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Do Good Governance and Economic Growth Affect Environmental Degradation During Covid-19?

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Abstract

During the covid-19 outbreak, Thailand endured environmental damage. The failure of public sector departments to manage economic and environmental challenges sparked a national media discussion about poor governance. The public had an unfavorable impression of the government's performance during the epidemic. This study aims to comprehend how good management and economic progress affect environmental degradation in Thailand during covid-19. This study examined the aspects of good governance and economic growth that contribute to environmental deterioration using secondary sources deemed to be credible. This study indicated that good management and economic progress contributed to environmental degradation in Thailand throughout the covid-19 period. This study combines ARDL techniques with the Error-Correction Model (ECM). These results demonstrate how strong governance and economic progress contribute to a decline in CO2 emissions. The latest investigation confirms the conclusions of prior research. This research contributes to the body of knowledge because previous studies did not address the importance of good governance and economic growth in environmental degradation. The recent research also has significant implications for the Thai government's efforts to increase environmental sustainability through good management and economic development.

Keywords. Digital government, government effectiveness, e-government, public service, environmental degradation

1. Introduction

During the pandemic era, humanity faced various social and environmental challenges (Puntub & Greiving, 2022; Sampantamit et al., 2020; Yohmad & Prabrat, 2022). Indeed, it is the responsibility of public sector institutions to safeguard the rights and ideals of the populace (Tancho, Sriyakul, & Tang, 2020; Thumronglaohapun et al., 2022). In Thailand, environmental issues occurred during the covid season, when human lives were in peril (Charoenwat et al., 2022; Numpong et al., 2022; Paiboonvong et al., 2022). Environmental issues arose due to unethical labor practices (Wattanawong et al., 2021). Because the companies do not care about their waste, industrial pollution is the root cause of environmental degradation (Papwijitsil et al., 2021; Pisitsankkhakarn & Vassanadumrongdee, 2020; Thaothampitak & Wongsuwatt, 2022). At the same time, poor governance is regarded as one of the fundamental causes of environmental problems (Papwijitsil et al., 2021; Pattanakuhar et al., 2022; Sapbamrer et al., 2022), as it is the government's responsibility to protect the environment by enforcing the laws effectively (Barua & Narattharaksa, 2020; Chanthawong et al., 2020; Suttipun & Arwae, 2020). Since the pandemic outbreak and the government machinery's involvement in the healthcare sector and economic sustainability, environmental issues in Thailand have emerged (Nakasu et al., 2022; Otwong, Jongmeewasin, & Phenrat, 2021).

During the pandemic epidemic in Thailand, 12 percent of environmental issues arose due to the government's involvement in treating medical problems (Ditta-Apichai, Kattiyapornpong, & Gretzel, 2020; Kokkhangplu & Kaewnuch, 2022; Pongsakornrungsilp & Pongsakornrungsilp, 2021). Similarly, it is believed that the Thai government failed to control affairs at a higher level due to the lockdown (Chuaypen et al., 2022; Moallef et al., 2022; Montes & Cruz, 2020). In addition, the collaboration between government departments deteriorated, which posed a significant obstacle to good governance (Pholphirul et al., 2021; Suwannarong et al., 2022; Tanantong, Pannakkong, & Chemkomnerd, 2022). Before the outbreak, the Thai government successfully managed the country's environmental challenges (Khamsuk & Whanchit, 2021; Kitchanapaibul et al., 2022). At the same time, the government of Thailand was confronted with an economic dilemma due to stalled economic growth

during the pandemic (Stange & Sasiwongsaroj, 2020; Weerasombat, Pumipatyothin, & Napathorn, 2022). The failure of public sector agencies to manage economic and environmental challenges sparked a national media debate on poor governance (Adams et al., 2005; Puntub & Greiving, 2022; Sampantamit et al., 2020; Tancho et al., 2020; Yohmad & Prabrat, 2022; Zeng, Gower, & Wood, 2018). During the epidemic, the public had an unfavorable impression of the government's performance (Puntub & Greiving, 2022; Tancho et al., 2020; Thumronglaohapun et al., 2022; Yohmad & Prabrat, 2022).

