THE IMPACT OF INCOME INEQUALITY ON CARBON DIOXIDE EMISSIONS IN MALAYSIA

BY

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ABSTRACT

This thesis investigates the environmental Kuznets curve (EKC) and the link between economic growth, income inequality, population, urbanization, industrialization, energy consumption, open trade, and Carbon Dioxide (CO_2) emissions in Malaysia, covering the period from 1989 to 2018. For this purpose, the study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach and Error Correction Model (ECM) to examine the short-run and long-run relationship among the selected variables of this study. Furthermore, Toda-Yamamoto is used to investigate the causality among the variables. The empirical results obtained from the analysis suggest the EKC hypothesis. Besides, the results of ECM suggest that economic growth, income inequality, energy consumption, and industrialization have a positive relationship with carbon dioxide. Still, urbanization has an insignificant negative connection with CO_2 emissions. In addition, the findings obtained from the Toda-Yamamoto Granger causality test reveal that there is bidirectional causality among CO_2 emissions and all explanatory variables. Finally, the results obtained from several diagnostic and stability tests are robust, stable, and reliable. The finding of this study could be highly significant for adequate policymaking to reduce CO2 emissions in Malaysia.

مُلخَّص البحث

يسعى هذا البحث إلى الكشف عن تأثير الاختلاف في الدخل والسكان والتوسع الحضري و الستهلاك الطاقه والتصنيع والانفتاح التجاري؛ تأثيرها علي انبعاثات ثنائي أكسيد الكربون في ماليزيا بين عامي 2018 – 1989، و ذلك من خلال اختبار منحنى كوزنتس البيئي (EKC)، ويتوسَّل البحث اختبار الانحدار الذاتي الموزع (ARDL) لاختبار العلاقة طويلة المدى، وأنموذج تصحيح الخطا (ECM) لاختبار العلاقة قصيرة المدى، واختبارالسببية Toda – Yamamoto Granger لاختبار العلاقة السببية بين المتغيرات، وقد أكدت النتائج التجريبية التي بيَّنها اختبار (EKC) علاقة إيجابية طويلة المدى بين ثنائي أكسيد الكربون وجميع المتغيرات التفسيرية بما فيها الاختلاف في الدخل في ماليزيا، وتشير نتائج (ECM) إلى أن للنمو الاقتصادي والاختلاف في الدخل واستهلاك الطاقة والتصنيع؛ علاقة إيجابية بثنائي أكسيد الكربون، ولكن ليس للتوسع الحضرى علاقة سلبية كبيرة بانبعاثات ثنائي أكسيد الكربون، في حين أظهرت نتأيج اختبار السببية علاقة سببية ثنائية الاتجاه بين انبعاثات ثنائي أكسيد الكربون و جميع المتغيرات التفسيرية، علاوة عن ان نتائج بعض اختبارات الصدق والثبات تشير إلى أن النتائج التي توصَّل إليها التحليل قوية ومستقرة وموثوقة، ومن ثم تقدم نتائج هذا البحث رؤى مفيدة لواضعي السياسات في ماليزيا؛ للنظر في الدخل للحد من مستوى انبعاثات ثنائي أكسيد الكربون.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Economics

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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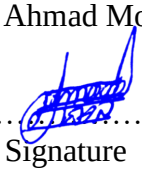

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CHAPTER ONE

1.1 INTRODUCTION

The economy has been flourishing worldwide for the last three decades. Many countries, especially the developing ones, have taken enough advantage of this budding globalization (Wang et al., 2016; Duan et al., 2019). Based on the nationwide statistics of the world bank, the gross world product has been increased by more than double in less than 20 years. In 1991 the value of the gross world product was $38.491 trillion, but in 2018 it was $82.643 trillion at the constant price of 2010 (world Bank, 2019). The fast increasing economic growth rate also caused several social and environmental concerns, such as income inequality and global warming (Jorgenson et al., 2017 and Hao et al., 2016). For instance, the data from the world bank indicator in 2016 showed that the Gini coefficient was 0.65, more than the recommended 0.40. The statistics also indicate that the income contribution of the top 10 percent was around 52.12 percent of the total income in 2017. Meaning that a considerable amount of social wealth is being possessed by the upper class. Though the level of per capita is growing at an increasing rate globally, it has not significantly decreased income inequality (IBRD, 2018).

