

Urbanization, income distribution, and environmental degradation: A case of COVID-19 economic crisis

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Abstract

Due to the covid-19 epidemic in Thailand, the industry was shut down, and the population faced a significant issue. Since a medical emergency had been declared throughout the country, the Thai government was primarily concerned with medical facilitation. During covid-19, the lack of focus on urbanization and income distribution contributed to environmental degradation. This study aims to examine the relationship between urbanization, income distribution, and environmental deterioration in Thailand during the covid-19 epidemic. Using secondary data and a fixed effect methodology, this study determines the effects of urbanization, income dispersion, and environmental degradation during the covid-19 pandemic using secondary data. Over twenty-four years, from 1987 to 2021, information was collected from ten different ASEAN nations. To answer the question posed by the study, panel data analysis is utilized. If there are variations among the entities (countries, persons, etc.) and those differences, influence the dependent variable, the random effects model (REM) is utilized. The study concluded that urbanization and income distribution were significant challenges to Thailand's economic predicament. The theoretical implications of this study are significant since they solve a research gap. This study's practical ramifications offer a road map for enhancing the Thai government's response to the economic crisis and environmental deterioration.

Keywords. Income unequal, urbanization, environmental degradation, economic crisis, covid-19

1. Introduction

Since the industrial revolution, employees from diverse parts of towns have been relocated to large cities and industrial districts, and urbanization began at this time (Adams et al.; Jermittiparsert, 2021; Puntub & Greiving, 2022; Zeng, Gower, &

Wood, 2018). It is the role of the government to build cities in industrial zones and safeguard the residents' fundamental rights (Sampantamit et al., 2020; Tancho, Sriyakul, & Tang, 2020; Thumronglaohapun et al., 2022; Yohmad & Prabrat, 2022). As a result of the covid-19 outbreak in Thailand, the industry was shut down, and residents could not transfer from one location to another, posing a significant issue (Khamsuk & Whanchit, 2021; PhramahaWattana et al., 2020). Similarly, the pandemic posed a threat to the employment of those who mistrusted the social structure and living conditions of others (Otwong, Jongmeewasin, & Phenrat, 2021; Papwijitsil et al., 2021; Wattanawong et al., 2021). In modern nations, the government has planned for inflation and well-regulated the workforce, but for the workers of Thailand during covid-19, it was a significant struggle to deal with this condition (Stange & Sasiwongsoroj, 2020; Weerasombat, Pumipatyothin, & Napathorn, 2022). Because a nation's economy is directly dependent on the daily income of its citizens, a fluctuating income might generate economic problems (Khamsuk & Whanchit, 2021; PhramahaWattana et al., 2020). If people lose their jobs, as was the trend in Covid-19, these crises are unsuitable for the working class (Stange & Sasiwongsoroj, 2020; Weerasombat et al., 2022). Similarly, the shutdown of industry in any country can directly impact inflation, as exports are directly related to the industry's continued operation (Papwijitsil et al., 2021; Pattanakuhar et al., 2022; Pisitsankkhakarn & Vassanadumrongdee, 2020; Sapbamrer et al., 2022). Indeed, economic management can be managed by the relevant authorities, but during the epidemic, this control was hidden from the public (Khamsuk & Whanchit, 2021; Kitchanapaibul et al., 2022; Pholphirul et al., 2021; Suwannarong et al., 2022; Tanantong, Pannakkong, & Chemkomnerd, 2022). Like other ASEAN nations, Thailand's economy was mistrusted due to an international trade impasse (Papwijitsil et al., 2021; Pattanakuhar et al., 2022; PhramahaWattana et al., 2020). Therefore, the priority of any government should be to defend the labor class in the country, as they rely heavily on government rehabilitation programs (Khamsuk & Whanchit, 2021; Kitchanapaibul et al., 2022). The plight of the working class poses a threat to the environment because of their lack of environmental awareness and activities that contradict environmental sustainability goals (Gödecke & Waibel, 2011; Pholphirul et al., 2021).

