IMPACT OF GOODS AND SERVICES TAX ON THE MALAYSIAN ECONOMY

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ABSTRACT

This study examines the impact of the goods and services tax (GST) on the Malaysian economy from three major perspectives. First, it investigates the consequent changes in sectoral responses, including output, sales, and prices for 15 main sectors. Second, the study presents the results of GST impact on seven macroeconomic variables, namely, consumption, investment, government revenue, government expenditure, export, import, and gross domestic product. Third, the results of household welfare are discussed. A computable general equilibrium model is utilized to simulate GST impact on the Malaysian economy, and a simple comparative static model is performed. Three simulations are carried out to examine the impact of GST when it is imposed at 4 percent (Simulation 1), 6 percent (Simulation 2), and 8 percent (Simulation 3). The analysis proceeds with the findings based on all simulations taken. The results prove that the higher the GST rate introduced, the higher the impact is on each sector. The sectors most affected by GST are communication and ICT and the electricity and gas sectors. By contrast, agriculture, forestry, and logging and the petroleum and natural gas sectors are the least affected. Most of the examined factors are adversely affected by GST. Consumption and investment receive the largest negative effect, whereas government revenue and expenditure show the largest positive effect. The study likewise finds that welfare loss may be minimized by lowering GST rate, and higher-income groups may be affected more than lower-income groups. Therefore, policymakers should promote the service sector as an engine for other sectors to generate economic growth, given that it will produce a more stable source of revenue in the long run. Importantly, GST is an effective method to broaden the country's revenue base and improve the efficiency of the tax system. This outcome is similar to the primary aim of GST to reduce the fiscal deficit of the country. With budget surpluses, the government could afford to give away sufficient tax rate offset to

cushion the effects of GST. In a nutshell, GST is a useful complement to the economy when it is charged at the minimum rate. A 6 percent rate is a reasonable initial rate. However, should the rate fluctuate, low-income earners may suffer a setback owing to their small consumption power. Therefore, GST should be stabilized at a lower rate for a period of at least five years.

ABSTRAK

Tujuan kajian ini adalah untuk mengkaji kesan cukai barang dan perkhidmatan (GST) ke atas ekonomi Malaysia melalui tiga perspektif utama. Pertama, kajian ini mengkaji tindakbalas GST ke atas setiap sektor, iaitu tindakbalas ke atas output, jualan dan harga sektor bagi 15 sektor utama. Kedua, kajian ini melihat kesan GST ke atas tujuh pembolehubah makroekonomi iaitu penggunaan, pelaburan, hasil kerajaan, perbelanjaan kerajaan, eksport, import dan Keluaran Dalam Negara Kasar. Ketiga, kajian ini melihat kesan yang berlaku ke atas kebajikan isi rumah. Untuk mensimulasi kesan GST terhadap ekonomi Malaysia, model *computable general equilibrium (CGE)* telah digunakan. Model statik telah digunakan untuk menjalankan eksperimen ini. Terdapat tiga simulasi yang dijalankan di dalam kajian ini; Simulasi 1 dengan kadar GST pada 4 peratus, Simulasi 2 pada 6 peratus dan Simulasi 3 pada 8 peratus. Untuk Simulasi 1, hasil kajian menunjukkan bahawa lebih tinggi penetapan kadar GST, kesan GST ke atas 15 sektor dalam ekonomi semakin besar. Sektor komunikasi dan ICT; dan sektor elektrik dan gas menerima kesan terbesar daripada pelaksanaan GST. Sebaliknya, sektor pertanian, perhutanan dan pembalakan; dan sektor petroleum dan gas asli kurang terjejas daripada perlaksanaan GST. Seterusnya, kebanyakan pembolehubah makroekonomi adalah terjejas dengan perlaksanaan GST. Penggunaan dan pelaburan menerima kesan negatif yang terbesar manakala kesan positif terbesar adalah daripada hasil dan perbelanjaan kerajaan. Akhir sekali, kajian ini juga mendapati bahawa lebih rendah kadar GST, lebih kecil kesan kerugian kepada kebajikan. Selain itu, kajian ini menunjukkan bahawa golongan berpendapatan rendah adalah kurang terjejas berbanding dengan golongan berpendapatan tinggi. Secara keseluruhan, hasil kajian mencadangkan pembuat dasar perlu menjadikan sektor perkhidmatan sebagai pemangkin untuk sektor-sektor lain dalam menjana pertumbuhan ekonomi. Ini kerana GST melalui sektor ini dapat menghasilkan sumber pendapatan yang lebih stabil di

dalam jangka masa panjang. Ia mempunyai persamaan dengan matlamat utama perlaksanaan GST; iaitu untuk mengurangkan defisit fiskal negara. Selain itu, perkara yang lebih penting lagi adalah GST dapat meningkatkan hasil kerajaan dan memberi manfaat kepada negara. GST juga terbukti dalam mengatasi kelemahan yang wujud daripada cukai yang diamalkan sebelum ini, iaitu GST dapat meluaskan asas cukai. Dengan lebihan bajet, kerajaan mampu untuk mengenakan kadar cukai yang berpatutan untuk mengimbangi kesan buruk daripada perlaksanaan GST. Secara ringkas, GST boleh menjadi pelengkap yang berguna kepada ekonomi apabila GST ditetapkan pada kadar yang minimum. Kadar 6 peratus adalah merupakan satu kadar permulaan yang berpatutan. Walau bagaimanapun, sekiranya kadar turun naik, sumber pendapatan golongan berpendapatan rendah mungkin mengalami kemerosotan kerana kuasa membeli mereka adalah kecil. Oleh itu, penetapan kadar GST yang lebih rendah adalah disarankan untuk tempoh sekurang-kurangnya lima tahun.

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LIST OF ABBREVIATIONS

AFTA	:	ASEAN Free Trade Area
AGE	:	Applied General Equilibrium
ASEAN	:	Association of South-East Asian Nations
BNM	:	Bank Negara Malaysia
CGE	:	Computable General Equilibrium
E&E	:	Electrical and Electronic
EPU	:	Economic Planning Unit
EV	:	Equivalence Variations
GDP	:	Gross Domestic Product
GST	:	Goods and Services Tax
HES	:	Household Expenditure Survey
HIS	:	Household Income Survey
ICT		Information and Communications Technology
IMF	:	International Monetary Fund
MST	:	Manufacturers' Sales Tax
MTR	:	Marginal Tax Rate
NKEA	:	National Key Economic Areas
PEMANDU	:	The Performance Management and Delivery Unit
PETRONAS	:	Petroliam Nasional Berhad
R&D	:	Research and Development
RST	:	Retail Sales Tax
SAM	:	Social Accounting Matrix
SARS	:	Severe Acute Respiratory Syndrome
SAS	:	Self-Assessment System
SMEs	:	Small and Medium Enterprises
VAT	:	Value Added Tax

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CHAPTER 1: INTRODUCTION

1.1 Background

In the past, natural resources such as land, mineral extraction, and farming became sources of revenue for the government through taxation. An economic philosophy called Georgism believed that taxing economic rent derived from land and natural resources is efficient, fair, and equitable. Ibnu Khaldun (1377), the first Muslim scholar, discussed the taxation system in his early view on the philosophy of social sciences in *Muqaddimah of Ibn Khaldun*. In the book, he discussed the concept of charity tax, known as zakat, and the relationship between tax rate and government revenue. Later, Adam Smith (1776), in his popular monograph, *The Wealth of Nations*, defined a taxation system that is considered as classical taxation theory. He further developed the views of Ibnu Khaldun and postulated four maxims of taxation, including proportionality, transparency, convenience, and efficiency.

As the economy developed, the role of tax became more complex. David Ricardo (1817) improved Smith's ideas and discussed them in *The Principles of Political Economy and Taxation*. He focused on four types of taxes levied at the current time, namely, taxes on wage, agriculture, profit, and manufactured products. Keynes (1936) initiated taxation theory that advocated state interventions in the market. He believed that savings must be subtracted with tax to finance state spending because such a large amount represented a scarcity in the economy. He argued that low tax rates and the increasing number of progressive tax would reduce tax revenues and hinder economic growth.

In Keynesian macroeconomic theory, taxation, i.e., taxes on consumption, is a part of government measures to stabilize the economy. Irving Fisher and Nicholas Kaldor also suggested that tax should be levied on the final cost produced for every product in the economy. Kaldor stated that the rate imposed on consumption tax should be progressive, with tax exemptions and allowances combined. These measures were appropriate to apply to necessities and basic needs, particularly, to people in lower-income groups.

By contrast, in neoclassical theory, Emanual J. Mutt and Arthur Laffer recommended that tax should be imposed as low as possible and relevant tax exemption should be given to firms. High tax imposed on firms would hamper the economic development and restrain the investment capability of firms, outcomes that would reduce production levels and subsequently lead to recession. Laffer suggested the relationship between tax rates and tax revenue, a relationship that is known as a *Laffer curve*. According to him, high tax rate leads to high tax revenue only up to a certain level and then it begins to decline. Specifically, tax rates that are too high discourage production and decrease taxable income.

Fiscal issues swept the world after World War I (1914–1918). Germany and America introduced the value-added tax (VAT) or goods and services tax (GST)[1]. Interest on VAT was revived in Western Europe and America in the 1950s (Lindholm, 1970), and thereafter, VAT became the most productive tax in the world. The main factor behind the rapid spread of VAT is its widespread use in the European Union (EU). The International Monetary Fund (IMF), in its financial assistance package to countries

[1] GST and VAT are different in terms of terminology but their concepts are similar. In some countries, GST is known as VAT.

affected by a financial crisis, suggested the implementation of VAT in such countries. Thus, the IMF also played a vital role in spreading the concept of VAT to developing and transitional economies (DTEs) (Bird, Martínez-Vázquez, & Torgler, 2005). It has suggested the adoption of GST to all countries because the structure of this tax encompasses the whole economy (Freebairn, 2011), i.e., for value chain/added of all economic sectors. To date, more than 160 countries have adopted GST (Mohd Yusof, Dietzenbacher, & Los, 2014; Keen and Lockwood, 2010).

Fiscal policy, which is based on Keynesian economic theory, discusses the way a government can influence economic productivity levels by adjusting the tax level and public spending (Blanchard and Fischer, 1989; Tejvan, 2013). Fiscal policies can overcome inflation, reduce unemployment, and maintain the stability of the value of money by applying one of two approaches, expansionary or contractionary fiscal policy (Abel, Bernanke, & Croushore, 2013; Gordon, 2006; Premchand, 1983). GST or VAT is a fiscal instrument that can play the role of a fiscal policy.

Expansionary fiscal policy benefits the public because the government aims to lessen the burden of businesses by, for instance, reducing the corporate tax rate. This policy will promote consumption and investment and generate an increase in the aggregate demand in the economy (Arthur, Steven, & Stephen, 2010; Charles, 2014). By contrast, contractionary fiscal policy burdens the public by increasing taxes and reducing government expenditures. However, this policy can lead to a fall in general prices, thus overcoming inflation (Tanzi, 1987).

In general, governments influence macroeconomic productivity by making adjustments to their taxation system and spending (Mark and El-Ganainy, 2012). Tax

constitutes an important instrument for generating revenue for the government. As a part of the fiscal policy, tax is regarded as a social instrument for achieving macroeconomic objectives, namely, good economic growth, equal current account of the balance of payments, low unemployment rate, price stability, equal income distribution, and stability of external balance (Ames, Izquierdo, Devarajan, & Brown, 2001; Gemmell, 1988; Gordon, 2006). However, these objectives depend on the political situation, policy implementation, and economic background of a country (Amir, Asafu-Adjaye, & Ducpham, 2013).

Besides the economic motive, taxation is also used to meet socio-economic goals in terms of transferring resources from the private sector to the public sector; distributing government expenditure fairly among all income groups (vertical equity) and among people with the same economic circumstances (horizontal equity); and promoting economic growth, stability, and efficiency (Jorge and McNab, 2000). Hence, tax collection is beneficial to the public, particularly in terms of income distribution.

Tax has become a substantial source of revenue for governments around the world. In 2012, the top three countries that generated much of their income from various sources of tax revenue were China (36.5 percent), Denmark (34.1 percent), and New Zealand (29.3 percent). By contrast, Malaysia's tax revenue-to-GDP ratio was low at 16.2 percent in 2012 and 15.5 percent in 2015 (World Bank, 2012).

Taxes are classified into two types: direct tax and indirect tax. Direct taxes are levied directly on individuals and corporations, and the amount of tax cannot be passed on to others (Gordon, 2006). Indirect taxes are imposed on consumers when they buy goods and services, and the tax can be shifted to others. Income tax, corporate tax, and

petroleum tax are classified as direct taxes, while sales tax, service tax, export duties, import duties, excise duties, and goods and services tax (GST) are categorized as indirect taxes.

In the 2014 budget of Malaysia, the government recommended the implementation of GST effective 1 April 2015 at a rate of 6 percent to replace the sales and services tax (SST) (Lau, Tam, & Heng-Contaxis, 2013). Numerous discussions and debates on issues relating to GST and its implications have occurred. The main issue arising from the implementation of GST is the budget deficit of Malaysia (Lim and Ooi, 2013; Nor Hafizah and Azleen, 2013; Mohd Rizal and Mohd Adha, 2011; Amanuddin, Muhammad Ishfaq, Afifah, Nur Fatin, & Nurul Farhana, 2014; Singh, 2014).

The motivations for considering the implementation of GST are to (1) broaden the country's revenue base, and (2) overcome the inherent weaknesses in the SST system, which has a limited scope (The Performance Management and Delivery Unit, 2012, p. 279; Saira, Zariyawati, & Yoke-May, 2010; Singh, 2014; Tan, 2012). Imposing GST would, at least, be a relevant reform because its revenues would be spent by the government, especially to solve some of the budget deficit problems facing Malaysia. The budget that could be used to finance the country's government expenditure would probably increase.

Another reason for implementing GST was to address the estimated 30 percent shadow economy in Malaysia. Informal workers, such as part-time workers and roadside vendors, can contribute to the widened tax base. The shadow economy represents considerable potential revenue for the government because they would have registered their businesses (Faizulnudin, 2012; Siti Halimah, 2014; Tan, 2012; Wan,

2013). In this manner, GST is introduced not only to raise revenues but also to improve the efficiency of the tax system.

In the present thesis, the tax system reform is considered by converting the current SST to GST. SST, which charges from 5 percent to 10 percent on taxable items, is changed to GST, which has a standard rate of 6 percent. Therefore, for the analysis, the author removes the effect of SST from the model and only then adopts the effect of GST in the model (refer to Section 4.6.5).

Given that tax is the most stable type of government revenue, GST is not expected to result in any unpredictable economic situation (Ahmad, 2014). Evidence from the United Kingdom suggests that GST is the most successful tax system according to citizen feedback, including businesses (Webb, 2014). As such, the implementation of GST is expected have an impact on the economic performance of Malaysia.

Although numerous studies on GST in different country contexts have been carried out, determining whether or not the GST system is effective remains a challenge, because it depends on the socio-economic situation, government policy, and responsiveness to the effects of the implementation (Narayanan, 1991). Several economic practitioners and tax experts have concerns about the distributional and macroeconomic impact of GST because these two factors describe the overall economic situation. For instance, in the Malaysian context, the income distribution would be less equal if GST is to be implemented (Mohd Rizal and Mohd Adha, 2011).

Several studies that provide beneficial information for the country, particularly in terms of economic position, have been conducted by both government and non-

governmental agencies. The Ministry of Finance carried out a study on the impact of GST in Malaysia by using the computable general equilibrium (CGE) model. Findings revealed that some variables, such as GDP, exports, and imports, increased by 0.3, 0.5, and 0.4 percent, respectively (Faizulnudin, 2012). The same study also found that the price of 944 goods in the consumer price index (CPI) basket would increase by 1.8 percent when GST is implemented (Hussain, 2014).

The general perception is that introduction of GST at 6 percent would result in an increase in prices for certain products and a decrease in others (Siti Halimah, 2014; Wan, 2013). The price impact from such introduction is a major concern, particularly for those in the lower-income group, who are more sensitive to price shocks in the market because they spend most of their income on consumption and have little savings. However, with GST, they would pay less because consumption is largely used for purchasing basic needs.

The brief discussion above reveals that many questions and arguments related to GST are unresolved, particularly its impact on prices and the welfare of consumers. Therefore, the present study aims to investigate and identify the actual impact of GST on the Malaysian economy. By unveiling the impact of GST, this research is linked with the broad agenda of the Malaysian government, namely, the implementation of GST. The motivation for this research could be achieved from this implementation.

1.2 Problem Statements

The Royal Malaysian Customs Department noted that of the 10 Association of South-East Asian Nations (ASEAN) member countries, only Myanmar and Brunei do not implement GST. Malaysia implemented SST from the 1970s up to March 2015

before it was replaced by GST. While Myanmar imposes commercial tax on goods and services, Brunei does not implement any type of consumption tax (Vermeend, van der Ploeg, & Timmer, 2008).

Observing and evaluating other studies are important to the current work to identify some of the issues, problems, and implications experienced by other countries that implemented GST as a new tax system (refer to Section 3.3). Research on the subject is necessary for policymakers in Malaysia to obtain beneficial information and minimize the expected negative impact that may occur. For instance, enforcement of GST may result in the increased prices of goods and services that could, in turn, change the level of public and private consumption expenditure, investment, trading, and economic growth (Tholasy, 2012). This section discusses the problem statements and issues that motivated this study. The statements and issues are highlighted below:

(1) Economic Structure. According to the Economic Planning Unit (EPU) (2013), Malaysia had a persistent fiscal deficit from 1988 to 2013, with an average of 2.93 percent of the GDP. In 2012, the deficit was 4.5 percent of the GDP, and in 2013, it was 3.9 percent. The 2013 deficit was the highest in Asia after Japan at 9.3 percent and India at 7.1 percent (International Monetary Fund, 2014). Consequently, in July 2013, the Fitch Ratings lowered its perspective on Malaysia from strong to negative. They cited public finances as the country's key record fatigue (Bond and Hughes, 2013).

In 2013, the inflation rate in Malaysia was 3.0 percent, which was lower than the rate in Indonesia at 8.5 percent and in Laos at 7.0 percent (Tan, 2012). However, in 2014, the inflation rate increased to 3.4 percent. The increment was largely related to the increase in fuel prices in the second half of 2014 (Tholasy, 2012). Accordingly, in 2013,

Malaysia experienced a slower economic growth of 4.7 percent compared with that of other countries in the ASEAN region. Indonesia and the Philippines grew at 5.8 and 7.2 percent, respectively. Furthermore, the total government gross debt-to-GDP ratio in Malaysia in 2013 was 56.03 percent, the second highest among its ASEAN counterparts after Singapore with 108.16 percent. The debt-to-GDP ratio was large for both countries compared to other countries, such as Indonesia at 23.65 percent and Brunei at 2.45 percent, which had the lowest gross debt-to-GDP ratio in the region (Tan, 2012). Therefore, Malaysia is clearly in need of economic reforms to achieve strong economic fundamentals, raise the level of its economy, and ensure long-term sustainable economic growth. The most suitable reform to promote growth is by implementing changes to the taxation structure, such as by implementing GST.

(2) *Tax Structure*. Gordon and Nielsen (1997) indicated that the dependency on direct taxes would be traded off by any increase in the indirect tax. The reasons behind this outcome are as follows: (i) Indirect taxes are most recommended because they offer a wider aim. Governments could improve their objective of collecting additional revenue from indirect taxes because they cover the entire population, unlike direct taxes, which merely concentrate on fixed income earners. (ii) The switch to indirect taxes could widen the base and minimize the burden on employment. This result is especially vital for countries facing an aging population (Bond and Hughes, 2013).

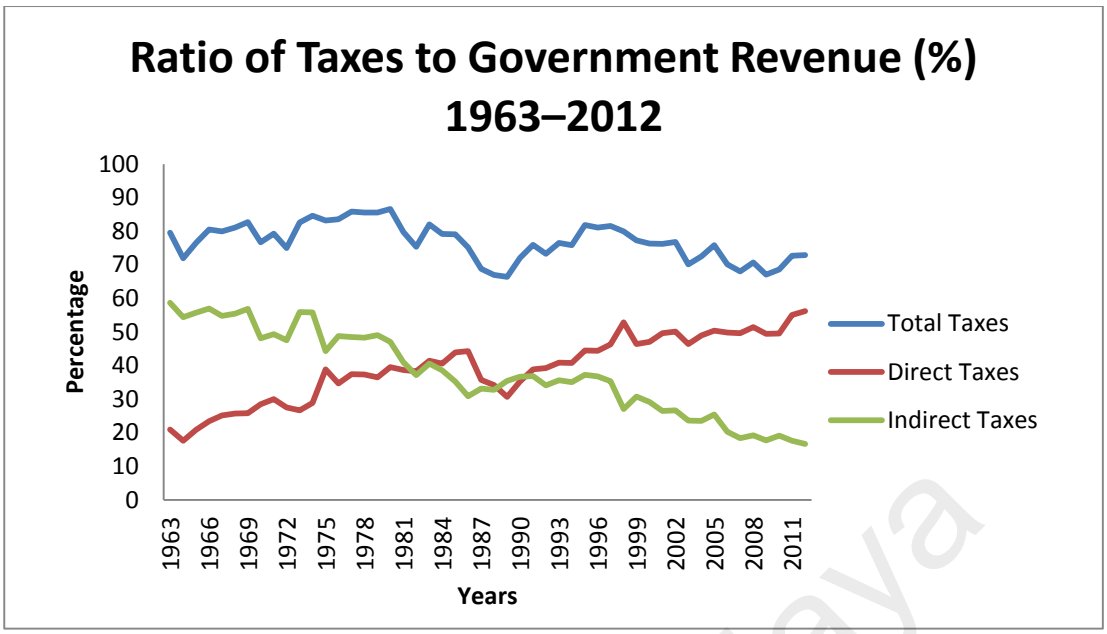

Figure 1.1: Ratio of Taxes to Government Revenue

Source: Ministry of Finance (1960–2013)

As indicated in Figure 1.1, from the 1960s to 1981, Malaysia relied more heavily on indirect taxes than on direct taxes (Bank Negara Malaysia, 2014a) for its revenue. After 1981 until 1987, the contribution of direct taxes was more than that of indirect taxes; however, revenue dropped for almost four years and increased again thereafter. Since 1981, a large portion of direct tax revenue have been contributed by corporate and petroleum revenues (Bank Negara Malaysia, 2014a). In fact, direct taxes contributed 56.4 percent to Malaysia's tax revenue in 2012 compared to indirect taxes, which was only 17.2 percent. The global trend and pattern over the last few decades were to reform and transform all the tax structures into a wider and more comprehensive tax base.

(3) Sectoral Responses. The contribution of production sector is important for the Malaysian economy. GST is imposed at each stage of production that adds some percentage to the value-added products (Lent, Casanegra, & Guerard, 1973; Tait, 1988)

and is paid in order by the supplier, manufacturer, wholesaler, retailer, and, finally, the consumer.

The output growth of the sector would be affected by the implementation of GST, because the broad scope of GST covers all industrial products, commercial sales, imported goods, and specific services. GST affects consumption expenditure and the investment and trade of firms (Devarajan, Jitsuchon, & Sussangkarn, 1991; Summer, 1981). Therefore, the implementation of GST is expected to pose a huge challenge as it will affect the Malaysian economy through sectoral growth, which is related to taxable goods or services that cover all industrial products, commercial sales, imported goods, and specific services that are not subject to zero and exempted rates.

(4) Household Welfare. In 2012 and 2013, an average of 1.75 million people paid their income taxes from among the 11.4 million total labor force in Malaysia (Lee, 2012). This figure represents 15.8 percent of the total labor force in Malaysia who are qualified as taxpayers. However, the number is small because about 50 percent of the labor force in Malaysia earn a monthly income below RM3,000 (Department of Statistics, 2012a). A study by the Inland Revenue Board (IRB) of Malaysia (2013) revealed that people who earn a monthly income of less than RM3,000 do not have to pay income tax because they are considered to be in the lower-income bracket for households in Malaysia[2].

Although the lower-income group is not required to pay income tax, they contribute to the tax revenue through SST, which was estimated at about RM71 per month

[2] Author justification based on household per capita income in Malaysia (Department of Statistics, 2012b)

(Tholasy, 2012). Therefore, if GST is implemented, they will pay almost the same amount of tax as the SST they pay for. The belief is that the imposition of GST will have different effects on different income groups. To date, studies conducted on the impact of GST on household welfare are few. For instance, most studies focused on exploring the level of awareness among consumers and producers with respect to the implementation of GST (Mohd Rizal and Mohd Adha, 2011; Saira et al., 2010; Amanuddin et al., 2014). One study was also related to the concept and mechanism of GST (Nor Hafizah and Azleen, 2013). In addition, GST impact studies were performed by Lau et al. (2013), but only one study has been conducted on the incidence of GST in Malaysia (Lim and Ooi, 2013). Further discussions on prior studies are in Section 3.2.1.

Given the shortage of literature on GST and its impact on Malaysia, filling this gap is an urgent concern. This study attempts to address all the issues mentioned above by determining and analyzing the impact of GST in Malaysia on three major issues raised as research questions.

1.3 Research Questions

In relation to the problem statements above, the main aim of this study is to answer the three specific questions on the impact of GST on the Malaysian economy.

(1) What are the sectoral responses to GST?

(2) What are the responses of macroeconomic variables to the implementation of GST?

(3) What is the impact of GST on household welfare?

1.4 Research Objectives

The aim of this study is to analyze the impact of GST on the Malaysian economy. Specifically, it attempts to achieve the following objectives:

(1) To identify the sectoral responses to the GST imposition.

(2) To examine the impact of GST on macroeconomic variables.

(3) To estimate the impact of GST on household welfare.

1.5 Significance of the Study

In quantifying and analyzing the impact of GST on sectoral responses, macroeconomic variables, and household welfare, the overall impact of GST implementation on the Malaysian economy must be identified first. This study will bring benefits in terms of understanding the economy and expanding the body of knowledge on GST. The two contributions of this study are outlined below:

(1) This study raises the important issue of GST implementation in Malaysia, especially after the announcement was made in the 2014 budget concerning its start on 1 April 2015, which motivated the research on this subject. Studies on the impact of GST on the Malaysian economy are limited because this tax reform is new to the country. The government and some independent institutions conducted studies and conferences to explain the rationale of GST and its implementation in Malaysia; however, those studies were not published. Those studies were conducted by the Ministry of Finance and the Royal Malaysian Customs Department.

The Malaysian government's study only reported on the impact of GST on tax incidence, businesses, GDP, price level, foreign direct investment, export, and revenue of the tourism sector (Faizulnudin, 2012; Tan, 2012; Tholasy, 2012). With the exception of the government's study, studies relating to the Malaysian GST are scarce.

Therefore, this thesis intends to look at the large scope of macroeconomic variables, such as consumption, investment, government revenue, government expenditure, export, import, and GDP, to obtain broad findings concerning the economic impact of GST.

(2) This study employs CGE modeling to quantify the effect of GST implementation. Although CGE models on different types of fields are available, none are based on the taxation system in Malaysia. For example, Ragayah (1988) and Barjoyai (1993) used applied general equilibrium (AGE) to study the impact of Malaysian taxation and fiscal incidence.

On the basis of the limitation discussed above, this study is the first to attempt using the CGE model to look at the impact of indirect taxes on the Malaysian economy. Several studies have applied the CGE model, but these looked at different aspects in Malaysia, such as income distribution, agriculture, trade, environment, labor, poverty, and energy (Ahluwalia and Lysy, 1979; Ee, 1982; Lundborg, 1984; Demery and Harrigan, 1985; Yeah, 1994; Al-Amin, 2009; Jaafar, 2011). To the best of the author's knowledge, no study has applied the CGE model on the impact of taxation in Malaysia, especially in an impact study on GST.

