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INSTITUTIONAL REGULATIONS, ENVIRONMENTAL DEGRADATION AND GREEN GDP IN MALAYSIA

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By

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December 2019

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Malaysia currently uses the gross domestic product (GDP) as the measurement of national income. However, when measured alone, GDP is limited because it only represents the final monetary value of goods or services. Measuring Green GDP can help to address this shortcoming because it considers the environmental impacts. Malaysia has the aim of becoming a high-income economy, one way this can be achieved is through the growth of green industries and by using Green GDP to promote higher economic growth.

Conventional GDP fails to take into account the external costs like pollution, deforestation, and mineral exploitation. Nature the implantation of government legislation determines the impact felt by society, which all have detrimental public health consequences. High levels of these problems result in higher average health expenditure. Based on the issues described, this research contains several objectives.

The first objective is to investigate the relationship between the quality of regulation and external costs. Effective regulatory procedures are essential to manage and reduce external costs that are shown to cause health issues in society. Therefore, this research second objective is to examine the impact of external costs on health expenditure. Finally, this study investigates the environmental impacts of Green GDP, and conventional GDP are compared and discussed.

The quality of regulatory processes plays an essential role in controlling environmental problems. If external costs are reduced, it leads to a reduction in overall health expenditure. The Environmental Kuznets Curve (EKC) states

that increases in income levels initially leads to an increase in pollution. By using the EKC hypothesis, it is probable that Green GDP is an appropriate measure of environmental impact and economic development in Malaysia.

Autoregressive Distributed Lag (ARDL) is used to investigate the impact for the first and the second objective. The first objective investigates the impact of the regulatory quality to external costs. However, for the second objective, external costs are an independent variable that determines the impact on health expenditure. Lastly, the third objective employs a Nonlinear ARDL (NARDL) model to test the EKC hypothesis by employing GDP and Green GDP as a proxy for income. The data contained information from 1980 to 2017 and was sourced from World Development Indicators (WDI) (2018).

When regulatory quality increases, it leads to a reduction in external costs. This reduction in external costs is essential to achieve green or sustainable growth. Increases in carbon dioxide (CO_2) emissions also have detrimental external costs.

Secondly, when there was an increase in external costs, personal healthcare expenditure will also be increased. Increased external costs and CO_2 emissions show a positive correlation with health expenditure.

For the environmental aspect, when GDP and Green GDP both used as a proxy for income, there are similar impact on CO_2 emissions. However, energy consumption and trade can lead to an increase in CO_2 emissions. In general, incorporating Green GDP into the policy-making process results in a healthier environment compared to solely relying on conventional GDP.

If Green GDP used effectively in Malaysia, then Green GDP can promote sustainable growth through the improvement of institutions and the promotion of zero pollution strategies. The results show that external cost in Malaysia leads to increase in the health expenditure. Policymakers should act to reduce these external costs and promote a better living environment. Lastly, it is proven that using GDP or Green GDP are no different in term of CO_2 emission in Malaysia. Therefore, it is time for Malaysia to use Green GDP as a measurement for national income to help achieve the goal of green growth.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PERATURAN INSTITUSI, PENCEMARAN ALAM SEKITAR DAN KDNK HIJAU DI MALAYSIA

Oleh

CHEAH CHAN FATT

Disember 2019

Pengerusi : Profesor Madya Abdul Rahim Abdul Samad, PhD
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Malaysia kini menggunakan Keluaran Dalam Negara Kasar (KDNK) sebagai pengukuran pendapatan negara. Walau bagaimanapun, pengukuran KDNK mempunyai batasan yang hanya dapat menangkap nilai akhir barang atau perkhidmatan akhir dalam tempoh tertentu. KDNK Hijau adalah salah satu penyelesaian untuk KDNK dengan mengambil kira kesan alam sekitar. Malaysia bertujuan untuk mencapai ekonomi berpendapatan tinggi, salah satu cara adalah melalui pertumbuhan hijau dengan menggunapakai KDNK Hijau sebagai pengukuran pendapatan negara.

Dalam kes KDNK konvensional, ia gagal untuk mengambil kira kos eksternaliti seperti pencemaran, penebangan hutan, pengurangan mineral dan pengurangan sumber tenaga. Sifat implantasi undang-undang kerajaan menentukan kesan yang dirasakan oleh masyarakat, yang semuanya mempunyai kesan kepada kesihatan awam. Tahap tinggi masalah ini mengakibatkan perbelanjaan kesihatan rakyat yang lebih tinggi. Berdasarkan isu yang dijelaskan, kajian ini mengandungi beberapa objektif.

Objektif yang pertama adalah untuk menyiasat hubungan antara kualiti organisasi kerajaan dan kos eksternaliti. Prosedur pengawalseliaan yang berkesan adalah penting untuk mengurus dan mengurangkan kos eksternaliti yang akan menyebabkan masalah kesihatan dalam golongan masyarakat. Oleh itu, objektif kajian kedua ini adalah untuk mengkaji kesan kos eksternaliti terhadap perbelanjaan kesihatan masyarakat. Akhirnya, kajian ini mengkaji kesan alam sekitar dengan menggunakan KDNK Hijau dan KDNK konvensional untuk berbanding dan berbincangkan.