Much material in the body of knowledge discusses environmental degradation in Thailand (Adams et al.; Phrakhrupatnontakitti, Watthanabut, & Jermittiparsert, 2020; Puntub & Greiving, 2022; Sampantamit et al., 2020; Tancho et al., 2020). Similarly, other studies have examined the role of sustainability and forestation in Thailand's environmental protection (Arouri et al., 2013; Azam, Alam, & Hafeez, 2018; Jones, 2002; Papwijitsil et al., 2021; Ping, 2011). Similarly, the current literature has analyzed Thailand's medical status and government resources (Lopez & Bhaktikul, 2018; Naipinit & Kroeksakul, 2014; Nonthapot & Srichaiyo, 2017; Panya et al., 2018). However, no previous study has addressed the significance of urbanization in Thailand as an environmental concern before covid-19 (Arouri et al., 2013; Azam et al., 2018; Jones, 2002; Papwijitsil et al., 2021; Ping, 2011). In addition, the research lacks a comprehensive examination of the relationship between environmental deterioration and low income (Chavalparit et al., 2006; Naipinit & Kroeksakul, 2014; Nakasu et al., 2022; Nankongnab et al., 2015; Nonthapot & Srichaiyo, 2017; Panya et al., 2018). Consequently, this study aims to examine the relationship between urbanization, income distribution, and environmental deterioration in Thailand during the covid-19 pandemic outbreak. This study will address this gap in the literature in this manner. Undoubtedly, the older literature contains vital material that any study may utilize to comprehend better the state of urbanization, environmental degradation, and economic sustainability in Thailand. On the other hand, the results of this study would be significant because these links have never been examined in the context of a pandemic. Consequently, the theoretical ramifications of this work would contribute to the body of knowledge by explaining the connection between these crucial variables. In addition, the study's practical consequences will improve the government's understanding of how to improve the functioning of public sector agencies to avoid such issues in the future. In addition, this study's key future directions would give future researchers a way to comprehend relationships better, explore and address more gaps in the body of knowledge, and enhance the practice of addressing these difficulties.

2. Literature Review

Environmental problems are escalating because governments emphasize environmental issues less (Puntub & Greiving, 2022). Indeed, to achieve environmental sustainability, the government must ensure that the sustainable development goals are properly implemented (Adams et al., 2005). In this way, the environmental catastrophe threatens the global community (Sampantamit et al., 2020). The environmental crisis is not trivial because environmental problems place many communities at risk (Tancho et al., 2020). However, the priority of any government should be to develop the appropriate authority to address environmental issues (Bennett et al., 2014). As a result of the covid-19 pandemic, several difficulties are emerging in society, and the environmental problem is one of them (Bennett et al., 2014). During the covid-19 pandemic, the objective of every government was to safeguard the environment constructively; nevertheless, the Thai government failed miserably to protect the community and ecology (Jones, 2002). As a result of the country's declaration of a medical emergency, it may be claimed that the administration was preoccupied with health facilities for the people (Lopez & Bhaktikul, 2018). However, urbanization mismanagement and income disparity have also contributed to environmental challenges (Naipinit & Kroeksakul, 2014). People experiencing environmental problems must be informed of environmental deterioration and its causes, as the government cannot control environmental problems without the active engagement of the public (Nonthapot & Srichaiyo, 2017). Moreover, the industrial shutdown during the pandemic led to inequality in Thailand since, on the one hand, the wealthy had easy access to resources. At the same time, the poor and working class were denied their fundamental rights to food and medical care (Chavalparit et al., 2006). In this approach, the government's responsibility is not facilitated by non-government organizations, and community and environmental improvement efforts are accelerated (Weerasombat et al., 2022). In Thailand, the pandemic caused significant harm since it was difficult for people to survive in a hostile environment. They increased their activities to survive in dense communities (Kitchanapaibul et al., 2022). Floods posed a significant concern for the Thai government during covid-19 because of environmental issues (Suwannarong et al.,