The findings of this study will be valuable to Malaysian tax authorities and can also be relevant to other ASEAN countries, particularly for Brunei and Myanmar, both of whom have not considered and implemented GST. This study could help these countries in formulating policies, in the same way that Malaysia also learned from other experienced countries, such as China, India, Australia, and many other countries around the world (Narayanan, 1991). This study will assist policymakers in evaluating whether

the implementation of GST increases the sectoral output of the country and whether it improves the economic performance overall.

1.6 Scope and Limitations of Study

This study discusses the impact of GST implementation on the Malaysian economy. It will only focus on GST as a new tax system to replace SST. To calculate GST, the effect of SST must first be removed from the base. Only then can the effect of GST be added to the taxable output amount. For additional details, refer to Section 4.6.3.

This study does not consider the other types of direct and indirect tax as these are beyond the scope of this research. Some of the crucial variables included in this study are sectoral output, sales, prices, consumption, investment, government revenue, government expenditure, export, import, and GDP.

The researchers employ the CGE mode because it can handle multiple data. Moreover, the model has become a standard tool for empirical economic analysis over the past 25 years. The data are collected from various sources, such as the Malaysian Input-Output Table for 2010, the Malaysian Household Income Survey (HIS) for 2012 and the Household Expenditure Survey (HES) for 2009, Bank Negara Statistics, Balance of Payment 2010, Labor Force Survey 2010, and National Accounts 2010. All collected data are combined to form a consistent benchmark dataset.

This study categorizes the economic sector into 15 main sectors considered to be highly affected by the implementation of GST. Factors of production are mainly divided into labor and capital. Labor is considered the same; there is no difference in terms of area or race. Households are also differentiated into three income groups: lower, middle,

and higher. Therefore, this study is significant because it examines the impact of GST on household welfare. However, it does not attempt to determine the impact of GST on rural and urban household sectors.

1.7 Organization of the Study

This study discusses the impact of GST on the Malaysian economy in terms of sectoral responses, macroeconomic variables, and household welfare. The following is an overview of the study. This thesis is organized into eight chapters, as follows.

Chapter Two provides a brief background of taxation and tax reformation, as well as an overview of GST in Malaysia. Chapter Three outlines three parts: the first section presents the literature on GST, the second section discusses the relationship between taxes and other economic variables, and the third section presents the literature on AGE tax models. The literature review is based on the experience of other countries, the objectives proposed, and the methodology employed, all of which enables the research gaps to be identified based on the literature discussed.

Chapter Four discusses the conceptual and theoretical frameworks, description of the empirical model, basic structure of the CGE model, sources of data collection, and justification and briefly reviews the methodology employed in this study. The standard steps taken to conduct the research with the method employed are outlines. The steps begin with a classification of the sectors, model equations, and the development of CGE modeling. This chapter concludes by providing simulation scenarios.

Chapter Five presents the empirical findings related to Research Question One regarding the sectoral responses to GST. Chapter Six delivers the findings to Research

Question Two on the responses of macroeconomic variables to the implementation of GST. Chapter Seven answers Research Question Three, which concerns the impact of GST on household welfare. Finally, Chapter Eight provides the conclusion and policy implications of the study.

CHAPTER 2: TAXATION IN MALAYSIA

2.1 Introduction

This chapter presents an overview of taxation in Malaysia. It starts with a discussion on tax revenue, including an explanation on the trend of direct and indirect taxes. Then, an overview of tax reformation is provided, and finally, a review of GST in Malaysia is discussed.

2.2 Overview of Tax Revenue in Malaysia

Taxes are classified into two types: direct tax and indirect tax. From the 1960s to 1981, Malaysia relied heavily on indirect tax rather than on direct tax (Bank Negara Malaysia, 2014a). In 1963, the percentage of indirect tax revenue to government revenue was 58.7 percent, more than double that of direct tax. However, this percentage declined to 20.9 percent in 1981. From 1963 to 1981, the contribution of indirect taxes declined. However, its share to the government tax revenue was still larger than that of direct taxes. Table 2.1 shows the share of tax revenue-to-GDP from 1996 to 2015.

Table 2.1: Total Tax Revenue-to-GDP (%)

Year	Tax Revenue	Year	Tax Revenue	Year	Tax Revenue	Year	Tax Revenue
1996	19.38	2001	17.79	2006	14.52	2011	14.79
1997	19.75	2002	17.45	2007	14.30	2012	15.61
1998	16.73	2003	15.50	2008	14.66	2013	15.31
1999	14.09	2004	15.20	2009	14.94	2014	14.84
2000	13.67	2005	14.83	2010	13.33	2015	15.5

The total tax revenue-to-GDP percentages are between 13 and 20 percent from 1996 to 2015. The peak share of tax revenue-to-GDP was in 1996 to 1997 at 19 percent, which then declined until 2000. It again reached a high rate of 17 percent in 2001 to 2002. The years afterwards, the average tax revenue-to-GDP share was at 14 percent, and recently in 2015, it was recorded at 15.5 percent.

In the early 1980s, the contribution of tax revenue to the government changed. Particularly since 1982, direct taxes have contributed immensely to government revenues (Narayanan et al., 2007). The differences in the amount of tax revenue between them widened and were affected by the rapid economic growth in the 1980s and 1990s. The structure of production changed in terms of its contribution, and the growth of the production sector became largely dependent on the manufacturing sector. However, in the late 1980s, the growth of total tax revenue declined because of (i) the fluctuation in the price of petroleum, and (ii) the increase in tax exemption and tax incentives for the private sector to encourage more capital formation in manufacturing industries (Singh, 2002).

In addition, the robust growth of tax revenue in the 1990s was interrupted by the 1997 Asian Financial Crisis. Thus, in 1998, the rate decreased by approximately 2 percent within one year and continued decreasing until 2001. However, the total taxes fluctuated after 2001 until 2012, with the minimum rate recorded at 67.1 percent in 2009, an effect of the global financial crisis. Figure 2.1 shows the government revenue and tax revenue for each of the selected 10-year periods from 1982 to 2012. Figures 2.1 and 2.2 illustrate the increase in amount of all types of taxes, which contributed to the increment in total government revenue as shown by the blue upward line. The biggest revenue comes from direct tax. From 2001 to 2012, the total direct taxes continuously

contributed to half of the government's revenue with an average of 51.45 percent (refer to Appendix A).

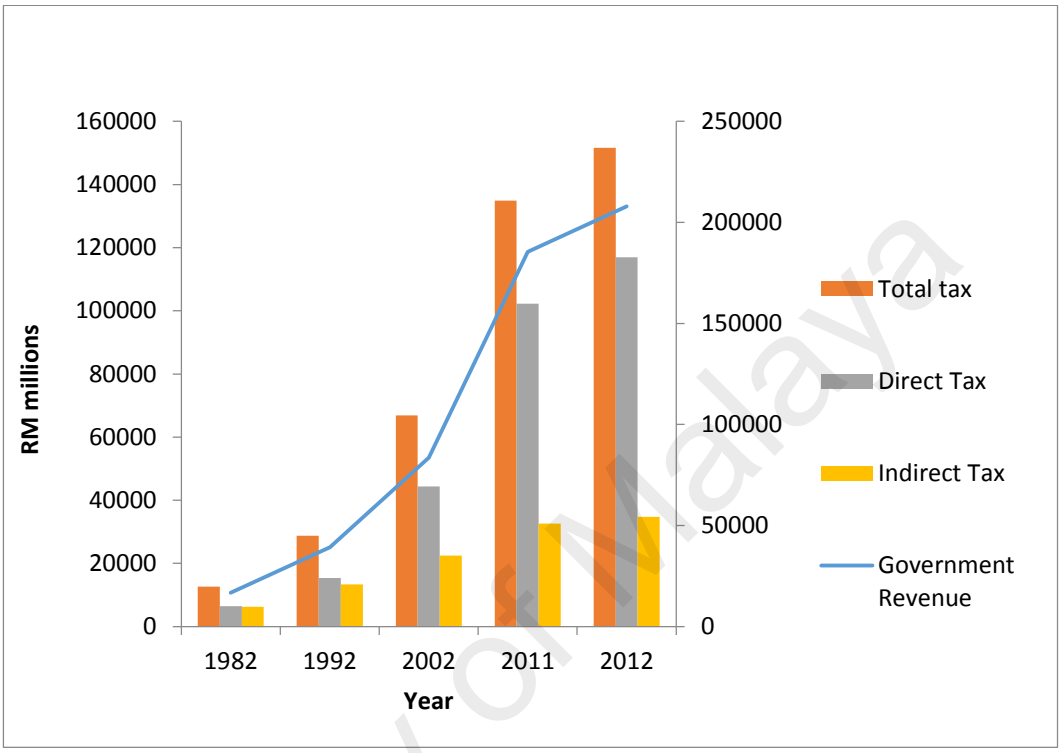

Figure 2.1: Government Revenue and Tax Revenue

Source: Bank Negara Malaysia (2012)

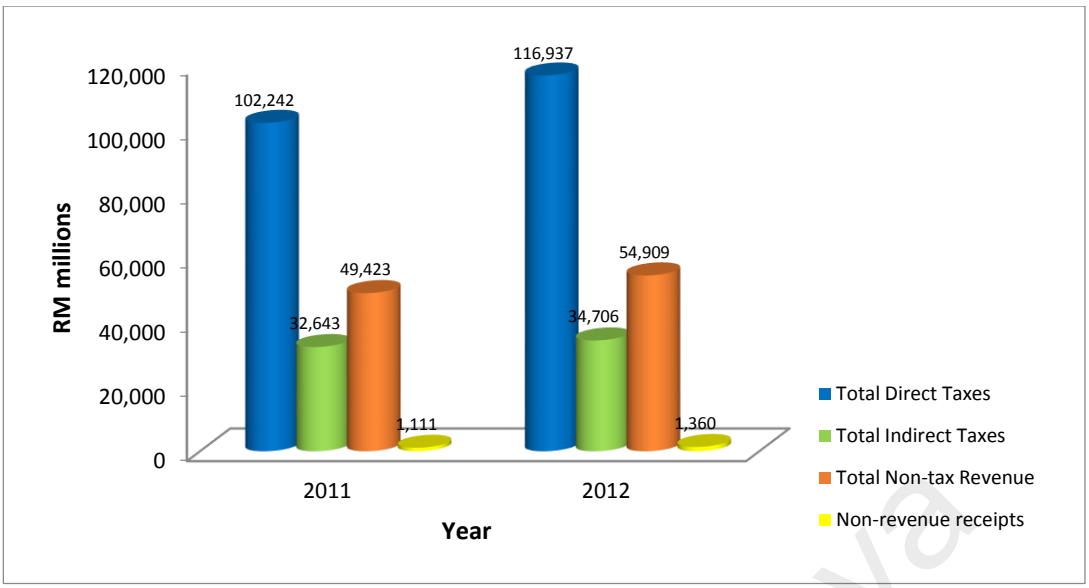

Figure 2.2: Total Government Revenue in 2011–2012

Source: Bank Negara Malaysia (2012)

Figure 2.2 shows that the total government revenue for 2011 was RM185,419 million, total direct tax was RM102,242 million, total indirect tax was RM32,643 million, total non-tax revenue was RM49,423 million, and non-revenue receipts was RM1,111 million. In 2012, the total tax revenue increased by 12.07 percent to RM207,913 million. There was a further increase in the total revenue owing to an increase in direct tax by 14.37 percent (RM116,937 million), total indirect tax by 6.32 percent (RM34,706 million), total non-tax revenue by 11.10 percent (RM54,909 million), and non-revenue receipts by 22.4 percent to (RM1,360 million). The increase in tax revenue is believed to have lowered the government budget deficit and improved economic growth (Vermeend et al., 2008).

2.2.1 Direct Tax

Direct tax is paid directly by an individual or organization to an imposing entity. A taxpayer, for example, pays direct taxes to the government for different purposes, including income tax, corporate tax, petroleum tax, stamp duty, estate duty, real property gains tax, capital gains tax, inheritance tax, and poll tax. In Malaysia, direct taxes are collected by the IRB.

The considerable increase in the number of taxpayers since 1981 caused direct tax contribution in Malaysia to increase upward; the largest amount of direct tax collected was in the 2000s, with more than double the amount of that collected in the 1990s (Bank Negara Malaysia, 2014a). From 1971 to 1980, the collection of direct tax was RM2,348 million; from 1981 to 1990, it was RM7,875 million; from 1991 to 2000, it was RM23,128 million; and from 2001 to 2014, it was RM60,220 million (refer to Appendix B).

In the early 2000s, direct tax collection declined because of the waiving and restructuring of the tax system in 1999 and 2000. The introduction of the Self-Assessment System (SAS)[3] for companies in 2001 had an impact on the reduction of the revenue (Loganathan and Roshaiza, 2007). From 2002 to 2003, direct tax collection dropped by 3 percent for all types of direct taxes, except for petroleum revenue. Among the factors that influenced the drop was the reduction in corporate tax rate from 28 percent to 20 percent. To a certain extent, the war in Iraq and the severe acute respiratory syndrome (SARS) pandemic influenced the growth of the tax revenue as well (Loganathan and Roshaiza, 2007). The introduction of SAS in 2004 for individual

[3] SAS was introduced to upgrade the tax administration and enhance voluntary compliance.

taxpayers partially increased the individual income tax revenue by approximately 13.58 percent in 2006.

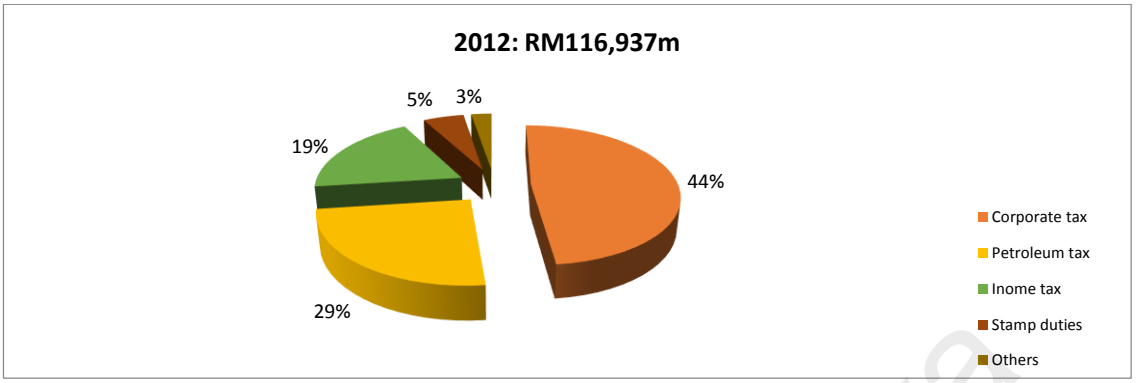

Figure 2.3: Total Direct Tax Revenue in 2012

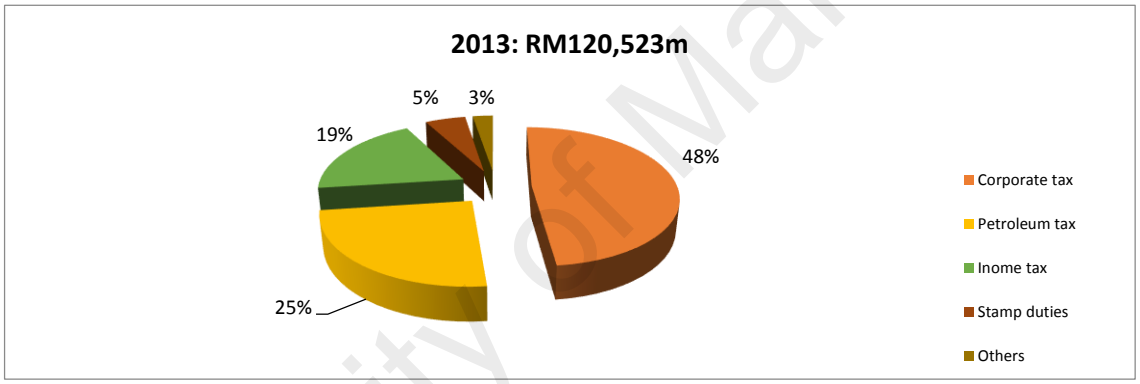

Figure 2.4: Total Direct Tax Revenue in 2013

Source: Bank Negara Malaysia (2012)

Figures 2.3 and 2.4 show the different types of total direct taxes levied in 2012 and 2013 that generated government revenue. Direct tax continued to be a major contributor to the total revenue since 1982. In 2012, corporate tax and petroleum tax contributed about 44 and 29 percent to the total direct taxes, respectively. In 2013, the contribution of corporate tax revenue increased slightly to 48 percent, the petroleum tax contribution to total direct tax reduced to 25 percent, while the other tax contributions remained unchanged.

2.2.1.1 Corporate Tax

Total direct taxes rely heavily on corporate tax. In 1970, corporate tax revenue was RM489 million. In 1990, it increased considerably from RM4,497 million to RM 17,294 million in 1998. However, in 1999, the revenue declined to RM15,742 million and again declined to RM13,905 million in 2000. The reduction in corporate tax revenues was due to the reduction in corporate tax rate from 30 percent, which was imposed before 1996, to 28 percent, which was announced in the 1998 budget. Subsequently, in 2003, the rate of corporate tax was reduced to 20 percent. This led to the decline in corporate tax collection from RM24,642 million in 2002 to RM23,990 million in 2003. In 2009, a substantial reduction in revenue of 19.98 percent occurred, from RM37,741 million in 2008 to RM30,199 million in 2009 (Bank Negara Malaysia, 2014a). The reduction was due to the introduction of the current-year basis of assessment and the SAS. Thereafter, corporate tax revenue continued to increase to RM51,288 million in 2012 and RM58,175 million in 2013. Swire (2007) reported that Malaysia has imposed a higher rate of corporate tax than did other members in the ASEAN.

2.2.1.2 Individual Income Tax

Individual income tax has been collected since the 1960s, with a small tax base rate imposed. In 1985, about 13 percent of the total employment paid income tax. From 1986 to 1998, the number of taxpayers doubled by as much as the increase in population (Chen, 2012). In the 1991 budget speech, the rate of personal income tax was cut to 35 percent for the top rate and to 4 percent for the bottom rate (Narayanan, 1996). The average individual income tax collection from 1992 to 2002 was RM6,429 million, which increased to RM13,901 million from 2003 to 2012 (Bank Negara Malaysia,

2014a). In 2004, individual income tax was liberalized by the introduction of the SAS (Fatt and Khin, 2011). These changes led to a rise in income tax revenue.

2.2.1.3 Petroleum Tax

Petroleum tax revenue is derived from the income from oil and gas industries. In 1979, the petroleum tax revenue was RM829 million. A year later, the contribution amount more than doubled at RM1,736. However, in 1987, the revenue declined by almost half from RM3,072 million in 1986 to RM1,533 million. In 1996-1997, the revenue increased by about 75 percent, from RM2,203 million to RM3,861 million owing to the rise in crude oil prices. Between 2006 and 2012, petroleum tax collection significantly increased from RM20,770 million in 2006 to RM33,934 million in 2012. However, in 2010, revenue dipped to RM18,713 million from RM27,231 million in 2009. Petroleum tax contributed approximately one-third of the total direct tax in the 2000s. The improved performance in revenue was largely due to the higher dividend receipts from Petroliam Nasional Berhad (PETRONAS) that helped the government enhance its development expenditure and reduce other taxes.

2.2.1.4 Stamp Duties and Real Property Gains Tax

Although stamp duties and real property gains tax have not contributed much to direct tax, they have been increasing over the years up to 2012. However, the contribution amount decreased during the Asian Financial Crisis in 1997–1998. The revenue dropped from RM2,714 million to RM1,190 million, an approximate 56 percent decrease. Furthermore, the revenue from stamp duties and real property gains tax decreased from RM1,799 million in 2000 to RM1,650 million in 2001. The reduction was due to the standardization of the rate of stamp duties and the lower

transaction rates for stock and property markets. In 2012, the revenue collected was RM5,595 million.

2.2.2 Indirect Tax

Indirect taxes are those levied on consumers when they buy goods and services. These taxes can be shifted to another person. Sales tax, service tax, export duties, import duties, excise duties, and GST are examples of indirect taxes. In Malaysia, the Royal Customs and Excise Department is responsible for the collection of indirect taxes.

Before 1981, indirect tax was a major contributor to the total tax revenue. However, by 1982 up to the present, direct taxes have been more dominant. The proportion of indirect tax to total tax revenue in 1960 was 76.9 percent, and in 1975, this dropped to 53.2 percent but then slightly increased to 58.2 percent in 1976. In 1977, the tax revenue dropped as the economy began to rely more on industrialization and less on the foreign sector. The contribution of Malaysia's export and import tax revenues has decelerated since 1983 (refer to Appendix C).

Total indirect taxes declined by 33.9 percent from RM23,195 million in 1997 to RM15,321 million in 1998. This drop was related to the financial crisis in 1997. In 1999, tax revenue increased by 18.1 percent as a result of the high petroleum prices and strong economic performance. In 2000, Malaysia has removed the import and excise duties on petrol and petroleum products in line with the ASEAN Free Trade Area (AFTA) requirement.

Consequently, from 1999 to 2000, the contribution of import and excise duties declined by 23.75 and 19.48 percent, respectively. The drop in revenues had a 0.45

percent effect on total indirect tax. The total indirect tax increased from 2007 to 2012, except in 2009. Excise duties have continued to be a major contributor to total indirect tax revenue followed by sales tax. Figures 2.5 and 2.6 show that, in 2012, these taxes generated approximately 35 and 27 percent respectively, to total indirect tax.

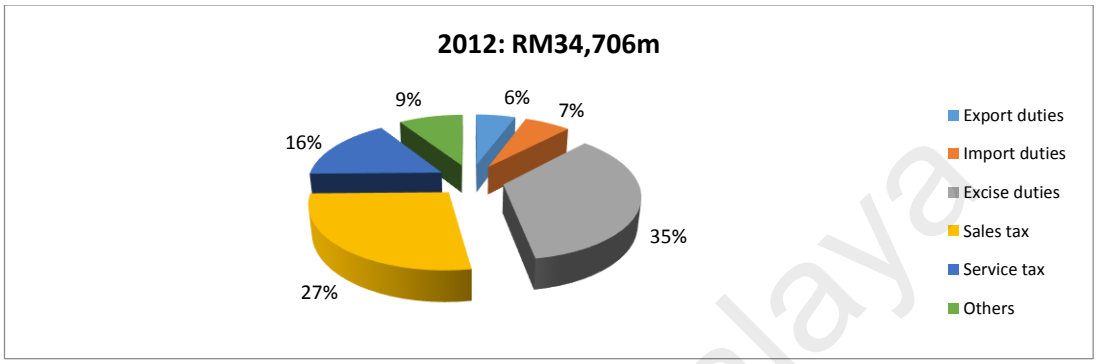

Figure 2.5: Total Indirect Tax Revenue in 2012

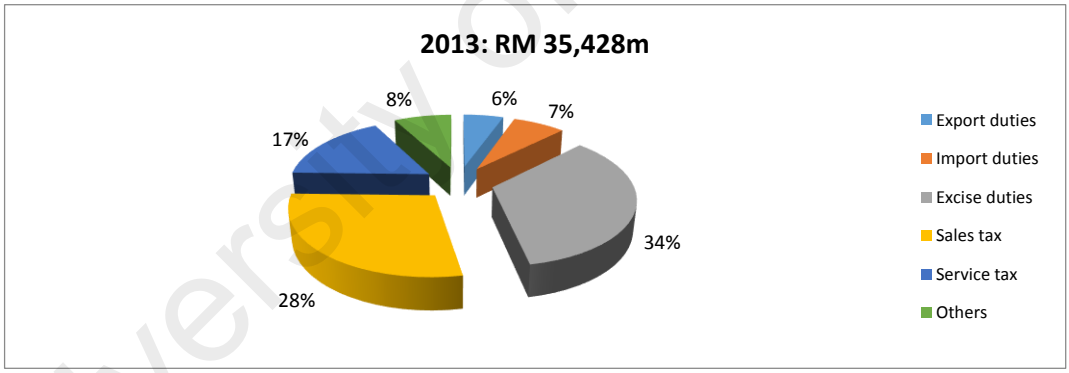

Figure 2.6: Total Indirect Tax Revenue in 2013

Source: Bank Negara Malaysia (2012)

In 2013, revenue from excise duties recorded a slightly decreased contribution of 34 percent. However, sales tax contribution to total indirect tax increased to 28 percent.

2.2.2.1 Excise Duties

In 1970, excise duties were among the lowest contributors to total indirect taxes at approximately 21.5 percent. However, in 2012, excise duties revenue became the largest contributor at 35.1 percent. The increase was due to the high demand for imported vehicles. In 1983, duties on beer, ale, and soft drinks were converted from a fixed rate of RM2 per liter to an ad valorem rate of 85 percent. The revenue contributed was at RM1,361 million. In 1990, excise duty on motor vehicles was raised from 10 percent to 20 percent on motorcycles and to 30 percent on vans. The excise duty rate for cars increased from 5 percent in 1981 to 45 to 60 percent in 1990 depending on the capacity of the cars. This increase led to a rise in domestic prices. In 1995, under the AFTA, duties on kerosene and fuel were abolished. The revenue dropped from RM6,054 million in 1997 to RM3,586 million in 1998. However, the revenue from excise duties increased from RM4,130 million in 2001 to RM12,187 million in 2012.

2.2.2.2 Import Duties

In 1980, the revenue of import duties was RM2,060 million. The average of import duties revenue within the period 1980–1989 was RM2,373 million. From 1990 to 1999, this average continued to increase to RM4,895 million, and from 2000 to 2012, the average of import duties revenue collected reached RM2,904 million. In 1971, the government abolished the tax on sugar. Sugar is a necessary product highly demanded by households. In 1996, import duties for 710 products were reduced, though the reduction did not affect the revenue from import duties. However, in 1998, the contribution declined to RM3,868 million from RM6,524 million in 1997, a drop of approximately 40 percent. In the 2002 budget, the import duty rates of 55 products were reduced and excise duties on 37 products were abolished. Most of the products are related to the tourism sector owing to the government's strategy to expand this tourism

sector. In 2003, import duty collection was RM3,919 million, and in 2004, the revenue was RM3,874 million. However, in 2011, import tax revenue declined to RM2,026 million when the import tax rate was imposed at 25 percent. In 2012, when the import tax rate increased to 30 percent, the revenue collection rose to RM2,282 million.

2.2.2.3 Export Duties

Total indirect taxes are lightly dependent on export duties. The percentage of export duty revenues to total indirect taxes has been inconsistent over the years. In 1980, such revenue was RM2,567 million and its ratio to total indirect taxes was 39.1 percent. The ratio declined to 18.1 percent in 1990, 5.72 percent in 2000, and 5.67 percent in 2002. In 1993, the export duty revenue was RM1,464 million, which decreased to RM1,158 million in 1994 because of the decrease in crude oil prices. In addition, from 1999 to 2000, the collection of export duty revenue generated from petroleum duty increased by 54 percent, comprising more than 90 percent of the total export duties. In 2000 to 2012, the average amount of export duties was RM1,693 million, up from RM1,255 million in 1990 to 1999 because of the higher crude oil exports in the 2000s.

2.2.2.4 Sales Tax

Sales tax has been collected since 1972. The proportion of sales tax to total indirect taxes in 1972 was 8.29 percent. The revenue continued to increase from RM788 million in 1982 to RM1,284 million in 1983. However, the revenue declined from RM1,234 million in 1985 to RM992 million in 1986 (Bank Negara Malaysia, 2014a). In 1997, some products used by lower-income groups were exempted from the sales tax, while some luxury products were taxed at lower rates. Inconsistency in the sales tax collection was affected by an increase in consumption expenditure and changes in market price. From 1999 to 2002, fluctuations in the market prices resulted in a more than double

increase in sales tax revenue, from RM4,488 million to RM9,243 million. In addition, in 2002, rates for all goods were standardized at 10 percent. However, fruits, certain foodstuff, and building materials were rated at 5 percent, and rates for cigarettes, liquor, and other alcoholic drinks were imposed at 15 percent. Collection for sales tax revenue fluctuated from RM7,965 million to RM9,496 million in 2003 before reaching its peak at RM10,068 million in 2013.