Kualiti proses pengawalseliaan memainkan peranan penting dalam mengawal masalah alam sekitar. Jika kos eksternaliti dikurangkan, ia membawa kepada pengurangan dalam keseluruhan perbelanjaan kesihatan. *Environmental Kuznets Curve* (EKC) menyatakan bahawa kenaikan tahap pendapatan masyarakat pada mulanya akan membawa kepada peningkatan pencemaran. Dengan menggunakan hipotesis EKC, terbukti bahawa KDNK Hijau adalah langkah yang sesuai untuk menggurangkan impak pencemaran alam sekitar dan peningkatan pembangunan ekonomi di Malaysia.

Autoregressive Distributed Lag (ARDL) digunakan untuk menyiasat impak untuk objektif pertama dan kedua. Objektif pertama menyiasat impak kualiti pengawalseliaan kepada kos eksternaliti. Walau bagaimanapun, untuk objektif kedua, kos eksternaliti adalah pembolehubah bebas yang menentukan kesan ke atas perbelanjaan kesihatan. Akhir sekali, objektif ketiga menggunakan model *Nonlinear* ARDL (NARDL) untuk menguji hipotesis EKC dengan menggunakan KDNK dan KDNK Hijau sebagai proksi untuk pendapatan. Data tersebut mengandungi maklumat dari 1980 hingga 2017 dan diperoleh daripada *World Development Indicators* (WDI) (2018).

Apabila kualiti pengawalseliaan meningkat, ia akan membawa kepada pengurangan kos eksternaliti. Pengurangan kos eksternaliti adalah penting untuk mencapai pertumbuhan ekonomi hijau atau mapan. Peningkatan pelepasan Karbon Dioksida (CO_2) akan meningkatkan kos eksternaliti.

Kedua apabila terdapat peningkatan dalam kos eksternaliti, perbelanjaan kesihatan peribadi juga akan meningkat. Peningkatan kos eksternaliti dan pengeluaran CO_2 menunjukkan korelasi positif dengan perbelanjaan kesihatan.

Bagi aspek alam sekitar, apabila KDNK dan KDNK Hijau digunakan sebagai proksi untuk pendapatan, terdapat kesan yang sama ke atas pelepasan CO_2. Walau bagaimanapun, penggunaan sumber tenaga dan peningkatan perdagangan boleh menyebabkan peningkatan pengeluaran CO_2. Pada umumnya, memasukkan KDNK Hijau ke dalam proses membuat keputusan dasar dalam persekitaran yang lebih sesuai berbanding hanya bergantung pada KDNK konvensional.

Sekiranya KDNK Hijau digunakan dengan berkesan di Malaysia, maka KDNK Hijau dapat menggalakkan pertumbuhan ekonomi yang mampan melalui peningkatan institusi dan promosi strategi pencemaran ke arah sifar. Keputusan menunjukkan bahawa kos eksternaliti di Malaysia membawa kepada peningkatan dalam perbelanjaan kesihatan. Pembuat dasar perlu bertindak untuk mengurangkan kos eksternaliti ini dan mempromosikan persekitaran hidup yang lebih baik. Akhirnya, terbukti bahawa menggunakan KDNK dan KDNK Hijau tdiak ada perbezaan dalam kepada pelepasan CO_2. Oleh itu, sudah tiba masanya untuk menggunakan Malaysia KDNK sebagai

ukuran untuk pendapatan negara untuk membantu mencapai matlamat pertumbuhan hijau.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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Declaration by graduate student

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag
CIESIN	the Center for International Earth Science Information Network
CO_2	carbon dioxide
Data-DrivenYale	Yale Data-Driven Environmental Solutions Group at Yale University
DOS	Department of Statistics Malaysia
DTF	Distance to Frontier
ECM	Error Correction Model
EKC	Environmental Kuznets Curve
EPI	Environmental Performance Index
EPU	Malaysia Economic Planning Unit
FDI	foreign direct investment
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GNI	Gross National Income
GPI	Genuine Progress Indicator
GS	Genuine Savings
HCUs	high-cost users
HDI	Human Development Index
IMD	Institute for Management Development
MW	Megawatts
NARDL	Non-linear ARDL
NGOs	non-governmental organisations
NIS	non-indigenous species
OECD	Organization for Economic Cooperation and Development
$PM_{2.5}$	fine particulate matter
PP	Phillips–Perron
PQLI	Physical quality of life Index

R&D	Research & Development
SEDA Malaysia	Sustainable Energy Development Authority of Malaysia
SEEA	System of Environmental-Economic Accounts
SES	socioeconomic status
SO_2	sulfur dioxide
VAR	vector autoregressive
VECM	vector error correction models
WDI	World Development Indicators
WGI	Worldwide Governance Indicators
YCELP	Yale Center for Environmental Law & Policy

CHAPTER 1

INTRODUCTION

1.1   Introduction

Malaysia is located in South East Asia, as shown in **Figure 1.1**. South-East Asia consists of 10 countries with different levels of income (**Table 1.1**). The countries with previously low-income economies had transitioned to become lower-middle-income economies by the year 2016. Thailand, which borders Malaysia, was one country to make the change from a lower-middle-income economy to an upper-middle-income economy. In 2016, the gross national income (GNI) in Malaysia was $10,727 per capita, and the total population was approximately 31 million. For Malaysia to achieve its goal of becoming a high-income economy, the GNI per capita must increase by $1510.