According to Bennett, Dearden, Murray, and Kadfak (2014) environmental deterioration occurs when the government has no intention to protect the environment. According to Adams et al. (2005), the Kyoto protocol emphasizes protecting the environment for future generations on the part of signing governments. Limpaphayom and Polwitoon (2004) further highlighted that sustainable development goals aim to preserve the environment and its resources for future generations. Silanoi (2012) study identified poor governance as a major contributor to environmental degradation in all nations. Puntub and Greiving (2022) noted that during the pandemic, the Thai government was interested in protecting the general public by improving medical care, which generated environmental degradation in Thailand. Less concern for the environment may cause Thailand's environmental conditions to deteriorate. In addition, according to Suttipun (2018), economic instability is one factor contributing to environmental deterioration.

This study aims to comprehend how good governance and economic progress affect environmental degradation in Thailand during covid-19. The purpose of the study is to supplement the existing literature with knowledge that is more significant and realistic than previous studies. This research contributes to the body of knowledge because previous studies did not address the importance of good governance and economic growth in environmental degradation. In this light, this research is important for the academic literature and Thai practitioners to enhance governance and prevent environmental damage. In addition, this study's theoretical and practical consequences would enrich the literature with more significant information for strengthening the government's working ability through comparisons with other nations.

2. Literature Review

Thailand is a premier nation in Southeast Asia, but the country's rapid economic growth has generated severe climate problems that threaten the survival of its inhabitants (Coate, Handmer, & Choong, 2006; Rossi, 2012; Stange & Sasiwongsaroj, 2020; Watthanabut & Jermsittiparsert, 2020). As Thailand has moved from a traditional agrarian economy to a modern economy, the country's ecosystem has deteriorated during the past several years (Chakpitak et al., 2018; Coate et al., 2006; Khamken et al., 2021; Lopez & Bhaktikul, 2018). Bangkok has six key climatic challenges: resource depletion, intensive agriculture, climate change, and water and air pollution (Khamsuk & Whanchit, 2021; Wedchayanon & Chorkaew, 2014). There are approximately 101 local sewage purification plants in the United States (Khamsuk & Whanchit, 2021). 91 have been completed, 10 are still under construction, and one has been delayed (Sumardiana, Wicaksono, & Ramada). Daily, 3,2 million square meters of surface area can be treated in total (Yoelao, Mohan, & Sombatwattana, 2019). A 2020 survey of urban wastewater treatment stations in the United States found 71 operating facilities (Stange & Sasiwongsaroj, 2020). 63 sites (89%) with wastewater cleanliness met the standard, whereas 8 sites had wastewater purity that went below the limit. Four comparable organizations aided local governments with sewage management system management difficulties (Nonthapot & Srichaiyo, 2017; Suwannarong et al., 2022; Tanantong et al., 2022). They helped local governments prepare project designs and specifications for viability evaluations (Ditta-Apichai et al., 2020). As part of the regional strategic plan for sustainable development, they aided regional authorities in securing finance for industrial and building projects or infrastructure renovation. The Ministry of Natural Resources and Environment also assisted in developing a sewage treatment system (Chuaypen et al., 2022; Moallef et al., 2022; Yoelao et al., 2019). The Ministry drafted specific regulations to regulate the treated wastewater discharged by local wastewater treatment plants (Punyaratabandhu & Swaspitchayaskun, 2018).

Municipalities were urged to utilize the Municipal Sewage Management System, which conformed to the worldwide standard ISO 9001, to routinely document the company's construction compliance (Yohmad & Prabrat, 2022). Regional