2.2.2.5 Service Tax

The service tax revenue contributed RM8 million when it was first launched in 1975. By 1985, the revenue collected had increased to RM107 million. However, in 1986, it decreased to RM60 million and then increased to RM5,583 million in 2012. The rate of service tax imposed doubled from 5 percent in 1975 to 10 percent in 1983. The scope of items, which included services provided by professionals, such as lawyers, engineers, architects, surveyors, consultants, advertising firms, private hospitals, insurance companies, communication companies, hotels, and restaurants, was broadened between 1995 and 1998. However, the government proposed an across-the-board increase in the service tax rate on all taxable services from 5 percent to 6 percent in 2011 (Wong and Partners, 2010). Since 2000, taxable services have covered organizations that deal with spare parts services. The average service tax for the period 1993–2002 was RM1,390 million. The revenue significantly increased to RM3,384 million for the period 2003–2012. This larger amount was derived from the higher usage of services provided particularly by the wholesale and retail trade, hotel and restaurants, transport, storage and communication, and financial services sub-sectors. These sub-sectors gained importance in Malaysia and contributed to its economic growth.

2.3 Overview of Tax Reformation in Malaysia

Malaysia has implemented several adjustments in its tax system over the last 50 years. Tax reforms based on an incremental approach[4], which affect a single tax, have been used in tax modifications. The public sector in Malaysia was huge in the 1970s before the privatization policy was implemented in 1983 under a tax reform strategy. This policy downsized the tax revenue because of certain factors: (1) the government gave tax incentives for investment, reinvestment, export, research and development, labor utilization, manpower training, and other purposes to make corporate investment attractive; (2) export and customs duties to GDP dropped by 3 and 1 percent, respectively, between 1978 and 1988; (3) sales tax improved from 5 percent to 10 percent in 1983; and (4) development taxes on professional, business, and rental income were levied at 5 percent, an additional 5 percent was imposed on profit tax, and numerous individual income surtaxes were applied (Jomo, 2000; Wee, 2006; Nik Rosnah, 2010).

Malaysia fell into deep recession in 1984–1986. The economic crisis caused the downfall of primary industries and affected tax revenue collection, especially of export and import tax revenues. Excise duty collection also dropped. However, the reduction in the amount of excise duties in 1982 was due to the application of specific, rather than ad valorem, levy taxes. Other smaller tax sources and petroleum revenues were introduced to compensate for the dwindling collection of excise duty revenue. In 1984, the former Finance Minister, Tun Daim Zainuddin, recommended that individual income tax rates be reduced for all taxpayers the following year by decreasing the taxable income brackets from 12 percent to 9 percent (Narayanan, 1996). From the initial 6 percent to

[4] This approach is mostly focused on a predetermined target.

55 percent, marginal tax rates (MTRs) were reduced to 5 percent to 40 percent. In the 1991 budget, the range of MTRs was likewise further reduced to 4 percent to 35 percent. The rate of corporate tax was reduced from 40 percent to 35 percent.

In 1986, the government reduced corporate tax to attract new investors, encourage investment for existing businesses, and promote economic growth. This policy was crucial because the government and private sector were working together to achieve economic growth. In addition, the Promotion of Investment Act 1986 provided a number of schemes for tax relief, including exemption from taxes on imported raw materials and machinery and tax breaks for big companies that purchase inputs from small firms (Narayanan, 1996). These fiscal adjustments affected direct tax and other government revenues, which expanded at 7.07 percent per year from 1984 to 1991. Most of the revenue was largely contributed by the oil and gas sector. In 1990, the abolishment of development tax on companies started with a 1 percent reduction (Narayanan, 1996). The economic condition in 1987–1990 indicated a growth in GDP, which recovered to 5.2 percent in 1987 and climbed up to 9.7 percent in 1990 after its negative growth in 1985. In 1990, two deficits, namely, budget deficit and current account deficit, rose at 5 and 4.1 percent, respectively (Narayanan, 1996).

Government revenue declined for the first time in 30 years in 1986–1987[5], mainly due to the decline in petroleum prices, which somehow contributed to the government budget deficit in 1984–1985 (Narayanan, 1996). The over-reliance on petroleum-led taxes seemed detrimental to the government's financial condition. On one hand, tax exemption and incentives given to the private sector affected the amount of revenue

[5] 5th Malaysian Plan

collection. On the other hand, these policies encouraged the corporate sector to increase their investments (Singh, 1992). The policies indicated that the government was reducing its dependency on direct and non-oil commodity taxes for revenue. These developments showed the reformation of the tax system and were quite successful in promoting sustainable economic growth.

The initiative to concentrate on the contribution of consumption taxes to government revenue commenced in early 1988, when then-minister Tun Daim highlighted the importance of further considering the inclusion of VAT in the tax system (Narayanan, 1996). Although the recommendation of a broad-based VAT was designed, the implementation was put on hold. In 1993, the government implemented the sales tax and services tax into a single broad-based tax on consumption. In addition, the government cut the top rates for income and corporate taxes from 35 percent to 34 percent. In 1995, both taxes were further reduced to 30 percent to maintain Malaysia's competitiveness among its ASEAN neighbors. In addition, the budget abolished or lowered import duties for more than 600 products, particularly consumption goods, and another additional 2,600 products in the 1995 budget (Narayanan, 1996). However, no major tax effort was implemented apart from the improved import and excise duties on tobacco and alcoholic products and the widening of the service tax base in the 1992 and 1993 budgets (Narayanan, 1996). In 1994, direct tax collection dropped due to various tax reliefs offered.

Malaysia, as with other countries, has been affected by the Asian Financial Crisis in 1997, and one of the economic recovery policies that the government implemented was tax reformation. Under the new initiative tax reform in 1999, the government planned to be less dependent on indirect tax. In 2000, the collection of tax revenue fell owing to the

restructuring of the tax system and the exemptions given under income tax in 1999. However, the federal government tax revenue recorded an increase in amount from 2001 to 2005[6] that was mainly contributed by direct tax. Direct tax has been a huge contributor to tax revenue since 2001, partly due to the increase in the number of taxpayers, the introduction of SAS, and rising oil price (Asian Development Bank, 2006; Loganathan and Roshaiza, 2007). A small decrease in export duties revenue related to marginal decline in exports occurred.

In 2002, under the Pre-emptive Stimulus Package[7], the government designed and implemented policies and strategies to minimize the negative impact of the external recession. The policies included alteration of corporate tax with (1) 70 percent exemption for pioneer status and (2) increased exemption from 10 percent to 20 percent for promoting the export of local products (Bernardi, Fraschini, & Shome, 2007). Compared to 2002, direct tax collection dropped by 3.39 percent in 2003 for all types of direct taxes, except for petroleum revenue. Among the factors that influenced this trend was the reduction of corporate tax rate from 28 percent in 1999[8] to 20 percent in 2002. This reduction was also influenced by the effect of the war in Iraq and of SARS in 2003 (Bernardi et al., 2007; Roshaiza and Loganathan, 2008).

In 2004, the SAS was implemented on personal income taxpayers, thus raising individual income tax revenue (Choong and Edward, 2011; Loganathan and Roshaiza, 2007). The following year, the higher revenue gained from petroleum taxes and dividend payments from the state-run oil company helped the government increase

[6] 8th Malaysian Plan
[7] The Stimulus Package also contains some relevant fiscal measures to improve investment.
[8] From 1998 to 2006, the government maintained the corporate tax rate at 28 percent. In the 2007 budget, this rate was reduced to 26 percent and then to 25 percent in 2009. The corporate tax rate has been at 25 percent since then.

development spending and reduce the imposition of taxation. The Malaysian government relied heavily on the oil and gas industries, from which the amount collected reached RM14,566 million (Loganathan and Roshaiza, 2007). Furthermore, several tax modifications were introduced: (1) individual income tax was liberalized by the introduction of the SAS in 2004 (Fatt and Khin, 2011), (2) corporate tax rate increased from 20 percent in 2002 to 25 percent in 2009 owing to the introduction of the current-year basis of SAS, (3) sales tax rates increased from 8 percent to 10 percent in 2002, and (4) import duty rates increased from 25 percent to 30 percent in 2012.

In 2010, under the New Economic Model, Prime Minister Najib Razak recommended a number of reforms to increase government revenues. The key component of the reforms was a wider tax base; therefore, GST was introduced as Malaysia's new tax system[9]. The reasons for a more diversified tax base were to reduce reliance on (1) income tax, which increased from 56.4 percent in 2012 to 58 percent in 2013; and (2) petroleum revenue, which decreased from 32.6 percent in 2012 to 30.6 percent in 2013; such changes aimed to encourage and stimulate individual incomes and firm profits by lowering both rates (Siti Halimah, 2014; Tan, 2012; Wan, 2013). Therefore, the plan was announced to realize the complete implementation of GST on 1 April 2015 (GST Malaysia, 2014).

2.4 Overview of GST in Malaysia

GST replaced the existing SST. The former sales tax, which imposed rates of 5 percent to 10 percent and services tax at 6 percent, was converted to GST at a rate of 6 percent. With the conversion of the current consumption tax of SST, GST was expected to avoid the occurrence of unpredictable economic situations. The GST system has

[9] Previously referred to as VAT

proven to be the most stable type of revenue (Ahmad, 2014). Evidence from the United Kingdom indicates that GST is the most successful tax system on the basis of feedback from citizens and businesses (Webb, 2014).

Since 1982, the Malaysian tax revenue has been dependent on direct taxes (Narayanan et al., 2007). The percentage of tax revenue-to-GDP was 15.5 percent in 2015. However, the government introduced the GST to increase revenue from indirect taxes and make it a major revenue source for the country. The reasons behind these reforms are as follows: (1) indirect taxes offer a broader aim because they cover the entire population, as opposed to direct taxes, which merely concentrate on fixed-income earners; and (2) the switch to indirect taxes could widen the base and minimize the burden on those who are employed, especially for countries challenged by an aging population (Bond and Hughes, 2013).

The adoption of GST can enlarge revenue productivity and provide flexibility as an instrument of taxation (Ismail, 1988). If GST is implemented, then the budget deficit will be the main issue to overcome (Lim and Ooi, 2013; Nor Hafizah and Azleen, 2013; Mohd Rizal and Mohd Adha, 2011; Amanuddin et al., 2014; Singh, 2014). However, this reasoning was opposed by Hussain (2014), who stated that GST is not being introduced because of the country's deficit but is levied instead because of weaknesses in the current SST.

Indeed, Malaysia has been trapped in a budget deficit for more than 15 years. In 2009, the deficit accounted for 7 percent of the GDP. As of 2015, this deficit was expected to be reduced to 3 percent of the GDP (Lau et al., 2013; Saira et al., 2010). In the second quarter of 2013, Malaysia's current account surplus decreased to RM2.6

billion (Liau, 2013). Malaysia aimed to avoid a twin deficit similar to what happened in other emerging countries, such as India and Indonesia. Therefore, it attempted to counter the problem by proposing to widen the tax base though the replacement of SST with GST, which would reduce irrelevant government spending and strengthen the government income (Lau et al., 2013; Saira et al., 2010).

The chronology for the introduction of GST started 30 years ago, given that the government has proposed its introduction on various occasions. However, the implementation was postponed several times. Malaysia's GST model was developed over 10 years ago, with the first steps taken in 1983 when Malaysia sent a research team to South Korea to study the potential of GST (Wan, 2013). Subsequently, in the 1989 budget, GST was announced by former Minister of Finance Tun Daim Zainuddin to determine whether it would be the best choice for the country. GST was implemented to compensate for the loss of government revenue because of the reduction in the amount of direct taxes; however, this plan was deferred (Lau et al., 2013; Narayanan et al., 2007). In the 1993 budget, GST was announced for the second time by former Finance Minister Dato' Seri Anwar Ibrahim but was later deferred (Wan, 2013).

After more than 10 years' of deferring GST, on 10 September 2004, Dato' Seri Abdullah bin Ahmad Badawi included GST in the 2005 budget. Malaysia sent a team to visit Australia, New Zealand, and Indonesia to study GST mechanisms. However, on 22 February 2006, the implementation of GST was again postponed to 1 January 2007 to provide enough time for businesses and manufacturers to undergo business restructuring, system development, and staff training (Nor Hafizah and Azleen, 2013; Wan, 2013).

Once again, on 24 November 2009, the GST Bill was read in the parliament and Dewan Rakyat as a step to develop a more effective, efficient, and sustainable taxation system. However, in April 2010, the postponement of GST was again announced for two reasons: (i) to ensure the law was ready and (ii) to obtain feedback from the people (Amanuddin et al., 2014; Wan, 2013). Under the New Economic Model in 2010, the sixth prime minister recommended a tax reform to enhance the revenue of Malaysia (The Performance Management and Delivery Unit, 2013, p. 13). The key component of the reform was broadening the tax base with the introduction of GST. The reasons for a more diversified tax base were to reduce reliance on (i) income tax, which in 2012 and 2013 accounted for 56.4 and 58 percent, respectively; and (ii) petroleum revenue, which in 2012 and 2013 accounted for 32.6 and 30.6, respectively. Lowering both rates were intended to encourage and stimulate individual incomes and firm profits (Siti Halimah, 2014; Tan, 2012; Wan, 2013).

Finally, in the 2014 budget, Datuk Seri Najib Tun Razak, the current Prime Minister, recommended GST at 6 percent starting from 1 April 2015 (GST Malaysia, 2014; The Star, 2013). The GST model Malaysia has chosen comprises three types of tax mechanisms: (i) standard-rated, (ii) zero-rated, and (iii) exemptions. This model was used to alleviate and mitigate the impact of GST on lower-income groups (Faizulnudin, 2012; Ruebling, 1973; Tholasy, 2012). However, in the current thesis, the author assumes that all goods and services are taxable products. For further details, refer to Section 4.6.3.

2.5 Summary

This chapter provides an overview of the Malaysian taxation system. The discussion includes the tax revenue collected by the government from direct and indirect taxes and

shows that direct taxes are the largest contributor to government revenues. A historical background of tax reformation that began in the 1960s and a chronology of GST proposal and implementation that commenced 30 years ago follow the discussion.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

This chapter reviews past studies on taxation that are relevant to this research. Most of the reviews are based on countries that have implemented GST. The literature review is essentially based on what is depicted in Figure 3.1. We will discuss the impact of GST on specific economic variables used in the analysis of this thesis.

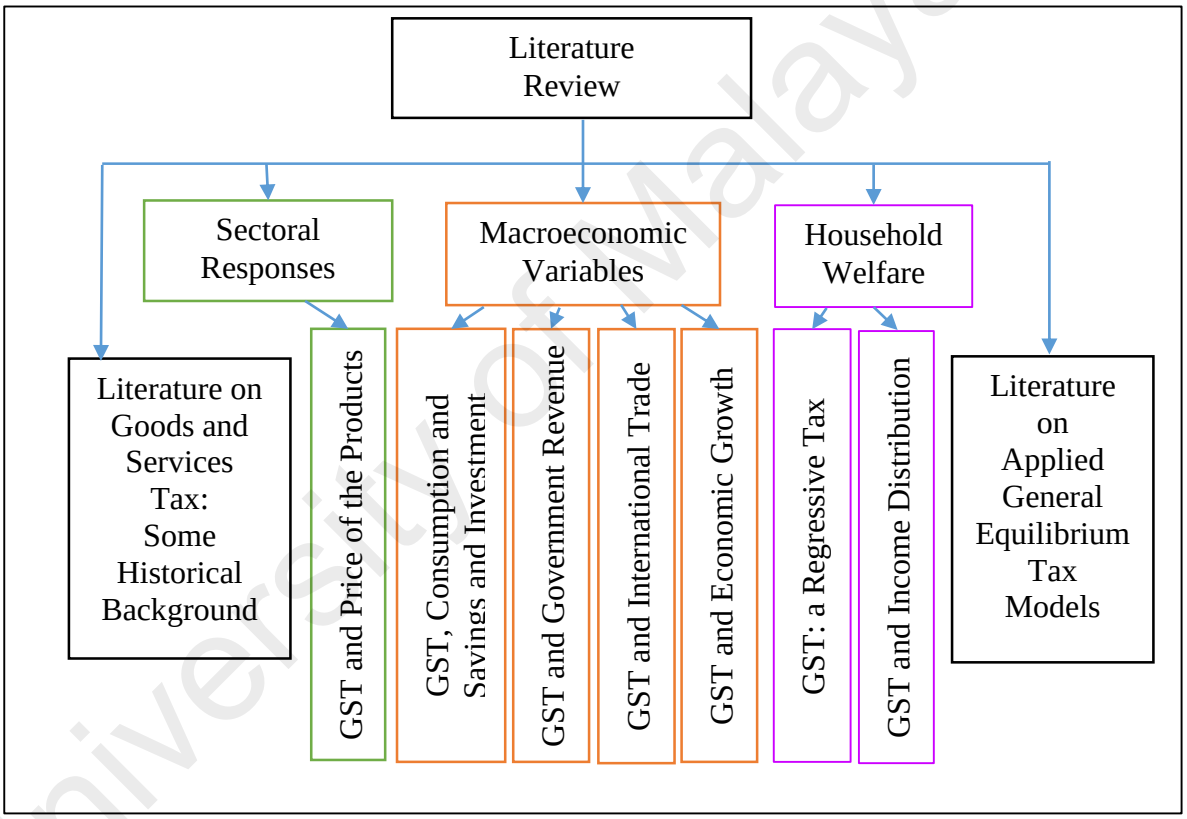

Figure 3.1: Overview of Topics Discussed in this Chapter

3.2 GST: A Historical Background

GST is a consumption tax that is also known in certain countries as VAT. It has been an important fiscal tool since the 1950s (Goode, 1984) and, to date, has been adopted by more than 160 countries around the world. Such prevalent adoption shows that GST is well accepted as a significant tax tool, which is not surprising as it is backed by

influential international bodies such as the IMF. Numerous prominent public finance specialists (Narayanan, 1991) also recommend GST to countries that have not yet considered it.

VAT was first proposed in 1918 in Germany, but France was the first to implement it in 1954, followed in 1967 by Denmark, which imposed a 10 percent rate. From 1967 onwards, the tax was introduced to the rest of the European countries. In 1968, the multistage sales tax was replaced by VAT at a rate of 10 percent for normal goods and 5 percent for foodstuff and agricultural products in certain countries in Europe.

Sweden, the Netherlands, and Belgium shared the same tax structure whereby they use a complicated cascade tax. In Belgium, VAT rates were proposed at 6 percent for basic foodstuff, followed by varieties of luxury goods (in accordance to ranking) at 18, 23, and 25 percent, respectively. The Netherlands did not change directly to VAT but moved to wholesale stage tax. In another case, New Zealand replaced its wholesale tax with VAT in 1986 and imposed tax at 15 percent.

Several Caribbean countries have considered adopting GST, and Libya, Syria, and the United Arab Emirates are also planning to do the same (Keen and Lockwood, 2010). Generally, most countries experienced a rise in VAT rate when they changed from the smallest to the biggest rate. However, four countries, namely, Argentina, Chile, Costa Rica, and Peru, had lower standard rates for VAT. In another case, several countries started with a single tax rate, then moved to double tax rates, and finally converted to a single rate, as in the case of the United Kingdom. In addition, Italy and Belgium attempted to reduce their VAT rates. Table 3.1 shows the countries and their adopted GST rates in 2013.

Table 3.1: Selected Countries and their GST/VAT Rates in 2013

Country	Rate (%)
Sweden	25.0
Denmark	25.0
France	19.6
Germany	19.0
New Zealand	15.0
Australia	10.0
Indonesia	10.0
Singapore	7.0
Japan	5.0
Taiwan	5.0

Source: Royal Malaysian Customs Department (2013)

In Asia, the first three countries to introduce GST were Republic of Korea in 1977 with an imposed rate of 10 percent, Indonesia in 1985, and Taiwan in 1986. To date, almost all ASEAN countries have opted for GST. Only Brunei and Myanmar are the remaining members of ASEAN that have yet to consider the imposition of GST.

3.2.1 Review of Literature on GST in Malaysia

Most studies focused on exploring the level of awareness among consumers and producers with respect to the implementation of GST. Saira et al. (2010) examined Malaysian awareness on GST implementation and collected data through a questionnaire-based survey. Most of the respondents have degree qualifications, and almost half (46 percent) earn RM4000 and above, while 23 percent earn RM2000-RM3000 monthly. From the findings, the authors highlighted that the level of awareness among Malaysians is relatively low, which might be due to their lack of knowledge

regarding GST. As a result, most of the respondents disagree with the implementation of GST.

Rizal and Adha (2011) gave an overview of consumers' readiness, perceptions, and acceptance of GST. They analyzed the potential consumption behavior of households as GST is implemented. They applied a structured survey among the middle-income group, whose monthly income is RM2000-RM4000. The respondents were randomly selected from the government or from private sectors in Kuala Lumpur. The study highlighted that the majority of the respondents were not satisfied with the information provided by the government about GST implementation. Most of them were also not ready to support GST. They were worried about the price hikes and increases in the cost of living. Additionally, the study suggested that 64 percent of the respondents will spend the same portion but with prudent consideration because of the implementation of GST.

Amanuddin et al. (2014) also studied the level of awareness on GST implementation. The respondents were teachers in Universiti Tenaga Nasional and Politeknik in Bandar Muadzam Shah in Pahang. A total of 244 respondents were involved in this survey. The findings reveal that most of the respondents have a low level of awareness on GST but were moderately accepting of GST implementation. The study suggested that people are not ready for GST implementation because of the unclear and insufficient information provided by the government. This result is supported by Saira et al. (2010).

In addition to the study on the level of awareness concerning GST implementation in Malaysia, a study was also conducted on the impact of GST. Lau, Tam, and Heng-Contaxis (2013) studied the impact of GST implementation in Malaysia. They analyzed

the impact based on their review of the Malaysian economic situation and other related studies. From the analysis, they found three impacts of GST on the economy. The first impact is on growth. They found that if the government shifts taxes on income to taxes on consumption, then excess revenue will be gained. This revenue will be used to reduce the budget deficit, which, in turn, will increase investors' confidence in the ability of the government to raise revenue and cope with unexpected downtime in the global economy. GST also has an immediate impact on short-term growth, which will decline before households adjust their consumption behavior.

The second impact is on inflation. Lau, Tam, and Heng-Contaxis (2013) stated that the cost of doing business drops because tax on non-capital inputs is claimable. Poor and rural households are more affected by price changes. They tend to substitute basic necessities and goods to adjust their consumption patterns as price hikes. Middle- and high-income earners are better at managing inflation because they already are using most of the goods and services subjected to SST.

The third impact is on equity and socio-economic development. Lau, Tam, and Heng-Contaxis (2013) found that the poor are adversely affected by price shocks and are highly sensitive to income fluctuation. In addition, they have little savings because most of their income share is spent on essential goods. Without savings, they will face difficulties in accumulating assets and having access to education.

Aside from the above research, only one other study was conducted on GST incidence in Malaysia, that of Lim and Ooi (2013) from Penang Institute. The authors examined the impact of GST in Malaysia, applied data from HES in 2009, and used descriptive analysis for their study. For the findings, they listed seven key points. One,

GST is a regressive tax. Two, making GST a progressive tax and reducing the burden of GST on low- and middle-income earners are impossible if the same amount of tax revenue needs to be increased. Three, households that pay high GST rates are those of single persons, the young, Bumiputera, in Peninsular Malaysia, working as clerical workers, and skilled agricultural and fishery workers. Four, those who will contribute higher amounts of GST in revenue are the big spending, large households, such as Chinese-led and those of legislators, senior officials, managers, and professionals. Five, a GST rate of 7 percent will increase tax revenue to RM7.5 billion annually. Six, inflation rate will spike up to 3.86 percent after GST implementation. Seven, the spending power of households will decrease and slow the economic growth.

3.3 Review of the Taxes and their Relation to Other Economic Variables

A number of studies have explored the impact of GST on various economic aspects. This sub-section reviews the impact of GST implementation in other countries in which the general equilibrium model and other methods of estimations were applied.

3.3.1 GST and Sectoral Responses

In this sub-section topic, we discuss GST and its relation to product prices. Generally, tax will reduce the consumption expenditure of households and affects their daily expenses. Consumption, as a proportion of income, is positively correlated with income and negatively correlated with price, particularly for normal goods. Narayanan (1991) noted that price level will increase as GST replaces existing sales tax and brings larger revenue to the countries owing to its broadened base and increased rate. However, such outcome will depend solely on elasticity from either the demand or supply side. Several studies show that GST does not have considerable effect on price level. A study on 22 developed and 14 developing countries found that the impact of

GST on price had little effect on the CPI. However, price was permanently increased and affected by increasing or imposing GST as reported in eight cases of the study, where four of the cases were developing countries (Narayanan, 1991). For instance, in the case of the UK, Pike, Lewis, and Turner (2009) examined the impact on CPI of VAT rate deduction from 17.5 percent to 15 percent (on 1 December 2008). They found that the price was reduced by 0.5 percent after VAT implementation.

In Fiji, the government imposed and increased the GST rate to 25 percent in 2003. The analysis based on the CGE model revealed that the impact of the 25 percent rate was a 1.3 percent increase in CPI, which reduced real consumption expenditure and the national welfare (Narayan, 2003). In the case of the tourism sector, the GST had a strong effect on the price level and disrupted the tourism sector at the district/state level.

Kusumanto (1989) examined the VAT cases in Indonesia. Her analysis showed that the implementation of VAT resulted in little change in relative prices. When the government replaced sales tax with VAT, the tax reduced the relative prices of agricultural, food, beverage, and textile products. However, it increased the prices of other products and the wage rates of labor across all industries. With respect to the income distribution, VAT significantly increased income of all categories of household groups except for urban workers. This outcome was due to the increase in average wage rates for all labor categories. Tax also increased the income of urban middle-income households more than those involved in the agricultural sector or households in rural area.

Gábriel and Reiff (2006) analyzed the impact of changes of VAT rates in Hungary on the prices of products and services. The analysis was based on the reduction of VAT

rates from January 2004 to January 2006. Their findings showed that the effect of changing VAT rates did not have an immediate impact on prices. The effect took a few months to produce results. The findings showed that the cut in VAT rate resulted in minimal reduction in consumer price. However, the policy increased firm profit marginally. The percentage changes are less significant compared to changes in VAT rates.

The market view or market sentiment indicates that the future price will increase if the rate of VAT increases. Christandl, Fetchenhauer, & Hoelzl (2010) analyzed the perception of price changes when VAT increased in Germany. The study looked at price estimates made by consumers two months before and after the increase in VAT rate. The analysis used a panel design, in which 303 participants estimated the current prices of four selected products subjected to VAT and another four products not subjected to VAT. The participants anticipated the prices of these products. The findings showed that before VAT increase, the future price was anticipated to increase. However, after the rate increased, the increase in price was significantly higher than the official price announcement.

Smart and Bird (2009) studied the effect of tax replacement, i.e., retail sales tax (RST) replaced by GST, in 1997 in the provinces of Ontario and British Colombia in Canada. They applied an autoregressive model to estimate the effect of tax reform on consumer price. Their results were quite similar to those in Narayanan (1991), in which few changes were observed in the price level when GST took over RST. In fact, most of the prices decreased though in a small rate, except for necessary goods such as shelter, clothing, and footwear. The income distribution of the country has not changed much as well.

Imposing taxes will broaden the tax base and increase the price level (Renata and Sabina, 2010; Narayanan, 1991; Smart and Bird, 2009). Most of the studies conducted suggest that the introduction of GST or increase of GST rate may not increase a general price level. The studies show that the collection revenue of GST for a country implementing the tax may be neutral. However, this situation is not fully guaranteed because the authority has to ensure that the distortion will not have additional effects on the economy (Narayanan, 1991).

3.3.2 GST and Macroeconomic Variables

This sub-section will discuss the relationship between GST and macroeconomic variables, namely, consumption, savings, investment, government revenue, trade, and economic growth.

