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Article

The Impact of Health Quality and Pollution Levels on Tourist Arrival: A Case Study of Six ASEAN Countries, 2010-2022

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Abstract: This research aims to analyze the impact of health quality and pollution levels on tourist flows in six ASEAN countries during the period of 2010-2022. Health quality is measured based on life expectancy, population growth, and COVID-19, while pollution levels are assessed using the concentration of PM2.5 particles in the air. Data was obtained from reliable sources and analyzed using a panel data regression model. The method used in this research is panel data analysis with a common effects, fixed effects, and random effects approach to test the relationship between variables. The approach chosen in this research is the general effects. Research results show that better health quality and lower pollution levels significantly increase the number of tourists visiting these countries. Research shows that health quality has a significant positive impact on tourist flows, while pollution levels have a significant negative impact. This finding shows that improving health quality and reducing pollution levels can encourage an increase in tourist flows. Thus, governments in ASEAN countries need to pay attention to health factors and design strategies to enhance the tourism sector by improving health quality and managing pollution.

Keywords: Health quality, Pollution levels, Tourist arrivals, COVID-19, ASEAN, Panel data

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1. Introduction

Tourism has been one of the economic development strategies for developing countries for more than half a century. According to Torres and Momsen (2004), tourism currently serves as an incentive revenue machine for developing countries in macroeconomic growth. Tourism has become a potential industry for generating foreign exchange revenue, attracting international investment, increasing tax income, and creating new job opportunities. Not only that, tourism encompasses all related elements (tourists, tourist destinations, travel, industry, and so on) that result from travel, as long as the travel is not permanent [1].

Tourism has been established as a driving force for economic growth. (Brida et al., 2010; Payne and Mervar, 2010; Tang, 2010; Brida et al., 2011; Dritsakis, 2012; Jalil et al., 2013; Chou, 2013; Tang and Tan, 2015; Shahbaz et al., 2017; Ekeocha et al., 2021). The tourism sector can also increase foreign exchange earnings, create jobs, and stimulate the growth of the tourism industry. This can trigger economic growth and serve as a driving factor in various countries to develop the tourism sector [2]. Revenue from the tourism industry in developing countries can contribute to their macroeconomic stability by helping to improve the external balance, which in turn facilitates easier access to international capital markets [3]. Especially the developing countries in ASEAN, which consist of Indonesia, Malaysia, Thailand, Singapore, the Philippines, Vietnam, Brunei Darussalam, Cambodia, Laos, Myanmar, and Timor Leste.

Tourism is influenced by several factors, including issues of air, water, and soil pollution, as well as public health concerns. The issue of air pollution can be observed through air quality (AQ) assessed by the most critical pollutant, which is PM10 that has been identified. PM10 refers to particles in the atmosphere with an aerodynamic diameter of less than 10 micrometers. These airborne particles are one of the most concerning air pollutants because their concentration levels consistently exceed the established limits for the protection of human health each year. There are a limited number of studies that use PM10 or PM2.5 as representatives of air quality and examine their relationship with tourism [4,5]. Tourists have varying perceptions of health risks at different tourist destinations (Carter, 1998; Cossens and Gin, 2008; Lepp and Gibson, 2003; Sönmez and Graefe, 1998) and tend to avoid destinations that pose high health risks. Tourists choose countries that offer high-quality healthcare and consider these countries to be healthier and safer places for vacationing.

In addition, tourism is also influenced by health aspects. The determining variables of tourism are divided into several parts, namely terrorism, political instability, and political violence; corruption; institutional quality; crime; climate change; environmental sustainability; as well as health and air quality. (AQ). When tourism activities take place, the environment is bound to undergo changes because tourism causes many alterations and transformations to the environment and nature. Although tourism heavily relies on the natural environment (such as coastal areas, natural parks), tourism activities can also lead to significant negative environmental externalities (for example, through pollution or the extraction of natural resources) [6,7].

Literatur Review

The arrival of tourists, as defined by the World Tourism Organization (WTO) in 2009, involves the movement of tourists from one place to another. This flow is essential to understand because it includes not only the physical movement of tourists to a specific destination, known as incoming tourism flow, but also the movement of critical elements in tourism production, such as capital, talent, technology, information, and materials. This broader understanding highlights the complexity of the tourism industry, where various factors and resources are in constant motion to support the experience and satisfaction of tourists [8].