The growing income inequality is one of the leading social concerns in many countries. The problem has been raised simultaneously with several environmental crises because of the environmental pressure (M. A. Baloch, Danish, et al., 2020). The United Nations designed an agenda for sustainable development goals to get through these challenges, which were too accomplished by the year 2030. These goals aimed to enhance economic development, environmental quality, and social development. The goals focused on reducing poverty, increasing sustainability, supporting equality, and protecting the environment (He et al., 2019).

Developing nations face many challenges in achieving sustainable goals and national contribution (M. A. Baloch, Danish, et al., 2020; He et al., 2019). The developing part of the world is stuck in multidimensional concerns. Countries in this particular part of the world are looking for development of their economy. They are seeking to improve the process of industrialization in their countries to advance the living standards of their citizens (He et al., 2019). Meanwhile, the continuous growth

of gross domestic product (GDP) or high production level is associated with environmental degradation (M. A. Baloch, Danish, et al., 2020; He et al., 2019; Ravallion et al., 2000). Among several environmental factors, the increasing rate of CO2 emissions has derived the attention of ecologists and environmentalists. The CO2 emissions used to measure climate change are critical contributors to greenhouse gases, which are well known for their impact on the environment and their contribution to global warming (Liu and Bae, 2018; Wang et al., 2019). The continued growth of the production sector worldwide has raised the global demand for fuel consumption, which is the primary source of CO2 emissions. As stated by IEA, the total amount of carbon dioxide discharged from fossil fuels globally has grown by 60% between 1990 and 2017(IEA, 2019).

Moreover, Figure 1.1 below describes the upward trend or continued growth of CO2 emissions globally. The chart covers annual data of global CO2 emissions from fuel consumption covering 1950 to 2010. The graph shows that the amount of annual CO2 emissions has been increasing from 6 billion tons in 1950 to 35 billion tons in 2020 over 70 years.