3.3.2.1 Relationship among GST and Consumption, Savings, and Investment

GST will affect manufacturers in the process of production, which will, in turn, negatively influence the amount of investment (Summer, 1981). Investment is crucial to firm performance as it can help increase productivity and enlarge production. It is one of the main factors in the increasing scale of production and economic growth of a country (Dahmardeh, Shahraki, & Ghaderi, 2012).

James Tobin discussed the relationship between tax and investment in his theory, known as Tobin's Q-theory (1969). The theory states that tax affects a firm in terms of the amount of investment. The correlation between tax and investment is negative (Summer, 1981). Empirically, the relationship between tax rates and investment is difficult to determine. Other factors besides taxes can affect the capital stock, such as the expected future marginal product of capital and real interest rates. However, we can

assume that a change in investment is the result of changes in the tax rate rather than other factors. Companies will respond differently once a government imposes a tax. When aggregate investment is low, the government introduces tax cuts. The tax is imposed based on the types of capital investment and the degree of investment. If capital investment is high and above the threshold set by the government, the company may receive higher resale value.

Cummins, Hassett, and Hubbard (1996) found stronger effects of tax changes on fixed investment in 14 OECD countries. Investment elasticity was -0.66, which means that a tax reduction of 10 percent will raise aggregate investment by approximately 6.6 percent. Corporate investments generally respond to tax changes. Thus, an effective tax rate significantly affects investment.

In 1994, the United Kingdom introduced VAT in the energy sector at 8 percent rate, which then increased to 17.5 percent in 1995. Before the implementation, energy and other essential goods were zero-rated, but increasing tax revenues were needed to reduce the budget deficit. Crawford, Smith, and Webb (1993) evaluated the impact of VAT introduction on household consumption expenditure. Their simulation examined the impact of VAT on 7000 households and applied an econometric model to determine the effect of price changes on household spending. Findings showed that higher energy prices led to lower consumption. Poorer households reduced their spending on energy by 9 percent, while the richest only reduced their consumption by 1 percent. In addition, the lower-income households raised their consumption share in their total income. Blundell (2009) analyzed the impact of around 75 percent VAT decrease on consumption in the UK. With the tax reduction, consumers maintained their expenditure levels, though the demand for consumption goods increased. The demand for goods

depends on the economic situation; demand will be higher if the economic condition is better compared to an economy in recession.

In the UK, Swenson (1994) examined the relationship between taxes and foreign direct investment. He utilized data from the 1980s for the complete tax historical past. The study considered all kinds of business categories and identified the tax response to exchange rate changes. The data showed that tax rise increased investment outflow. Foreign investors reacted significantly to a country's tax policy and tax reform on pre-tax asset returns. This finding likewise suggested that average tax rates can generally be the best proxy of tax effects rather than effective tax rates. Abel (1982) examined the linkages between tax policy and investment and reported that two policy changes in tax policy on permanent and temporary investment will exert a dynamic effect on investment. His study incorporated Hall and Jorgenson's framework of tax policy analysis into a dynamic optimizing model. The model was modified by including adjusted costs to produce a q model[10] of investment. Abel (1982) found that the dynamic effects of temporary tax policies in a q model of investment are less compared that those of a permanent investment.

Andrikopoulos, Brox, and Georgakopoulos (1993) examined the short-run effects of VAT in Greece. They studied the effect of VAT on CPI, commodity prices, and consumption patterns and applied the static almost ideal demand system (AIDS) to estimate 13 commodity group data involved from 1958 to 1986. The model was simulated for the post-VAT period using the FIML approach. From the findings, VAT

[10] This model represents the ratio of the market value of a firm's existing shares of capital to the replacement cost of the firm's physical assets.

implementation changed the structure of demand and prices, raised the overall CPI, and improved the consumption allocation of goods and services.

In China (PRC), the impact of GST on investment is quite different compared to the aforementioned studies. In 2004, China introduced the VAT reform to replace the existing production-type VAT. The study applied the difference-to-differences method for manufacturing enterprises in China. Based on the findings, Nie, Fang, and Li (2010) revealed that the increase in investment in firms subsequently promoted labor productivity and improved industrial structures.

In a study examining the impact of GST on consumption in China, Zhai and He (2008) evaluated the impact of introducing consumption-based VAT on consumers in three provinces of northeast China. The new tax system is consumption-based VAT, which is a shift from the old system of production-based VAT. Zhai and He conducted research to ascertain the macroeconomic and welfare effects of the changes in VAT type. The analysis applied the dynamic general equilibrium model. Their findings showed that consumption-based VAT will give large macroeconomic and welfare gains to the people.

Kusumanto (1989) examined the impact of VAT on consumption in Indonesia. The study revealed little change occurred in the relative price when VAT was implemented. VAT had mixed impact on consumption demands for commodities. Moreover, it increased the demand for food and beverages while reducing the demand for food agriculture products, traded agriculture products, and services. Vermeend et al. (2008) analyzed the impact of VAT on macroeconomic and sectoral cases in Vietnam when there were changes in tax structures. The new tax system imposed a single VAT rate

and removed exemptions on taxable goods and services. The analysis utilized 2005 input–output data and estimated the data by using the general equilibrium model. Based on their analysis, a single rate of VAT actually raises private real consumption.

A study was conducted in Colombia to evaluate the impact of an increase in VAT rates on labor/households. Hernández (2012) divided labor into formal and informal and applied the 2005 Social Accounting Matrix (SAM) database and the MEGATAX model for analysis. Effective tax rate data were used instead of normal rates. The results showed that VAT negatively affected output and private consumption. Mwega (1985) analyzed the introduction of VAT in Kenya. He applied a CGE model that assumed labors are mobile and can choose to work in other sectors to take advantage of wage differentials. The analysis indicated that the implementation of VAT has led to a net increase of total demand and output. However, it resulted in a decline in agricultural output but an increase in manufacturing output.

In his thesis, Ricardo stated that a tax cut with no change in government purchases does not really benefit consumers. Any reduction in taxes today is balanced by tax increases in the future. Therefore, consumers have no reason to respond to tax cuts by changing their desired consumption. Although the logic of the Ricardian equivalence proposition is sound, many economists question whether it makes sense in practice. Most skeptics argue that, even though the proposition predicts consumers will not increase consumption when taxes are cut, in reality, lower current taxes will likely lead to an increase in the desired consumption and a decline in the desired national savings (Abel et al., 2013). Hence, Ricardo's argument may not reflect the real world and is subjected to criticism and analytical verification. However, the impact of GST or VAT

on consumption or household income is real. The impact, whether significant or not, largely depends on the rate of GST or VAT imposed by the government.

3.3.2.2 Relationship between the GST and Government Revenue

Expansionary or contractionary fiscal policy is determined by government revenue and expenditure allocation, as well as the policy objective in a particular year. Regardless of the policy chosen for implementation, the ultimate goal is to overcome inflation and unemployment problems and ensure economic growth at a stable rate in the country. However, tax will directly affect government revenue, which will indirectly change government policy. A number of studies found a strong positive relationship between GST and government revenue (Jangra and Narwal, 2014).

Engel, Galetovic, and Raddatz (2001) analyzed the relationship between government spending and tax evasion in Chile. Tax evasion is difficult to estimate because of the unavailability of data. To estimate the impact of changes in spending, tax revenues can be represented by tax evasion data. The study found that VAT revenues will increase by US$31, if US$1 is added to spending. In the same vein, tax evasion can be reduced from its current rate of 23 percent to 20 percent if a 10 percent increase is made in enforcement spending. Pagan, Soydemir, and Tijerina-Guajardo (2001) investigated the impact of GST rate increase from 10 percent to 15 percent in Mexico. The Mexican government increased the rate of GST owing to the Mexican Peso crisis in 1994. The study estimated the model by using impulse response and variance decomposition methods and revealed that government revenue increased due to the increment in GST rate.

Robinson, Kilkenny, and Hanson (1990) investigated the impact of tax reform, i.e., VAT implementation in Iran. Using CGE modeling and data based on an input-output table and the national account, they simulated the impact of VAT on the Iranian economy if the rate increases to 3, 4, and 10 percent. They found that if the government increases the VAT rate, then government revenue will increase. However, as rate increases, the household welfare and GDP will decline. A similar pattern happened when VAT was introduced in Nigeria in 2009. Onaolapo, Aworemi, and Ajala (2013) examined the impact of VAT on revenue generation by using stepwise regression analysis. The result indicated that VAT increased government revenue in Nigeria. Further, the study recommended that the government should try to improve its tax collection to ensure honesty and compliance toward tax payments.

In 2000, the Indonesian government introduced VAT to increase its tax revenue. The study conducted by Amir et al. (2013) evaluated the impact of VAT introduction on key macroeconomic variables and on poverty and income distribution. They stated that VAT contributed 32 percent of total tax revenue in 2008. The policy reforms have led to a small reduction in the incidence of poverty. However, it led to an increase in income inequality as well.

Pereira and Teixeira (2010) examined the effects of indirect tax reduction on final consumption, intermediary inputs, and sector production in Brazil. The study applied GTAP. A 10 percent reduction in indirect taxes will improve tax revenue and welfare. However, the reduction also reduced the production of various sectors. Previous studies proved that government revenue has high dependency on the rate of taxes levied. The majority of the literature stated a positive relationship between tax rate and government revenue.

Buettner and Erbe (2014) studied the impact of abolishing VAT exemption on consumers and intermediate-input demand for financial services in OECD countries. Their result showed that tax revenue increases from three aspects, namely, taxation of consumers, taxation of financial services, and labor market responses. Their empirical test used Germany as the case study. The abolition of VAT exemption in the three categories of services increased revenue by 1.3 percent, and welfare increased to about 0.04 percent of the GDP.

Keen and Lockwood (2010) examined the factors and impact of the increase in VAT rate on the effectiveness of national tax systems. The analysis used panel data regression for 143 countries and 25 years of series. The introduction of VAT reduced the marginal cost of public funds (MCF). Their study revealed that VAT is the most effective revenue-generating instrument for the government. Furthermore, VAT can increase up to 4.5 percent of revenue-to-GDP in developed and more open countries in the long run. Lockwood (2011) studied the impact of VAT on tax revenue for 26 EU countries in 2007. The 2007 data reveal that VAT revenues declined by 0.06 percent when VAT was implemented. Huizinga (2002) studied the impact of VAT exemption on financial services and businesses in the EU in 1998. He estimated the different rates of VAT to be charged to households and businesses. From the findings, VAT exemption will significantly increase total VAT revenues by 4.7 percent. However, it has little impact on overall welfare because of the increased in the price of financial services.

Dietl, Jaag, Lang, Lutzenberger, and Trinkner (2010) studied the impact of VAT exemption in the EU. From their findings, the impact of VAT exemption has been mixed. VAT exemption wields a negative impact on tax revenue and a positive impact on consumer surplus and welfare.

3.3.2.3 Relationship between GST and International Trade

International trade activities increased substantially during the latter half of the 20th century in Malaysia. The trading sector was affected by changes due to the tax reform implemented in the 1970s, 1980s, and 1990s. Different charges were imposed on various taxable supplies exported out of and imported into the country. For the GST mechanism, export is a zero-rated supply, which applies to exported goods to encourage local firms to expand their product to the international market.

Feldstein and Krugman (1990) discussed how VAT affects trade. From the finding, VAT has no effect on the exports or imports of a country because it is levied on imports and rebated on exports. VAT acts as a combination of protection and export subsidy. However, the case would be different if VAT is paid only on imports and not on exports. By contrast, income tax is paid by export producers but not by foreign producers of the imported goods. Hence, VAT has an advantage in international competition compared to countries that depend on income taxation.

Hines and Desai (2005) examined the impact of VAT in 168 developing and developed countries. They utilized a panel data approach to analyze the impact of VAT on the trading sector from 1950 to 2000. They found that VAT revenue is negatively related to trade intensity, particularly in export. For a 10 percent increase in revenue, export reduced by 2 percent. In addition, export for countries that rely on VAT revenue was 33 percent less than that for countries that do not apply VAT. The reason for the negative relationship between VAT and trade is the higher rate when VAT is imposed on traded goods compared to non-traded goods. The effect of VAT on exports is also stronger among low-income countries than among high-income countries. A significant negative effect of VAT on exports even among high-income countries was observed.

Keen and Syed (2006) evaluated the relationship between VAT and total exports for 27 OECD countries. They applied data from 1967 to 2003 and used the unbalanced panel data approach. From the findings, VAT revenue is negatively related to net export in the short run, whereas no effect was observed in the long run. Corporate tax was positively related to net export in the short run, but had no effect in the long run.

Nicholson (2010) discussed the impact of VAT on the trade balance of the US. For the analysis, the panel data approach was utilized, and data for 12 years were collected from 29 industries and 146 countries. Results showed that VAT actually reduces the amount of trade for exports and imports. The amounts of exports and imports are negatively related to VAT. These effects are stronger in extractive and location-intensive sectors. Nicholson (2013) further studied the impact of VAT on the international trade of the US. This time, he analyzed the other side of the effect. The two types of taxes are refundable, whereby domestic taxes are paid by exporters, and the second is the import tax. For analysis, he used the panel data of 20 years of 29 industries and 145 countries. From the result, he found that VAT affects trade competitiveness positively, but the impact on each sector in the economy is different. He suggested that VAT implementation in the US has benefited its trading partners because VAT increased US exports.

Gourdon, Hering, Monjon, and Poncet (2014) studied the effect of VAT rebates on export performance in China. For analysis, they used city-specific export-quantity data at the HS6-product level that covered the period 2003–2012. From the findings, VAT had affected export performance, in which a 1 percent increase in VAT rebate had raised export quantity by 6.5 percent. This magnitude shows the strong resistance of a

country's exports when global recession occurs, during which export rebates increase substantially.

Chandra and Long (2013) examined the impact of a given GST rebate rate on Chinese firms. The analysis used the panel data approach for 2000 to 2006 data. From the results, they found that the higher rate of GST rebate increased exports in Chinese firms. They measured the impact of tariff reduction on firm export as well, and the result showed that an increased rebate rate largely contributed to the export performance rather than tariff reduction. Meanwhile, an increase of 1 percent GST rebate rate led to an increase in exports by 13 percent.

Chadha (2009) analyzed the impact of GST on international trade in India. He applied CGE modeling to analyze data from 60 sectors in the Indian economy from the Annual National Survey and National Accounts Statistics. The findings showed that the rate of GST revenue was neutral, between 6.2 and 9.4 percent. If the economy used the allocation of factors of production efficiently, then the GST can lead to export and GDP growth.

Narayan (2003) looked at the impact of GST on international trade in Fiji, where GST was increased to 25 percent. For analysis, he applied CGE modeling. From the result, he found that import reduced by 2.1 percent and export reduced by 3.9 percent. Many factors could lead to the reduction in imports of a country, such as rise in investment and CPI. These indices subsequently widened the decline in investment and consumption, and then the fall in investment affected the total export and import. However, the decrease in the amount of imports does not provide a good indication of the Fijian economy. This situation is due to the large dependence of the country on

imported factors of production, with 64 percent of its input coming from other countries.

Kusumanto (1989) evaluated the impact of VAT imposition in Indonesia. From the results, VAT increased the export demand for many products but slightly reduced the export of mining products. For import demand, VAT increased the demand for metal products except for import-oriented sectors. VAT also reduced the output of trade and service industries.

Devarajan et al. (1991) examined the impact of VAT reform in Thailand. The implementation of VAT at 10 percent was due to the cascade effect of business tax. The study used the multi-sector general equilibrium model of the 1987 benchmark dataset and simulated the impact of VAT when it replaced business tax. The authors found that VAT increases government revenue. However, if VAT replaces the business and excise taxes, the agriculture and export manufacturing sectors would benefit because the exempted or zero-rated tax would be applied to these sectors. However, non-tradable service sectors are considered as losers. Generally, GST increases revenue and has a slightly favorable effect on the distributional income in Thailand.

In short, total export declines if the rate of VAT increases, the rebate rate of VAT is low, and the rebate is difficult to claim. Conversely, VAT can efficiently improve the overall tax system if a trade-off between other taxes and tariff is implemented. GST implementation will encourage and enhance export competitiveness with the zero-rated supply for all export commodities. In the short run, GST will increase local commodity production, which will contribute to a surplus in the balance of payment of a country.

However, this condition will depend on the exchange rate determination, which is adjustable and constantly changing.

3.3.2.4 Relationship between GST and Economic Growth

Economic growth is one of the macroeconomic objectives of any country and is a measure of its economic level. The taxation system has a significant effect on economic growth. The efficient administration of a taxation system is one of the contributors to economic growth (Engel and Skinner, 1996).

Hines and Summers (2009) examined the factors that affect VAT implementation in the US. From the analysis, VAT is not an ideal tax system to be imposed in the US economy and is not implementable in the US. This finding is attributed to the local political situations and the large economic power of the country. Globalization in the US affects the US tax base and the size of the economy.

With respect to a study on impact of a state tax policy on the growth of a country, Poulson and Kaplan (2008) estimated the effect of the changes in MTR on growth. For analysis, they used regression to aggregate US data taken from 1963 to 2004. From the findings, growth is negatively related to MTR; that is, a high MTR will reduce growth. Johansson, Heady, Arnold, Brys, and Vartia (2008) also stressed the importance of consumption taxes. They highlighted the renewed attention to the issue of the optimal tax mix because of strong theoretical and empirical evidence that showed consumption taxes are less disruptive to economic growth than direct income taxes.

Several European countries have implemented growth-enhancing tax reforms that shift the reliance from income tax to consumption tax. Germany in 2007 and Hungary in

2008 are the most obvious examples. Croatia is the most recent country to have adopted a similar reform. Similar growth-enhancing tax reforms are being analyzed in other European countries, such as developed countries France, Belgium, and the Netherlands, and emerging nations Serbia and the Czech Republic. The European Commission (2013) noted that in the process of consolidating public finances, one-third of Eurozone member states will be involved, which may enhance economic growth by shifting the tax burden from labor to consumption.

Vermeend et al. (2008) examined the relationship between VAT and growth in Nigeria. In 1993, the Federal Government of Nigeria introduced VAT to replace sales tax. The aim of implementing VAT was to increase government revenue and spend for country developmental purposes. For analysis, time series data on the GDP, VAT revenue, total tax revenue, and total federal government revenue were applied from 1994 to 2008. The data were taken from the Central Bank of Nigeria. The study used simple regression analysis and descriptive statistical method. From the results, the ratio of VAT revenue to GDP in Nigeria averaged 1.3 percent compared to 4.5 percent in Indonesia. Both economic variables fluctuated greatly over the period, although VAT revenue was more stable. No causality was observed between the GDP and VAT revenue. The authors recommended that all identified administrative loopholes in Nigeria should be plugged for VAT revenue to contribute more significantly to its economic growth. Their findings showed that any action taken on either VAT revenue or the GDP will take two years to become effective.

Emmanuel (2013) examined the effects of VAT on tax revenue and economic growth in Nigeria. VAT was introduced in Nigeria in 1994. A simple linear regression method was used to analyze time series data from 1994 to 2010. The findings showed that the

VAT has a significant effect on tax revenue and economic growth. He recommended the government to increase the tax rate for the country's economic development.

Pereira and Teixeira (2010) examined the impact of indirect tax on the Brazilian economy. They proved that the reduction of indirect taxes improved the economic performance of the country. Their study showed that a reduction of 10 percent in indirect taxes on final and intermediate goods improves economic growth between 0.05 percent and 0.19 percent and welfare from US$ 2.26 billion to US$ 3.20 billion. Smart (2007) found that most of the studies proved that government revenue has a high dependency on the amount of taxes levied. Meanwhile, a positive relationship between GST and GDP is indicated in the long-run.

3.3.3 GST and Household Welfare

This topic will focus on the welfare side of GST. Two concepts will be discussed, namely, GST as a regressive tax and GST in relation to household welfare.

3.3.3.1 GST as a Regressive Tax

Regressive, progressive, or proportional taxes are different types of tax structures and are determined by individual income by using the rate imposed. Regressive tax is an inverse relationship between tax rate and taxable income. In simple terms, a regressive tax is a tax that takes a larger percentage from low-income groups than from high-income groups because it is applied equally (Saira et al., 2010). The tax tends to increase the tax incidence of low-income earners who have a lower capability to pay as measured by assets, consumption, or income (Khazali , 2014). Under a regressive tax system, medium- and low-income earners bear much of the tax burden, while under a progressive tax system, high-income earners pay more taxes (Tholasy, 2014).

Sometimes, income earners spend more than their income through borrowing or drawing down savings. In other words, VAT would be regressive because it would unfairly penalize the poor (Caspersen and Metcalf, 1995).

Critics of consumption-based taxation usually state that these taxes are regressive in nature (Lim, 2014; Rasiah, 2014; Tholasy, 2014) and are thus cause for serious concern to policy makers (Khazali, 2014). Conventional economic perception holds that most consumption-based taxation is regressive and passed down to the consumer (Pechman, 1985). The public, in particular, often deems consumption taxes and GST as regressive (Ballard, Scholz, & Shoven, 1987).

However, the redistribution, which can be reached individually via indirect taxes, is basically limited. Even though the poor pays a huge amount of their earnings on certain items, the rich would generally spend a significant amount on those items, too; hence, a regressive tax rate shifts more money to the rich than to the poor (Mushi, 2009).

The World Bank (2003) reviewed empirical studies on VAT on the basis of the types of taxes applicable in African and Asian countries. The study found that VAT is progressive in most of the countries because the zero-rated mechanism is applied for the items that are mostly consumed by the poor. This view is supported by Refaqat (2003), who wrote that GST in Pakistan is progressive. The study utilized the household integrated economic survey (HIES) data to analyze the social incidence of GST in Pakistan. GST is progressive because most of the items used by lower-income groups are exempted from GST.

In one study, Serbia was compared to other emerging European countries on the measurement of VAT equity or economic equality. To estimate the VAT incidence in Serbia, Arsic and Altiparmakov (2013) used the annual 2009 data from the household budget survey. VAT incidence was analyzed based on the estimated average VAT rate by income and expenditure groups to indicate whether the tax is progressive or regressive. The results indicated that VAT is a progressive tax with regard to the significant presence of small farming production of food in most emerging European countries and Serbia, as tax exemption is granted to farmers and low-income households.

Ikhsan, Trialdi, and Syahrial (2005) reported that Indonesia is unique owing to their claim that GST is proportional. Their study was carried out to recommend a tax reformation plan and improvements in taxation quality improvement. In particular, their objectives were to increase competence and government revenue because Indonesia has a good tax system management and to ensure the effectiveness of VAT collection. By reviewing 2000 SAMs and applying statistical analysis on income taxes (personal and corporate) and VAT, the study suggested that government revenue can be increased without increasing tax rates, but the government should increase the capacity of tax administration and expand the tax basis. However, compared to other countries in the region, the tax ratio of Indonesia is low, and its tax revenue-to-GDP ratio was only about 12 percent in 2001. The result also revealed that income taxes are more progressive for Indonesia, similar to Malaysia. This situation provides assistance to lower-income earners because the rich can contribute more to the government revenue (Chen, 2012). On the other hand, VAT was proportional for Indonesia given that VAT is levied on a broad base and is imposed with a single rate and zero rate for exports.

Two studies discussed GST based on lifetime[11] and annual income[12]. Bird et al. (2005) focused on consumption taxes and VAT in developed and developing countries. By reviewing the cases in various countries, they determined that consumption taxes are usually considered regressive. They noticed that these taxes are considerably less regressive on lifetime income compared to annual income. Hence, many DTEs offer lower VAT rates or exemptions for basic items, such as foods, passenger transport, medical services, and cooking fuel. In certain countries, significant distinctions can be found in consumption patterns among income groups. The study suggested that a small degree of progress is better and can be obtained via small adjustments in the income tax or transfer payments because the poor are affected by changes in the income tax or transfer payment.

Mushi (2009) investigated the perspective on the lifetime and annual income of VAT in Tanzania. He measured the exemptions in government revenue and tax burden distribution using the 2000/2001 household budget survey and applied the general equilibrium of tax incidence analysis. Lifetime income VAT is slightly progressive, whereas annual income VAT is very regressive. The distributional characteristics of exempted items show that the poor spend on unprocessed food, public transport, and petroleum products, while the rich spend on postal supplies, books, newspapers, and others. In general, VAT is less progressive than the previous sales tax applied.

Bird et al. (2005) and Mushi (2009) found that annual income VAT is more regressive in nature than lifetime income VAT. Moreover, unlike the studies mentioned earlier, several empirical studies show a contrast between progressive and proportional

[11] A lifetime income tax would tax a person based on his/her cumulative lifetime income.
[12] An annual income is the total amount of income earned annually.

tax, in which GST is a regressive tax, on the basis of evidence found in 12 studies discussed below.

First, Ballard et al. (1987) estimated the incidence of the introduction of VAT in the US economy. They utilized CGE model analysis and assumed that VAT is a partial substitute for the individual income tax. The implementation of zero-rated and exemption VAT may reduce the welfare for lower-income earners, whereas the opposite situation is applicable for higher-income earners. Therefore, tax is regressive. The study is similar to Shah and Whalley (1991), which stated that VAT is a regressive tax. The authors studied tax incidence in developing countries by applying a traditional analysis of the incidence effects. Their findings indicated that with a uniform rate imposed on VAT, even when it depends on the types of commodities and supplementary system of taxes, VAT remains regressive and tends to be more regressive as its rate increases.

This view is supported by Hossain (1995), who found that VAT benefits the rich but harms the poor. Hossain (1995) focused on the implications of different VAT schemes toward income distribution in Bangladesh. The study used HIES data in 1985 and found that the poorest group of urban areas suffers the most, whereas the rich benefits from the implementation of VAT. A study was also conducted in South Africa to analyze the impact of tax substitution from general sales tax into VAT. Go, Kearney, Robinson, and Thierfelder (2005) used the CGE model with the country's 2001 data. Through the reform, the government had taken the initiative to reduce the burden of the lower-income group by granting them exemptions on some essential food. The authors examined the impact toward the welfare and income distribution of a country. VAT implementation effectively generated the highest government revenue when the rate was increased. The authors also tried to reduce VAT and increase income tax rates. The

alternative has led to welfare improvement that benefits the poor without placing a heavy burden on the rich. Furthermore, VAT is slightly regressive[13] for the country, though the entire tax system is progressive[14].

A study by Zee (2006) on VAT modification in Pakistan in 1991 stated that VAT is a regressive tax. A slightly modified form of VAT from general sales tax was imposed in this tax reform. The study considered VAT as a type of regressive tax, though this finding contradicted Refaqat (2003), who found VAT to be progressive.

In addition, a particular research in Pakistan discussed the pre-implementation of taxation reforms. In this study, Ahmad Husni (2013) applied the CGE model with a micro simulation model that rationalizes the rate structure and expands the tax base. The reform is focused on indirect taxes because direct taxes are not capable of providing higher revenue to the government. The reform also aims to substitute general sales tax with VAT. The increase in general sales tax rate will decline consumption for farmers, rural workers, and the urban poor even though consumption will increase among the urban rich. Another effect from the increased rate is the reduction in investment and price of agricultural goods because most agricultural products are exempted from tax. On the other hand, the price of industrial good, electricity, and construction increases. The results indicate that the welfare deteriorates and that this tax policy is regressive. Hence, the government can still continue with this reform by considering the best options that bring less distortion to the economy.

Di John (2006) reviewed taxation in terms of economy, administration, and politics in several developing countries. Indirect taxes, in particular VAT, are one of the most

[13] The poor pay a higher share of their income to VAT than do the rich.
[14] The rich pay a higher share of their income to VAT than do the poor.

regressive taxes, and VAT contributes to a relatively higher share of overall tax burden in Latin America. The countries that are experiencing a serious unequal income distribution should diversify their revenue, particularly from direct taxes, by applying progressive income tax and property tax in the long run.