Understanding tourist arrivals is crucial for several reasons, including strategic planning, resource allocation, and marketing activities. Accurate measurement and analysis of these flows provide vital information that can help in the efficient management of tourism resources and the provision of services and goods. For instance, knowing the patterns and trends in tourist arrivals allows stakeholders to make informed decisions, design targeted marketing campaigns, and implement interventions aimed at enhancing the overall tourist experience [9].

Several factors influence the arrival of tourists, with air pollution (specifically PM 2.5), pandemics (such as COVID-19), and public health being among the most significant. Research by Xu et al. (2019) found that an increase of 1 μg/m3 in PM2.5 concentration in the air can lead to a decrease of 0.482% in domestic tourism and 1.227% in inbound tourism. This demonstrates the substantial impact of air quality on tourism, as higher levels of pollution can deter tourists from visiting certain destinations, resulting in a decline in tourism revenue. Dong et al. (2019) also emphasized the importance of controlling endogeneity in estimating the impact of air pollution on tourism, as failure to do so can lead to inaccurate assessments and ineffective policy interventions [10].

2. Materials and Methods

This study examines the relationship between health quality (population growth, life expectancy, and COVID-19), pollution levels, and tourist arrivals in Indonesia, Malaysia, Thailand, Singapore, Vietnam, and the Philippines. This study aims to determine whether a country with good health quality and air quality can increase its tourist arrivals and whether this affects its international tourism revenue, given that the country has a higher level of health quality and air quality compared to other relevant countries. These countries were selected based on the availability and completeness of data during the research period, ensuring a robust and comprehensive analysis. The type of data used is secondary data from various sources, such as the World Health Organization (WHO), the United Nations Environment Programme (UNEP), and the World Tourism Organization. (UNWTO) [11].

The variables used in this study are dependent and independent variables. In this research, the dependent variable is Tourist Arrivals. The independent variables used are Life Expectancy at Birth, Population Growth, COVID-19 (dummy), and PM 2.5. (Particular Matter 2.5). This research uses a panel data approach for analysis. A data panel is a combination of cross-sectional data and time series data that involves repeated observations on the same subjects, but conducted at different times. The panel data regression model in this study is as follows:

$$LOGY_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + D_i + e_{it}$$

In this study, $LOGY_{it}$ indicates Tourist Arrivals, X_{1it} represents Particulate Matter 2.5 (PM 2.5), X_{2it} indicates Life Expectancy, X_{3it} represents Population Growth, and D_i represents COVID-19 (Dummy). The subscription i dentifies the countries being analyzed, t represents the period of years, and e indicates the terms of errors related to cross-sectional and time series data [12].

Life expectancy at birth, total (years), HQ1, indicates the number of years a newborn is expected to live if current mortality patterns remain unchanged throughout their life. From several studies, life expectancy is widely used as a measure of health status. (Sequeira dan Nunes, 2008; Bloom et al, 2017; Azizi, 2018; Cervantes et al., 2020; OECD, 2011; UNDP). COVID-19 is measured using a dummy variable focused on the years 2020 to 2022. Particulate matter 2.5 (PM 2.5) PM 2.5 refers to particles with a diameter of about 2.5 micrometers (1 micrometer = 0.001 millimeters). These particles generally originate from the burning of wood, stove smoke, emissions from motor vehicles, residual combustion from power plants and industries, as well as cigarette smoke. There are also natural particles classified as PM 2.5, such as plant spores, pollen, smoke from forest fires, and volcanic ash. According to the World Health Organization (WHO), the ideal air quality standard has a PM 2.5 concentration weight between 0 to 5 micrograms per cubic meter [13].

In evaluating theoretical models, there are three main approaches: common effect, fixed effect, and random effect. The application of these different approaches allows for a comprehensive evaluation of the stability and reliability of the results. In determining the most suitable model, the Chow test and the Hausman test were used. The Hausman test is conducted to determine which model, fixed effect or random effect, provides a more accurate estimate for panel data [14].

There are five sections in this paper. Section 2 discusses the analytical methods used in the research. Section 3 presents the empirical findings from the analysis. Section 4 contains the main conclusions and implications of this research, providing a comprehensive overview of the results [15].

3. Results and Discussion

Table 1 presents a comprehensive summary of data, offering statistical insights into the key factors investigated in this study. The data observed from the descriptive statistical analysis includes the mean, standard deviation, minimum value, maximum value, and the total number of research data. The statistical calculations used in this research were assisted by Eviews 12 software [16].