Figure 1.1 : The map of South East Asia
[Source:https://latitudes.nu/introduction-to-southeast-asia-11-countries-593-million-people/]

Table 1.1 : Level of income for South-East Asia countries, 2016

Economies	Countries GNI per capita
Lower-middle-income economies ($1,006 ≤ GNI per capita ≤ $3,955)	• Indonesia ($3,841) • Philippines ($3,318) • Vietnam ($1,691) • Lao PDR ($1,438) • Myanmar ($1,329) • Cambodia ($1,009) •
Upper-middle-income economies ($3,956 ≤ GNI per capita ≤ $12,235)	• Malaysia ($10,727) • Thailand ($5,592)
High-income economies (GNI per capita ≥ $12,236)	• Singapore ($51,007) • Brunei Darussalam ($33,401)

[Source: World Bank (2017)]

Malaysia is currently an upper-middle-income economy in South East Asia. However, the government have created an ideal known as Wawasan 2020 that aims to help the country achieve developed status by the year 2020. Included in the proposal is green growth, which is one of six keys strategic areas that the government hope to exploit. Green growth is related to sustainable development and is growth that has minimal environmental or social consequences. Green growth is defined as:

> *"Growth that is efficient in its use of natural resources, clean in that it minimises pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital prevention physical disasters."*
>
> (World Bank, 2014)

The green growth can achieve by achieving sustainable development in Malaysia. The definition of sustainable development is as below:

> *"Sustainable development recognizes that growth must be both inclusive and environmentally sound to reduce poverty and build shared prosperity for today's population and to continue to meet the needs of future generations. It is efficient with resources and carefully planned to deliver both immediate and long-term benefits for people, planet, and prosperity."*
>
> (World Bank, 2017)

Three main pillars must be focused on to achieve green growth and sustainable development. They are the economy, society, and the environment. Integration of the three pillars is essential when formulating policy and

development strategies. With a clean, healthy, and high-income nation, then ongoing sustainable development is more comfortable to achieve. If sufficient resources are invested and processes are well managed, then Wawasan 2020 will hopefully become a reality by 2020.

1.2   Economic, Social, and Environment

1.2.1   Economic Growth

Malaysia has seen less economic growth in recent years compared to other lower-middle-income economies. The average economic growth rate in Malaysia is around 5.1%, whereas other South East Asia countries have seen a growth rate of between 6% to 7%.
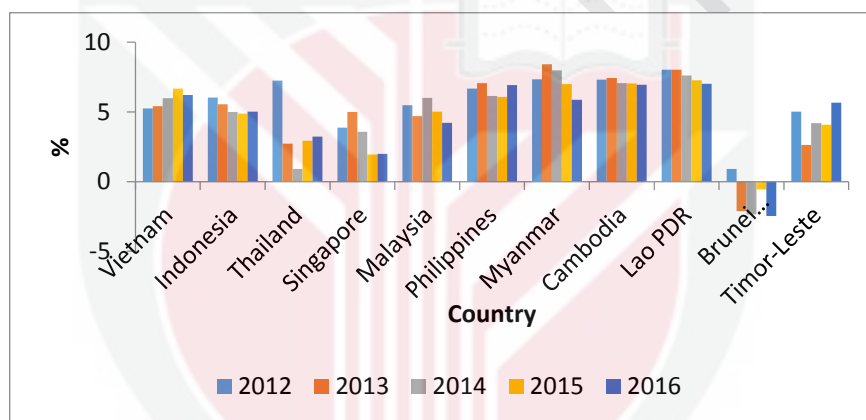
Figure 1.2 : Economic growth of South East Asia countries, 2012-2016
[Source: author's computation based on data obtained from World Development Indicators (WDI) (2017)]

Although GDP growth in Malaysia slowed down from 2014-2016, Malaysia was ranked 18th out of 140 economies in the Global Competitiveness Report 2016-2017 (World Economic Forum, 2016). These rankings prove that the Malaysian economy remains competitive despite facing challenges.

The Global Competitiveness Index (GCI) takes three aspects into consideration: requirements, efficiency enhancers, and innovation and sophistication factors. Malaysia was in the top 20% of the most competitive economies and was top of the developing Asian countries.

In the 2016 Doing Business Report produced by the World Bank, Malaysia ranked 18th out of 189 economies and was in the top 10% of most comfortable countries to conduct business (World Bank, 2016). The distance to frontier (DTF) score captured the gap between an economy's performance and was used in the 2016 Doing Business Report. DFT takes nine factors into account. 1) construction permits, 2) access to electricity, 3) registration of property, 4) obtainment of credit, 5) protection of minority investors, 6) payment of taxes, 7) enforcement of contracts, 8) cross border trading, and 9) insolvency resolution.

"Malaysia's Economic Growth" (2018) states that Malaysian GDP growth in 2017 was 5.9% and the report predicted that it would decrease to 4.8%, 4.4% and 3.6% in 2018, 2019 and 2020 respectively. These projections are made based on current economic forecasts and the continued fall in commodity prices ("Malaysia's Economic Growth", 2018). Malaysia`s plan to become a developed country by the year 2020 may have to be revised.

GDP growth rates that are used to measure economic progress do not take into account the external costs. If external costs are taken into account, then GDP growth may rise even under difficult economic circumstances. If Green GDP is employed as a measurement for economic growth, then the fall in growth rate forecast by "Malaysia's Economic Growth" (2018) may be avoided, and the aims presented in Wawasan 2020 could be more achievable.