administrations are implementing the ISO standard. The Ministry of Natural Resources and Environment has developed project services and mitigation techniques to anticipate and alleviate problems with groundwater assets in significant river valleys (Adams et al., 2005). To address concerns regarding the safety of freshwater in significant river basins, the Ministry of the Interior, Agriculture and Cooperatives, and Industry proposed a novel collaboration (Charoenwat et al., 2022). Multiple ministries got cash of 5,313,96,000,000 baht for trash and environment management in 2020, representing 0.3% of the entire yearly budget allocation (Numpong et al., 2022). Out of the allocated funds, 1,623,45,000,000 baht had been earmarked to develop a plan for the efficient and effective administration of the nation and the advancement of city authority (Sangchumnong, 2019). A total of 3,470.5 million baht was allocated for the development of a method for managing territory, natural resources, and the environment, for forest conservation and utilization, and for the creation of plans for preserving wildlife, lowering emissions, and regulating the climate (Hsu, Huang, & Yupho, 2015; Kanjanatarakul & Suriya, 2012; Silanoi, 2012). Various administrative authorities in Thailand have established climate and waste policies and recommendations (Tancho et al., 2020). The Ministry of Natural Resources and Environment's Department of Industrial Works' Pollution Control Department is vying for crucial jobs in sustainable development and atmosphere protection (Azam, Alam, & Hafeez, 2018; Nawawi et al., 2019; Pisitsankkhakarn & Vassanadumrongdee, 2020).

Due to decentralized philosophy and regulation, while having fewer resources, urban municipalities play an important role in ecological sustainability (Rajbhandari, Limmeechokchai, & Masui, 2019; Sapbamrer et al., 2022; Satimai et al., 2011). Despite a few articles that permit the employment of monetary measures, Thailand's ecological safeguards typically adhere to the control model (Tevapitak & Helmsing, 2019; Vantamay, 2018; Zhang et al., 2019). PHA is a key legislation that tackles waste materials, business activity pollution, and environmental contamination (Nakasu et al., 2022). It describes the responsibility of city councils for municipal garbage collection, transportation, and management (Nakasu et al., 2022). Additionally, it permits individuals or businesses to carry out these responsibilities on their behalf

(Rajbhandari et al., 2019). Municipal administrations can issue permits to individuals and corporations to facilitate transactions. The Minister of Public Health appears to be authorized by law to choose the optimal consultation charge (Adams et al., 2005; Sampantamit et al., 2020; Yohmad & Prabrat, 2022). The processing fee would subsequently be imposed by city authorities within their jurisdictions but never over the minister's usable capacity (Rajbhandari et al., 2019). No matter how much pollution is generated, it is typically reduced to an inadequately low level. The issue may be the reluctance of public leaders to implement very controversial initiatives (Azam et al., 2018; Nawawi et al., 2019; Thaothampitak & Wongsuwatt, 2022). PHA is essential for controlling environmental emissions from urban facilities. The PHA classifies the vast majority of specular reflection subject to NEQA regulation and practically all commercial activities as "activity detrimental to society" (Azam & Khan, 2017; Jones, 2002; Pattanakuhar et al., 2022). The management of these private firms necessitates competent municipal performance. Whether or not they have adequate resources, most local councils still require the workforce and professional knowledge to monitor and manage air pollution (Yohmad & Prabrat, 2022).

Under the Ministry of Industry's Factory Act, all hazardous wastewater is regulated (Limpaphayom & Polwitoon, 2004). To submit their waste for treatment, enterprises that produce hazardous substances through manufacturing processes must obtain approval from the MOI (Thumronglaohapun et al., 2022). Those that generate non-hazardous chemical waste must inform the MOI of the amount of their waste that must be managed or disposed of (Silanoi, 2012). They are responsible for funding the transportation and disposal costs, which range between 5,000 and 10,000 Baht per ton of hazardous garbage (Paiboonvong et al., 2022). Sending their garbage to unlicensed crushers is unethical (Tangcharoensathien et al., 2018). Even though violators face a maximum fine of 1 million Baht for either non-hazardous or hazardous wastewater, they always select the less expensive option (Jones, 2002; Papwijitsil et al., 2021; Thanachaisethavut, Charoenlert, & Saeng-ging, 2006). The NEQA specifies that localities that constructed infrastructure for the disposal of organic waste using a portion or the entirety of Environmental Fund funds must charge processing charges and retain 4.1% of those rates for return to the Environmental Fund (Sampantamit et