Table 1. Deskriptif Statistic Variable

	LOG (Tourist Arrival)	Population growth	PM (microgram)	COV	Life Expectancy
Mean	15.94276	1.138205	21.71487	0.230769	75.08154
Median	16.14157	1.115000	19.81000	0.000000	74.51000
Maximum	17.50229	3.310000	51.70000	1.000000	83.60000
Minimum	11.81101	0.040000	11.80000	0.000000	67.58000
Std. Dev.	1.225575	0.574092	6.513646	0.424052	4.446435
Observations	78	78	78	78	78

Source: Secondary Data, processed 2024

The average arrival of tourists is around 15,942 people. This indicates that most of the data revolves around that value. The population growth measured in percentage has an average of 1.14%. This indicates a moderate annual population growth in the observed area [17].

Air pollution is measured using the PM 2.5 indicator, which has an average of 21.71 micrograms per cubic meter, serving as an indication of the average air quality in the studied area. The figures indicate that the air quality in the six countries studied has a relatively high level of pollution, where the World Health Organization (WHO) has set the average PM 2.5 value per 24 hours at 15 micrograms per cubic meter ($\mu g/m^3$). PM 2.5 is a fine pollutant in the atmosphere that is larger than 2.5 micrometers. The main contributors to PM 2.5 are energy use and biomass burning [18].

COVID-19 The average value of the COV variable is 0.23, indicating that in 23% of observations, there is a decline in tourist arrivals due to COVID-19. The average life expectancy in six countries is 75.08 years, indicating a fairly good level of life expectancy in the observed region [19].

Table 2 and Table 3 present the results of three econometric approaches: common effects model (CEM), fixed effects model (FEM), and random effects model. (REM). Although all methods analyze the relationships between variables, these methods show slight differences in the significance levels of their coefficients. In this measurement, several tests were conducted, namely the Chow Test, which is used to determine which model is the best, whether to use the Common Effect model or the Fixed Effect model for panel data regression. The Hausman test is used to compare the best model between fixed effects and random effects models [20].

Table 2. Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.882774	(5,68)	0.0000
Cross-section Chi-square	39.209009	5	0.0000

Source: Secondary Data, processed 2024

Based on Table 2, the F probability value is 0.000 or less than 0.05, thus the null hypothesis is rejected. The best model selected is the fixed effect model (FEM), so the next test will shift to the Hausman test [21].

Tabel 3. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	16.166429	4	0.0028

Source: Secondary Data, processed 2024

Based on the data processing results in Table 5.3, the probability value is 0.0028, which is greater than 0.05, thus H1 is accepted. So, based on the Hausman test, the Fixed Effect Model (FEM) is the best model to use.

Table 4 presents the regression results of this study, which includes the variables and the countries that have been observed. Panel data regression can be used to determine whether there is a significant influence of independent variables, which number more than one, on the dependent variable. One of the more robust and widely used methods is simple linear regression. In simple linear regression, the relationship between the variables is linear, where changes in variable X will be followed by consistent changes in variable Y [22].

Table 4. Panel Data Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.53904	7.883391	-2.224809	0.0294
Population growth	0.435284	0.201752	2.157519	0.0345
PM	0.022424	0.015728	1.425741	0.1585
COVID-19	-2.030156	0.191108	-10.62309	0.0000
Life Expectancy	0.439095	0.103175	4.255834	0.0001

Source: Secondary Data, processed 2024

The regression results of this study indicate that Life Expectancy has a negative and significant impact on Tourist Arrivals at a significance level of 1%. This shows that Life Expectancy affects the decline in international tourist arrivals in six ASEAN countries. When life expectancy is low, it reduces the number of international tourists visiting for leisure in these six ASEAN countries. (Indonesia, Malaysia, Thailand, Singapura, Vietnam, dan Filipina). In this study, the beta coefficient value for variable AHH is 0.439095 with a probability value of 0.0001, which is highly significant at the 1% significance level. This indicates that every 1% increase in life expectancy will increase the dependent variable by 0.439095, assuming other variables remain constant. It can be concluded that the higher the life expectancy of a country, the higher the number of tourists visiting that country [23].

The results of the population growth regression from this study indicate a coefficient of 0.435284 with a probability value of 0.0345, which means it is significant at the 5% significance level [24,25]. This suggests that every increase of 1 unit in population growth will raise the dependent variable by 0.435284, assuming other variables remain constant. It can be concluded that population growth has a significant impact on tourist arrivals at a 5% significance level. This indicates that population growth affects the decline in international tourist arrivals in six ASEAN countries [26].