2022). On the one hand, the entire government apparatus sheltered the people and medical facilities (Tanantong et al., 2022). On the other side, the population did not have access to medical services and lived extremely impoverished lives (Moalleg et al., 2022). In this way, the administration did not prioritize droughts and floods in various locations (Chuaypen et al., 2022). Similarly, the government issued flood warnings for the eastern areas of Thailand, and many people fled their homes to preserve their lives (Kokkhangplu & Kaewnuch, 2022). As a result, the economic crisis was precipitated by unemployment and homelessness (Nakasu et al., 2022). The lives of individuals in these dire circumstances were difficult, and the community also faced an environmental disaster due to these economic issues (Sapbamrer et al., 2022). Similarly, the industry was not functioning, and people were engaged in activities that were not optimal for environmental protection (Puntub & Greiving, 2022). Due to a lack of economic resources, the Thai government could not embrace the advanced nation's model of environmental sustainability, as these measures need a lot of resources that are essential for sustainable development (Yohmad & Prabrat, 2022). Moreover, the Thai government was confronted with numerous issues, and the lockdown was a significant and fundamental obstacle to addressing these challenges jointly (Thumronglaohapun et al., 2022). In addition, the military and other stakeholders assisted the government in enhancing government infrastructure for the benefit of the public (Charoenwat et al., 2022). Indeed, the official apparatus was incapable of rehabilitating people. Hence the government of Thailand relied heavily on assistance from ASEAN neighbors (Paiboonvong et al., 2022). In addition, the economic crisis and the shutdown of industry contributed to the environmental disaster since people were deprived of their resources and mistreated natural resources (Thaothampitak & Wongsuwatt, 2022). Indeed, climate change is a global concern for every nation, but in times of crisis, the will of any government to handle the catastrophe is diminished (Thaothampitak & Wongsuwatt, 2022). Malaysia and Indonesia adopted environmental sustainability with robust economic crisis management in opposition to this (Pattanakuhar et al., 2022). The government of Thailand must develop a combined corporation to handle environmental and economic issues since addressing both issues simultaneously will give the

government a greater potential for sustainable operation (Nakasu et al., 2022). Before the advent of the pandemic, the Thai government had good control over environmental sustainability but lacked the competence to manage large-scale crises (Suwannarong et al., 2022). In this perspective, fundamental human concerns must be addressed before other societal issues. However, global countries can govern the environment through collective action because environmental deterioration does not affect the economy and people of a single nation but has far-reaching implications (Kitchanapaibul et al., 2022; Suwannarong et al., 2022). The United Nations is collectively responsible for addressing environmental issues to safeguard the planet and its population.

3. Data and Methodology

Over twenty-four years, from 1987 to 2021, information was collected from ten different ASEAN nations. To answer the question posed by the study, panel data analysis is utilized. If there are variations among the entities (countries, persons, etc.) and those differences, influence the dependent variable, the random effects model (REM) is utilized. The RE assumes that variation between entities is both random and uncorrelated with the predictor variables. In other words, it is assumed that the entity's error term is uncorrelated with the predictor factors, allowing the incorporation of time-invariant components with different independent variables, including ethnicity and culture.

In contrast, these factors are considered by the constant term in the FEM model. When employing the REM, it is necessary to identify traits that may or may not influence the predictor variables. However, certain variables may be unavailable, resulting in an omitted variable(s) bias. Thankfully, the REM permits the finding to be extended much further than the model's sample allowed. The following are the REM model's specifications:

$$Y_{it} = \beta_{it} \sum_{i=1}^k X_{it} + \mu_{it} + \varepsilon_{it} + \dots(1).$$

One of the advantages of utilizing panel data is the ability to account for unobserved heterogeneity. To account for time- and country-dependent effects, Equation (2) may be rewritten as follows:

$$Y_{it} = \mu_i + \theta_t + \beta_i \sum_{i=1}^k X_{it} + \varepsilon_{it} + \dots (2).$$

A FEM accounts for the unobservable heterogeneity between nations and time by permitting the intercept to vary across nations and periods. [Jalilian, Kirkpatrick, and Parker \(2007\)](#) asserted that this strategy, including a dummy for each country and period in the estimated time-invariant variables that influence the dependent variable, is the most suitable. One of the benefits of fixed effects specification is that individual or time-specific effects can be associated with explanatory factors ([Hsiao, 2007](#)). To choose between pooled OLS (limited model, time, and impact of country = 0) and FEM (unrestricted) estimation techniques, one can do a statistical test (F-test) on the combined significance of the country-specific coefficients in the FEM versus the OLS panel. The cross-sectional unit's findings and the timing of the diagnostic test. Based on underlying problems and available literature, the research has provided the following models:

$$CO2_{it} = \alpha_0 + \alpha_1 UR_{it} + \alpha_2 IINEQ_{it} + \alpha_3 IAID_{it} + \alpha_4 INFL_{it} + \alpha_5 POLT_{it} + \varepsilon_{it} \dots \dots \dots (3)$$

Where CO2 represents environmental degradation, UR represents urbanization, IINEQ, is a proxy of income inequality, and IAID, INFL, and POLT are control variables