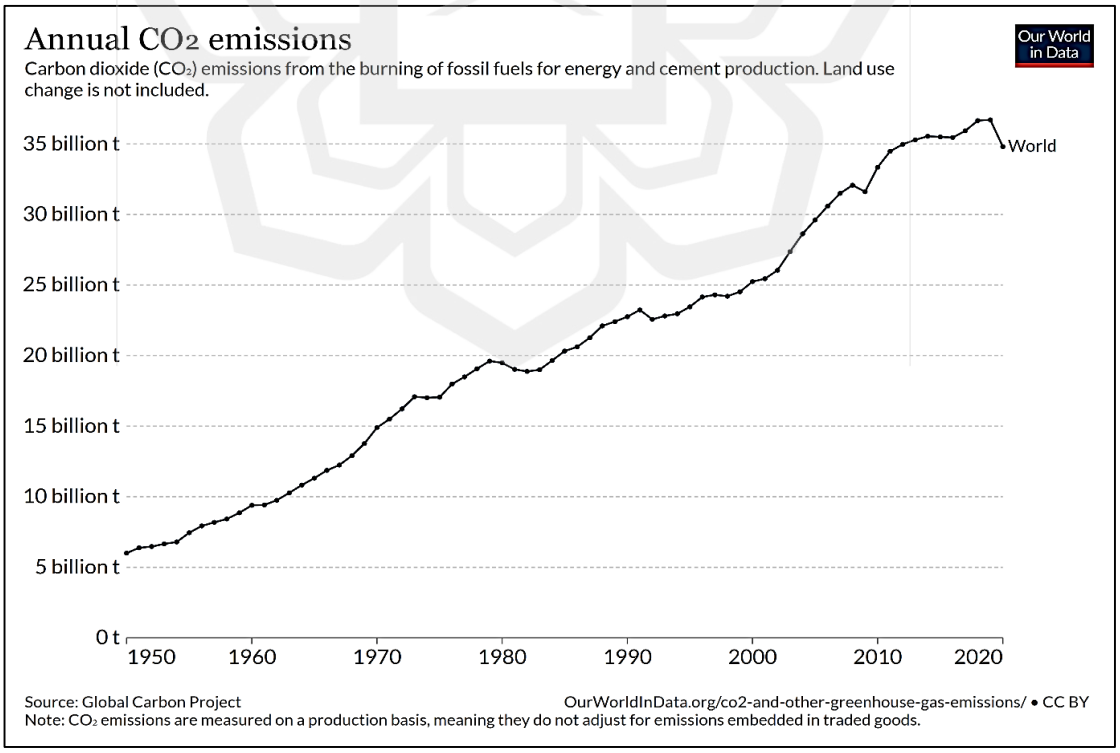

Figure 1.1 Global CO2 emissionss

While several natural factors cause CO2 emissions and environmental degradation, the amount of CO2 produced by human beings has been proved to have a critical role in global warming. Considering the harmful impact of CO2 on the environment, an incorporated structure of regulation, which can manage the emissions of CO2 globally, is essential. However, because of differences in geographical location, economy, national policies, demography, and other factors across the countries, designing a unified structure of laws for CO2 reduction is both problematical and challenging.

Though several studies have found a positive relationship between economic growth and CO2 emissions, many studies suggest an inverted U-shaped relationship. These studies believe that economic growth will decrease the emissions of CO2 at an advanced level or in the long-run. The idea of an inverted U-shaped relation between economic growth and environmental degradation is also referred to as the Environmental Kuznets Curve (EKC), introduced by Grossman and Krueger (1991). Even though it assumes the direction of economic growth and environmental quality, it does not provide information on the theoretical linkages that define the path of the connection (Torras and Boyce, 1998). According to Grossman and Krueger (1995), these hypothetical relationships might be developed via pollution controls, technical advancements, and economic compositions. The relationship between economic growth and environmental quality in this setting is determined by scale, composition, and technology effects (Grossman and Krueger, 1995; Dinda, 2004). Income inequality, which has socioeconomic and environmental implications, is rarely considered a factor in EKC investigations, which has been overlooked (Torras and Boyce, 1998; Baek and Gweisah, 2013). Income disparity occurs when income created in a country or period is inequitably allocated among people, locations, or socioeconomic levels. The economic activities that pollute the environment usually generate losers who bear the cost and winners who are getting the advantage of the economic activities. If the winners were wealthy, they would employ their wealth and power to lessen the pressure of environmental laws. Likewise, if the wealthy class of the society were losers, they would utilize their influence to support strict environmental regulations. Hence, the quality of the environment is subjected to both income level and income distribution (Boyce 1994; Coondoo and Dinda 2008; Wolde-Rufael and Idowu 2017). Besides,

(Drabo and Alassane, 2011; Ravallion et al., 2000; Mahalik et al.,2018; Torras and Boyce, 1998) also argue that the rise of environmental quality-related challenges is mainly because of the social problem, which is rooted in income and power inequality. The income inequality can affect the level of CO2 emissions through several ways.

Firstly, the connection between income inequality and CO2 emissions can be positive because of political influence. Boyce, 2007 examined the relationship of income inequality and environmental harm through political perspective. He focused on two different assumptions. The author believed that income has a strong relationship with political power, and the decadent party of society is getting most of the benefit from the harmful activities to the environment. He further added that majority of pollution-generating companies were owned by the wealthy class of the society. Environmental degradation does not affect the rich as seriously as the poor due to the ability of the former to move to a place with a better environment. Hence, the wealthy party does not prefer to have the regulation limiting their production and decreasing their profit. They will utilize all their influence to disturb the application of any environmental policy that affects their income and profit. According to Boyce, 2007, if the two mentioned assumptions were fulfilled in a country, income inequality is expected to cause higher environmental degradation. Assuming these assumptions are fulfilled, the result will be the same across the countries. Likewise, (Granser, 2021) believes that there is a gap between the development of environmental values and actions that reduce environmental degradation. In other words, individuals reaching a high level of income might increase energy consumption to improve their standard of living, leading to a higher level of environmental degradation.