The regression results of this study indicate that the COVID-19 variable has a negative and significant effect on Tourist Arrivals at a significance level of 1%. This shows that COVID-19 has contributed to the decline in international tourist arrivals in six ASEAN countries [27]. In this study, the beta coefficient value of the COVID variable is -2.030156 with a probability value of 0.0000, which is highly significant at the 1% significance level. This indicates that for every 1 unit increase in the number of COVID-19 cases, the dependent variable will decrease by 2.030156, assuming other variables remain constant. In this study, it can be concluded that the higher the level of COVID-19 in the country, the lower the number of tourists visiting [28,29].

The regression results of this study indicate that the coefficient is 0.022424 with a probability value of 0.1585, which means it is not significant at the 10% significance level. This shows that the PM variable does not have a significant effect on the number of tourist arrivals in six ASEAN countries. At the 10% significance level, this indicates that PM 2.5 does not significantly affect the decrease in international tourist arrivals in the six ASEAN countries [30].

4. Conclusion

The regression analysis reveals that life expectancy and population growth significantly influence international tourist arrivals in six ASEAN countries, with higher life expectancy positively correlated with increased tourism, while population growth also exhibits a positive effect. In contrast, the COVID-19 pandemic exerts a substantial negative impact on tourist flows, indicating the sensitivity of tourism to public health crises. Interestingly, air pollution levels, measured by PM2.5 concentrations, do not show a statistically significant effect on tourist arrivals. These findings suggest that enhancing health outcomes and managing public health risks are crucial for boosting tourism in the region. The lack of significance of air quality in this context warrants further investigation, as it may reflect either the resilience of tourism demand or variations in environmental awareness among tourists. Future research should explore potential nonlinear effects of pollution and incorporate other health and environmental indicators to refine understanding of the factors driving tourist behavior.

REFERENCES

[1] A. Lestari and Y. S., "Analisis Regresi Data Panel Untuk Mengetahui Faktor yang Mempengaruhi Belanja Daerah di Provinsi Jawa Tengah," Jurnal Statistika Industri dan Komputasi, vol. 2, no. 1, pp. 1-11, 2017.

[2] A. Sharma, I. Ahmad Farouk, and S. K. Lal, "COVID-19: A Review on the Novel Coronavirus Disease Evolution, Transmission, Detection, Control and Prevention," Viruses, vol. 13, no. 2, p. 202, 2021. doi: 10.3390/v13020202.

[3] B. Xu and D. Dong, "Evaluating the Impact of Air Pollution on China's Inbound Tourism: A Gravity Model Approach," Sustainability, vol. 12, no. 4, p. 1456, 2020. doi: 10.3390/su12041456.

[4] California Air Resources Board, "Inhalable Particulate Matter and Health (PM2.5 and PM10)," Available: www.arb.ca.gov/resources/inhalable-particulate-matter-and-health. Accessed: 2023.

[5] D. N. Gujarati, Dasar-Dasar Ekonometrika, 5th ed., R. C. Mangunsong, Trans., Jakarta: Salemba Empat, 2013.

[6] D. Setiawan and S. Sukanti, "Pengaruh Ekspektasi Pendapatan, Lingkungan Keluarga dan Pendidikan Kewirausahaan Terhadap Minat Berwirausaha," Journal Profita, vol. 4, no. 7, pp. 1-12, 2016.

[7] Department of Finance, "Duterte Admin Investing $23 Billion in Tourism Infra, Says DOF Executive," 28 Nov. 2016.

[8] Department of Tourism Philippines, National Tourist Development Plan 2016-2022, 2016.

[9] E. D. Santa, "The Evolution of Philippine Tourism Policy Implementation from 1973 to 2009," Tourism Planning and Development, vol. 12, no. 2, pp. 156-162, 2014.

[10] H. Plecher, "Philippines: Total Population from 2014-2024," Statista, 20 May 2020. Available: https://www.statista.com/statistics/578726/total-population-of-philippines/. Accessed: 3 Jan. 2021.

[11] H. Uçak, "The Relationship Between the Growth in the Health Sector and Inbound Health Tourism: The Case of Turkey," SpringerPlus, vol. 5, no. 1, p. 1685, 2016. doi: 10.1186/s40064-016-3341-8.