al., 2020; Tancho et al., 2020; Thumronglaohapun et al., 2022). The NEB establishes and releases cost levels (Rajbhandari et al., 2019). Approximately 15 municipal governments have received grants from the Environmental Fund (Puntub & Greiving, 2022; Zeng et al., 2018). These neighborhood councils must adhere to the NEB's cost speed regulation (Sangchumnong, 2019; Wattanawong et al., 2021). The 2021 NEB Announcement, for instance, established the sewage treatment service fee for Trad Council and similar communities (Yohmad & Prabrat, 2022). The earlier literature explains that the government and its ministries continue to play a crucial role in environmental issues, such as waste management and water problems, which are major contributors to environmental degradation (Adams et al., 2005; Bennett et al., 2014; Charoenwat et al., 2022; Kato & Charoenrat, 2018; Limpaphayom & Polwitoon, 2004; Munkongsujarit, 2016; Numpong et al., 2022; Puntub & Greiving, 2022; Sampantamit et al., 2020; Tancho et al., 2020; Thumronglaohapun et al., 2022; Yohmad & Prabrat, 2022; Zeng et al., 2018). During the pandemic, the Thai government played a crucial role in economic growth and environmental sustainability.

3. Methodology

The interplay of regressors across time can be analyzed using various methods, including the residual model. In recent years, this technique has acquired substantial popularity for examining the historical relationship between the regressor and the empirical model. This technique also accounts for the possibility of variables' dynamic interactions. Several additional considerations may have impacted the choice to pursue this course. The ARDL model permits power and testing of the long-run connection to be added in any order, as opposed to needing the same sequence for all explanations, which was a significant improvement over the prior method. This is an enormous plus. Therefore, checking the model's integration sequence without ARDL is superfluous.

Consequently, the ARDL cointegration approach may be utilized regardless of whether the explanatory variables are mutually co-integrated, only I(O) or I(O) alone (1). Suppose you want a trustworthy result, though. In that case, you must integrate the response variable to order I. (1). Pre-testing introduces uncertainty (I(O), 1(1), or

mutually co-integrated) to the study of level connections, according to Cavanagh, Cavanagh, Elliott, and Stock (1995); Pesaran, Shin, and Smith (2001). This holds true regardless of the settings under which preliminary tests are conducted. This may make it difficult for the researcher to choose the optimal method of data analysis. In addition, some academics assert that the power and size aspects of unit root tests are inadequate, especially when applied to series with a small sample size.

Even if the ARDL method does not need pre-testing of the sequence in which the series are integrated, each series within the proposed model should be tested. This is done to ensure that the dependent and explanatory variables are both I(1) series. If the regression results are to be believed, the order-integrated conformation of the series must be accurate. In addition, the regression outcomes will be wrong if the investigated series is a 1(2) variable. This occurs because the limits test acts under the assumption that the variables are either I(0) or I. (1).

Second, the Error-Correction Model (ECM) of the ARDL methodology gave statistically superior results compared to the Engle-Granger method. This is because the Engle-Granger technique's residual term does not consider short-run dynamics (Tang, 2005). The residual resulting from serial correlation can also be altered using the ARDL approach, which can include 143 endogenous variables. In the meantime, this method is more effective with a larger sample size. With such a small sample size, there was also fear that the Johansen-Juselius experiment could provide deceptive results.

$$_t\, \alpha_0\, \beta_t + \sum_{i=1}^{k-1} \Phi\, Y_{t-1} \varepsilon_t \ldots (1)$$

In this piece of research, the long-run equations of the production functions model were explored. This model may also be expressed as a generic vector autoregressive model with order P in Zt, as seen in the formula shown further down in this section.

$$_t\, \alpha_0\, \beta_t + \Pi\, Y_{t-1} + \sum_{i=1}^{k-1} \alpha_i\, \Delta\, Y_{t-1}\, \varepsilon_t \ldots (2)$$