Moreover, Smart and Bird (2009) conducted a study on the Canadian tax system as RST converted to VAT. They estimated the distributive impact on consumer price by using input-output tables. Their results indicated that the overall prices of goods and services have declined, with the exception of housing, clothing, and footwear. Given that these three items are important goods to the majority of people, the country's tax reformation is, therefore, somewhat regressive toward individual income. Furthermore, India applies specific types of VAT, such as gross product type, income type, wage type, and consumption type. Jayakumar (2012) attempted to determine whether VAT can promote prosperity and well-being to the community in India. From among the various types of VAT, only several types of wages are exempted from capital goods production. The study also considers VAT as investment income. Tax is regressive. However, the labor alone has to bear the entire burden of tax due to its regressive nature.

In Ethiopia, Jalata (2014) examined whether the regressive tax afflicts people or not. This study employed the ordinary least square method. By imposing a single standard rate, the VAT system is regressive even when some goods and services are tax exempted. Moreover, the goods and services that are tax exempted are not beneficial to the poor. The regressivity harms people because both rich and poor pay the same price for a product, a situation the will generally pose adverse impact to the country's economic growth. Hence, the consideration of taxing authority about these issues is

preferable and additional regulations should be provided where appropriate. Accordingly, necessity goods should be tax exempted. The rate should be maintained at a minimum level as they should not distort the country's economic growth. The study recommended a strong administration system to be in place to support tax revenue collections and implementations.

Some studies perceive different types of taxes within an extensive tax structure. Some studies reported that tax is regressive in nature. Hamilton and Whalley (1989) indicated that sales tax in Canada is somewhat regressive. The study analyzed the effect of the federal and provincial sales tax systems by using the general equilibrium model. Both taxes have distorted economic activity. The replacement of broad-based sales taxes presents minimal welfare gain to the people and more revenues to the country. Gemmell and Morrissey (2005) likewise found that various types of taxes, such as sales and export and import duties, are regressive. They discussed the impact of adopting various types of taxes on income distribution in some developing countries. For luxury goods such as alcohol, cars, and beverages, the imposed tax is progressive, whereas regressive tax is applied on exports or consumable goods, which are more burdensome on lower-income groups. Moreover, import duties are more regressive compared to sales tax.

The experiences from other countries demonstrated the variety of measures taken to monitor the nature of GST, whether it is regressive, progressive, or proportional. The majority of studies stated that GST is a regressive tax and other consumption taxes, such as sales taxes, export, and import duties, are also regressive in nature. In addition, some countries applied a zero-rated mechanism and exemption to certain necessity goods to minimize the tax burden on the poor. Hence, VAT can benefit the people overall depending on the mechanism applied.

3.3.3.2 Relationship between GST and Household Welfare

The tax policy debate has always focused on the impact of VAT on distributional issues. Income distribution is important and has been a concern of economic theory and economic policy by classical economists such as Smith, Malthus, and Ricardo. Modern economists have also addressed the issue in relation to economic growth. Income inequality is measured by a Gini coefficient that ranges from zero to one. A country with a Gini coefficient near to zero (value) has a more equalized and better-conditioned income distribution than near to one (value) (Aronson, Johnson, & Lambert, 1994).

Whalley and Zhang (2005) examined the relationship between tax and income distribution. They employed traditional general equilibrium techniques of calibration for a base case followed by a counterfactual equilibrium analysis. They found that when GST expands, consumer welfare worsens. Broadening of the VAT base reduces the welfare gains compared to narrow-based taxes. Consumption tax is also negatively related to household disposable income.

Furthermore, Curtis and Kingston-Riechers (2010) examined the impact of GST introduction in Canada. They measured the impact on household welfare, particularly the low-income households with children. The study used quadratic AIDS to calculate the changes in expenditure levels. Replacing manufacturers' sales tax with GST resulted in difficulties for the low- and middle-income households, and the goal of increasing their welfare was not achieved.

In the EU, Dietl et al. (2010) examined the impact from VAT implementation. Most of the states provided VAT exemption for universal postal services because it was considered a public service. For other postal services, VAT was imposed at a standard

rate. By applying simulation, the study found that the impact of VAT exemption was mixed. The exemption results in different welfare impact for different labor types and is highly sensitive to the labor policies of operators. In general, VAT exemption positively affects consumer surplus and welfare but negatively affects tax revenue.

In Thailand, Field and Wongwatanasin (2007) examined the implementation of various tax policies in the economy. They used SAM and a multi-sectoral CGE model for data from 1980 to 1985. Their findings revealed that income tax in Thailand is progressive, and that the amount of tax depends on the household income. Thus, this has produced a low Gini coefficient.

Engel, Galetovic, and Raddatz (1999) conducted a study in Chile to examine the direct effect of several types of taxes on income distribution. They also estimated the distributional effect of several changes in tax structure at the household level. The analysis applied the 1986 National Accounts Input-Output Matrix. As the rate of GST increased from 18 percent to 25 percent, the Gini coefficient increased from 0.488 to 0.496. The income distribution was affected and became less equalized. In addition, replacing the 20 percent proportional tax in the country minimally affected the present progressive income tax.

Another article investigated the efficiency and distributional impacts of the VAT reform in Germany. Boeters, Böhringer, Büttner, and Kraus (2010) utilized the AGE approach to examine the VAT differentiation, which was imposed in the country. To develop the model, they used the Input-Output Table for 1997, the production–consumption transition matrix (Z-matrix), and the German Income and Expenditure Survey. They found that this policy improved several macroeconomic indicators, such

as GDP, employment, domestic capital, and aggregate consumption, thus increasing public welfare. They mentioned several cases for support. First, elimination of the reduced VAT rate caused small redistributive effects. Therefore, VAT differentiation can be considered an important factor of redistribution. However, it only has a slight effect on industry output, so the different rates of VAT should be transformed into subsidy for some industries rather than being used as instruments for redistribution. Second, VAT reforms significantly affect welfare. Lastly, the introduction of a revenue-neutral harmonized VAT combined with reductions in the marginal income tax rates or social security contributions provides extensive welfare gains to the people.

Arsić and Altiparmakov (2013) estimated the VAT incidence in Serbia. They applied the annual 2009 data from the household budget survey for analysis. Serbia's Gini coefficient lowered when tax was levied. Hence, the country has a progressive lifetime VAT incidence.

In China, Xinqiaoa, Shuanga, Chaoyanb, Haiyanga, and Lianga (2009) conducted a study to measure the welfare impact of VAT and business tax. For analysis, they utilized compensating variation and equivalence variation by using the CGE model and applying numerical simulations. The taxes wielded different welfare effects on consumers. The results suggest that the price effect of VAT is smaller than price effect of business tax. On average, business tax causes more welfare damage to each consumer group than VAT. The government must provide VAT exemption to small enterprises and convert business tax into VAT. Consequently, all the enterprises in the service industry can be exempted from input tax.

Aamir et al. (2011) examined the impact of taxes in the economies of Pakistan and India. They used a regression equation and the standardized betas for the periods 1999–2000 and 2008–2009 for the analysis. When more indirect taxes were imposed in the country rather than direct taxes, the income gap between the rich and the poor expands, which creates exploitation for certain labor classes in both countries.

Salti and Chaaban (2010) also conducted a study to examine the impact of the increment in VAT rate on poverty and inequality in Lebanon. The study used expenditures from household survey data and spatial price indices. They estimated the model using AIDS. Their finding indicated that the increase rate in VAT negatively affects total private expenditure in the economy. A significant impact also occurs on poverty inequality in Lebanon, which demonstrates that the rich are less affected than the poor.

Serra-Puche (1979) pioneered the study on VAT incidence in developing countries. They started to study the fiscal reform in Mexico in 1980. They examined the consequence of introducing a consumption-type VAT on resource allocation and income distribution in Mexico by using a general equilibrium for analysis. The model employed 14 sectors of production with 15 consumption goods, 3 factors of production, and 12 consumer groups. The analysis obtained two outcomes: the welfare effects of the tax show an improvement, but more for the rich rural household categories; and the tax is inadequately progressive because VAT substantially decreased the overall tax revenue. These outcomes are attributed to the VAT imposed being coupled with tax exemptions and the reduction of other taxes. However, given the positive effects of VAT on income distribution and resource allocation, this revenue loss was interpreted

as having a positive effect on the economy. The introduction of VAT was appropriate for the overall thrust of the Mexican government's policy.

In Kenya, Mwega (1985) examined the incidence of VAT in less-developed countries. Similar to the Mexican tax study, the Kenyan study also applied the general equilibrium model. It employed 11 production sectors using the Cobb-Douglas production function. Consumers were aggregated into six household groups according to the rural–urban size income distribution. The study analyzed tax incidence when VAT replaced other types of taxes, such as income tax, corporate tax, consumption taxes, excises, and tariff. With regard to the income distribution, VAT appears to be regressive when it replaces all other taxes. However, it is slightly progressive when it replaces only indirect taxes and tariff. It increases the income of the rural group and the lowest-income households of the urban group while decreasing that of high-income households. The opposite effect is observed when VAT replaces direct taxes.

In Thailand, Bovenberg (1987) simulated the effect of VAT on equity. He used Keller's model (1980), which adopted a log linear approximation. Households were disaggregated into six urban–rural groups for the analysis, differentiated by the types of labor and income. Unlike other developing countries, Thailand's service sector was exempted from the VAT instead of being zero rated. The producers of exempted goods were not deducting the VAT paid on purchased inputs. The service sector benefits from VAT implementation. Excluding service industries from the VAT will likely have negative effects on equity owing to the relatively huge size of the urban low-income population working in the service sector.

The impact of GST on household welfare cannot be generalized. However, most of the studies show they are negatively related.

3.4 Review on AGE Tax Models

The economic theory of general equilibrium was founded in 1874 by Leon Walras. He introduced the simplest mathematical general equilibrium model that produced one equation for every commodity in the economy (Salvatore, 2009). The model was then developed further by Arrow and Debreu (1954), who enhanced abstract models into realistic models (Arrow and Hahn, 1971; Shoven and Whalley, 1972). They discussed the maximization of consumer utility, which is subjected to their budget constraints, and maximization of producer profit.

The expansion of the theory has been considered by economists and mathematicians. In 1969, Professor Scarf pioneered the real empirical analysis developed from the theory, which was modeled and solved by computing relative prices and quantity equilibrium. This is known as the Walrasian model. Two of Scarf's scholars, Professors Shoven and Whalley (1972), were the first to demonstrate the potential of empirical work using computer programs to study economic equilibrium. They investigated the impact of fiscal reforms on the US economy (Cardenete, Guerra, & Sancho, 2012). They showed that Harberger's model of corporate tax could be expanded to include multiple industries and solved using Scarf's algorithm (Harrison, 2000).

Consequent to the findings, other related literature and analysis were produced that explored empirical applications of the basic theory of general equilibrium. Cardenete et al. (2012) discussed fundamental issues regarding public finance, trade and environmental economics, and regional and urban economics. General equilibrium

analysis addressed the appropriate quantitative approach to integrate the smallest parts of the economic system into the broadest economic coverage under neoclassical economics.

The work of Johansen (1960) for the Norwegian economy is the first empirical example of a general equilibrium model. It introduced the new type of nonlinear multi-sectoral models, which are also known for their computable effect of tax policy reform. The study applied an empirical simulation of economic policies and external shock effects on the domestic economy. The usage of CGE models has increased in the last three decades. The major areas of applications of these models are taxation, international trade, finance, macroeconomics, and environmental and energy economics.

In the field of taxation, Harberger (1962) founded the study of tax incidence analysis using a two-sector ($2 \times 2 \times 2$ model) CGE model. Subsequently, several researchers have continued the tax incidence analysis using CGE models. Shoven and Whalley (1972, 1984) developed larger scales of modeling to analyze the incidence effects and efficiency costs of various income taxes in the US. They also provided the numerical estimates of efficiency and distributional effects within the same framework.

Later, Piggott and Whalley (1977) used the same analysis for Britain. Ballard, Fullerton, Shoven, and Whalley (1985) incorporated the Harberger model into their own model, which included 19 production sectors, 15 commodities, and 12 worker-consumer groups in the US; Kehoe and Serra-Puche (1983) for Mexico; Keller (1980) for Netherlands, and Piggot (1980) for Australia carried out the same investigation using these datasets.

The model structure changed and became complex when applied onto an open economy, which includes consumption and labor-leisure choice effects. This model is a perfect CGE model for tax policy evaluation (Ballard et al., 1985). A modified model by Ballard (1988) and Ballard (2000) was then used for the redistribution policy and health care programs. In 1993, Fullerton and Rogers extended the model to study the effect of US taxes on lifetime income (Fullerton and Rogers, 1993).

Several studies in developing countries has focused on the works of Feldstein, Slemrod and Yitzhaki (1980), Ballentine and McLure (1980), Isaacson and Keller (1994), Broer and Lassila (1997). They analyzed the nexus between taxes and financial behavior. In Korea, Adelman and Robinson (1978) has conducted the first study using CGE model. In 1981, Dervis, De Melo, and Robinson (1981) focused on income distribution in developing countries to expand their model.

In the 2000s, Rutherford, Light, and Díaz (2002) determined the best way to increase the government revenue in Colombia. They applied CGE model to identify the impact of each type of tax implementation on government revenue. Cardenete and Sancho (2003) also applied the AGE model in Spain. They analyzed the effects of the income tax reform on the country's economy. Similarly, Mabugu (2005) used a dynamic AGE model to explore the impact of income tax on the African economy. Ferreira Filho, Vieira dos Santos, and do Prado Lima (2007) examined the effect of tax reform on poverty and income distribution in Brazil. Yusuf, Djoni, and Wawan Hermawan (2008) used the CGE model to analyze several aspects of fiscal policy implementation in Indonesia. In addition, Xiao and Wittwer (2009) used the dynamic AGE model to distinguish the impact of some policies on the financial sectors in China. They examined the real and nominal impacts of several policy changes in China. They

applied three approaches: using a nominal exchange rate, a fiscal policy, or a combination of the fiscal and monetary policies. The criteria in selecting the best policy are based on the redress in China's external imbalance.

Recently in Spain, André, Cardenete, and Romero (2010) evaluated the hybrid model of AGE and other models. They focused on the potential AGE and multi-criteria decision-making models to design the implications of fiscal policy implementation. In India, Sahoo and ten Raa (2012) applied a frontier-general equilibrium model to examine the productivities between skilled and unskilled labor. The data applied were from 1994 to 2002. For analysis, they used the endogenous labor supply model to examine the changes of labor skills over time. In 2012, an empirical CGE model was developed by Pauw and Leibbrantt (2012) in South Africa. They examined the relationship between minimum wages and poverty eradication and found that minimum wage rate can reduce poverty.

A dynamic CGE model was used to analyze the distribution and welfare in Vietnam after the VAT rate was modified. The effects of revising the multiple rates into a single rate was analyzed by Giesecke and Nhi (2010). Cordano and Balistreri (2010) conducted two studies in Peru, while Auriol and Warlters (2012) conducted a study in Africa. These authors examined the MCF using the CGE model. According to the findings of Auriol and Walters, VAT has a low MCF. Hence, VAT is more efficient compared to other types of taxes in Africa.

Table 3.2: Summary of Specific AGE on Taxation

Author	Year(s)	Country
Harberger	1959, 1962	United States
Shoven and Whalley	1972, 1984	United States
Piggott and Whalley	1985	Britain
Keller	1980	Netherlands
Piggott	1980	Australia
Feldstin and Slemord	1980	Developed countries
Ballentine and Mclure	1980	Developed countries
Kehoe and Serra-Puche	1983	Mexico
Adelman-Robinson	1978	Korea
Dervis, De Melo, and Robinson	1981	Developing Countries
Ballard, Fullerton, Shoven, and Whalley	1985	United States
Ballard	1988, 2000	United States
Ragayah Mat Zain	1988	Malaysia (Fiscal Incidence)
Barjoyai Bardai	1993	Malaysia (Tax Policy)
Isaacson and Keller	1994	Developed countries
Broer and Lassila	1997	Developed countries
Rutherford, Light and Diaz	2002	Colombia
Cardenete and Sancho	2003	Spain
Mabugu	2005	South Africa
Ferreira Filho, Vieira dos Santos, and do Prado Lima	2007	Brazil
Yusuf, Djoni, and Wawan Hermawan	2008	Indonesia
Xiao and Wittwer	2009	China
Andre´, Cardenete and Romero	2010	Spain
Giesecke and Nhi	2010	Vietnam
Cordano and Balistreri	2010	Peru
Auriol and Warlters	2012	African countries
Sahoo and Raa	2012	India
AlShehabi	2012	Iran
Pauw and Leibbrantt	2012	South Africa

Source: Shoven and Whalley (1984) and Author's collection

AlShehabi (2012) developed a dynamic general equilibrium model to examine the impact of changes in Iran's fiscal policy. The government removed subsidies from crude oil to raise tax revenues for the economy. For analysis, the author measured the way additional revenue from the subsidy removal could be used, such as for household redistribution and increased investment. The results revealed that household welfare and real GDP increase when the government cuts subsidies but employment decreases.

3.5 Research Gap

The literature revealed that many variables were used in the studies related to GST. Given that Malaysia has only implemented GST in 2015, no tax-related, local-based studies have utilized CGE modeling. Only two studies have focused on the AGE in relation to the context of Malaysian taxation and fiscal incidence, namely, Ragayah (1988) and Barjoyai (1993). However, these studies were not related to Malaysian GST.

3.6 Summary

This chapter presents the review of related literature. It is divided into three sections: the historical background of GST, the taxes related to other variables, and the AGE model. The reviewed studies indicate that mixed results are obtained depending on the variables chosen in relation to their relations to GST.

CHAPTER 4: METHODOLOGY AND MODEL SPECIFICATIONS

4.1 Introduction

This chapter explains the main variables and estimation methods adopted in this research. It is divided into six sections. The first section illustrates the conceptual framework, which introduces the variables based on the objectives of the study. The second section elaborates the theoretical framework. The third and fourth sections comprise the description of the empirical model and the basic structure of the CGE model. The fifth section lists the sources of data collection. Finally, the sixth section explains the simulation scenarios.

4.2 Conceptual Framework

Figure 4.1 shows the conceptual framework, wherein GST affects sectoral responses, macroeconomic variables, and household welfare. The impact of GST is divided into three areas according to the research objectives.

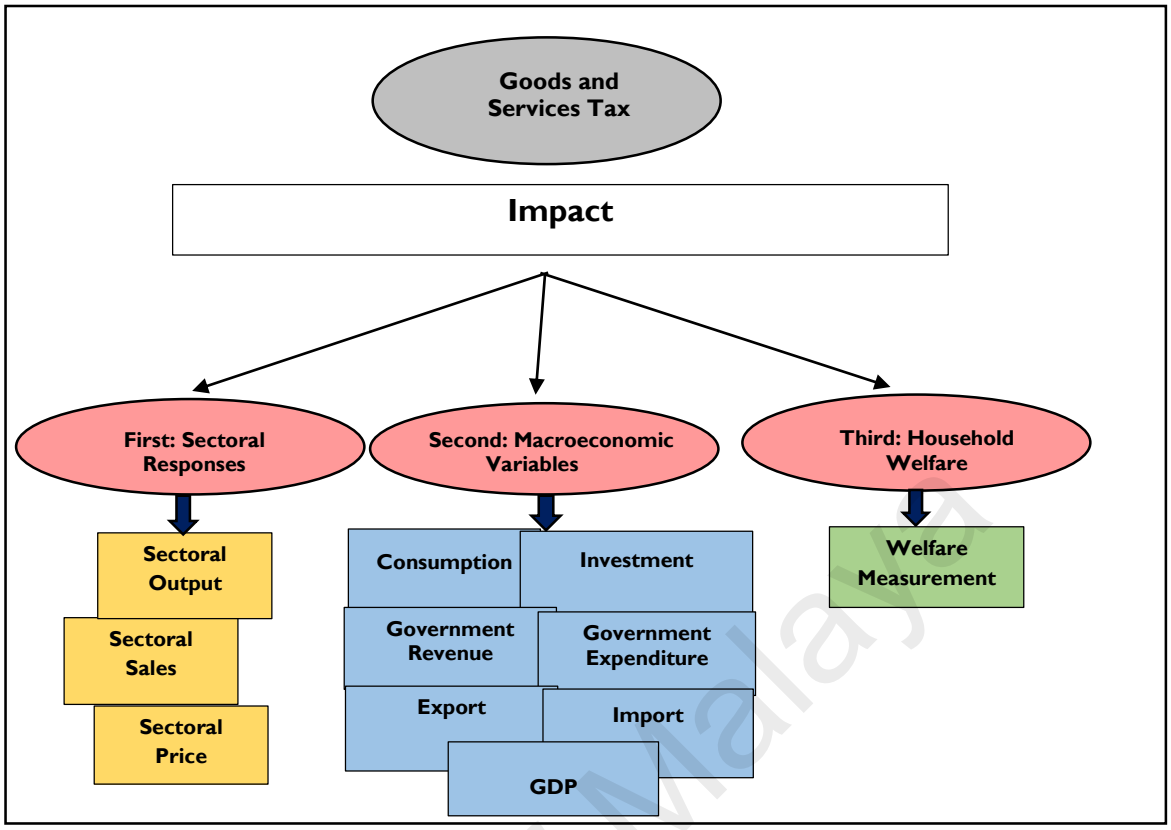

Figure 4.1: Conceptual Framework

Source: Author's Design

The conceptual framework shown in Figure 4.1 can be explained as follows:

(1) *First objective:* To examine the impact of GST, Malaysian industries are aggregated into 15 sectors, including agriculture, forestry and logging; crude oil, natural gas and mining; food and beverage; textile and leather; petroleum refinery; chemical and rubber; cement, glass and ceramic; iron, steel and metal; wood, machinery and other manufacturing; electricity and gas; wholesale, accommodation, and restaurants; transportation and operation services; communication and ICT; banking, financial, and insurance; and education, health, and other services. These can be referred to in Table 4.3. The impact of GST implementation is demonstrated through sectoral output,

sectoral sales, and output price. This study examines the sectoral responses and determines the industries that are more affected by GST implementation.

(2) *Second objective:* In general, GST can directly or indirectly affect several macroeconomic variables. The impact of GST implementation is on consumption expenditure, investment, government revenue, government expenditure, export, import, and GDP. For instance, the study examines how much government revenue would be affected by any changes in GST rate.

(3) *Third objective:* Households are divided into three income groups: lower, middle, and higher incomes. The impacts of GST on these groups are analyzed by examining the household welfare when some economic shocks are introduced in the system. The impact of GST can also be measured based on the consumer utility by calculating the equivalent variation.

Based on the framework discussed above, the CGE model assumes the best method to examine the impact of GST on the Malaysian economy. The theoretical framework of this study is discussed in the next section.

4.3 Theoretical Framework

The three types of theories related to this study will be discussed, namely, consumption tax theory, theory of consumer behavior, and general equilibrium theory. Consumption tax theory indicates the effect of consumption tax on market equilibrium and consumer utility. General equilibrium theory is divided into general equilibrium of exchange and production.

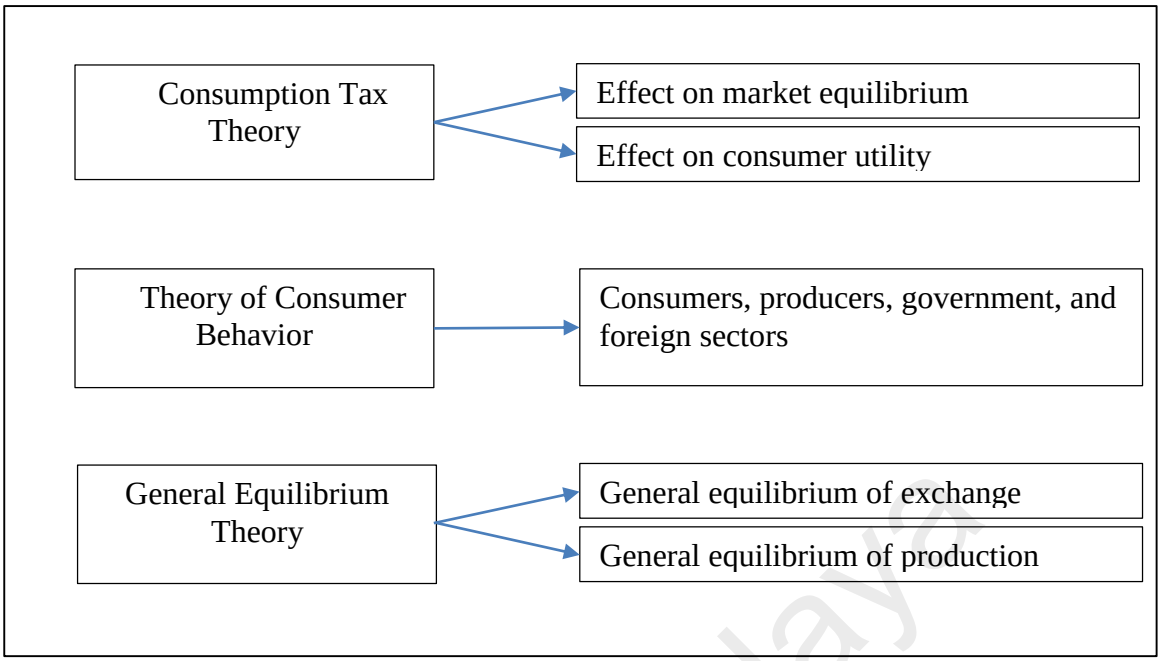

Figure 4.2: Theoretical Framework

4.3.1 Effect of Consumption Tax on Market Equilibrium

This section explains how taxes affect market equilibrium. With a fixed income and prices, an increase in tax would increase the price of goods, which brings about income and substitution effects on individual demand. Assume that a consumer uses good X. A high price of good X causes someone to consume a low quantity of X. The same effect applies when an individual income is reduced. This is called income effect, which will reduce in the consumption of good X. Furthermore, consumer uses two goods, X and a substitute good Y. When the price of good X increases, consumers will buy good Y instead of good X; this is called the substitution effect.

This research focuses on consumption taxes, which can be SST or GST. With the assumption that other factors are constant, the analysis on tax effect in the market for a single commodity, which is referred to as partial equilibrium analysis, is made. The efficiency loss of imposing tax is a deadweight loss or an excess burden toward both consumer and producer. The higher the consumer's elasticity of demand, the greater the

excess burden is for the consumer. In this case, we assume that the demand and supply curves have the same level of elasticity. Figure 4.3 illustrates how the imposition of tax is shifted between producer and consumer.

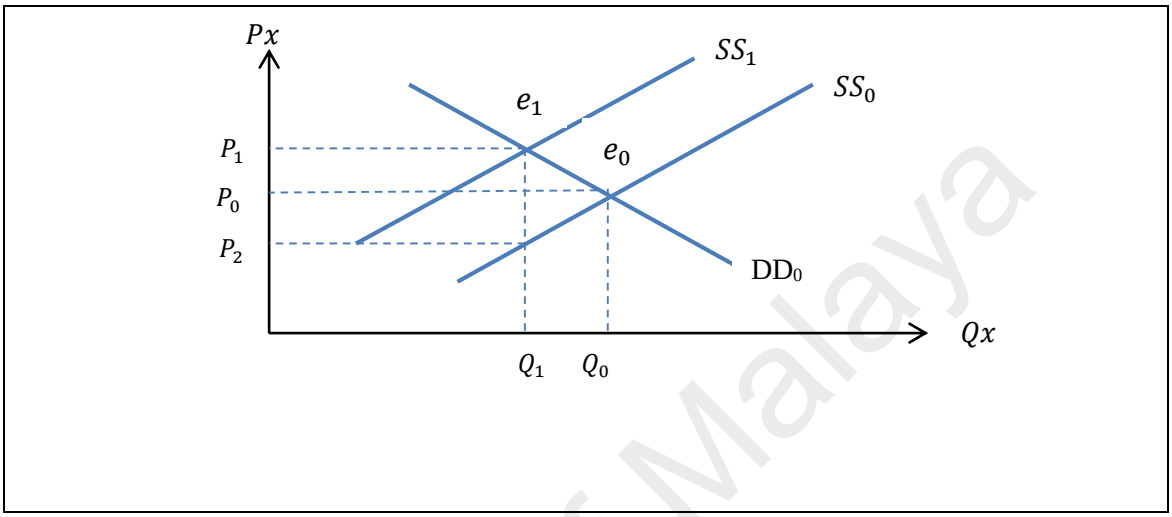

Figure 4.3: Effect of a Consumption Tax on Market Equilibrium of Good X

As shown in Figure 4.3, the initial market equilibrium is at e_0, as price and quantity of good X are at P_0 and Q_0, respectively. In the short-term, we assume that the level of income has no change. A tax is imposed by the government on the producer as P_1P_2. This will reduce supply and is reflected by a leftward shift of the supply curve from SS_0 to SS_1. The same good becomes more expensive as price increases from P_0 to P_1 and leads households to reduce the quantity of demand from Q_0 to Q_1. At Q_1, the new market equilibrium is at e_1.