[12] I. Basuki and A. T. Yuliadi, Electronic Data Processing (SPSS 15 dan EViews 7), Danisa Media, 2014.

[13] I. Ghozali and D. Ratmono, Analisis Multivariat dan Ekonometrika dengan EViews 10, Semarang: Badan Penerbit Universitas Diponegoro, 2017.

[14] I. Konstantakopoulou, "Does Health Quality Affect Tourism? Evidence from System GMM Estimates," Economic Analysis and Policy, vol. 73, pp. 425–440, 2022. doi: 10.1016/j.eap.2021.12.007.

[15] J. C. Hendersen, "Tourism Development and Politics in the Philippines," Tourismos: An International Multidisciplinary Journal of Tourism, vol. 6, no. 2, pp. 160-162, 2011.

[16] L. S. Beh and W. L. Lin, "Impact of COVID-19 on ASEAN Tourism Industry," Journal of Asian Public Policy, vol. 15, no. 2, pp. 300–320, 2022. doi: 10.1080/17516234.2020.1871180.

[17] L. Wang, B. Fang, and R. Law, "Effect of Air Quality in the Place of Origin on Outbound Tourism Demand: Disposable Income as a Moderator," Tourism Management, vol. 68, pp. 152–161, 2018. doi: 10.1016/j.tourman.2018.03.007.

[18] L. Wang, X. Zhou, M. Lu, and Z. Cui, "Impacts of Haze Weather on Tourist Arrivals and Destination Preference: Analysis Based on Baidu Index of 73 Scenic Spots in Beijing, China," Journal of Cleaner Production, vol. 273, p. 122887, 2020. doi: 10.1016/j.jclepro.2020.122887.

[19] L.-J. Wang and M.-H. Chen, "Nonlinear Impact of Air Quality on Tourist Arrivals: New Proposal and Evidence," Journal of Travel Research, vol. 60, no. 2, pp. 434–445, 2021. doi: 10.1177/0047287519899993.

[20] M. Dwangga, "Intensitas Polusi Udara Untuk Penunjang Penataan Ruang Kota Pelaihari Kabupaten Tanah Laut," Metode Jurnal Teknik Industri, vol. 4, no. 2, 2018.

[21] M. Mudrajad, Metode Penelitian Kuantitatif Kualitatif Dan R&D, Jakarta: Erlangga, 2013.

[22] M. T. H. Panjaitan, "Does Good Financial Development Attract Tourists? Evidence from ASEAN Countries," Journal of Developing Economies, vol. 7, no. 2, pp. 342–353, 2022. doi: 10.20473/jde.v7i2.37433.

[23] OECD, "Infant Mortality Rates," 2024. doi: 10.1787/83dea506-en. Accessed on 28 Jun. 2024.

[24] OECD, "Life Expectancy at Birth," 2024. doi: 10.1787/27e0fc9d-en. Accessed on 28 Jun. 2024.

[25] R. C. Capistrano and P. A. Notorio, "A Content Analysis of the Future of Tourism Through the Presidential State of the Nation Address in the Philippines (1987-2019)," Journal of Tourism Futures, vol. 7, no. 1, pp. 131–146, 2021. doi: 10.1108/JTF-05-2020-0075.

[26] R. Patrick, T. Capetola, M. Townsend, and S. Nuttman, "Health Promotion and Climate Change: Exploring the Core Competencies Required for Action," Health Promotion International, vol. 27, no. 4, pp. 475–485, 2012. doi: 10.1093/heapro/dar055.

[27] S. Notoatmojo, Metodologi Penelitian Kesehatan, Jakarta: PT Rineke Cipta, 2002.

[28] US EPA, "Particulate Matter (PM) Basics," 11 Jul. 2023. Available: www.epa.gov/pm-pollution/particulate-matter-pm-basics. Accessed: 2023.

[29] X. Xu, D. Dong, Y. Wang, and S. Wang, "The Impacts of Different Air Pollutants on Domestic and Inbound Tourism in China," International Journal of Environmental Research and Public Health, vol. 16, no. 24, p. 5127, 2019. doi: 10.3390/ijerph16245127.

[30] Y. Yu, W. Zou, M. Jerrett, and Y.-Y. Meng, "Acute Health Impact of Wildfire-Related and Conventional PM2.5 in the United States: A Narrative Review," Environmental Advances, vol. 12, p. 100179, 2023. doi: 10.1016/j.envadv.2022.100179.