4. Results and Discussion

The initial step of our investigation was to confirm that all variables were compatible. Utilizing the panel Fisher type unit root test and the Philipps perron method, we could determine whether or not our variables were stable. As a result, we were able to eliminate the possibility of utilizing incorrect regressions. Statistical analyses indicate that the variables do not change independently of the level ([Choi, 2001](#)). The Fisher-type unit root test was used for panel data evaluated with four of Choi's approaches. This test applies the Augmented Ducky Fuller (ADF) test to each cross-section and calculates integrated p-values based on unit-root testing. This allowed us to determine whether or not the information contained the unit root (2001). There are four distinct methods for modifying p-values: an inverse-normal transformation, an inverse-logit transformation, or an inverse-2 transformation. The fourth way is a common application of the inverse-2 transformation as N approaches infinity. The sixth way involves converting p-values back into other values.

Throughout this particular test, it is assumed that each panel has a unit root by default. The results indicate that the values of the variables are consistent across all levels; hence, the null hypothesis is not supported. Therefore, the test's null hypothesis stipulates that each panel must have a unit root to be valid. Throughout the test specification, we experiment with various lag times, but the results that matter remain unchanged.

Table 1 presents the Pearson correlation coefficients utilized in this study to measure the association level between the independent variables. Table 1 shows no correlation coefficient between the independent variables has a value larger than 0.80. Gujarati and Porter (2009) advises using a correlation threshold of 0.80 to find instances of multicollinearity. Table 2 displays the results of the Spearman correlation between CO2 and the other explanatory factors. The correlation between CO2 and UR is 0.52, close to 0.50, showing a strong relationship between the two variables (Cohen, 1992). The correlation between CO2 and IINEQ is significantly higher than the average of 0.43, yet it is negative. The relevance criterion of one percent demonstrates that their relationship is meaningful. The low correlation values between CO2 and the other variables result in a tenuous relationship between the variables.

Table 1: Correlation

Variables	1	2	3	4	5	6
CO2	1.00					
UR	0.52	1.00				
IINEQ	0.43	0.24	1.00			
IAID	0.49	0.31	0.23	1.00		
INFL	0.23	0.12	0.14	0.14	1.00	
POLT	0.12	0.21	0.15	0.22	0.21	1.00

Various diagnostic tests were conducted to obtain precise estimates (see Table 3). The deployed aggregate model was initially examined for heteroscedasticity concerns using the White Heteroscedasticity test. The results reveal that our aggregate model does not support the null hypothesis at the 5% significance level, where the p-values range from 0.0000 to 0.0020. This indicates the presence of heteroscedasticity in the combined model, which encourages using random effect estimates.

To choose between the random effect estimate and the pooled OLS estimate, the Breusch Pagan LM test is applied (Breusch & Pagan, 1979). This test guarantees that the specified term has a value of zero and that the pooling OLS approach is an estimator free of autocorrelation for cross-sections. LM utilized the chi-square distribution with one degree of freedom to test the null hypothesis. The null hypothesis was rejected since the calculated chi-square statistic was greater than the predicted value. The results indicated the existence of individual cross-sectional effects, hence confirming the hypothesis of the random effect. The results of the LM test presented in Table 1 suggest evaluating the combined OLS data with the random effects model. Step four is to decide between random or fixed effects models. The Hausman specification test demonstrates that the fixed effect estimate 1 and the random effect estimator 2 are separate. It has been demonstrated that Estimator 2 can accurately estimate the parameters, supporting the null hypothesis. Any differences between the two estimators should be random and difficult to detect. The data-supported alternative to the fixed effects model is supported by the assumptions presented in Table 4. Table 2 displays the regression results of the current investigation. Following the diagnostic tests, the fixed effect method was the most suitable approach for the current investigation.

Table 2: Regression Results

Variable	Coefficient	Standard Error	t-value	p-value
Fixed Effects:				
Constant	55.764	3.942	16.86	0.000***
UR	0.133	0.168	3.48	0.000***
IINEQ	0.508	0.721	2.73	0.000**
IAID	-0.816	0.628	-3.70	0.000***
INFL	0.218	0.122	3.21	0.000***
POLT	0.125	0.134	2.55	0.001**
Diagnostic statistics:				
R²				
Within	0.311			
Between	0.203			
Overall	0.172			
Wald χ^2 (7)	21.56			
Prob (χ^2)	0.00			
Multicollinearity	1.27			
Heteroskedasticity	6.0e+04			
Serial Correlation	7.233			
F-Statistics	F(44,440)=22.12			