1.2.2 Quality of Institution

Law et al. (2015) said that an efficient government is vital to promote economic growth in developing economies. The definition of the index of government effectiveness is below:

> "The index of Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."
>
> (World Bank, 2017)

The score of government effectiveness ranges from -2.5 to 2.5, with -2.5 signifying low government efficiency and 2.5 showing strong government effectiveness. The Malaysian government effectiveness score fell from 2014 to 2016, and the current rating is 0.97, which is lower than both Singapore (2.18) and Brunei Darussalam (0.99).
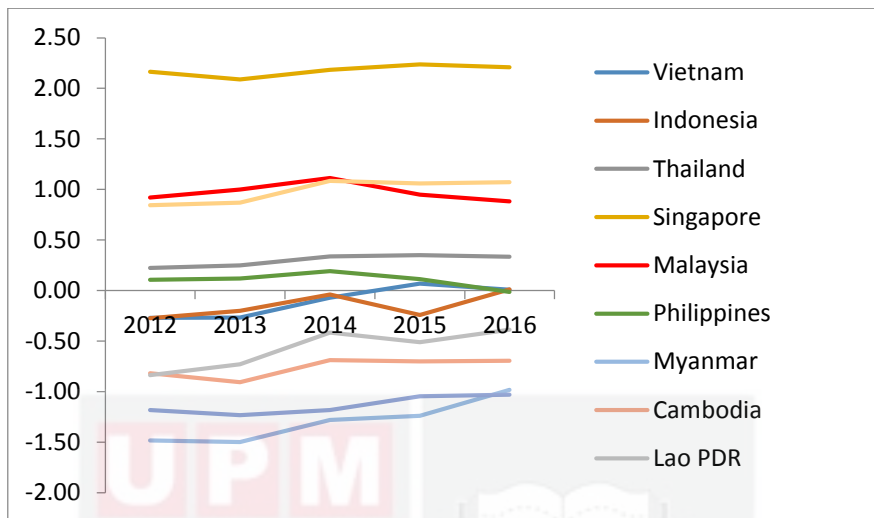
Figure 1.3 : Government Effectiveness score of South East Asia countries, 2012-2016
[Source: author's computation based on data obtained from Worldwide Governance Indicators (WGI) (2017)]

Based on **Figure 1.3**, Malaysia has a higher score regarding the quality of institutions compared with other South-East Asian countries. Malaysia has effective policymakers, policy enforcement teams, and high-quality regulatory institutions. Something that is essential, especially regarding pollution control and achieving green growth. The 11th Malaysian Plan states that Malaysia wishes to achieve substantial green growth by the year 2020. Therefore a continued commitment to maintaining high-quality institutions is vital.

Malaysia ranked 19th out of 61 in the World Competitiveness Yearbook 2016 (Institute for Management Development (IMD), 2016). This ranking takes into account four aspects: economic performance, government efficiency, business efficiency and infrastructure.

Concerning the rankings, Malaysia provides a healthy economic environment to conduct business, which in the long-run will be beneficial for Malaysian economic growth. However, challenges remain, especially in public health. Socioeconomic status (SES) underlies three significant determinants of health: healthcare, environmental exposure, and health behaviour (Adler and Newman, 2002).

A clean environment is necessary to create a healthy society, and a healthier society can boost economic growth. The population must strive to reduce pollution and contamination as much as possible so that health risks can be

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eradicated or minimised. Malaysian institutions must also play a role in pollution control. Cooperation between government, public, and institutions can reduce pollution and environmental damage, and improve the SES of Malaysians.

1.2.3 Malaysian Well-being Index

The Malaysia Economic Planning Unit (EPU) developed an economic well-being index and a social well-being index, which are both adaptations of other indexes. The economic well-being index contains factors like transport, communication, education, income and distribution, and work-life indexes. While the social well-being index includes factors like housing, leisure, governance, public safety, social participation, culture, health, environment, and family indexes.
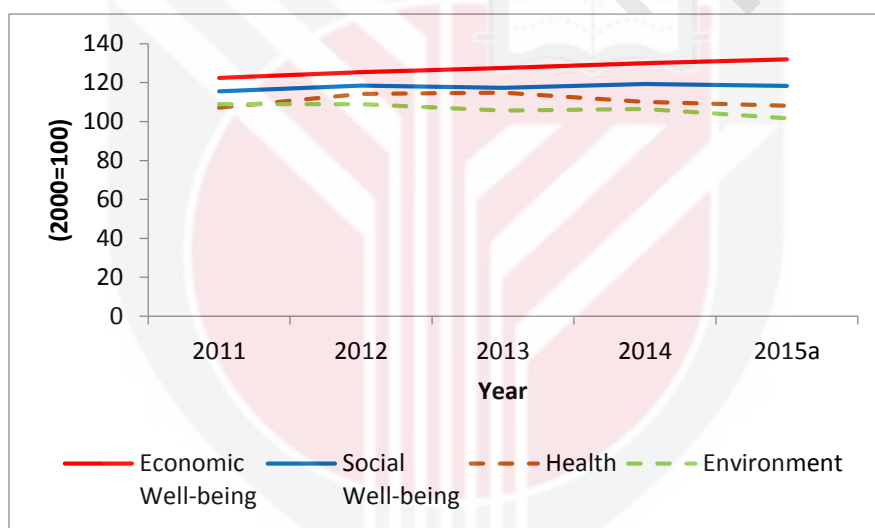
Note: a preliminary
Figure 1.4 : Malaysia Well-being Index on economic well-being, social well-being, health and environment, 2011-2015
[Source: author's computation based on data obtained from EPU (2017)]

Figure 1.4 shows that both economic well-being and social well-being increased, but the health and environment index decreased. Malaysian society performs well on income and social welfare, but not as well on the environment and public health. Foo (2016) conducted a study in the Klang Valley region and found that the natural environment has a significant impact on human physical, mental, and social well-being.