The econometric model of the current study is as follows

$$ln(CO_2)_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i\, \Delta\, ln(CO_2)_{t-1} + \sum_{i=1}^{k} \alpha_i\, \Delta\, ln(EG)_{t-1} + \sum_{i=1}^{k} \alpha_i\, \Delta\, ln(GG)_{t-1} + \sum_{i=1}^{k} \alpha_i\, \Delta\, ln(PS)_{t-1} + \sum_{i=1}^{k} \alpha_i\, \Delta\, ln(GEXP)_{t-1} + \Gamma_1 ln(CO_2)_{t-1} + \Gamma_2\, ln(EG)_{t-1} + \Gamma_3\, ln(GG)_{t-1} + \Gamma_4\, ln(PS)_{t-1} + \Gamma_5\, ln(GEXP)_{t-1} \ldots\ldots (3)$$

4. Results

The correlational analysis of the variables is shown in table 1. The correlation value indicates that all the variables used in the current study are highly correlated.

Table 1: Correlation

		1	2	3	4	5	6
CO_2	**1**	1					
EG	**2**	-0.1730	1				
GG	**3**	-0.5647	0.6903	1			
PS	**4**	0.7230	0.6108	0.8239	1		
GEXP	**5**	0.6296	-0.4463	0.8389	0.7379	1	

ASEAN optimum models' selection was undertaken, as depicted in Table 2. The selected models are ARDL **(2,1,0,2)**and ARDL **(1,2,0,2)**for equation 3.

Table 2: Optimal ARDL Model Selection of CO2 Model

Variables	Coefficients	Standard Error	*t*-statistics	*p-Value*
ARDL (2,1,0,0,0)				
CO2(-1)	0.315	0.142	2.922	0.008*
CO2(-2)	0.325	0.147	3.090	0.006*
EG	0.001	0.001	3.437	0.014*
EG(-1)	0.001	*0.001*	4.918	0.000*
GG	-0.427	0.127	-3.458	0.001*
PS	0.011	0.001	1.212	0.213
GEX	0.013	0.033	0.516	0.614
C	6.416	2.872	2.530	0.028*
T	0.045	0.008	4.431	0.000*
ARDL (0,1,0,0,2)				
CO2	0.419	0.117	3.614	0.001*
EG	0.001	0.001	4.158	0.000*
EG (-1)	0.002	0.000	1.602	0.060**
GG	0.000	0.010	-3.312	0.003*
POL	-0.261	0.076	3.824	0.001*
GEX	0.415	0.147	3.090	0.003*
GEX(-1)	0.000	0.000	2.424	0.023*
GEX(-1)	0.000	*0.000*	5.932	0.000*
C	22.954	6.213	4.168	0.000*
T	0.044	0.006	4.231	0.000*

The outcomes of Model 3's regression are displayed in Table 1 below. These results demonstrate how strong governance and economic progress contribute to a decline in CO2 emissions. The latest investigation confirms the conclusions of prior research. The elements that contribute to economic development have a significant effect on CO2 emissions, according to the findings of model 3. The model results indicated that areas with more government were likely to have fewer carbon emissions. Numerous scholarly articles have been published on this topic, focusing on the relationship between ecological health and effective management. The vast majority of studies indicate a positive correlation. However, the majority of this research ignores carbon emissions' effects. The political space available to reduce global pollution levels is inversely proportional to the effectiveness of international conferences in achieving agreements (Anselin, Florax, & Rey, 2013). According to this report, implementing these pacts has only just begun. Therefore, it is premature to draw definitive conclusions regarding the influence of good governance on emissions. It has also been demonstrated that economic activity, real GDP, and energy consumption substantially affect CO2 emissions.

5. Discussion

The conclusions of this study suggested that the government plays a vital role in environmental preservation. Indeed, government machinery can combat natural calamities (Puntub & Greiving, 2022), but for the sustained development of any nation's economy, the government must enhance its performance (Tancho et al., 2020). The United States government is working efficiently to tackle these challenges since, based on these issues. It can control many situations (Charoenwat et al., 2022; Kato & Charoenrat, 2018; Munkongsujarit, 2016). Indeed, any government's actions should be for the people's advantage (Rossi, 2012). However, the outcomes of this study indicate that strong governance is required for environmental preservation because governments in modern and developed nations have established legislation for environmental protection (Khamken et al., 2021; Naipinit & Kroeksakul, 2014). In addition, the results of this study indicate that environmental protection in Thailand should be conducted with the aid of good governance. To enhance working conditions, the Thai government must emphasize

