of -0.1332, indicating that each one-unit increase in this variable will decrease the value of Y by 0.1332 units. However, its effect is not statistically significant at the 5% significance level, as the p-value is 0.058, which is slightly above 0.05.

Variable X2 has a coefficient of 0.3195, meaning that each one-unit increase in X2 will increase the value of Y by 0.3195 units. Its effect is statistically significant at the 1% significance level because the p-value is 0.000, which is well below 0.01.

Meanwhile, the control variable has a coefficient of 0.1344, indicating that each one-unit increase in this variable will increase the dependent variable by 0.1344 units. However, its effect is not statistically significant at the 5% level, as the p-value is 0.224. As a control variable, its presence is used to account for other influences outside the main variables in the model.

The constant (intercept) has a value of 41.3245, which indicates that when all independent variables are equal to zero, the average value of the dependent variable is 41.3245. This intercept is statistically significant at the 1% level, with a p-value of 0.001.

Overall, X2 is the only independent variable that has a statistically significant effect on the dependent variable. The first variable approaches the 5% significance level but is not statistically significant.

PARTIAL TEST (F-TEST)

Table 6 Partial test (f-test)

y	Coef.	Std. Err.	t	P>|t|
x1	-.1332162	.0675305	-1.97	0.058
x2	.3195101	.063362	5.04	0.000
z1	.1344365	.1082795	1.24	0.224
_cons	41.32453	11.12237	3.72	0.001

Source : Processed STATA data, 2025

Based on the regression results, the number of observations used in the analysis is 34. The F-statistic value of 9.74 with a probability (p-value) of 0.0001 indicates that the regression model is statistically significant at the 1% significance level. This means that the independent variables collectively have a significant effect on the dependent variable.

The R-squared value of 0.4934 shows that approximately 49.34% of the variation in the dependent variable can be explained by the variations in the independent variables included in the model. The remaining 50.66% is explained by other factors outside the model.

The Adjusted R-squared value of 0.4428 indicates that, after adjusting for the number of independent variables and the number of observations, the model still explains about 44.28% of the variation in the dependent variable.

The Root Mean Squared Error (Root MSE) of 1.5658 indicates the standard deviation of the residuals or prediction errors in the model. The smaller the Root MSE value, the better the model is at predicting the dependent variable.

Overall, this model is considered quite good, as it is statistically significant (F-statistic p-value < 0.01), and the R-squared value indicates that nearly half of the variation in the dependent variable is explained by the model.

COEFFICIEN OF DETERMINATION (R^2)

The coefficient of determination (R^2) value of 0.4934 indicates that approximately 49.34% of the variation in the dependent variable can be explained by the independent variables used in this regression model. Meanwhile, the remaining 50.66% is accounted for by other factors outside the model that were not included in this analysis. This suggests that the model has a reasonably good level of predictive ability.

1.The Relationship Between Poverty (X1) and Happiness Level (Y)

The regression analysis results show that the poverty variable (X1) has a negative coefficient of -0.1332 in relation to the happiness level (Y), with a p-value of 0.058. Although not statistically significant at the 5% level, the p-value approaching 0.05 indicates a tendency that an increase in poverty may reduce happiness levels. A study by Caria & Falco, (2014), found that the risk of poverty has a significant negative relationship with happiness in developing countries. Using unique longitudinal data, they discovered that vulnerability to income poverty significantly lowers life satisfaction, even after controlling for the positive income effects commonly found in the literature Irawan *et al*., (2022).

A meta-analysis by Howell & Howell, (2008), also showed that the relationship between economic status and subjective well-being (SWB) is stronger in developing countries, particularly among populations with lower levels of education Rizal & Fitrijanto, (2021).

The effect of economic status on subjective well-being (SWB) is strongest in low-income developing economies (r = 0.28) and among the least educated samples (r = 0.36).
These findings support the Hedonic Theory of Happiness**,** which states that happiness is derived from the attainment of pleasure and the avoidance of suffering. Poverty, which is often associated with a lack of resources and financial insecurity, can hinder individuals from experiencing pleasure and increase suffering, thereby reducing overall happiness levels Dasgupta & Ehrlich, (2013).

2. Hubungan antara Indeks Kualitas Lingkungan (X2) dan Tingkat Kebahagiaan (Y)

The variable *Environmental Quality Index* (X2) has a positive coefficient of 0.3195 in relation to the *Happiness Level* (Y), with a p-value of 0.000, indicating a statistically significant effect. This suggests that an improvement in environmental quality significantly enhances individual happiness.

According to J. Helliwell *et al*., (2020), in the *World Happiness Report*, good environmental quality contributes positively to subjective well-being. They highlight that clean and green natural environments can improve individual happiness Ferdiana *et al.*, (2018).

A study by MacKerron & Mourato, (2013), shows that individuals are happier when they are in natural environments compared to urban areas. They found that participants were significantly more joyful when being outdoors in all types of green

or natural habitats than in urban settings Muljono *et al.,* (2019).

A study by Levinson, (2018), found that air pollution has a negative impact on individual happiness. The study reported that increases in air pollution significantly reduce happiness levels, even after controlling for other factors such as income and employment status Communities, (2019).

These findings support the Eudaimonic Theory of Happiness, which emphasizes the achievement of meaning and self-actualization. A high-quality environment provides the necessary conditions for individuals to realize their full potential and live meaningful lives, thereby enhancing happiness Khasanah & Suryanto, (2023).

3. The Relationship Between Population Density (Z1) and Happiness Level (Y)

The control variable of population density (Z1) has a positive coefficient of 0.1344 in relation to the happiness level (Y), but with a p-value of 0.224, indicating that its effect is not statistically significant. Nevertheless, the inclusion of control variables such as population density is important to ensure that the influence of the main variables on happiness is not confounded by external factors that are not directly measured.

A study by Li, Norman P, (2016), found that high population density can reduce happiness levels, especially among individuals with high intelligence. They showed that densely populated areas may decrease life satisfaction due to limited space and increased social stress Singh et al., (2023).

Research by Rehdanz & Maddison, (2005), revealed that individuals living in highly populated areas tend to have lower happiness levels. They found that environmental factors such as climate and population density significantly influence happiness levels Rahmi, (2019).

A study by Tassinari *et al*., (2024), found that high population density can reduce individuals' quality of life and happiness. They emphasized that densely populated urban environments can lead to stress and discomfort, which negatively affect subjective well-being Preferences & Rights, (2017).

CONCLUSION

This study demonstrates that environmental quality has a significant positive effect on the level of societal happiness, indicating that a clean and livable environment is a crucial factor in enhancing subjective well-being. Meanwhile, poverty tends to reduce happiness, although its effect is not yet statistically significant; it still deserves attention due to its potential to diminish quality of life. The population density variable, as a control factor, does not show a meaningful impact; however, its inclusion remains important to ensure the accuracy of the analysis.

These findings affirm that societal happiness is influenced not only by economic conditions but also heavily depends on environmental quality. Therefore, the integration of sustainable and environmentally friendly development policies is essential to improving overall societal well-being.

RECOMMENDATIONS

The government is advised to enhance environmental quality through pollution reduction and the provision of green open spaces, as these have been shown to have a positive impact on public happiness. Poverty alleviation programs should continue to be strengthened, even though their effects are not yet statistically significant, due to the observed tendency of a negative relationship with happiness. Additionally, population density should be managed through effective spatial planning to maintain a comfortable living environment.Future research is recommended to include social and cultural variables in order to achieve a more comprehensive analysis.

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