Moreover, as the government imposes GST, the tax tends to increase the price of output to $P1$ and the quantity of demand would be reduced to $Q1$ compared to before the tax was imposed. However, the magnitude of shift depends on the types of goods, the proposed rate, and the GST mechanism imposed by the government (Abel et al., 2013).

4.3.2 Effect of a Consumption Tax on Consumer Utility

The widely used measure of welfare change is equivalent variation; given a change in the price, this index measures the change in the level of consumer utility (Hassan, 1995). With a stable income, the change in price would affect consumer welfare (Hicks, 1939). Normally, to generate a similar fall in utility, a fall in income is necessary. The consumer is clearly worse off after tax is imposed, which creates additional cost to people (Vermeend et al., 2008). To measure the welfare effect of consumption tax, the framework of budget line and indifferent curve can be used for elaboration, as shown in Figure 4.4.

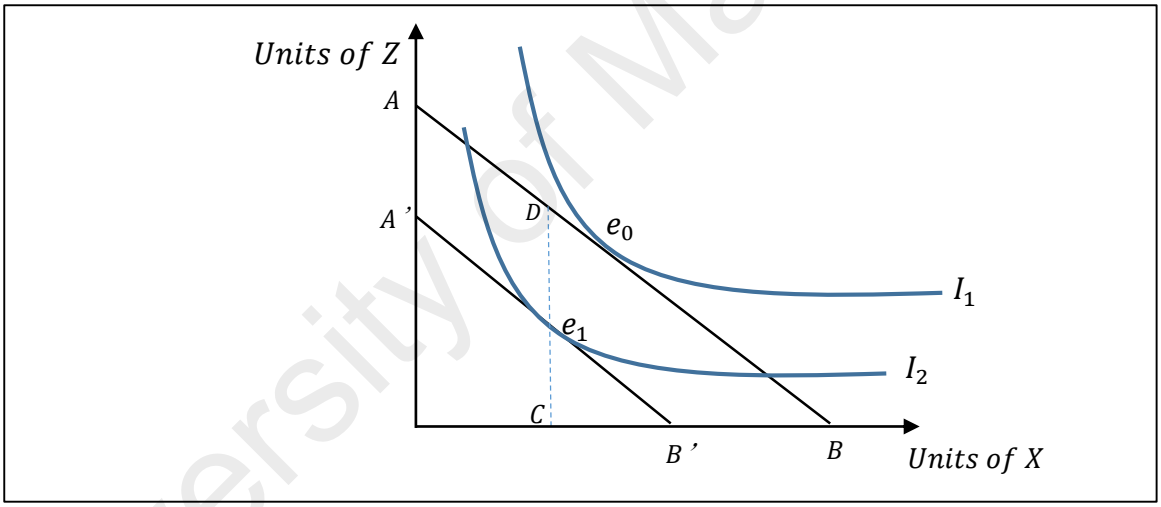

Figure 4.4: Effect of a Consumption Tax and the Equivalent Variation

The initial budget line AB and the indifferent curve I_1 of a utility-maximizing person is tangent at e_0. People consume bundle e_0, which includes an amount of CD of good Z. As the government imposes an ad valorem tax with tax rate t on both goods, X and Z, the budget line shifts inward from AB to $A'B'$. The shift is parallel to its original position because t is the same for both goods. Income is fixed at Y, and the intercepts with the x- and y- axes are determined by $\frac{Y}{(1+t)Px}$ and $\frac{Y}{(1+t)Pz}$, respectively, in which Px and Pz are indicated as the prices of X and Z.

With the new budget line $A'B$, the consumption of goods X and Z is at the lower indifference curve I_2 and with bundle e_1. The consumption point moves from point e_0 to e_1 with tax, demonstrating that the consumer used less of goods X and Z compared to before the imposition of tax. The amount of good Z after tax is reduced from CD to Ce_1.

Two cases arise from this situation, namely, excess burden and tax revenue. The imposition of tax creates excess burden and loss in consumer welfare, with e_1D indicating the amount of good Z that must be waived. The tax revenue is equal to e_1D per unit. When e_1D is multiplied by z, the amount of total tax revenue can easily be converted into monetary value. The tax revenue is equal to the equivalent variation, in which the imposition of the consumption tax has not created an excess burden; by contrast, it can be traded off with a gain in the tax revenue collected by the government, e_1D.

4.3.3 Theory of Consumer Behavior

Theory of consumer behavior portrays the reaction of consumers and producers to an adjustment in price and income. As rational individuals, consumers always try to maximize utility with infinite demand, but they face limited income. On the producer side, an affordable price is necessary to encourage consumers to buy more products to increase production and profit to the firm. On the government side, a shortage in resources could be covered by the government by borrowing either from domestic or foreign funds, which would subsequently affect economic agents, such as consumers and firms by increasing the tax rate and the prices of goods. Finally, the foreign sector or the rest of the world are interconnected to a country's economy through trading activities.

For consumers, price will increase as tax is levied, and with the same amount of income, their preferences on goods would be affected and they would buy fewer goods. Therefore, consumption expenditure reduces with the implementation of GST. For producers, as the price of final product increases because of GST, they may worry about the reduction in quantity demanded by consumers, an effect that will consequently reduce the firm's profit. The tax would likewise affect the firm in terms of the investment amount it can make. The government, on the other hand, will help consumers by setting the maximum price or ceiling price policy. For the foreign sector, to encourage local firms to expand their product overseas for trading, exported goods are zero-rated. In this case, GST would affect Malaysian trading, mainly the manufacturing sector.

4.3.4 General Equilibrium Theory

General equilibrium theory is an economic theory that discusses the way markets are organized for the equilibrium of production and consumption. Developing a model that attempts to consider the whole economic system is quite complicated. This theory can be a tool to analyze policy issues by applying actual economic data. This type of modeling approach is called AGE analysis, which was popularized by Shoven and Whalley. However, this model assumes perfect competition and that all markets are simultaneously achieving equilibrium (Arrow and Debreu, 1954; Salvatore, 2009). Based on Walrasian theory, general equilibrium can happen separately in two ways, namely, general equilibrium of exchange and general equilibrium of production, or they can happen simultaneously. For the purpose of this study, they are discussed separately.

4.3.4.1 General Equilibrium of Exchange

Figure 4.5 illustrates that assumption of the theory that the economy only has two individuals, A and B; and two commodities, X and Y, without any production, as shown in Equation 1.

$$Qi = \sum_{i=1}^{n} Xi, Yi \; \ldots\ldots\ldots\ldots\ldots Equation\ 1$$

The market is assumed to be working in perfect competition. Consumers will maximize their utility by choosing preferable goods. The indifference curves[15] of A_1, A_2 and B_1, B_2 belong to individuals A and B, respectively.

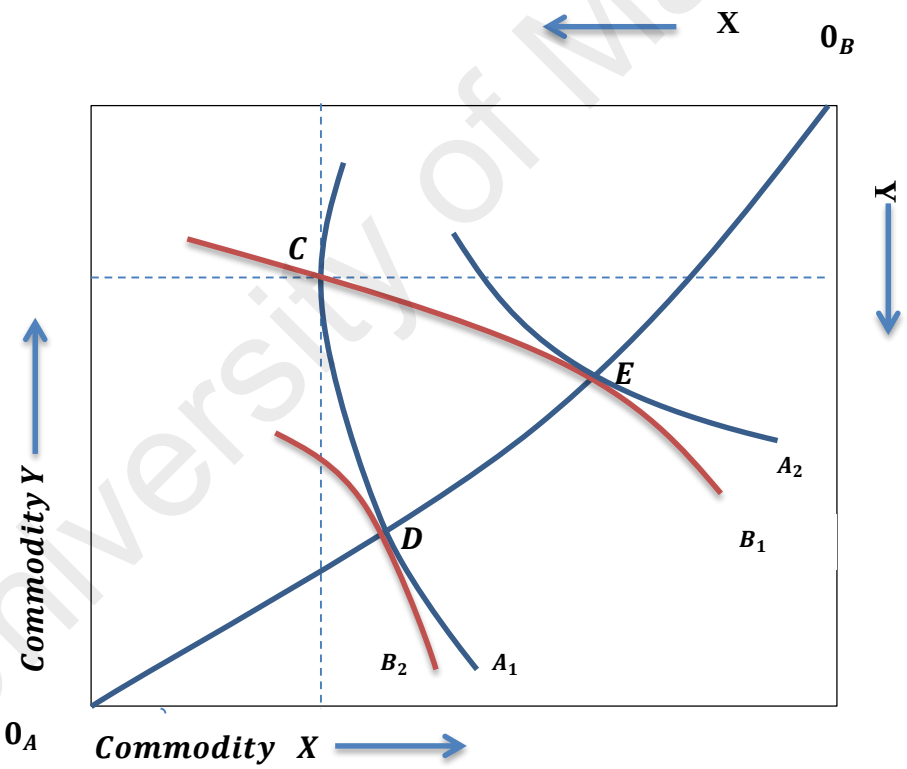

Figure 4.5: General Equilibrium of Exchange between Commodities X and Y

[15] Indifference curves represent each of the consumer's/producer's preferences, with both having the same preferences. The preferences are depicted by an indifference curve.

Figure 4.5 shows that any point inside the Edgeworth box indicates how the total amount of the two commodities is distributed between two individuals. The slope of marginal rate of substitution between commodity X and commodity Y (MRS_{xy}) differs at point C when both A_1 and B_1 are intersecting. However, they can reach points D and E, because MRS_{xy} is the same for individuals A and B when the point is located along the contract curve of $0_A DE0_B$. The contract curve shows the locus of tangencies of the indifference curve between two individuals. Individuals cannot be made better off without making the other worse off. The economy is in general equilibrium at points D and E.

4.3.4.2 General Equilibrium of Production

We assume this equilibrium involves production but not for exchange. The economy only produces two commodities (X and Y) by using two inputs (K and L) as shown in Equations 2 and 3. The producer will choose the best technique to maximize output.

$$Qi = \sum_{i=1}^{2} Xi, Yi \quad \ldots\ldots\ldots\ldots\ldots\ldots \textit{Equation 2}$$

$$Q_i = K_i^{\beta} L_i^{1-\beta} \quad \ldots\ldots\ldots\ldots\ldots \textit{Equation 3}$$

The above equations involve two isoquants for commodities X and Y, including X_1, X_2, and Y_1, Y_2.

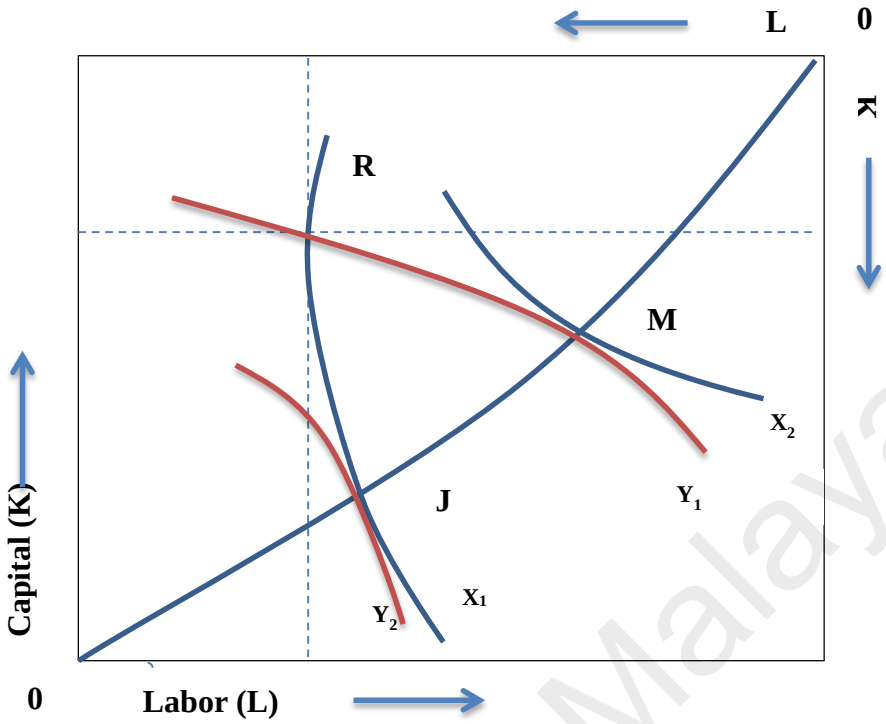

Figure 4.6: General Equilibrium of Production between Factor K and L

Figure 4.6 shows that any point inside the box indicates how the total amount of the two inputs is utilized in the production of two commodities. The slope of marginal rate of technical substitution between the labor for capital ($MRTS_{LK}$) differs at point R when both X_1 and Y_2 intersect. From point R, the economy can produce more of X, Y, or both by moving to point J or M. They can reach point J or M because $MRTS_{LK}$ is the same for factors L and K when the point is located along the contract curve of $0_X JM0_Y$. The contract curve for production is shown by the locus of tangencies of the isoquant curve between both commodities. The economy can only increase the output of one commodity by reducing the output of the other. The economy is in general equilibrium of production when $MRTS^{X_{LK}} = MRTS^{Y_{LK}}$ either at point J or M.

The basic idea behind theory of general equilibrium is how goods are allocated among all agents based on two sides: demand by consumers or supply by producers. Demand and supply in each market determine the equilibrium market price $\bar{P}$ and quantity $\bar{Q}$ as shown in Equations 4 and 5.

$$\bar{P} = f(dd, ss) \quad \text{.....Equation 4}$$

$$\bar{Q} = f(dd, ss) \quad \text{.....Equation 5}$$

General equilibrium analysis simultaneously examines the links among all inputs and commodities rather than study each market. For example, a change in price and quantity demanded for local automobiles will affect the price and quantity demanded for steel, glass, and rubber, which are considered inputs for that industry. Moreover, it will affect quantity demanded, the income of automobile labor, and the labor in other related industries. It will also indirectly affect the price and quantity demanded for gasoline and public transportation, as well as their incomes.

In the real world, economy includes households and firms and considers the choice of consumers in terms of the types of goods and services to purchase and their amount. It also provides hired labor in the market and capital for production activities. In turn, the workers will get the rewards in terms of wage and interest payment. Consumers can spend their money to purchase goods and services. However, such spending is subject to income level and factor endowments. The production that meets market demand will generate profit. Government spending is subject to the government revenue. Economic agents are interacting, whereby consumers try to fulfill their utility while firms maximize their profits. Despite this situation, not all agents are able to meet their

targets. However, general equilibrium theory links the consumer, firm, and market as a whole in the economy.

Therefore, theory of general equilibrium examines if there is shock in a particular market, which automatically affects other industries' activities. This thesis attempts to study the impact of tax policy changes in Malaysia in all sectors. If a sector is affected, it will also affect labor and capital, which are linked with the industry and will subsequently create a domino effect on the whole market and the economy. Therefore, this study examines the impact of GST on sectoral responses, macroeconomics variables, and household welfare.

4.4 Description of the Empirical Model

The empirical approach used in this study is a CGE model developed by Robinson, Kilkenny, and Hanson (1990) that has been used to analyze the impact of trade policy. The model comprises a set of nonlinear equations to be satisfied simultaneously with different orders of degrees. The production is assumed to have constant returns to scale, which means the increment of production will use the same cost amount. The model is static and can be applied to a small open economy.

The basic assumptions of the CGE model are roughly based on standard microeconomic assumptions. Data should be consistent with the equilibrium conditions, such as demands should be equal to supplies, which mean that all production must be consumed, and the profits are zero with revenues equal to costs. In addition, factor markets must be the same as the factor endowment. The factors of production, labor and capital, are assumed to be getting similar average wage or rental income, irrespective of sectors. There are no different skills among labor because all have similar skill levels.

The model used two factor inputs, labor and capital, and four agents in the economy: households, firms, governments, and the rest of the world. It includes three types of households classified according to income level: higher income, middle income, and lower income. Each household has a choice for different consumption goods. Firms are categorized into 15 sectors, which produce a certain number of products. From 124 groups of industries in the 2010 Malaysian Input-Output table, this study condensed it to 15 sectors.

Consumers try to maximize their utility while producers attempt to maximize profit, subject to budget allocation, production technology, and cost constraints. The market demand and supply achieve equilibrium with flexible price adjustments. The market is assumed to be a small open economy that does not have any impact on the rest of the world.

Optimizing the behaviors of the consumers, producers, and the government is simulated, and all transactions in the circular flow of income are captured. Producers minimize the costs subject to a production function by applying constant elasticity of substitution (CES) in the function. It shows that all local products used domestically and imported goods are imperfectly substituted. In CGE literature, this is known as the "Armington assumption." Another assumption is the constant elasticity of transformation (CET). It represents the total sectoral output, which is supplied to the export and domestic markets.

4.5 Basic Structure of the CGE Model

Five equation blocks are required in CGE modeling; price block, production block, income and savings block, expenditure block, and system constraint block.

4.5.1 Price Block

The price system in the model is rich, mainly due to the assumed quality differences among commodities of different origins and destinations, including imports, exports, and domestic outputs used domestically.

Market demand and supply achieve equilibrium with flexible price adjustments. Therefore, import price is exogenously taken in the model. Based on Robinson, Yu´nez-Naude, Hinojosa-Ojeda, Lewis, and Devarajan (1999), the domestic prices of imports (PM_i) are determined by world prices of import (*pwm*), exchange rate (*EXR*), and import tariff (t^m), as shown in Equation 6.

$$PM_i = pwm_i\,(1 + t_i^m)EXR \ldots\ldots\ldots\ldots\ldots \textit{Equation 6}$$

On the export side, the country's export demand function is downward sloping, so the world prices of export (*pwe)* are endogenous. Equation 7 shows that domestic prices of exports (PE_i) are determined by world prices of export (*pwe)*, exchange rate (*EXR*), and export subsidy (t^e).

$$PE_i = pwe_i\,(1 + t_i^e)EXR \ldots\ldots\ldots\ldots\ldots \textit{Equation 7}$$

The zero homogeneity of demand function and the linear homogeneity of profits in prices imply that only relative prices are significant in this model. Absolute price level has no impact on the equilibrium outcome. Equilibrium in this model is characterized by a set of prices and levels of production such that market demand equals market supply for all commodities (Arrow and Hahn, 1971).

Price of Composite Goods for Commodities Q. Q represents the constant elasticity of substitution (CES), aggregation of sectoral imports (M), and domestic goods supplied to

the domestic market (D). The price of composite goods for commodities Q can be derived as in Equation 8.

$$PQ_i = \frac{PD_i.D_i + PM_i.M_i}{Q_i} \ldots\ldots\ldots\ldots\ldots \textit{Equation 8}$$

where $PQ_{i,}$ PD_i, and PM_i denote the price of composite goods for commodities Q, the price of domestic output, and the price of imported product for sector i, respectively; while $Q_i, D_i,$ are M_i are the quantities produced by them.

Price of Composite Goods for Commodities X. X is the total sectoral output, which is a constant elasticity of transformation (CET) aggregation of goods supplied to the export market (E) and goods sold to the domestic market (D). The price of the composite goods for commodities X can be derived as in Equation 9.

$$PX_i = \frac{PD_i.D_i + PE_i.E_i}{X_i} \ldots\ldots\ldots\ldots\ldots \textit{Equation 9}$$

where $PX_{i,}$ PD_i, and PE_i denote the price of composite goods for commodities X, the price of domestic output, and the price exported product for sector i, respectively; while $X_i, D_i,$ and E_i are the quantities produced by them.

Aggregate Price Index is defined in the GDP deflator as nominal GDP ($GDPVA$) divided by real GDP ($RGDP$).

$$PINDEX = \frac{GDPVA}{RGDP} \ldots\ldots\ldots\ldots\ldots \textit{Equation 10}$$

The GDP deflator is an index that provides the numeraire price level against all relative prices in the model. The CGE model's core can only determine relative price, therefore the numeraire is necessary.

4.5.2 Production Block

In this model, the economy consists of 15 production sectors, and the commodities produced are consumed by households and the government. Composite goods produced in each sector can be transformed into exported goods or commodities sold in a domestic market. These are perfectly mobile across sectors. Other inputs into the production structure are the domestic and imported intermediates, which are also imperfectly substitutable for each other.

Each production activity is assumed to combine the primary factors, labor and capital, in a constant return to scale using the Cobb-Douglas production function to produce the final product. Total production of domestic output X_i is given as in Equation 11.

$$X_i = AK_i^{\beta} L_i^{1-\beta} \ldots\ldots\ldots\ldots\ldots Equation\ 11$$

The industries in the model also use domestic and imported commodities by CES function. The nested structure of the production in a CGE model is presented in Figure 4.7.

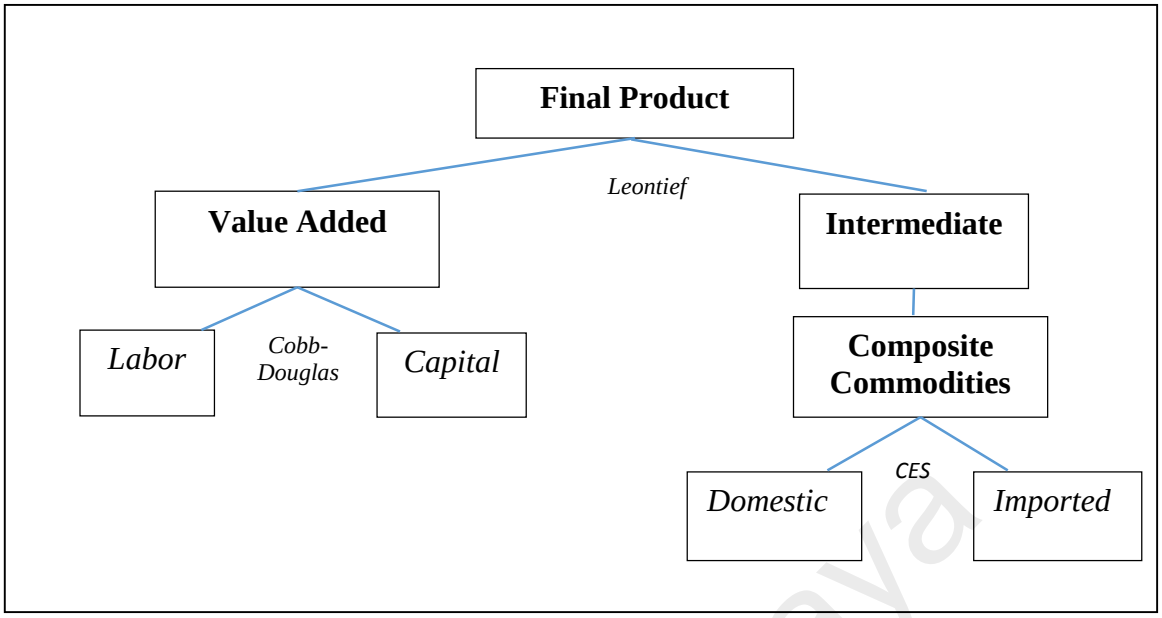

Figure 4.7: Nested Production Structure in the Economy

Figure 4.7 presents the production structure in the economy. The sources of production activities are from value added and intermediate inputs. Value added are production factors that consist of labor and capital via the Cobb-Douglas function. Intermediate inputs are the supply of different kinds of commodities. The domestic and imported intermediate inputs are called composite goods. All producers face a two-level nested *Leontief/CES* production function.

4.5.3 Income and Savings Blocks

This section explains the factor income and savings of institutions. There are income and savings made by households, firms, and government. The factor income consists of capital and labor shares. It is a function of wage, and the share of each factor *f* from factor income in sector *i*.

$$YF_F = \sum_i WF \,.\, FDSC_{if} . wfdist_{if} \ldots\ldots\ldots\ldots\ldots Equation\ 12$$

where YF_f is the factor income received by each factor, WF is wage, $FDSC$ is factor demand, $wfdist_{if}$ is the share of factors, and *f* is from the factor income in sector *i*.

The *received income of household* (YH_{hh}) is derived from selling their own factors, such as labor and capital (YF_f). It is the function of wage and the share of each factor *f* from factor income of each sector *I*, transfers from government ($GOVTRN$), and factor income from abroad ($FACTIN$).

$$YH_{hh} = \sum_f hhdis_{hhf} + gtrn_{hh}.GOVTRN + ctrn_{hh}.YCORP.(1 - ctax).(1 - csav) + sfin_{hh}.FACTIN.EXR \ldots\ldots\ldots\ldots\ldots\ldots Equation\ 13$$

where $hhdis_{hhf}$ denotes the share of factor f income received by the household, $gtrn_{hh}$ is government share, $ctrn_{hh}$ is household share, and hh is from government transfers, $sfin_{hh}.FACTIN$ is company income and factor income from abroad, which includes exchange rate and EXR. The $ctax$ and $csav$ are the income taxes and propensity to save of companies, respectively.

Corporate income ($YCORP$) is derived from the receipts of capital income (YF_k) and the interest income ($INTERS$) from loans to government minus outflow in the form of repatriated profits ($REPAT$).

$$YCORP = YF_k - EXR.REPAT + INTERS_{corp} \ldots\ldots\ldots\ldots\ldots Equation\ 14$$

Government revenue (GR) is drawn from two sources, direct taxes and indirect taxes. Direct taxes consist of three types of taxes collected by the government, namely, household income tax ($hhtax$), corporate tax ($cortax$), and petroleum tax ($pettax$),

while indirect taxes include tariff ($tariff$), goods and services taxes ($gsttax$**),** and export tax ($exptax$). We assume excise duties do not significantly contribute to government revenue because it contributed to the lower portion of total indirect tax revenue. In this model, total government spending equals government revenue (GR) from different types of taxation.

The function of each tax can be written as follows.

The government collects *household income tax* based on household income. The total income tax collected by the government is described in Equation 15.

$$hhtax = \sum Y_{hh} * T_{hh} \ldots\ldots\ldots\ldots\ldots Equation\ 15$$

where Y_{hh} is a household income, and T_{hh} is a tax rate.

Equation 16 is a *corporate tax* collected based on corporate income.

$$cortax = \sum Ycorp * tc \ldots\ldots\ldots\ldots\ldots Equation\ 16$$

where $Ycorp$ is corporate income, and tc is corporate tax rate.

As for the *petroleum tax,* it is assumed that the government collects oil revenue in a fixed proportion rate, *tp,* based on the gross income of the major local oil company, PETRONAS. Therefore, the oil revenues can be defined as in Equation 17.

$$pettax = \sum Yi_p * tp \ldots\ldots\ldots\ldots\ldots Equation\ 17$$

where Yi_p is petroleum gross income, and tp is oil tax rate.

For *tariff*, imports can be subjected to VAT as well as ad valorem tariffs. Therefore, tariff revenues are calculated on the value of imports as in Equation 18.

$$tariff = \sum M * tm * pwm * exr \quad \text{.....Equation 18}$$

where M is an import volume, tm is a tariff rate, pwm is a world price import, and exr is the exchange rate.

In Equation 19, the firms apply the *goods and services tax* to their domestic sales.

$$gsttax = \sum Xi * tg \quad \text{.....Equation 19}$$

where Xi is the total taxable output, and tg is GST rate.

Export duties are collected based on the export value as in Equation 20.

$$exptax = \sum E * te * pwe * exr \quad \text{.....Equation 20}$$

where E is export volume, te is export rate, pwe is world price export, and exr is exchange rate.