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The low score on the environment index represents environmental pollution and depletion of natural resources. The environment index takes into account air quality, water quality, forested area and means temperature (EPU, 2017). The low environment index score also implies that progress regarding green growth has been slow and that achieving sustainable development in Malaysia remains challenging.

Health problems and environmental damage are intrinsically linked, and both hinder socioeconomic progress and development. As pollution increases people are more likely to experience health problems, leading to increased health expenditure and lowering SES. The economic well-being index shows an increasing trend, which may be deceptive because of the increase in external costs offset it.

1.2.4   Health Expenditure

Health expenditure is an essential expenditure for humans to stay healthy. In Malaysia, health expenditure can be divided into either private or public spending.
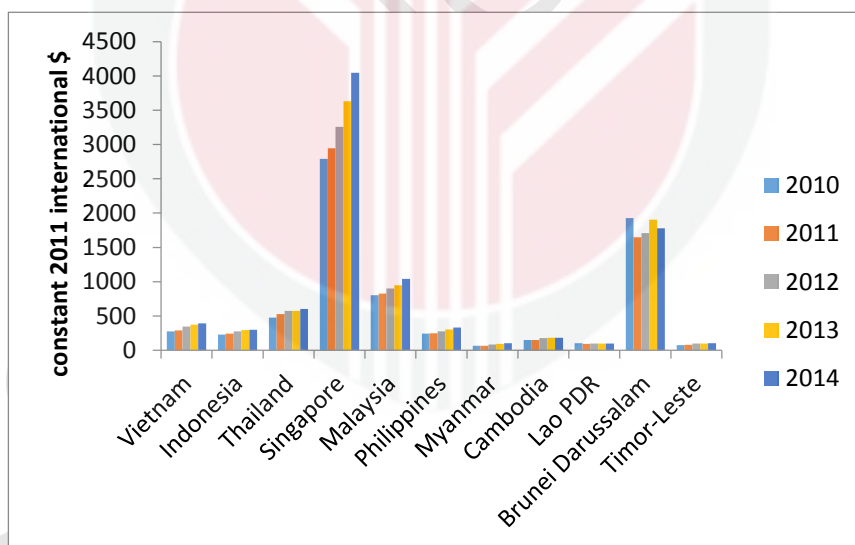
Figure 1.5 : Real health expenditure per capita of South East Asia countries, 2010-2014
[Source: author's computation based on data obtained from WDI (2017)]

Malaysian health expenditure per capita was ranked third in South East Asia, with citizens of Singapore and Brunei spending the most on health. As stated in the 11th Malaysia Plan, Malaysia aims to be a developed nation by the year

2020; therefore, an increase in health expenditure is necessary. A sound healthcare system is a must for achieving high-income status.

Nghiem et al. (2013) estimated that the impact on human health of harmful non-indigenous species (NIS) in Southeast Asia was US$1.85 billion. Furthermore, NIS harm the low and middle-income regions the most because they affect more rural areas where salaries are usually lower.

According to the Ministry of Health (2018), in 2018 the Malaysian government allocated RM26,581,938,800 to the Ministry of Health, which equates to around RM42,777 per capita. This figure is 9.42% of the 2018 Malaysian Budget (Ministry of Health, 2018). By allocating this amount of funding, the Malaysia government is showing that they are making an effort and assigning resources to improve the nation's health. One benefit of this is that a healthier population leads to a higher level of productivity.

When productivity increases so do economic growth. However, private health expenditure is also dependant on the education level of the population (Boardman et al., 2015). A more educated population results in higher average health expenditure because of improved access to and awareness of information related to maintaining good health.

1.2.5 Carbon Dioxide (CO2) Emissions

An increase in economic activity usually leads to increased CO_2 emissions, and it is difficult to grow without seeing a substantial rise in CO_2. Malaysia was ranked third in South East Asia in total CO_2 emissions. Indonesia, which was the top CO_2 emitter in South East Asia, has a decreasing trend compared to Malaysia. For Malaysia to achieve high-income status, it must reduce CO_2 emissions to a level similar to that of Singapore and Brunei Darussalam.
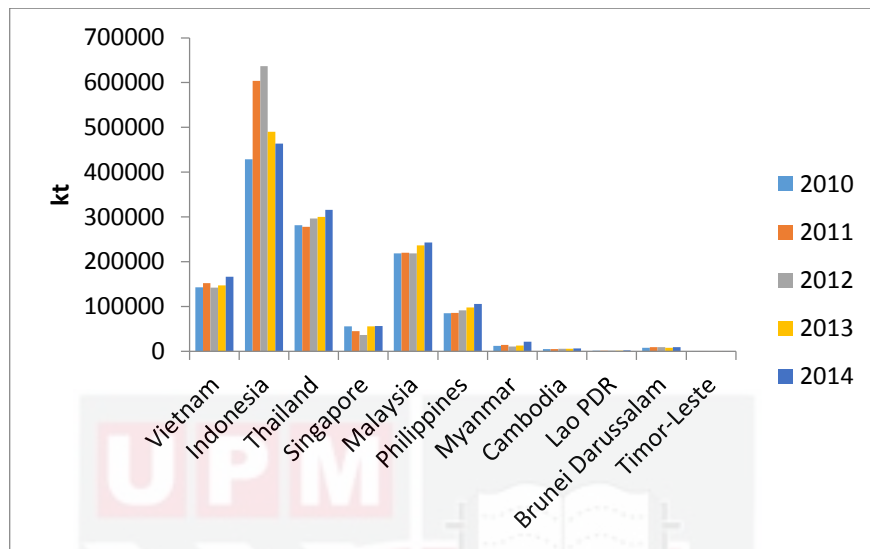
Figure 1.6 : Total CO_2 emissions of South East Asia countries, 2010-2014
[Source: author's computation based on data obtained from WDI (2017)]