Another factor contributing to the positive association between economic disparity and CO2 emissions is the widespread use of polluting goods and services. Income inequality surges the consumption of goods and services harmful to the environment (Schor, 1998). This is because households receiving high income tend to consume more on polluting products. Likewise, the number of working hours also grow with an increased level of income inequality, which will increase the level of CO2 emissions because the high number of working hours require extra energy consumption, and high energy consumption leads to an increase in the level of CO2 emissions (Bowles and Park, 2005; Knight et al., 2013; Fitzgerald et al. 2015).

Finally, the impact of income inequality on CO2 emissions can also be explained with marginal propensity to emit or MPE, which describes the amount of emissions that increase because of the increase in income level. According to Schmalensee et al. (1998) and Ravallion et al. (2000), the MPE alters with the income level. Policies employed to reduce income inequality might lead to an increase in CO2 emissions if poor people had a high level of MPE. However, the policy might decrease the level of carbon dioxide if they had a low level of MPE. Generally, people with lower income levels have greater MPE than those with higher income levels. This is because people with low income are employing relatively more polluting products for energy production due to the high cost of eco-friendly technology.

Besides, the increasing rate of economic growth also causes several social concerns. Among other social problems, the rate of income inequality is one of the significant side effects of economic growth. Available statistics on the pattern of income distribution in Malaysia indicate that the Gini coefficient, which measures the degree of disparity in income distribution, has decreased during the previous decades from an average of 2.33 in the 1970s to 1.99 during the 1980s, then to 1.91 during the 1990s, and finally increased to 2.02 during the period 2000-2018 (Solt, 2019). This means that the pattern of economic development that Malaysia followed during the period of 2000 to 2018 was biased towards the rich. Meanwhile, it is also noted that CO2 emissions increased from 172680 Ktoe to 239620 Ktoe each year between 2006 to 2018 by 38.8 percent over the same period. As a result, it is vital for Malaysia to identify high emissions sources and create solutions to the problem. In Malaysia, income inequality has the potential to produce economic, social, and environmental problems. As a result, the links between the environment and these inequities must be explicitly defined and resolved. In general, studies examining whether the EKC hypothesis was valid in Malaysia used variables including income levels, energy consumption, and FDI to explain CO2 emissions (Bekhet and Othman, 2018; Gill et al., 2019). Many experts have recently focused on the relationship between income inequality and CO2. Much research has been done to assess the relationship for a single country or a group of countries; some studies found a positive relationship. (See for example: Uddin & Smyth, 2014; Zhang & Zhao, 2014; Wolde-Rafael & Idowu, 2016; Bae, 2018; Uzar & Eyuboglu, 2019; You et al., 2020; Baloch et al., 2020; Granser, 2021 among others). Others found negative relationships (Sager, 2019; Kusumawardani & Dewi, 2020; Wu & Xie, 2020; Z. Huang & Duan, 2020, among

others). Although several studies have been conducted in Malaysia to highlight the relationship between economic growth and CO2 emissions over different periods, none of them have added the variable that can represent income inequality; instead, they only focus on the evidence to support (see for example; Saboori et al., 2012; Bekhet and Othman, 2018; Gill et al., 2019; Mugableh, 2013; Bekhet & Yasmin, 2013; Ara et al., 2015; W. Ali et al., 2016; Gill et al., 2018; Suki et al., 2020 among others). To the best of the author's knowledge, this will be the first study of its sort, exploring the impact of economic inequality on CO2 emissions in Malaysia. The findings of this study are likely to offer policymakers relevant information on income disparity and CO2 emissions.

This study aims to look at the relationship between economic disparity and CO2 emissions in Malaysia. In this study, we portray income inequality using the Gini coefficient, employed in previous empirical works (Ravallion and Chen, 2007). The coefficient value ranges from 0 to 1, 0 representing perfect equality and 1 representing complete inequality. The STIRPAT model proposed by (Hundie, 2021) was conducted with an ARDL bound test to assess the impact of the Gini coefficient, GDP per capita, population size, urbanization, industrialization, energy consumption, and trade openness on CO2 emissions. Besides, the study also investigates the existence of the Environmental Kuznets Curve.