According to the study, urbanization and wealth inequality have a substantial positive link with CO₂ emissions. The observed results are consistent with the predicted outcomes. Generally, it is the government's job to manage urbanization, and town planning should be conducted for greater sustainable performance and improvement. In addition, the people must collaborate with the government to improve environmental sustainability (Nakasu et al., 2022). During the pandemic outbreak, it was difficult for the government to work on urbanization with an effective policy because the policy was changed, and the primary focus was to improve the hospital sector and economy (Nakasu et al., 2022). However, the government should be prepared to face similar challenges in the future (Nakasu et al., 2022).

Consequently, an emphasis on sustainable urbanization can improve the environment and safeguard it from degeneration. On the other hand, it is the government's primary job to assist the populace during an economic downturn (Thaothampitak & Wongsuwatt, 2022). The Thai government must provide financial support to those affected by economic disasters (Yohmad & Prabrat, 2022). As their physiological demands take precedence, it would be advantageous for these people to gain a deeper comprehension of the surroundings if they were provided with the right resources. In light of this, the government of Thailand should collaborate with non-government organizations to tackle all of these issues. In this approach, these difficulties can be readily addressed with improved management, and environmental sustainability may be attained by enhancing urbanization efforts and assisting people with their normal economic challenges. The Thai government must adopt the Danish model of environmental sustainability to better understand and combat environmental degradation in Thailand.

5. Implications

Some studies in the body of knowledge have addressed the role of poverty in economic crises. Similarly, several studies examine the connection between social justice and the economic crisis in Thailand. Nonetheless, no prior research has addressed the interaction between urbanization, wealth inequality, and economic crisis as a threat to environmental deterioration during covid-19. In this regard, the

significance of this study lies in the fact that it contributes to the body of knowledge by explaining the essential role of urbanization in economic stability. In a previous study, urbanization in Thailand was identified as a major success element for sustainable development and poverty reduction. This study has contributed to the literature by demonstrating that urbanization can negatively influence environmental sustainability. In addition, this work has addressed the previously unexplored role of income inequality in the context of economic crises and environmental degradation. In this regard, the findings of this study contribute significantly to the body of knowledge since they demonstrate that income inequality has a detrimental effect on economic growth, which might result in environmental deterioration. Therefore, the study's findings are relevant to the body of knowledge and contribute to a fresh examination of the literature on covid-19 and environmental degradation.

On the other hand, this study has substantial practical ramifications because it reveals that urbanization can be hazardous to environmental degradation. In this sense, the Thai government must provide the town planning authority with efficient management to enhance environmental sustainability performance. Simultaneously, sustainability must be viewed differently, and government machinery must be constructed to function effectively. In addition, the study's practical conclusions are significant because environmental degradation can be halted by highlighting the importance of community development. This way, society, and the government can collaborate to achieve sustainable development. In Thailand, the government should establish a monitoring authority to regulate urbanization, and industrial areas must be planned for their populations. In addition, workers' wages in the public and private sectors should be adequate to manage their households effectively. In the meantime, the Thai government should embrace the sustainability model for urbanization modernization to assist its citizens' productiveness. Because these aspects are intertwined in every nation, particularly in the industrial sector, environmental control can quickly alter economic crisis management. However, the Thai government must design and implement long-term policies to accomplish permanent reforms within the deadline. The government of Thailand should adopt the sustainability-related goals established in the UAE and Qatar and work effectively to attain these objectives.

6. Future Direction

Despite this, the outcomes of this study would be relevant because these linkages have never been examined collectively in the context of a pandemic. Consequently, this study aims to examine the relationship between urbanization, income distribution, and environmental deterioration in Thailand during the covid-19 pandemic outbreak. However, this study contains limitations that require further investigation and discussion. This study focuses on urbanization's impact on environmental deterioration and economic disaster. Therefore, future research must concentrate on the relationship between government urban planning and environmental degradation during the covid-19 epidemic in Thailand. Second, the scope of this research is restricted to the effect of income inequality on environmental degradation and economic catastrophe. Therefore, future research must concentrate on the relationship between social equity and environmental deterioration during covid-19 in Thailand. This study is limited to covid-19's function in environmental degradation and economic catastrophe. Future studies must therefore concentrate on the impact of natural disasters, flooding, and environmental deterioration in Thailand.

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