Therefore, the government sector derives its revenue based on the sum of the six tax revenues specified in Equation 21.

$$GR = hhtax + cortax + pettax + tariff + gsttax + exptax \ldots\ldots\ldots\ldots\ldots Equation\ 21$$

Household savings is derived from the marginal propensity to save (mps) out of the after-tax income in Equation 22. mps and company savings rate ($csav$) are computed from the 2010 Malaysia SAM[16]. The corporate savings formula is shown in Equation 23.

$$HHSAV = \sum_h YH_h \,.\left(1 - \tau_h^h\right).mps_h \ldots\ldots\ldots\ldots\ldots Equation\ 22$$

$$CORSAV = YCORP.(1 - ctax).csav \ldots\ldots\ldots\ldots\ldots Equation\ 23$$

$$SAVINGS = HHSAV + CORSAV + GOVSAV + FSAV.CUREXR \ldots\ldots\ldots\ldots\ldots Equation\ 24$$

The total savings ($SAVINGS$) is derived from Equations 22 and 23. Equation 38 is the sum of household savings ($HHSAV$), corporate savings ($CORSAV$), government savings ($GOVSAV$), and foreign savings ($FSAV.CUREXR$).

4.5.4 Expenditure Block

Domestic demand includes household consumption (C), investment demand (I), government expenditure (G), and intermediate demand. GDP is the sum of domestic demand.

[16] This represents the flows of all economic transactions that take place within an economy. The matrix representation of the National Accounts is for a given country but can be extended to include non-national accounting flows and can be created for whole regions or areas.

4.5.4.1 Domestic Demand

Total *domestic demand* consists of four components: household expenditure, investment demand, government spending, and intermediate demand. All the components yield a fixed nominal expenditure share. For instance, household spends for paying income tax and saves a fixed share of disposable income.

Household expenditure functions are derived from a linear expenditure system (LES) demand function. It is determined using fixed expenditure shares as described in Equation 25.

$$QH_{ch} = \frac{\beta_{ch} \cdot (1 - mps_h) \cdot (1 - ty_h) \cdot yh_h}{PQ_c} \quad \ldots\ldots\ldots\ldots\ldots Equation\ 25$$

where QH_{ch} is a household consumption; PQ_c is a price of composite goods; β_{ch} is expenditure shares; and $mps_h, yh_h,$ and ty_h denote household savings rate, income, and income tax rate, respectively.

Equation 26 specifies total nominal fixed investment ($FXDINV$) as a total nominal investment ($INVEST$) minus the change in inventory stocks ($PQ_i.STK_i$).

$$FXDINV = INVEST - \sum_i PQ_i \,.STK_i \ldots\ldots\ldots\ldots\ldots Equation\ 26$$

Equation 27 defines investment allocation by destination (DK) using fixed shares (zz) computed from the SAM database.

$$DK_i = \frac{zz_i.FXDINV}{\sum_j ccmat_{ij}.PQ_j} \ldots\ldots\ldots\ldots\ldots Equation\ 27$$

The demand for investment goods by sector of origin (ID_i) is defined in Equation 28 using the capital composition matrix ($ccmat$). The matrix determines the composition of capital goods demand arising from a unit of investment in each sector.

Sectoral investment is exogenously determined and has no impact on current production and demand in a static model because it is installed in the next period. It affects the final demand in the current period only if the capital composition coefficients vary across sectors. In the present model, capital is heterogeneous.

$$ID_i = \sum_j ccmat_{ij} \, . \, DK_j \ldots\ldots\ldots\ldots\ldots \textit{Equation 28}$$

Total spending of the *government* on goods and services is exogenously fixed because the government decides the amount for purchasing commodities. Government expenditure (*GE*) consists of transfer payments (tr), expenditure on goods and services ($P_c Q_c$), government savings ($GOVSAV$), and interest payment on foreign borrowing (i), as shown in Equation 29.

$$GE = \sum tr + \sum P_c \, Q_c + \sum GOVSAV + \sum i \ldots\ldots\ldots\ldots\ldots \textit{Equation 29}$$

Intermediate demand is calculated from sectoral output, subject to fixed input-output coefficients. Total composite demand is broadly grouped into total domestic demand and total import demand. Figure 4.8 shows the nested structure of demand in the economy.

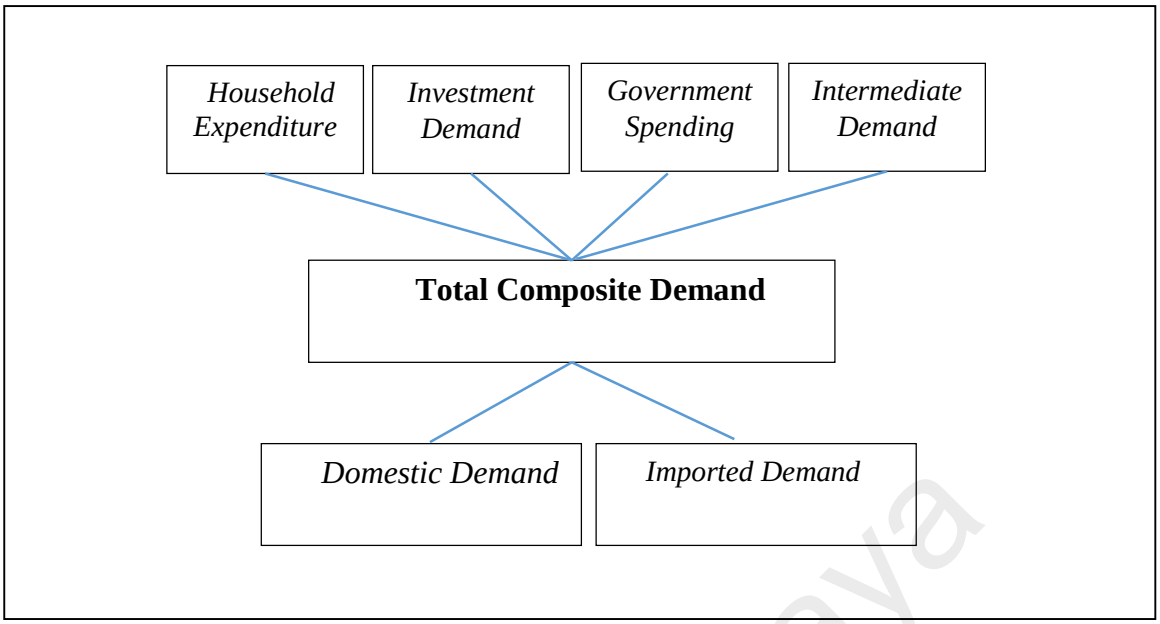

Figure 4.8: Nested Demand Structure in the Economy

Figure 4.8 shows the economy's demand structure. Total composite demand consists of household expenditure, investment demands, government spending, and intermediate demands. These four components have a fixed share. For example, the demands for government expenditure are exogenously fixed because government decides how much to demand. Total composite demand is then divided into two forms, domestic and imported demands.

A multi-level nesting of all factors of production constructs the sectoral output. Each sector decides how much of the sectoral output will be produced as exports or domestic products for domestic consumption, which are imperfect in supply. The households and government consume composite consumption goods, which are the combination of domestic and imported goods, as shown in Figure 4.8. The world prices of exports and imports are assumed to be exogenous owing to the small country assumption. Trade is taxed via tariffs on imports.

4.5.5 Real GDP

The sum of expenditures is the real GDP ($RGDP$). $RGDP$ is defined from the expenditure side using the familiar national accounting equation $RGDP = C + I + G + E - M$, as shown in Equation 30.

$$RGDP = \sum_i (CD_i + ID_i + GD_i + STK_i + \sum_{ie} E_{ie} - \sum_{im} (1 - tmreal_{im}). M_{im} \ldots\ldots\ldots\ldots\ldots Equation\ 30$$

4.5.6 Household Welfare

The welfare measurement is explained using the CGE model assumption.

4.5.6.1 Welfare Measurement

Many economist researchers have discussed the methods for measuring the welfare impacts of fiscal policies for decades. Some measurements of welfare impacts by policy changes have been developed. Most of the studies focused on measuring the welfare cost of taxes conducted by totally removing the existing tax and replacing it with another tax, assuming that the equal-yield revenue is maintained (Ballard, Fullerton, Shoven & Whalley, 1985; De Melo and Tarr, 1992).

Most CGE modelers who conduct this type of study use the equivalent variation to measure welfare changes of alternative tax policy (Ballard, 1988; Ballard, Fullerton, Shoven, & Whalley, 1985; De Melo and Tarr, 1992). Shoven and Whalley (1992) also applied this equivalent variation in the model of general equilibrium. As measured by Hicksian, equivalent variation refers to the changes in the total household consumption associated with welfare changes. The formula can be referred to in Equation 34.

Therefore, in the present study, the equivalent variations are applied to measure the welfare changes of GST. The formula can be written as in Equation 31.

$$EV_h = \frac{U_h^1 - U_h^0}{U_h^0} (Y_h - hhsav)^0 \ldots\ldots\ldots\ldots\ldots Equation\ 31$$

where U is household utility, U_h^0 and U_h^1 are for utility before and after shock, Y is household income level, $hhsav$ is household savings, and $(Y_h - hhsav)^0$ is the old expanded income. In this study, shock is referred to as changes in the rates of the imposed GST.

For utility function (UU), it is derived from some variables, such as household consumption, household income, and GST tax, as shown in Equation 32.

$$UU(hh) = \frac{prod_i(hhcles_i(hh)*(1-mps(hh)))*(Yh_t(hh)*(1-tg(hh)))}{PQ(i)^{hhcles(i,hh)}} \ldots\ldots\ldots\ldots\ldots Equation\ 32$$

where $hhcles$ is household consumption share, mps is marginal propensity to save, Yh is household income, and tg is GST rate. hh is referred to as low-, middle-, and high-income groups (refer to Section 4.6.2). PQ is the price of composite goods.

On the basis of the calculation, when there is a shock in the economy, for instance, the changes in GST rate, the study can determine which household income group will be the most and the least affected. Such outcome will depend on each group's level of sensitivity toward this function.

Equation 33 is the function of private consumption demand by households ($CDEQ$).

$$CDEQ(i,t) = \frac{SUM_{hh}(hhcles_i(hh)*(1-mps(hh)))*(Yh_t(hh)*(1-tg(hh)))}{PQ(i,t)} \ldots\ldots\ldots Equation\ 33$$

Equations 31 to 33 are the derived functions for the measurement of welfare using equivalent variations.

4.5.7 System Constraint Block

The model economy must satisfy a number of system constraints, including market clearing conditions and the choice of macro closure for the model.

Composite Commodity Markets. Product market equilibrium is defined in Equation 34, which states that the sectoral supply of composite commodities must equal demand.

$$Q_i = INTM_i + CD_i + GD_i + CD_i + ID_i + STK_i \ldots\ldots\ldots\ldots\ldots Equation\ 34$$

The sectoral prices and quantities are equilibrating variables. Although there is an equivalent sectoral market-clearing condition for output sold in the domestic market (D), it is redundant because it is implicit in the clearing of composite goods markets (Q_i) and the assumption that a constant ratio of imports to domestic goods applies across all categories of demand (Robinson et al., 1999).

Factor market equilibrium is given by Equation 35. In the equilibrium, total factor supply equals demand.

$$\sum_i FDSC_{if} = FS_f \ldots\ldots\ldots\ldots\ldots Equation\ 35$$

The supplies of labor and capital are mobile in the long run. In this model, capital stocks are exogenously fixed to reflect its rigidities in short-run allocation. In the long-run closure, mobility in all factors is assumed.

Current Account Balance. The current account balance (expressed in terms of foreign currency) indicates the country's expenditure to the rest of the world and must be equal to the country's income in foreign currency. This means spending for imports and factor income outflows must equal to income from exports and factor income inflows (foreign saving, $FSAV$). For the basic version of the model, $FSAV$ is fixed and the real exchange rate (EXR) plays the role of balancing variable in the current account, as in Equation 36.

$$pwm_{im}.M_{im} = pwe_{ie}\,.E_{ie} + FSAV \quad \ldots\ldots\ldots Equation\ 36$$

Equation 37 defines the government budget's balance:

$$GOVSAV = GR - \sum_i PQ_i\,.GD_i - EXR.INTERS_{br} - INTERS_{comp} \ldots\ldots\ldots\ldots\ldots Equation\ 37$$

In this equation, government savings are expressed as total government receipts less the purchases of goods and services and the interest payments ($INTERS$) for the government's debt.

Savings–Investment Balance. Equation 38 determines the savings–investment balance. Out of the four savings' variables, only government savings is endogenously determined.

$$SAVING = INVEST \ldots\ldots\ldots\ldots\ldots Equation\ 38$$

The model is savings-driven, in which the aggregate investment is determined by aggregate savings. This is commonly referred to as the neoclassical closure in CGE literature.

As in most CGE models, Equation 38, which defines the savings–investment balance, is dropped so that the number of equations is equal to the number of endogenous variables. A full listing of the model's parameters and variables is presented in Tables 4.1 and 4.2.

Table 4.1: Specification of Variables in the Model

Variables	Definition	Variables	Definition
EXR	Exchange rate	$WFDIST_{i.f}$	Factor price sectoral proportionality ratios
PDi	Domestic prices	YF_f	Factor income
PEi	Domestic price of exports	CD_i	Final demand for private consumption
$PINDEX$	Consumption price index	$CORSAV$	Corporate savings
$PINDOM$	Domestic price level	GD_i	Final demand for government consumption
PKi	Price of composite capital goods	DK_i	Volume of investment by destination
PMi	Domestic price of imports	$FXDINV$	Fixed capital investment
PQi	Price of composite goods	$GDPVA$	Value added in market prices: GDP
PVi	Value added price by sector	$GOVCON$	Total volume of government consumption
$PWEi$	World price of export	$GOVSAV$	Government savings
PXi	Average output price by sector	$GOVTRN$	Government transfers
P_j	Prices by sector	GR	Government revenue
Di	Domestic sales of domestic output	$HHSAV$	Total household savings
Ei	Exports by sector	ID_i	Final demand for productive investment
Mi	Imports by sector	$HHTAX$	Household income tax
Qi	Composite goods supply	$CORTAX$	Corporate tax
Xi	Domestic output by sector	$PETTAX$	Petroleum tax
FS_f	Factor supply	$TARIFF$	Tariff
$FDSC_{i.f}$	Factor demand by sector	$GSTTAX$	Goods and services tax
WF_f	Average factor price	$EXPTAX$	Export tax
$INTM_i$	Intermediates uses	$FACTIN$	Interest from abroad
$INVEST$	Total investment	$CURACT$	Current account
MPS_h	Marginal to save by household type	$BORROW_{br}$	Current borrowing
$RGDP$	Real GDP	$INTERS_{br}$	Interest payment on foreign debt
$SAVING$	Total Savings	$REMIT$	Remittance from abroad
$YCORP$	Corporate income	$CUREXT$	Nominal exchange rate

Source: Robinson et al. (1999).

Table 4.2: Specification of Parameters in the Model

Parameters and scalars	Definition	Parameters and scalars	Definition
$\boldsymbol{CSAV}$	Saving rate for corporation	$SUMSH$	Sum of share correction parameter
$\boldsymbol{CTAX}$	Tax rate for corporate income	$SUMHHSH_h$	Sum of share for h consumption shares
$\boldsymbol{CTRN_h}$	Share of distributed corporate income	$SUMCCSH_i$	Sum of share for ccmat and 10 tables
$\boldsymbol{DEVBUD}$	Development budget as reported by government	$TMREAL_i$	Real tariff rate
$\boldsymbol{GG_i}$	Government consumption shares	WTD_i	Domestic price index weights
$\boldsymbol{GTRN_h}$	Share of government subsidies	WTQ_i	Composite price index weights
$\boldsymbol{INV_i}$	Ratio of inventory investment to gross output	$io_{i,j}$	Input-output coefficients
$\boldsymbol{\rho_i^c}$	Armington function exponent	$ROUTIN$	Government routine expenditures
$\boldsymbol{\rho_i^e}$	Export demand price elasticity	$SFIN_h$	Share of foreign income for each household
$\boldsymbol{\rho_i^t}$	CET function exponent	ZZ_i	Share of investment by sector of destination
$\boldsymbol{\rho_i^v}$	Value added function exponent	α_i	Utility function exponent
$\boldsymbol{\delta_j^{mt}}$	Share parameter for CES production function for material aggregate	th_i	Household income tax rate
$\boldsymbol{\alpha_j^{mt}}$	Shift parameter for CES production function for material aggregate	tp_i	Petroleum tax rate
$\boldsymbol{\beta_i^c}$	Armington function share parameter	tm_i	Tariff rate
$\boldsymbol{\alpha_i^c}$	Armington function shift parameter	tg_i	GST rate
$\boldsymbol{\alpha_i^t}$	CET function shift parameter	te_i	Export tax rate
$\boldsymbol{\alpha_i^v}$	Value added function shift parameter	β_i^t	CET function share parameter
$\boldsymbol{\alpha_i^x}$	Production function shift parameter	β_{if}^x	Production function share parameter

Source: Robinson et al. (1999).

4.6 Sources of Data Collection

Data are obtained from various sources, such as Malaysian Input-Output Table for 2010, Malaysian HIS for 2012, HES for 2009, Bank Negara Statistics for 2010, Balance of Payment for 2010, Labor Force Survey for 2010, and National Accounts for 2010. The data were combined to form a consistent benchmark dataset.

As mentioned in the background of the studies, one reason for GST implementation was to address the estimated 30 percent shadow economy in Malaysia. The number is quite a sizable component of the economy. However, it is not accounted for in the CGE model in this thesis because the origin of the sectors could not be traced. For the 30 percent that was randomly included in the model, the results would have changed but only marginally owing to the scattered sectors. The portion changes in each sector would have been insignificant as well.

4.6.1 Input-Output Table 2010

The 2010 input-output table consists of 124 × 124 activities–commodities. From 124 industries listed in the table, the economy is aggregated into 15 sectors as follows: agriculture and mining (2 sectors), industrial and manufacturing (7 sectors), and services (6 sectors). These sectors are classified by commodity classes. They are designed to meet the objective of the study and determine the interactions of the tax policy toward all sectors in the economy. The sectors and their range of components are shown in Table 4.3.

Table 4.3: Aggregated Sectors in the Model

No	Aggregated Sectors	Sectors in 2010 Input-Output
1	Agricultural, Forestry, and Logging	1–12
2	Crude Oil, Natural Gas, and Mining	13–16
3	Food Processing	17–29
4	Textiles and Leather Industries	30–35
5	Petroleum Refinery	44
6	Chemicals and Rubber Processing	45–55
7	Cement, Lime and Plaster, Clay and Ceramic	56–59
8	Iron and Steel Products	60–64
9	Manufacturing	36-43 and 65–85
10	Electricity and Gas	86
11	Wholesale and Retail Trade	87–95
12	Land, Water, Air, and Other Transport Services	96–101
13	Communication and ICT	102–106
14	Financial Institution and Insurance	107–110
15	Other Services	111–124

Source: Author's aggregation

The data from the input-output table were not enough to construct a SAM. Therefore, other data, such as household income, household expenditure, labor force, and taxes, were needed. Although the EPU provided the 2005 SAM for the Malaysian economy, the database was not published. Therefore, the 2010 input-output were applied and the data were compiled from various sources, similar to what was required for the SAM construction. The aggregated SAM for Malaysia in 2010 is shown in *Appendix D*.

The general algebraic modeling system (GAMS) software is used to solve nonlinear equations and mixed-integer problems for data analysis purposes. GAMS is the main instrument used to analyze the objectives of the study. It makes economy-wide complex

mathematical models such as CGE model easier to construct. The CGE model has been a standard tool of empirical economic analysis over the past 25 years.

The CGE model is applicable to various fields of study. In the current study, the CGE model applied is based on the 1990 USDA/ERS model version. The said model was introduced by Sherman Robinson, Kenneth Hanson, and Maureen Kilkenny and was applied in the case of the United States. This model generally uses the same fundamental data as other models, such as input-output coefficient, prices, production, income, and consumption. However, the approaches for running the models are different.

Robinson model requires more data such as capital composition matrix, factor demand by sector, factor income by sector, household consumption shares, miscellaneous household parameter, household distribution of income, sectoral quantities and prices, sectoral taxes, miscellaneous parameters, sectoral elasticities, and parameter scales data. These data are placed individually in the GAMS program. They are placed separately, section-by-section, and are not utilized for the whole SAM as with other models. This is the main difference between the model produced by Robinson (1990) and other CGE models created by Hans Lofgren, Rebecca Lee Harris, and Sherman Robinson (2002).

The unique attributes to using the Robinson model are as follows: (1) major data are taken from the input-output table; (2) SAM construction is not required because the data are placed separately, section-by-section in the GAMS; and (3) the model is detailed, comprehensive, and requires long commands (Robinson et al., 1990).

4.6.2 Social Accounting Matrix

The social accounting matrix (SAM) is widely used as base data for calibration. Although the Economic Planning Unit (EPU) constructed the 2005 SAM for the Malaysian economy, the database was not officially published. Therefore, the author used an alternative database, the 2010 input-output table, to construct the SAM.

In the SAM construction, the 2010 input-output table is employed and the data are compiled from many sources as needed. However, given that the data of the input-output table are insufficient for the construction, other data are required, such as national accounts, government accounts, household income and expenditure, and balance of payment. Further details are discussed in Section 4.6.

The data on household consumption are disaggregated into three types of households, namely, higher-, middle-, and lower-income groups. The shares of each group are based on the consumption shares of 48, 36, and 16 percent, comprising the higher-, middle-, and lower-income groups, respectively. Details are presented in Table 4.9.

Table 4.4: Share of Household Consumption (RM Million)

Sectors	Households		
	Higher Income	Middle Income	Lower Income
Agricultural, Forestry, and Logging	9429.524	7072.143	3143.175
Crude Oil, Natural Gas, and Mining	65.208	48.906	21.736
Food Processing	18879.510	14159.630	6293.170
Textiles and Leather Industries	2541.062	1905.797	847.021
Petroleum Refinery	9181.698	6886.274	3060.566
Chemicals and Rubber Processing	2259.720	1694.790	753.240
Cement, Lime and Plaster, Clay and Ceramic	362.672	272.004	120.891
Iron and Steel Products	87.772	65.829	29.257
Manufacturing	7151.380	5363.535	2383.793
Electricity and Gas	5418.428	4063.821	1806.143
Wholesale and Retail Trade	45470.400	34102.800	15156.800
Land, Water, Air, and Other Transport Services	7050.318	5287.738	2350.106
Communication	13969.390	10477.040	4656.464
Financial Institution and Insurance	17429.970	13072.480	5809.989
Other Services	31856.990	23892.740	10619.000

Source: Author's Calculation

To construct the SAM, other data such as value added, labor, and capital income should be calculated as well. Value added is the total value added from each sector of the economy. It is calculated based on the 2010 input-output data. Labor income is calculated from the total compensation of employees in the input-output table. Capital income is generated from operating surplus in the same source of input-output table. Table 4.5 reports the data for value added, labor, and capital income.

Table 4.5: Value Added, Labor, and Capital Income (RM Million)

Sectors	Value Added	Labor Income	Capital Income
Agricultural, Forestry, and Logging	37041.040	13908.680	61992.630
Crude Oil, Natural Gas, and Mining	12079.540	4906.893	81471.460
Food Processing	141006.900	6934.224	15896.730
Textiles and Leather Industries	5504.906	1319.901	3265.925
Petroleum Refinery	59555.370	2871.626	20006.490
Chemicals and Rubber Processing	72633.590	6592.928	16361.290
Cement, Lime and Plaster, Clay and Ceramic	15633.950	1591.650	3223.042
Iron and Steel Products	29735.550	3830.037	8849.907
Manufacturing	111699.500	29211.610	64166.630
Electricity and Gas	53914.180	17908.500	25007.470
Wholesale and Retail Trade	95320.100	41951.820	92081.410
Land, Water, Air, and Other Transport Services	37403.250	6659.984	17663.750
Communication	43965.570	7414.071	24294.620
Financial Institution and Insurance	57676.720	22261.650	37798.190
Other Services	89058.940	92973.740	62527.250

Source: Author's Calculation

Government consumption, investment, export, and import by sector are generated based on the 2010 input-output table. Government consumption, export, and import are accounted directly from the corresponding input-output table data. However, the total investment by sector is estimated by adding up the gross fixed capital formation (GFCF) and the change in inventories. Some of the investment value is negative because of the negative value of the inventory, which is greater than the GFCF. The results of these calculations are reported in Table 4.6.

Table 4.6: Government Consumption, Investment, Export, and Import (RM Million)

Sectors	**Government Consumption**	**Investment**	**Export**	**Import**
Agricultural, Forestry, and Logging	0.000	3856.866	16317.753	11033.420
Crude Oil, Natural Gas, and Mining	0.000	-399.722	41854.083	6295.654
Food Processing	0.000	4944.719	66533.872	19164.265
Textiles and Leather Industries	0.000	-1487.449	6211.250	3314.076
Petroleum Refinery	0.000	-112.496	43764.654	21943.129
Chemicals and Rubber Processing	0.000	3103.385	59825.300	36437.844
Cement, Lime and Plaster, Clay and Ceramic	0.000	125.400	3853.579	4626.087
Iron and Steel Products	0.000	2894.359	23775.737	26620.026
Manufacturing	0.000	18608.817	276037.889	165475.133
Electricity and Gas	0.000	55756.664	6878.653	20564.515
Wholesale and Retail Trade	0.000	13436.553	53903.153	32755.546
Land, Water, Air, and Other Transport Services	0.000	1028.627	21897.481	13574.613
Communication	0.000	-1.502	10444.482	9692.982
Financial Institution and Insurance	0.000	0.000	8757.985	3495.675
Other Services	101379.562	7702.997	15579.784	25156.134

Source: Author's Calculation

Data on savings, companies, and government transfer are also gathered. Data on household savings are obtained as a residual of total receipts minus consumption and taxes. Table 4.7 reports the data on households, firms, and government savings. Furthermore, transfer from companies to households mainly serves as a link between factor income accruing to capital and institutions. Therefore, it has been estimated from total companies transfer to households. The shares of companies and government transfers to household income are calculated based on the income shares of 65, 25, and 10 percent of higher-, middle-, and lower-income groups, respectively. Details can be referred to in Table 4.9. Therefore, the data on savings, companies, and government

transfer are adopted in the 2010 SAM to obtain consistent data in the SAM. Table 4.7 shows the results of these estimations.

Table 4.7: Calculation of Dataset for Households, Firms, and Government (RM Million)

		Savings	**Company Transfer**	**Government Transfer**
Household	Higher	2937.918	109232.700	8499.135
	Middle	1129.968	42012.580	3268.898
	Low	451.987	16805.030	1307.559
Firm		117171.500	-	-
Government		9683.846	-	-

Source: Author's Calculation

On the basis of the corresponding data calculated above, all the data are combined to form a consistent benchmark dataset included in a SAM. The aggregated SAM for this study can be referred to in Appendix E.

4.6.3 Calibration of Parameters

Calibration is performed to estimate the related coefficient parameters or benchmark data if data are lacking in order to standardize the parameters used in the calibration technique. The accurate estimation of the model parameters is crucial to ensure consistent results. Two types of parameter estimates are widely used by researchers to develop computable general equilibrium (CGE) models: the econometric approach and the calibration method, which enables static module equations to generate a base-year equilibrium observation or a short-run solution (Sánchez and Vos, 2007).

Other than endogenous and exogenous variables in the equations, there are also parameters that are treated as constants. Many parameters, such as tax rates, are

estimated using only the information contained in the benchmark data. These parameters cannot be calculated from SAM data. For some parameters, such as elasticity of substitution, they can either be estimated using benchmark data or gathered directly from previous empirical studies.

The exponents of Armington and CET functions used in this model are based on the elasticities of Armington and CET functions employed by Al-Amin (2008). The elasticities of substitution for the Armington function (σ_i^c) and the CET function (σ_i^t) are reported in Table 4.8.