1.2 PROBLEM STATEMENT

Social and ecological crises have been known to be two of the most severe challenges worldwide (See, for example; Berthe & Elie, 2015; Knight et al., 2017; Bhattacharya, 2019 and M. A. Baloch, Danish, et al., 2020, among others). The increasing rate of income inequality, among others, is a major social challenge for many countries, where environmental degradation is also being known as a central concern for these countries (M. A. Baloch, Danish, et al., 2020).

Mcgee and Greiner, 2018 believed that income would increase environmental degradation in countries with low-income equality. Still, the relationship would be the opposite in countries with a higher level of income equality. Meanwhile, many past research studies argued that fair distribution of income supports environmental protections. At the same time, the environment could be one of the most important

factors in reducing extreme poverty (Cho, 2018). The usage of natural resources in the environment could help reduce extreme poverty by providing good health conditions, increasing food security, and generating handsome income in economic activities. It also indirectly raises the morbidity and rate of mortality of poor people (Barbier, 2010). Alternatively, the quality of the environment could be improved by reducing extreme poverty, mainly in developing economies of the region. It is observed that poverty and the quality of the environment are strongly related because poor people are primarily dependent on environmental and natural resources. The dependence on natural resources, less-privileged misused and manipulated the quality of natural resources in an unmaintainable manner that further aggravated pollution and quality of the environment (Munasinghe, 1999). Moreover, extreme poverty, urbanization, and high population growth deteriorate the absorbing capacity and reduce the quality of environmental and natural resources (Rai, 2019).

In addition, Malaysia has been experiencing increasing income inequality, which not only leads to several social and economic problems such as poverty but also causes environmental concerns such as CO2 emissions in the country (Khalid & Yang, 2021; Wang et al., 2020; Yang et al., 2020). The high level of environmental degradation mainly affects the poor class of the society (Hallegatte, et al., 2016). Grossman and Krueger (1995) suggested that in impoverished countries, the people may be led to use more significant amounts of resources to assist their necessities and economic benefit. As a result, it will negatively impact the environment by offering various types of destruction. Siwar and Murad, 2001 reported that in Malaysia, most of the economic activities are mainly located in the urban areas, a disproportionate increase in the population in urban areas has resulted in urban congestion, inadequate housing, and growth of squatters and marginal settlements as well as inadequate household waste management and other essential services. In Malaysia, although inadequate household waste management problem has been dramatically resolved by the appropriate actions and policies taken by the government engaging both the government and private sectors. But the environmental problems related to solid waste management systems amongst the squatters and low-cost flat dwellers in urban areas are more acute. Thus they also require appropriate actions and policies to be taken by the respective authorities for resolving related environmental problems (Murad and Mustapha, 2010). Besides, Malaysia is highly dependent on fossil fuels for electricity generation, which causes an

increased amount of CO2 and climate change. It is expected that CO2 emissions from electricity production will increase from 298,339 kt in 1999 to 800,519 kt by 2020 (Basri et al., 2015).

On the other hand, climate change is expected to increase mean annual temperature and the risk of heat-related medical conditions. It can also cause cardiovascular and respiratory diseases. It increases the medical expenditure of the people in society and reduces their productivity in the workplace. In Malaysia, it is estimated that reducing air pollutants could prevent 5,900 premature deaths attributed to outdoor air pollution per year from 2030 onwards (WHO, 2015). The trade-off between economic growth and environmental quality has become a concern for most developing nations, including Malaysia. To the coup with this particular challenge, the government of Malaysia has set a target of reducing the emissions of CO2 by 45% and holding a high rate of economic growth (Koswanage, 2015).

Although there are many studies underlining the relationship between economic growth and environmental degradation, especially under the framework of EKC, the majority of these studies have obtained inconclusive outcomes due to applying a weak econometric model (Narayan & Narayan, 2010; Dinda, 2004). According to a bulk of studies, income level and income inequality can affect environmental quality (Hübler, 2017; Jorgenson et al., 2017; X. Wang et al., 2020; Wolde-rufael & Idowu, 2017; Yang et al., 2020). Excluding income inequality would cause omitted variable bias when testing the income-environmental degradation nexus (M. A. Baloch, Ozturk, et al., 2020; Dogan & Turkekul, 2015). The available literature regarding income inequality and environmental degradation is quite diverse (Berthe & Elie, 2015; Hailemariam et al., 2019; Knight et al., 2017). The results of these researches are different because of different economic statuses across nations (Grunewald et al., 2017; Jorgenson et al., 2016; Kusumawardani & Dewi, 2020; Liobikienė, 2020; Magnani, 2000; Mittmann & de Mattos, 2020), different periods and data types (Time series, Cross-sectional and Panel data) (Bhattacharya, 2019; Uddin et al., 2020), and finally the results might vary because of distinct methodologies employed in the studies (Hubler, 2017; Uddin et al.,2020).