Hergoualc'h and Verchot (2014) mentioned that tropical peat swamp forests in Southeast Asia are effective absorbers of carbon. However, the environmental benefits of the peat swamp forests are often ignored, and they are converted into plantations for paper production or agricultural land (Hergoualc'h and Verchot, 2014). Miyama and Managi (2014) also forecast that South and East Asia will face increasing difficulties in the future as a result of CO_2 emissions.

The cost of the damage caused by industrial and commercial CO_2 emissions is not paid for by the polluters. Currently, Malaysia does not have a clear tax that targets businesses or individuals that pollute, and the external cost is borne by society. When people become ill due to CO_2 emissions or bad air quality, it is they who must pay the fees of healthcare or insurance services.

CO_2 emissions are the main component of external costs. A reduction in CO_2 emissions is essential to reduce external costs and improve the welfare of the population. Therefore, zero or minimum CO_2 emissions policies should be considered by policymakers.

1.2.6 Environmental Performance Index (EPI)

The EPI ranks performance on high-priority environmental issues in two areas: protection of human health and protection of ecosystems. Hsu and Zomer (2016) mention that EPI is currently used to measure policy efficiency in line

with the sustainable development goals (SDGs). Singapore was ranked top of the South East Asian countries, and Malaysia was ranked second. The EPI assessment included 180 countries and was conducted by the Yale Center for Environmental Law & Policy (YCELP), the Yale Data-Driven Environmental Solutions Group at Yale University (Data-DrivenYale), and the Center for International Earth Science Information Network (CIESIN) at Columbia University.

Table 1.2 : South East Asia countries EPI score and rank, 2016

Country	Score	World Ranking
Singapore	87.04	14
Malaysia	74.23	63
Philippines	73.70	66
Thailand	69.54	91
Brunei Darussalam	67.86	98
Indonesia	65.85	107
Vietnam	58.50	131
Timor-Leste	55.79	138
Cambodia	51.24	146
Lao PDR	50.29	148
Myanmar	48.98	153

[Source: Hsu et al. (2016)]

Malaysia achieved a score of 74.23, which is 12.81 less than Singapore. Even though Malaysia was only one rank lower, it still has a lot to accomplish before reaching a level similar to that of Singapore. Malaysia aims to promote green growth and improve its environmental performance. To achieve real progress in the area of green growth similar policies need to be adopted in Malaysia that have proven successful in countries like Singapore.

A clean environment is essential because it reduces external costs and increases the welfare of society. Nothing is more important than the people being able to enjoy a clean environment. We only have one environment, and it is rapidly being destroyed, there is no amount of wealth that can turn back the time and correct the often-irreversible environmental consequences of human development.

1.2.7   Malaysia Policies

As stated in the 11th Malaysian Plan, green growth has been stated as one of the main objectives to be achieved during the year 2020. According to The Star Online (2018), Malaysia government through the Environmental Protection Act to reduce greenhouse gas by 45% out of total GDP compared to the year 2005. On the other hand, Malaysia government also targeted 30% of the recycling

rate to take place in among the household. A total of 8,885 megawatts (MW) renewable energy will be installed by the year 2020. Next, Awang et al. (2000) find that about 70% of the vehicular emissions was happed in the urban area. To make sure these objectives to achieve a good rule and regulation must be implemented.

In term of healthcare policy, Malaysia is applied to a dual-tiered system of healthcare services. David (2014) figure out that about 65% of the population was cover by the public healthcare centre. The main objective of the government is to provide the minimum healthcare to all the population in Malaysia. Therefore, the Malaysia government must allocate a sum amount of money in the government budget for population healthcare. However, David (2014) mentioned that the dual healthcare system that consisted of public and private are not sustainable in the long run. This is due to both have different objective in term of conducting the healthcare services to the public. The public sector-main objective is to maximise the welfare of the society; however, the private sector-main objective is to maximise the profit.

Based on the research conducted by UNEP (2015), Malaysia currently does not have any national air quality policy. However, Environmental Quality Act, 1974; Solid Waste and Public Cleansing Management Act, 2007; National Policy on Climate Change, 2009; and biodiversity-related policies were enforced to control the national air quality. As stated in the 11th Malaysian Plan 2016 – 2020, Malaysia government are highly promoting green growth to take place in the country.

Green growth will be applied as a fundamental to promote the balance between the social, economic and environment. Thought the balance between the three componence above, it can help in the socio-economic development and biodiversity protection to be achieved together. One of the ways to promote green growth is to apply the Green GDP into the national account. Green GDP considered the external costs compared to the conventional GDP. By having external costs into account, it can promote the balance between the social, economic and environment.

1.2.8   Gap Between Conventional GDP and Green GDP

Daly (2006) states that economic GDP is the summation of total value added by capital and labour in the production of goods and services. No environmental components are included in the calculation of GDP. However, Boyd (2007) defined that Green GDP incorporates environmental impacts or values into account like the impacts of pollution and depletion of natural resources, which will be called as external costs in this study.