Table 4.8: Elasticities for the Armington and CET Functions

Sectors	$\boldsymbol{\sigma_i^c}$	$\boldsymbol{\sigma_i^t}$
Agricultural, Forestry, and Logging	0.9	0.6
Crude Oil, Natural Gas, and Mining	0.9	0.9
Food Processing	1.2	1.2
Textiles and Leather Industries	0.7	0.7
Petroleum Refinery	0.6	0.6
Chemicals and Rubber Processing	0.7	0.7
Cement, Lime and Plaster, Clay and Ceramic	0.7	0.7
Iron and Steel Products	0.7	0.7
Manufacturing	0.7	0.5
Electricity and Gas	0.9	0.5
Wholesale and Retail Trade	0.5	0.5
Land, Water, Air, and Other Transport Services	0.5	0.5
Communication	0.5	0.5
Financial Institution and Insurance	0.7	0.5
Other Services	0.5	0.5

Source: Al-Amin (2008)

The remaining parameter (i.e., share parameter of a CES production function) is estimated using a combination of data. Specifically, all the shift and share parameters for the CES and CET functions are calculated using the benchmark values. This procedure for estimating constants used in the equations of the CGE model is called calibration of the CGE model.

The calibration procedure assumes that the economy is in equilibrium. This assumption is established by a benchmark dataset that represents equilibrium for an economy so that the model is solved from equilibrium data for its parameter values (Shoven and Whalley, 1992). In particular, for many studies, the benchmark dataset is systematically represented in the compiled SAM. When these parameters are correctly estimated, the result, using the initial data, must match the base-year equilibrium data. When the results are not identical, the model must be modified until it can replicate the base-year observation.

Hence, in this study, the same calibration approach is used to determine the model parameters. To solve the parameter, the CGE model and equations are written in the general algebraic modeling system (GAMS). GAMS was developed to solve these types of models and simplify the process of programming and running the CGE models.

4.6.4 Data of Household Income Groups

For the purpose of empirical parameterization of the model and providing an estimation of the welfare impacts, households are disaggregated into three categories according to income level: higher income, middle income, and lower income. Based on the HIS 2012, income is defined as household income instead of individual income.

Furthermore, no difference exists between rural and urban areas because they are considered identical in terms of location.

Income is measured based on gross monthly income, including monthly paid allowance. The definition of household income groups is based on the household income of the "top 20," "middle 40," and "bottom 40" of total households in Malaysia. The definition of household income level is also referred to in Table 1.5 in the Household Income Survey (HIS) 2012[17]. Table 4.9 shows the range of income, share of income, and share of consumption among three types of households. The details are explained as follows.

Table 4.9: Range of the Three Income Groups

Income Group	Range of Income (RM)	Consumption Share (%)
Higher Income	Above 7,000	48
Middle Income	3,000–6,999	36
Lower Income	Below 3,000	16

Source: Author's definition

The 20 percent of the higher-income group consists of households that earn a monthly income above RM7,000. The 40 percent of the middle-income group have a monthly income ranging from RM3,000 to RM6,999. Both tend to be legislators, senior officials, managers, and professionals. The proportions of expenditure are 48 percent and 36 percent, respectively.

[17] Percentage distribution of households and income share by monthly income class, ethnic group, and strata in Malaysia in 2012.

For households in the lowest earning group, 40 percent, the monthly income is below RM3,000. This income range is eligible to receive Bantuan Rakyat 1 Malaysia ($BRIM$) provided by the Malaysian government. However, in 2014, the government widened the coverage of *BRIM* by including people with an income less than RM4,000. Their spending ratio is 16 percent. Lim and Ooi (2013) noted that these households are mostly likely skilled agricultural and fishery workers or single-person households.

4.6.5 Data for GST

This study assumes that all 15 sectors in the economy are taxable products. Although the government stipulated that basic goods and essential items are zero-rated from GST and that public transportation, healthcare, and education are exempt from GST, this study assumes all the products will be paid for by the GST. This assumption simplifies the analysis, which involves many industries and sectors. Some of the zero-rated and exempt items are not listed in the same sector as the author categorized. To avoid making a mistake in selecting and calculating the data, the author generalized all the sectors as taxable items for the GST imposed.

The government granted the zero-rate and exempt rate for less than 10 percent of all the products listed. This portion is quite small and insignificant. It most likely will not affect the findings of this study or even reduce the measurement of welfare loss.

Equations 39 to 43 derived the formula for calculating taxable output and the GST revenue, following Ignacio (2002).

$$Total\ Output + Import = Supply - Export = Domestic\ Consumption - Exemption = Taxable\ Output \quad \ldots\ldots\ldots Equation\ 39$$

$$Stocks\ outside\ GST\ base = \frac{Change\ in\ stocks}{Supply * Taxable\ Output} \ldots\ldots\ldots Equation\ 40$$

$$Taxable\ Base\ less\ Inventories = Taxable\ Output - Stocks\ outside\ GST\ base \ldots\ldots\ldots Equation\ 41$$

$$Taxable\ Supply = Taxable\ Base\ less\ Inventories - Marginal\ Firms \ldots\ldots\ldots Equation\ 42$$

$$GST\ Revenue = \frac{Taxable\ Supply}{1.04} * 0.04 \ldots\ldots\ldots Equation\ 43$$

The GST revenue figures for the 15 sectors are calculated based on the formula taken from Equations 39 to 43. In the beginning, the author removed the effect of tax from the base data. In this case, the effect of SST is deducted from domestic consumption. Hence, the GST effect is added to the amount of taxable output.

For Equation 43, to calculate the GST revenue, the GST rate of 4 percent is levied on the taxable supply for each sector. For instance, the GST rate is assumed to be imposed at 4 percent (using Simulation 1 in this study). Therefore, the taxable supply must be divided by 1.04 and multiplied by 0.04 to obtain the amount of GST revenue for each sector. The calculation is provided in *Appendix E.*

4.7 Simulation Scenarios

CGE model permits simulating different sorts of shock on exogenous variables and the effects of these shocks on various endogenous variables (Bröcker, 2004). The present study examines the impact of GST on the Malaysian economy on the basis of three simulations: Simulation 1, Simulation 2, and Simulation 3, imposed at 4, 6, and 8 percent by GST rate, respectively.

4.8 Sensitivity Analysis

Sensitivity analysis can enhance our understanding of the usefulness and reliability of a CGE model. To determine the robustness of the findings, this thesis performs an additional simulation for sensitivity analysis. The new simulation scenario is applied on the three objectives of the thesis. The author simulates a 30 percent reduction and 30 increments from the substitution elasticity parameters (Armington CES and CET functions) in the model. The new scenario is subject to the initial 4 percent of the rate of GST.

4.9 Summary

This chapter explains the methodology applied to address the research questions and objectives of the study. It commences with the description of conceptual and theoretical frameworks and ends with a brief elaboration on the simulation scenarios. The methodology discussed in this chapter sets the scene for the following chapters (i.e., Chapters five, six, and seven), which will discuss the findings of the study's three objectives.

CHAPTER 5: GST AND SECTORAL RESPONSES

5.1 Introduction

To understand the effect of GST on economic sectors, this chapter will analyze its impact in three parts, namely, production, sales, and prices. As mentioned in the previous chapter, 15 sectors are selected: agriculture, forestry, and logging; crude oil, natural gas, and mining; food and beverage; textile and leather; petroleum refinery; chemical and rubber; cement, glass, and ceramic; iron, steel, and metal; wood, machinery, and other manufacturing; electricity and gas; wholesale, accommodation, and restaurants; transportation and operation services; communication and ICT; banking, financial, and insurance; and education, health, and other services. All these sectors are assumed to be affected by the GST implementation. The year 2010 is considered as a benchmark year. Labor and capital for each sector are assumed to be fixed. The experiments conduct a simple comparative static model with three simulations: Simulation 1 with a GST rate at 4 percent, Simulation 2 at 6 percent, and Simulation 3 at 8 percent. All the results are reported in percentage form.

5.2 Sectoral Production

In this section, production measures in terms of growth value of the production are discussed. The resulting impact of GST on production is presented in Table 5.1.

Table 5.1: Sectoral Production (%)

Sectors	4%	6%	8%
Agriculture, Forestry, and Logging	-0.23	-0.46	-0.47
Crude Oil, Natural Gas, and Mining	-0.24	0.08	-1.47
Food and Beverage	0.97	0.58	0.43
Textile and Leather	0.39	-0.28	-0.80
Petroleum Refinery	0.01	-0.18	-2.67
Chemical and Rubber	0.47	-1.19	-1.85
Cement, Glass, and Ceramic	-2.25	-2.53	-3.47
Iron, Steel, and Metal	-0.34	-1.72	-2.39
Wood, Machinery, and Other Manufacturing	-2.61	-3.08	-4.24
Electricity and Gas	-3.04	-4.94	-10.74
Wholesale, Accommodation, and Restaurants	-2.56	-2.29	-5.53
Transportation and Operation Services	-1.82	-2.83	-4.72
Communication and ICT	-3.18	-5.04	-9.07
Banking, Financial, and Insurance	-0.52	-5.50	-1.11
Education, Health, and Other Services	0.92	3.55	-0.34

Source: Author's Calculation

Table 5.1 shows the results of 15 sectors of production. The results reveal that the first six sectors, namely, agriculture, forestry, and logging; crude oil, natural gas, and mining; food and beverage; textile and leather; petroleum refinery; and chemical and rubber, were less affected by GST based on all three simulations.

Only one sector was positively affected by the GST from all simulations, namely, the food and beverage sector. This was the expected result. Food is a basic necessity and an essential product consumed by people. Therefore, the demand for food is less elastic. Even though GST is imposed on these products, people will not significantly reduce the demand quantity as much. The output will also increase slightly in response to meet the demand from the market. In 2015, the food and beverage sector in Malaysia contributed to 10 percent of the growth of the manufacturing sector. Furthermore, food and

beverage products have been exported to more than 200 countries (Malaysian Investment Development Authority, 2015a). Malaysian awareness toward food and nutrition has also increased because of improved education and health trends. The positive trend of production shows that the food and beverage sector can promote a stable production growth. The low production and marketing costs of the sector are basically due to large-scale production, which in turn makes the market strong enough to compete against GST.

In general, most of the productions of all the sectors were negatively related to GST. The highest production decline reported was for the electricity and gas sector at –10.73 percent. Electricity power is generated from natural gas. In 2013, approximately 45 percent of natural gas was used to generate electricity. The surging demand for electricity is mainly driven by the industrial and commercial sectors, which consume 67 percent more than most of the sectors in a country (Suruhanjaya Tenaga, 2014a, p. 10). From this figure, we noted that most of the sectors that consume electricity are subjected to GST. This situation is parallel to consumption tax theory, which shows that when tax is imposed, the goods consumed will be lesser. As a result, the production of electricity and gas drops as GST rate increases.

The petroleum sector recorded a 0.01 percent change as GST was imposed by the government. This figure shows that petroleum production was the least effected by GST. Although the petroleum sector plays a substantial role in the economy, its production still needs to be protected from resource depletion. When the amount of supply is fixed at a specific level, the production cost is persistent and does not easily fluctuate, and thus the market price is under control. Thus, GST does not exert a considerable effect on petroleum production, as shown in Table 5.1.

For a more comprehensive discussion, we transformed Table 5.1 into a graph (Figure 5.1). In the following paragraphs, we report the findings on sectoral production resulting from the changes in GST rate by each simulation (i.e., Simulations 1, 2 and 3).

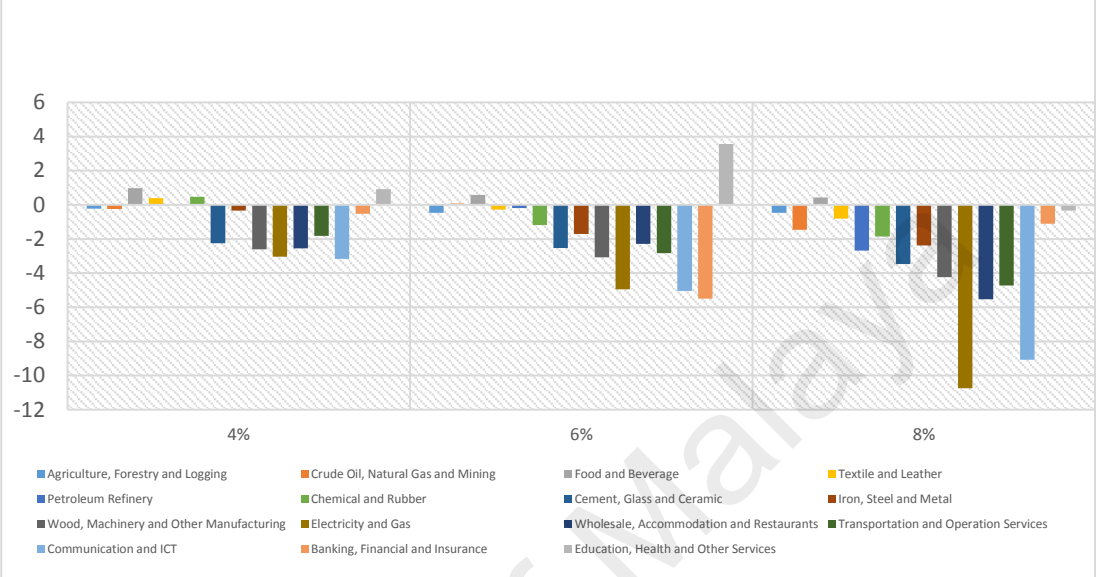

Figure 5.1: Sectoral Production (%)

Figure 5.1 presents the changes of sectoral production in terms of the three simulations. For Simulation 1, when GST was fixed at 4 percent, only five sectors, namely, food and beverage; textile and leather; petroleum refinery; chemical and rubber; and education, health, and other services, were positively related to the imposition of GST. This result contradicts consumption tax theory, which states that when tax is levied, the cost of production will increase. As a result, the supply curve will shift leftward and the quantity of supply will decline. The analysis suggests that at 4 percent GST rate, these five sectors can absorb the hike in production cost.

By contrast, the remaining 10 sectors were negatively affected by GST. The most affected sector was communication and ICT at a rate of 3.18 percent. This sector is heavily dependent on technologies and innovations. Its products are costly as input, and

other resources used are not cheap. Therefore, the 4 percent GST rate reduced the communication and ICT production.

Comparatively, in Simulation 2, three sectors, namely, education, health, and other services; food and beverage; and crude oil, natural gas, and mining, had increased production, whereas the rest of the sectors reported a decrease in production. The highest positive impact of the GST in the production sector was recorded by the education, health, and other services sector at 3.55 percent. To clarify, professional services such as accounting, engineering, architecture, and surveying services led the growth of business services. These segments recorded a 7.6 percent growth in the first quarter of 2015 owing to the sustained demand and the transition to the GST system (Ministry of Finance, 2014a, p. 65). The service sector likewise plays a vital role in coordinating and supporting other sectors in the economy. Hence, GST further increases their production. Mwega (1985), in his thesis on Kenya, mentioned that an increase in production of other sectors can be overcompensated by a decrease in production of any single sector.

Meanwhile, the least affected sector was crude oil, natural gas, and mining at the rate of 0.08 percent. This is one of the main trade sectors that contributed to almost 20 percent of the country's current gross domestic product (GDP). In fact, Malaysia was the second biggest exporter of liquefied natural gas after Qatar in 2012 (International Gas Union, 2015, p. 9). In other words, the presence of GST does not affect this sector significantly, though it thus increases the volume of production.

The largest negative effect of the GST was in banking, financial, and insurance at 5.5 percent. Production in this sector is in high demand, and the sector supports value-added

activities in the financial market. GST is charged on transaction fees, annual credit card fees, and general insurance. The huge drop in production of the banking, financial, and insurance sector was an indirect GST effect. The 2014 Economic Report found that the performance of the life insurance business was considerably slower than before. The total loan applications contracted were at 1.9 percent, while the approved loans were reduced to 2.4 percent in 2014 (Ministry of Finance, 2014a, p. 70). This outcome was partly due to the macro-prudential measures taken to control household debt. According to consumption tax theory, the imposition of indirect tax will cause the producer to reduce supply. As a result, price will increase. This will, in turn, lead to an increase in household debt whenever people want to hold more money to purchase as many real goods or services as they used to prior to tax imposition.

Finally, for Simulation 3, all the sectors showed a decrease in the amount of production, except for food and beverage, which recorded a 0.43 percent increase. The most affected sectors were electricity and gas at 10.74 percent, followed by communication and ICT at 9.07 percent. Education, health, and other services were the least affected when GST increased to 8 percent. This sector reported a small negative impact with a reduction of 0.34 percent in sectoral production. This result shows that as GST rate is imposed at the highest rate (8 percent), the production of education, health, and other services was reduced but only at a small amount. Thus, production from this sector is important for the public.

Overall, GST implementation decreases the production of most sectors in Malaysia. Even though some of the sectors are positively related to GST, most are affected negatively. This situation shows through the reduction in total production at almost 50 percent compared to the period before GST implementation. This finding is consistent

with Vermeend et al. (2008) and Hernandez (2012), who found that the increase in VAT rates (in Colombia) has a negative impact on sectoral production.

5.3 Sectoral Sales

Domestic sales by sector are defined as total output minus export. Table 5.2 presents the percentage of sectoral sales in Malaysia for three simulations, Simulation 1, 2, and 3, corresponding to 4, 6, and 8 percent GST rates, respectively.

Table 5.2: Sectoral Sales (%)

Sectors	4%	6%	8%
Agriculture, Forestry, and Logging	-0.37	-0.76	-1.16
Crude Oil, Natural Gas, and Mining	-1.52	-1.52	-3.06
Food and Beverage	0.49	-0.38	-1.55
Textile and Leather	-0.01	-0.79	2.42
Petroleum Refinery	-0.47	-0.89	-3.13
Chemical and Rubber	-0.17	-1.54	-2.88
Cement, Glass, and Ceramic	-2.43	-2.98	-3.99
Iron, Steel, and Metal	-0.96	-2.10	-3.20
Wood, Machinery, and Other Manufacturing	-2.35	-3.04	-4.88
Electricity and Gas	-3.05	-4.93	-10.68
Wholesale, Accommodation, and Restaurants	-2.63	-2.50	-5.44
Transportation and Operation Services	-1.82	-2.89	-4.61
Communication and ICT	-3.05	-4.88	-8.83
Banking, Financial, and Insurance	-0.66	-4.68	-1.10
Education, Health, and Other Services	1.18	3.70	-0.20

Source: Author's Calculation

Table 5.2 reports the results of domestic sales by the 15 sectors in the economy. The trend in sectoral sales is similar to the trend in sectoral production discussed earlier. To illustrate, the first six sectors, namely, agriculture, forestry, and logging; crude oil, natural gas, and mining; food and beverage; textile and leather; petroleum refinery; and

chemical and rubber, were moderately affected by GST. Moreover, the largest affected sectors were electricity and gas and communication and ICT for all three simulations conducted in the study.

Undoubtedly, gas and coal are inputs used for power generation, followed by hydroelectricity and oil. Indeed in 2014 and 2015, prices of electricity, gas, and other fuels rose as a group at a slower pace of 2.2 percent, resulting in the increase of cost of electricity supply (Suruhanjaya Tenaga, 2016, p. 15). This situation caused the sales of this sector to drop, as reflected by the effect of GST implementation. Similarly, the sales of the communication and ICT sector was affected more by GST. Many small and medium enterprises (SMEs) are involved in the business of ICT and computer services. These SMEs were affected more by GST than the large companies because most are supported by their own ICT investments. GST will increase the cost of most hardware, software, service offerings, and gadgets, and in turn, this increase will be passed on to customers by the increase in product prices (The National ICT Association of Malaysia, 2015, p. 36). However, the increment in price can only cover a part of the increment in cost involved, which will subsequently lead to reduced sales. Consumption tax theory supports this sales reduction.

Sales in the manufacturing sector, particularly from petroleum refinery; chemical and rubber; cement, glass, and ceramic; iron, steel, and metal; and wood, machinery, and other manufacturing, are reduced as well. Among these five sectors, the wood, machinery, and other manufacturing sector is affected more because it consists of crucial sub-sectors, such as electrical and electronic (E&E) and motor vehicle products. In 2014, the E&E industry contributed 24.5 percent of GDP to the manufacturing sector (Malaysia External Trade Development Corporation, 2014, p. 116). Even though the

E&E industry is one of the leading manufacturing industries in Malaysia, it cannot be free from the impact of GST. For a detailed explanation, we report the findings of sectoral sales in the following paragraphs based on Figure 5.2.

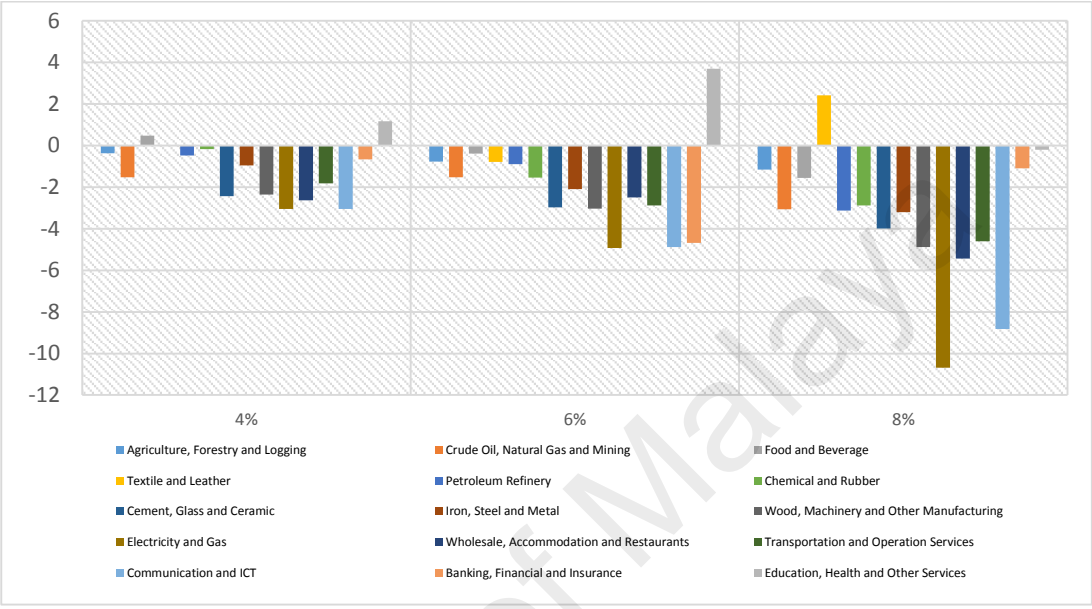

Figure 5.2: Sectoral Sales (%)

Figure 5.2 demonstrates the sectoral sales in three simulations. For Simulation 1 at 4 percent GST, all the sectors are negatively affected by GST implementation except for the food and beverage and education, health, and other service sectors. These two sectors increased sales by 0.49 and 1.18 percent, respectively, as GST was applied at 4 percent. Their increased sales show they are essential commodities in the economy. For instance, the increase in sales of food and beverage is supported by the high demand for necessities and daily needs products. GST imposition at 4 percent on these products did not affect their demand significantly. In fact, the increase in sales is related to the increase in output produced at the rate of 0.97 percent (Table 5.1).

The education, health, and other service sector shows a positive impact of GST because it serves as a supporting sector for other sectors in the economy. Private

education and private health increased by 7.5 and 5.4 percent, respectively, in the first quarter of 2015 (Ministry of Finance, 2015b, p. 6). Moreover, the service sector leads the growth in Malaysia (Ministry of Finance, 2015a, pp. 3-2). This outcome shows that the sales of this sector anticipated 1.18 percent growth, which was supported by strong activity in the real estate, business services, and other service segments. People can still afford the increment in price of the products or the price is still reasonable for them to consume those products. The sales from this sector increased when GST was implemented at 4 percent. The less affected sector was textile and leather at 0.01 percent. In 2015, this industry contributed approximately 1.7 percent to Malaysia's export of manufactured products (Malaysian Investment Development Authority, 2015, p. 40). As GST was implemented, the sales of textile and leather steadily declined because this sector does not bring significant effects to the household in order to change their consumption pattern of the product.

Meanwhile, the GST rate of 6 percent in Simulation 2 shows that all sectors had a reduction in sales except for the education, health, and other service sector, which had a 3.70 percent increase. This sector again had an increase in sales as GST rate increased, as indicated in Simulation 1. Electricity and gas was the largest sector affected by the GST, whereas the least effected sector was food and beverage at 0.38 percent. At 6 percent GST, the sectoral sales of food and beverage declined. This drop in sales is possibly due to the increase in cost of inputs because this sector is dominated by SMEs. It could also be caused by the disruption brought by massive floods in several states in the east coast states in 2014 (Ministry of Finance, 2015b, p. 4).

In Simulation 3, all the sectors had a reduction in sales as GST increased to 8 percent, except for textile and leather. The sales of this sector recorded a 2.42 percent

increase. In addition, in 2014, the industry was ranked the top 10 export earner. The investment in this sector was set to increase to more than US$3 billion during 2011–2020 (Malaysian Investment Development Authority, 2015, p. 40). The textile and clothing industry had the potential for further development that was focused on high-tech and high value-added products. This increase in sectoral sales was not affected much by GST. Likewise, the sector benefited from the government target, which subsequently brought a positive impact on its sectoral sales.

As with Simulation 2, Simulation 3 shows the sectoral sales of electricity and gas as the most affected sector from GST at 10.68 percent. Majority of the manufacturing sectors in Simulation 3, such as agriculture, forestry, and logging; crude oil, natural gas, and mining; food and beverage; textile and leather; petroleum refinery; chemical and rubber; cement, glass, and ceramic; iron, steel, and metal; and wood, machinery, and other manufacturing sectors, faced a decline in their sales. This drop may be due solely to GST or to other disruptive economic factors. The industry or sectors that are over-reliant on the electricity and gas sector will also be affected by the drop in sales of electricity and gas.

Overall, the obvious positive impact can be seen in the education, health, and other service sector when GST is charged at 6 percent, though the majority of the sectors had an adverse effect from GST. The trend of sectoral sales showed a decreasing trend in Simulations 1 to 3. Sectoral sales were affected more when GST rate increased. Consumption tax theory indicates that when tax is levied, the supply curve shifts leftward and leads to the decline in the quantity of sales. This finding is in line with Renata and Sabina (2010), who found that the imposition of tax in the Republic of Croatia reduced the sectoral sales of the industries.

5.4 Sectoral Prices

Sectoral prices are measured in terms of the percentage changes of the price of domestic output. The percentage is calculated by a change from the base year in 2010. The effects of GST on sectoral prices are reported in Table 5.3.

All 15 sectors generally had an increase in sectoral prices after the GST was implemented in Malaysia (Table 5.3). The sectoral prices are positively related to the GST. The increment in sectoral prices is supported by the study conducted by the Malaysian Ministry of Finance in 2013. The ministry's finding shows that prices increased to around 1.8 percent with GST implementation on the basis of 944 items in the CPI basket (Faizulnudin, 2012).

Table 5.3: Sectoral Prices (%)

Sectors	4%	6%	8%
Agriculture, Forestry, and Logging	2.73	4.74	9.58
Crude Oil, Natural Gas, and Mining	4.65	6.56	10.50
Food and Beverage	5.35	6.04	11.03
Textile and Leather	5.65	7.26	11.81
Petroleum Refinery	4.04	6.31	9.30
Chemical and Rubber	5.33	7.22	11.77
Cement, Glass, and Ceramic	5.25	6.35	10.54
Iron, Steel, and Metal	4.90	6.80	11.45
Wood, Machinery, and Other Manufacturing	5.88	8.06	12.10
Electricity and Gas	5.72	16.58	20.61
Wholesale, Accommodation, and Restaurants	4.66	9.66	8.74
Transportation and Operation Services	5.85	10.28	11.06
Communication and ICT	12.52	21.03	23.18
Banking, