

Dynamics of Economic Growth, Tourism and Carbon Emissions in the Context of Climate Change in Thailand

Adi Setiawan¹, Budi Sasongko², Muhamad Mukhlis³
^{1,2,3}STIE Jaya Negara Tamansiswa Malang, Indonesia

Abstract

This study aims to prove how education, internet literacy and economic growth can affect climate change in Malaysia. We use the World Bank as a complementary source of statistical data, namely data from 2000 to 2020, the variables we use are carbon emissions, economic growth, and tourism. We found that economic growth has a beneficial positive effect on climate change, both in the long and short term. This shows that economic growth can improve people's welfare without significantly increasing carbon emissions. The tourism factor has a negative effect on carbon emissions in the short term. This can be explained by the fact that tourism can increase public awareness about the importance of protecting the environment and reducing consumption of fossil energy. The previous year's carbon emission variable also has a beneficial negative effect on this year's carbon emission. That is, the lower the previous year's carbon emissions, the easier it will be to achieve this year's carbon emission target.

Keyword : Carbon emissions, economic growth, tourism, thailand

JEL Classification : C31, O40, Z30.

DOI : 10.54204/splashmagzvol2no12022008

Background

Thailand, with its stunning natural beauty and rich culture, has become a popular tourism destination in the world. The significant growth of the tourism sector has had a positive impact on the country's economy. However, along with economic growth, it is also necessary to pay attention to the negative impact on the environment, especially in terms of carbon emissions. This article will discuss how the tourism industry and economic growth in Thailand affect carbon emissions, as well as efforts that can be made to maintain a balance between economic development and environmental protection (Nitivattananon & Srinonil, 2019; Rusminingsih, Askar, Mutia, Fitria, Wahyudi, 2023).

The tourism industry has been one of the main contributors to Thailand's economic growth. With millions of tourists visiting each year, this sector makes a significant contribution to national income, creates jobs, and drives other related sectors. The economic growth resulting from tourism has had a positive impact on increasing people's income and welfare. However, rapid economic growth has also contributed to increasing carbon emissions in Thailand. Demand for energy and resources increases as economic activity increases. Air transport, energy use in hotels and tourism facilities, and the increasing demand for food and tourist consumption goods all contribute to increased carbon emissions. This is a challenge that needs to be overcome to maintain a balance between economic growth and environmental preservation (Hess, Dodds, & Kelman, 2021; Irawan, Sasongko, Mukhlis, Yanto, & Wulandari, 2022).

The tourism industry itself has a direct impact on carbon emissions. Air transport is one of the main contributors to carbon emissions in this industry. Significantly increasing international and domestic flights to meet the needs of tourists create a significant carbon footprint. In addition, accommodation facilities and tourism infrastructure such as hotels, restaurants and tourist attractions also contribute to carbon emissions through energy use and waste management. The Thai government and the tourism industry have taken several steps to reduce the negative impact on carbon emissions. The use of

renewable energy and more efficient technologies are being adopted to reduce the impact of the tourism sector on the environment. Emission control policies have also begun to be implemented to regulate energy use and reduce the impact of air transportation (Jermstittiparsert & Chankoson, 2019; Priyanto, Widarni, & Bawono, 2022).

The development of environmentally friendly infrastructure and the promotion of ecotourism are also considered solutions. Ecotourism can help divert tourists to more natural places and minimize the impact on the environment. In addition, education and environmental awareness also play an important role in reducing the impact of carbon emissions from tourism. Educating tourists and local people about eco-friendly practices and reducing carbon footprints can have a significant long-term impact. Tourism and economic growth are two important pillars in Thailand's development. However, the negative impact on carbon emissions generated by economic growth and the tourism industry must be overcome to maintain environmental sustainability. The joint efforts of the government, the tourism industry and the community are key in achieving the desired balance. Development of sustainable tourism models, use of renewable energy, emission control, and environmental awareness are important steps in ensuring that Thailand's economic growth does not come at an unmanageable environmental cost (Bhaktikul, Aroonsrimorakot, Laiphrakpam, & Paisantanakij, 2021; Sasongko, Nehruddin, Musriyatun, Siswanto, 2023).

The tourism industry directly contributes to Thailand's economic growth. An increase in the number of international and domestic tourists creates a demand for accommodation services, transportation, food and various other products and services. The revenue generated from the tourism sector has a positive impact on the country's GDP and creates jobs. Economic growth related to tourism can drive overall economic activity. Rapid economic growth tends to increase energy consumption and industrial activity. Demand for energy for commercial use, transportation, and household needs increases along with increased income and economic activity. This increase in energy consumption is generally generated from fossil fuels, which can contribute to increased carbon emissions. Tourism often relies on air transport, which has a significant impact on carbon emissions. Increasing the number of flights to accommodate the growth in tourism contributes to the emission of greenhouse gases into the atmosphere. Dependence on air transport can be one of the main factors in the increase in carbon emissions associated with the growth of the tourism industry. On the other hand, economic growth resulting from the tourism sector can also encourage technological innovation and sustainable practices. In an effort to reduce operating costs and meet the demands of an increasingly environmentally conscious market, many companies in the tourism industry are investing in technologies that are more energy efficient and environmentally friendly. This could involve using renewable energy, better waste management, and more efficient transportation (Fakfare, Lee, & Han, Thailand tourism: a systematic review, 2022).

The correlation between tourism, economic growth, and carbon emissions is also influenced by environmental policies implemented by the government and public awareness. Policies that support the use of renewable energy, better waste management, and sustainable transportation can reduce the impact of carbon emissions from the tourism sector. In addition, the level of public awareness and responsibility for the environment can also affect the demand for environmentally friendly practices in travel and consumption. The theme of how tourism and economic growth affect carbon emissions in Thailand has been highlighted in research, and the study results show arguments for and against the impact of these two factors. Several studies support the view that tourism and economic growth can reduce carbon emissions. One found that tourism makes an important local economic contribution, enabling investment in sustainable practices and green technologies. The economic growth generated from the tourism sector also encourages the use of funds for environmentally friendly infrastructure development. Likewise Raihan, et al., (2023) observes that strong economic growth in China stimulates technological innovation in tourism, such as more energy-efficient transportation and accommodation, which ultimately contributes to reducing carbon emissions.

However, on the other hand counter arguments regarding the impact of tourism and economic growth on carbon emissions are also found in research. Fakfare & Wattanacharoensil (2023) highlight that tourism growth in various destinations often depends on air transport which increases carbon emissions. Air transport, as an integral element in the tourism industry, is often a major contributor to carbon emissions. The rapid growth of tourism often leads to an increase in carbon emissions from the transportation sector. They also show that high economic growth can increase energy consumption and industrial activity, which in turn increases carbon emissions. In some situations, growth in people's incomes can spur greater mobility, including increased travel, which significantly contributes to carbon emissions. Overall, research results on the interaction between tourism, economic growth, and carbon emissions in Thailand provide a complex perspective. While some studies suggest that economic growth and tourism can provide opportunities for reducing carbon emissions through investments in sustainable technologies, other research underscores the potential negative impacts, particularly through increased air transport and energy consumption. It is important for Thailand to take a sustainable approach that combines economic and environmental policies to strike a balance between desired economic growth and important environmental protections. The purpose of this study was to determine the influence of tourism contribution and economic growth in influencing carbon emissions in Thailand.

Research Method

We use the World Bank as a complementary source of statistical data, namely data from 2000 to 2020, the variables we use are carbon emissions, economic growth, and tourism. We use the following econometric model:

$$CE_t = \beta_0 + \beta_1 CE_{t-1} + \beta_2 EG_t + \beta_3 TS_t + e_t$$

Where the carbon emissions is CE, EG is economic growth, and tourism is TS, the error term is e, and time series is t.

Result and Discussion

The stationarity test results are displayed in Table 1.

Table 1. ADF 1st stationary tets

Variable	ADF Test stat.	Signif.	Description
Carbon emissions (CE)	-4.967012	0.0009	Stationer
Economic growth (EG)	-6.364216	0.0001	Stationer
Tourism (TS)	-4.482353	0.0028	Stationer

The data for CE, EG, and TS are stationary in the first difference data, as can be seen from the table above. We may continue with the ARDL estimate because all the data are steady.

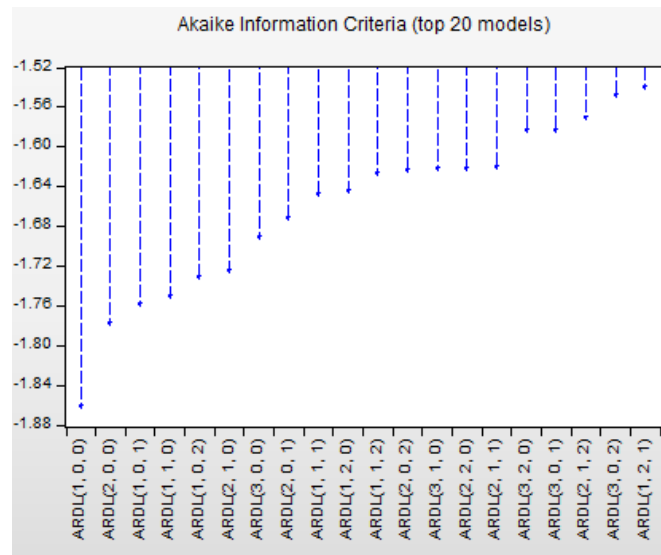


Figure 1. Optimum Lag Test

The lag test findings indicate that lag 1,0,0 is best lag. Now that the ideal latency has been identified, and next we perform an ARDL analysis.

Tabel 2. ARDL analysis results

	Coeff.	Std. Error	t-Stat.	Prob.*
CE(-1)	0.931506	0.076583	12.16337	0.0000
EG	0.023178	0.007901	2.933376	0.0097
TS	-0.000627	0.006678	-0.093934	0.9263
C	0.216241	0.240741	0.898232	0.3824
R-sq.	0.939869	Adj. R-sq.		0.928594

From the estimation results of the ARDL model, it is known that adj R-sq. and R-square. values varied between 0.93 and 0.92. With an R-squared of 0.93, the independent variable of the ARDL model can explain fluctuations in the dependent variable, carbon emissions, by 93 percent. This shows the suitability of this research model for use in research.

The economic growth variable has a positive beneficial effect on climate change with a coefficient value of 0.023178. the tourism variable has a negative effect on carbon emissions, with a coefficient value of -0.000627. the previous year's carbon emission variable had a positive beneficial effect on this year's carbon emission with a coefficient value of 0.931506.

Table 3. The long term and short term test

	Coef.	Std. Error	t-Stat.	Prob.
C	0.216241	0.240741	0.898232	0.3824
CE(-1)*	-0.068494	0.076583	-0.894380	0.3844
EG**	0.023178	0.007901	2.933376	0.0097
TS**	-0.000627	0.006678	-0.093934	0.9263

As seen in the table above, economic growth has a beneficial positive effect on climate change in the long and short term. The tourism factor negatively affects carbon emissions in the short term. That is, when tourism increases, the lower the rate of carbon emissions. The previous year's carbon emission

variable also has a negative beneficial effect on this year's carbon emission.

Conclusion

Economic growth has a beneficial positive effect on climate change, both in the long and short term. This shows that economic growth can improve people's welfare without significantly increasing carbon emissions. The tourism factor has a negative effect on carbon emissions in the short term. This can be explained by the fact that tourism can increase public awareness about the importance of protecting the environment and reducing consumption of fossil energy. The previous year's carbon emission variable also has a beneficial negative effect on this year's carbon emission. That is, the lower the previous year's carbon emissions, the easier it will be to achieve this year's carbon emission target.

References

- Bhaktikul, K., Aroonsrimorakot, S., Laiphrakpam, M., & Paisantanakij, W. (2021). Toward a low-carbon tourism for sustainable development: A study based on a royal project for highland community development in Chiang Rai, Thailand. . *Environment, development and sustainability*, 23 (1), 10743-10762.
- Fakfare, P., & Wattanacharoensil, W. (2023). Low-carbon tourism: determining domestic tourist perception from Thailand: TOURISM AGENDA 2030. *Tourism Review*, 78 (2), 496-516.
- Fakfare, P., Lee, J. S., & Han, H. (2022). Thailand tourism: a systematic review. *Journal of Travel & Tourism Marketing*, 39 (2), 188-214.
- Hess, J. S., Dodds, R., & Kelman, I. (2021). Assessing accommodation suppliers' perceptions of climate change adaptation actions on Koh Phi Phi Island, Thailand. *ASEAN Journal on Hospitality and Tourism*, 19 (1), 1-14.
- Irawan, C. B., Sasongko, B., Mukhlis, M., Yanto, D. D. G. F., & Wulandari, M. W. (2022). Trade and Foreign Direct Investment on Economic Growth in Indonesia: ARDL Approach: English. *Tamansiswa Accounting Journal International*, 5(1), 70-75.
- Jermstipparsert, K., & Chankoson, T. (2019). Behavior of tourism industry under the situation of environmental threats and carbon emission: Time series analysis from Thailand. *International Journal of Energy Economics and Policy*, 9 (6), 1-18.
- Nitivattananon, V., & Srinonil, S. (2019). Enhancing coastal areas governance for sustainable tourism in the context of urbanization and climate change in eastern Thailand. *Advances in Climate Change Research*, 10 (1), 47-58.
- Priyanto, E., Widarni, E. L., & Bawono, S. (2022). The Effect of Internet Inclusion on Financial Inclusion in P2P Lending in Indonesia Based on Human Capital Point of View. In *Modeling Economic Growth in Contemporary Indonesia* (pp. 107-121). Emerald Publishing Limited.
- Raihan, A., Muhtasim, D. A., Farhana, S., Rahman, M., Hasan, M. A., Paul, A., & Faruk, O. (2023). Dynamic linkages between environmental factors and carbon emissions in Thailand. *Environmental Processes*, 10 (1), 1-19.
- Rusminingsih, D., Askar, Mutia, D.K, Fitria, L., Wahyudi, M.I. (2023). Pembudidayaan Budidaya Hidroponik Sayur Organik Di Desa Kampung Putih Kelurahan Klojen Kecamatan Klojen Malang. *Jurnal Abdimas Jayanegara*, 1(1), 1-8.
- Sasongko, B., Nehruddin, Musriyatun, Siswanto, N.H. (2023). Peningkatan Nilai Ekonomis Di Bidang Lingkungan Di Desa Jenggolo Kecamatan Kepanjen Kabupaten Malang. *Jurnal Abdimas Jayanegara*, 1(1), 21-28