11
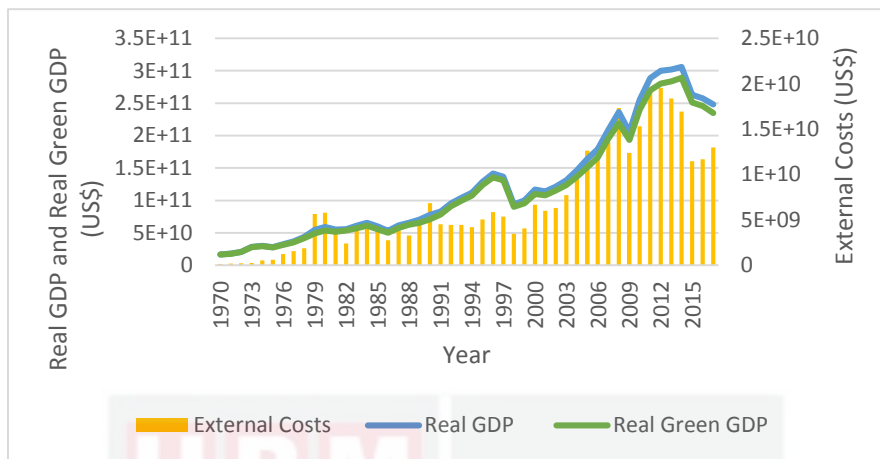
Figure 1.7 : Real GDP, Real Green GDP and External Costs in Malaysia, 1970-2017
[Source: author's computation based on data obtained from WDI (2017)]

From **Figure 1.7**, it shows that there was a gap between the Conventional Real GDP and the Real Green GDP. The gap between the conventional GDP and Green GDP is due to the external costs. The external costs show an increasing trend from year 1970 until the peak in year 2012. After the year 2012, Malaysia government through the enforcement of the rule and regulation, it has led to the falls of the external costs. However, the external costs have an increasing trend from year 2015 after the falls from year 2012. These data and trend have proven that there was an increase in the external costs in Malaysia.

GDP and Green GDP are inherently different, and the environmental impacts that take place during the process of producing goods and services are called external costs. The external costs are reflected in environmental degradation and societal effects. Therefore, to increase sustainable development in Malaysia, there needs to be a reduction in external costs. Green growth should encourage policies and activities that cause minimum pollution and depletion of the natural environment. At the same time, the SES and the EPI ranking are likely to improve if external costs are reduced. Lastly, the economic well-being index and social well-being index will be more reflective of society if there is a reduction in external

1.2.9 External Costs

As discussed in section 1.2.8 above, the external costs apart of the social costs. The total social costs are the sum of the private costs and the external costs. The private costs are the costs which pay by the firm during the production. All the costs include the tax and costs of production pay by the firm

only. However, the pollution released by the firm that leads to sick and illness; these costs are not paid by the firm.

The sick and illness costs can be called as the external costs. According to Chen et al. (2016), the external costs should include agricultural production, environmental problem and infrastructure inadequate. Rabl and Holland (2008) mentioned that the external costs are the primary key to achieve green growth in a country. However, in most of the countries around the world had ignored the external costs during the past and start to be giving attention to the external costs and promote green growth in their country.

In Malaysia currently, there are still limited data and account about the external costs. However, the World Bank had collected the set of data that can be used as the proxy for the external costs. The proxy data are net forest depletion, mineral depletion, energy depletion and, the cost of carbon dioxide emission. These sets of data can be applying as the proxy for the external costs that can help to promote green growth in Malaysia. Giannetti et al. (2015) mentioned that the data provide by Work Bank can be used to compare the country economic performance.

1.3   Problem Statement

The 11th Malaysia Plan entitled "Anchoring Growth on People" was launched by former Prime Minister, Dato' Seri Najib Razak. He stated that if Malaysia was to achieve sustainable growth, then was a necessary ingredient, and green growth was the way to accomplish this.

"*Achieving growth that is inclusive, sustainable, growth with equity, competitive and progressive…*"

Dato' Seri Najib Razak

Conventional GDP fails to consider the external costs of environmental factors like mineral depletion, CO_2 emissions, and deforestation. The external costs happened which have a link with the quality of the institutional of the country. Good quality of the institutional will makes sure all the external costs will be at the minimum or zero.

The IMD (2016) reported that Malaysia ranked 19th out of 61 global economies in the 2016 World Competitiveness Yearbook. However, the benefits of a positive economic performance may not be felt if there is low institutional and government efficiency. The efficiency of the government in term of policy implementation and rule and regulation will help to reduce external costs.

On the other hand, all these factors mentioned above have a detrimental impact on health and increase per capita health expenditure. These external costs will lead to the reduction of the welfare of society. The external costs are the costs that had to bear by society itself. These costs have to do with the expenditure on healthcare of society. This is because of the sick and illness faced by society. The costs of the external costs are not paid by the firm but the society itself. To promote green growth, Malaysia should take into account of the external costs.

The average annual GDP growth in Malaysia from 2012 to 2016 is 5.1%. This figure is lower if the environmental impacts are incorporated into it. The 2017 Malaysian well-being index shows the score increased from 125.4 in 2011 to 133.3 in 2015. However, environmental quality declined from 108.9 in 2011 to 101.7 in 2015. The index suggests that the increase in carbon emissions brought subsequent increases in health expenditure. The index also shows that the current situation does not meet the SES objectives set out by the Malaysian government.