fair operations in government agencies (Suwannarong et al., 2022). Likewise, the Thailand government should embrace the Australian environmental protection approach to protect the environment and eliminate environmental damage (Stange & Sasiwongsaroj, 2020). Furthermore, the Thai government must adopt Norway's legal environmental laws to sustainably safeguard the environment at an advanced level (Stange & Sasiwongsaroj, 2020). Again, Khamsuk and Whanchit (2021) highlighted that excellent governance is the key to environmental sustainability since the government implements environmental protection policies. Weerasombat et al. (2022) disclosed that the UAE government is attempting to enhance the country's environmental state by planting new wood. These efficient government measures can enhance the government's performance to the highest degree.

6. Conclusion

In general, the epidemic presents the Thai government with various issues, but it is possible to control economic expansion and environmental destruction with appropriate management. The financial situation in Thailand has been seen with skepticism by covid-19. Still, with strong governance, all the repercussions can be ameliorated beneficially to eliminate all these issues in the future. According to this study, environmental sustainability must be a priority for the government. Thus government machinery should be prepared to meet these difficulties in the future. Similarly, the findings of this study are not exclusive to the Thai government; with good management, the governments of other ASEAN nations may control economic sustainability and environmental degradation. In this sense, the public will benefit, and other natural hazards and calamities will no longer pose a concern in Thailand and other ASEAN nations.

6.1 Implications

6.1.1 Theoretical Implications

This research has substantial theoretical implications that contribute to a better understanding of the impact of economic expansion and good governance on

environmental deterioration in Thailand. This study contributes to the existing literature by emphasizing that good governance is one of the key indispensable aspects for addressing environmental challenges. In addition, this paper discusses a research gap that was not even addressed by recent studies completed post-pandemic. The significance of the interaction between public policy and governance in Thailand's environmental preservation was not discussed in the prior literature. This study's most important contribution is the development of meaningful relationships based on secondary data. In addition, the preceding corpus of knowledge only included information regarding good governance and environmental issues.

Consequently, this work makes a theoretical contribution to the influence of good governance on environmental degradation during pandemic outbreaks. These correlations were absent from the current literature; hence, this study made a substantial contribution to this field. These ramifications would be significant for future research and would improve future researchers' understanding of the interactions between these parameters. This research enhances the theory in this regard, and more productive interactions between variables are defined with the help of prior research.

6.1.2 Practical Implications

The purpose of this study is to fill a vacuum in the literature. In addition, the current research has significant practical implications for the Thai government's efforts to increase environmental sustainability through good governance and economic growth. This analysis indicated that the government of Thailand should prioritize economic growth because, with a robust economy, it would have the resources necessary to combat the pandemic and other natural calamities and safeguard the economy. Second, this study indicates that the economy can be robust and thrive even during the time of covid-19 by taking proper action. The earlier studies undertaken in this field did not identify the pandemic as a significant cause of economic instability. This research also demonstrated that the Thai government should undertake reforms in governance, as natural disasters may be managed by the government and state apparatus with the aid of good governance. Therefore, these findings would provide a crucial way for the Thai government to enhance

governance and regulate environmental issues to achieve environmental sustainability. As a result, not only would there be economic sustainability, but the government would be able to take more corrective actions to address environmental issues. Lastly, this study has practical implications for reducing environmental issues and investing more government resources in good governance and sustainable economic growth.

6.2 Future Direction

Indeed, this study aims to comprehend how good governance and economic progress affected environmental deterioration in Thailand during covid-19. The purpose of the study is to supplement the existing literature with knowledge that is more significant and realistic than previous studies. Significantly, this work has investigated all undiscovered environmental degradation elements in Thailand during covid-19. However, this study identifies further research gaps for future investigations. In this regard, future research may examine the function of environmental policy in Thailand's environmental degradation problem. Second, future research may concentrate on the function of sustainable development goals' consequences on environmental degradation concerns in Thailand. Lastly, because this study is based on secondary data, future studies in this field of research should utilize primary data to validate the findings of this study.

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