Considering this background, this study seeks to examine the impact of income inequality on CO2 in Malaysia. To the author's best knowledge, no attempt has been

made yet to test the income inequality – CO2 emissions nexus along with the EKC hypothesis in Malaysia. The available studies were conducted in Malaysia to explain the connection between income level and environmental quality. They ignored the role of income distribution in demonstrating the environmental degradation, which leads to specification bias. To avoid variable-related specification bias, this research has considered the role of the income distribution. Adding income inequality to the model will facilitate a better understanding of the connection between income distribution, income level, and environmental degradation in Malaysia, which will help policy makers in designing and implementing effective policies that can address the ecological problems as well as income distribution and economic growth at the same time.

Unlike other related research conducted in Malaysia, the present study applied an accurate method for testing EKC. The model provides both required and adequate conditions for testing an inverted U-shaped connection between income level and environmental degradation. The majority of the research conducted previously in Malaysia applied the quadratic model for testing the EKC hypothesis, which only fulfills the critical condition of the hypothesis. These results are more likely to be misleading because of specification error and a strong association between the linear and non-linear series. With this regard, the present study results are accurate, robust, and consistent because it includes several necessary variables and applies passable econometric techniques. Considering the absence of research, which can describe the impact of income inequality on CO2 emissions and test the EKC hypothesis simultaneously, this study has been carried out to bridge this gap and provide proper recommendations to parties working in relevant areas.

1.3 RESEARCH OBJECTIVES

The research is carried out for the following goals

1. To investigate the impact of income inequality on CO2 emissions from 1989 to 2018 in Malaysia.
2. To investigate the presence of the EKC hypothesis in Malaysia
3. To observe a short-run and long-run relationship among some selected determinants of CO2 emissions in Malaysia.
4. To recommend the policies for reducing CO2 emissions in Malaysia.

1.4 RESEARCH SCOPE

This study focuses on the impact of income inequality on carbon dioxide emissions in Malaysia. Besides, the study also tests the presence of the EKC and the impact of other variables, which might also impact carbon dioxide. The data considered for each variable will be between 1989 and 2018. The data will be analyzed with the help of the Auto-Regressive Distributed Lag (ARDL) model. Using this particular methodology, the research will discover the impact of income inequality on Malaysia's carbon dioxide emissions and provide a valuable recommendation to policymakers.

1.5 RESEARCH QUESTIONS

1. How does change in income inequality affect the rate of CO2 emissions?
2. Is there evidence that can support the environmental Kuznets Curve in Malaysia?
3. What is the connection between CO2 and other influencing variables?
4. What are the policies that can lighten the problem of CO2 emissions in Malaysia?

1.6 SIGNIFICANCE OF THE RESEARCH

It is a known fact that the increasing rate of CO2 emissions is a primary ecological concern worldwide because it is a toxic gas that can harm humans, animals, and plants. The high rate of CO2 emissions is because of different economic and social indicators. Among other factors, income inequality is known for its impact on CO2 emissions.

To the author's knowledge, there is not any research available that can describe the relationship between income inequality and CO2 emissions for Malaysia. However, several studies have been to highlight the relationship between economic growth and CO2 emissions over different periods. Identifying the relationship will enrich the literature and fulfill this gap in Malaysia. The results of the research will also help policy makers in decision-making. Policy makers will be able to make effective policies to reduce both CO2 emissions and income inequality. Finally, the study would also give information on the impact of other influencing variables so that the policy makers will

be able to know the variables with the greatest significant positive or negative impact on CO2 emissions in Malaysia.