On the other hand the external costs also have an increasing trend in the past few years from 2015 onwards. This indirectly shows that Malaysia is facing an environmental problem in the past few years. It was also supported by the decline of the environment quality in the year 2015 compared to 2011 as discussed above. The increased of the external costs will lead to change in the economic, social and environment. The increased in the external costs happened may be due to the low quality of the institution. Next the external costs will also be led to the sickness happen in the society. Finally, the external costs will lead more harm to the environment and loss of the biodiversity in Malaysia will take place.

In countries with high economic growth and a polluted environment, people are more likely to become sick, which results in increased health expenditure. Economic growth that results in increased health expenditure fails to enhance the welfare of society. Hence, financial planning and growth must consider green growth factors like environmental and health impacts.

Green growth considers not only output but also environmental quality. It creates a gap between conventional economic growth and green economic growth. The difference between normal economic growth and green economic growth is known as the growth of external costs with the presence of environmental impacts.

The growth the external costs is highly related to institutional quality (Ibrahim and Law, 2014). A higher quality of institution leads to a reduction in external costs. Malaysia has a better quality of institution compared to some other

South-East Asian countries, which helps to reduce the external costs somewhat. However, some problems such as pollution and contamination still exist. High-quality enforcement, similar to the Singaporean policy, is an effective strategy for reducing pollution, and a similar scheme could be beneficial if implemented in Malaysia.

The 11th Malaysia Plan stated that in consideration of climate change, policymakers aimed to increase awareness of the health impacts resulting from climate change and natural disasters. Zou et al. (2016) found that air pollution increased health expenditure in low-income countries. The scale of the impact is different for the poor, middle and high-income people. Poor and middle-income people are affected more than high-income people. For example, Fitzpatrick et al. (2015) found that in Ontario, Canada, low-income people with secondary education are high-cost users (HCUs) of healthcare products.

Malaysia has set the target of reducing greenhouse gas emissions by up to 40% by the year 2020. According to the definition of green growth by the World Bank (2014), eradicating environmental problems can create a clean living and healthy society. SES is a measurement of socioeconomic status and a clean environment, and a healthy society is essential to improve the SES of Malaysia. Hence, the vision of green growth could be vital in reducing the health expenditure incurred by society.

Lastly, CO_2 emissions are a significant pollutant that can be reduced if Green GDP factors are given more consideration. This is because the Green GDP consider the external costs into measurement. The increase in the Green GDP also means that the reduction of the external cost and also increase in green growth.

1.4   Research Questions

The general research question:

What is the relationship between the economic, societal and environmental impacts of external costs in Malaysia?

 The specific research questions:

1.   Do institutions affect the environmental degradation?
2.   Do environmental adversely impact health expenditure?
3.   Do GDP and Green GDP negatively impact CO_2 emissions in Malaysia?

1.5 Objectives

This study investigates the relationship between external costs and the Malaysian economy, society, and environment.

The specific objectives are:

a) To investigate the impact of institutions in mitigating environmental degradation.
b) To examine the impact of enviromental degradation on health expenditure.
c) To examine the effects of GDP and Green GDP on CO_2 emissions in Malaysia.

1.6 Significant of Study

As stated in Wawasan 2020, Malaysia aims to become a high-income nation with a sustainable economy and environment. This research provides an insight into governmental, NGO, and healthcare practices in Malaysia related to the environment. Furthermore, pollution and other environmental problems are shown to be connected to the health expenditure of the society.

The external costs are calculated based on the value lost due to environmental damage, and the price is usually borne by society, not those responsible for the damage. Environmental problems and pollution lead to pollution that reduces SES. By using external costs as a variable of health expenditure, it is possible to identify how environmental damage affects healthcare expenditure. The external costs used in this study capture the environmental damage that results from economic activities in Malaysia.

Recent Malaysian government policy is more beneficial to the population and the environment. The efficiency of the Malaysian government plays an essential role in controlling pollution in the country because of the effectiveness of high-quality institutions. Institutions like the Forestry Department of Peninsular Malaysia and the Federal Court of Malaysia must continue to work collaboratively to reduce pollution and improve the quality of the environment in Malaysia. By have collaboration between different in the government sectors, it can help to improve the efficacy of the enforcement of the policy in pollution control.

Being aware of the relationship between external costs and healthcare expenditure encourages individuals and industry to reduce environmental pollution. The quality of the environment must not be compromised for purely

economic purposes. By reducing the environmental impact, it is possible to reduce public and private healthcare expenditure. Policymakers should also consider these two aspects when formulating healthcare and education budgets because of the pivotal role they play in societal well-being. Education can be act as a supporting key to promoting awareness to care about the environment in society during school time.

This study could be beneficial to the Ministry of Water, Land and Natural Resources in helping to formulate more effective policy by considering the external costs. Environmental impact is the most crucial aspect that the government must address to solve the current problems. Awareness of the link between government efficiency and external costs will lead to better policy and increase net GDP growth. Another critical aspect to consider is pollution control. By knowing the impact of GDP and Green GDP on pollution of Malaysia, respective government institutions can benefit. For example, the transportation sector is one of the leading CO_2 emitters in Malaysia. The Ministry of Transport could implement a new policy to reduce CO_2 emissions.

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PUBLICATION

Journal

Cheah, C. F., & Abdul-Rahim, A. S. (2018). Relationship between Health Care and Tourism Sectors to Economic Growth: The Case of Malaysia, Singapore and Thailand. *Pertanika Journal of Social Sciences & Humanities, 26*(2), 1203-1213.

Chapter in book

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