1.7 ORGANIZATION OF THE RESEARCH

This research contains five chapters. The first chapter starts with the introduction, followed by the problem statement, the objectives, the significance, and the organization of the study. The second chapter gives information on some significant economic, social, and geographical indicators of Malaysia. Besides, the third chapter includes theoretical and empirical literature, which describes the theoretical and empirical relationship between income inequality and CO2 emissions in different countries of the world. The fourth chapter describes the methodology of the study. This chapter explains the data, variables, and techniques used in the analysis. Finally, the research ends with chapter five, which explains the results and the discussion. The chapter ends with a comprehensive conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter aims to review several kinds of literature to describe theoretical and empirical relationship connection between CO2 emissions and income inequality. This particular chapter is divided into several sections. The second section following the introduction covers global trends of CO2 emission. Third section gives information about CO2 trends in Malaysia. Section four proides information on some of the important determinants of CO2 emissions. Section five describes global income inequality and section six sheds light on previous literature. Following section six the next sections explains research gap and related theories, and ends with a conclusive summary.

2.2 GLOBAL TRENDS OF CARBON DIOXIDE EMISSIONS

CO2 is an odorless and colorless combination of two atoms` of oxygen and one atom of carbon (Sasana & Putri, 2018). It is one of the greenhouse gases produced with the energy obtained from the burning of solid wastes, fossil fuels, woods, and natural ingredients (Yoro, Isafiade, & Daramola, 2018).

CO2 emissions have been increasing rapidly across the globe nowadays. In 2019, the average global level of CO2 emissions increased by 1.9% compared to 2018 (Fasihi et al., 2019). According to (Janssens-Maenhout et al., 2019), the world rate of emitted greenhouse gases without land-use change in 2018 was 2%, equal to 51.8Gt of carbon dioxide. In the same year, the amount of the emissions, including land-use change, was 55.6 Gt carbon dioxide. The growth of the emissions coincided with worldwide economic growth. The world economy has experienced an average increase of 1.3% growth each year since 2012 (Wang et al., 2019)

The current level of greenhouse gas emissions without the change of land use is almost 57% greater than the level of 1990 and 2000, 57% and 43%, respectively. The

2% increase in greenhouse gas emissions was mainly due to the relatively high combustion of fossil fuel and industrial activities (Cao et al., 2016).

Climate change is expected to destroy the earth if the emissions continue to blow out at the same speed. According to (Hegerl et al., 2018), with no action being taken toward alleviating global carbon dioxide, the globe is expected to experience more than three centigrade temperatures on average this century.

To reduce emissions and provide a global solution to the problem of climate change and global warming, several nations around the world agreed on several agreements regarding the minimization of emissions to the air. Some of the popular agreements are the Geneva Agreement on long-distance cross-boundary air pollution signed in 1979 (Ojo & Ayo, 2018), the protocol of Montreal singed in1987 (Goyal et al., 2019), the Kyoto protocol of 1997 (Miyamoto & Takeuchi, 2019), the Doha amendment singed in 2012 (Nirmal & Singh, 2018), and the Paris treaty of 2015 (Mengal et al., 2018).

2.3 CARBON DIOXIDE EMISSIONS TRENDS IN MALAYSIA

The weather in Malaysia is hot and humid all year round, with an average temperature of 80 °F (27 °C) and a minimal variation in annual temperature. Malaysia has 580 km cubic of water, 76% for agriculture, and 13% for industrial activity. The country is one of the fast-developing countries in south Asia, which relies primarily on nonrenewable energy sources such as 40% petroleum, 36% gases, and 17% coal in 2014 (Energy Commission of Malaysia, 2017). It has transformed from being a resource-oriented producer to a multi-sector structure of the economy in the 1970s. The main reason behind the transformation was the increasing economic growth rate, which was fueled by exports of different industrial goods. The growing rate of the gross domestic product has also increased the demand for energy consumption, which is known to be the primary source of carbon dioxide emissions (Chik & Khalid, 2014). To satisfy the demand and increase the rate of economic growth, Malaysia generally takes advantage of non-renewable energy resources, such as coal uses and fossil fuels. Meanwhile, these sources are the main derivers of carbon dioxide emissions in Malaysia, because of which the conventional power systems are known to be inefficient and harmful to the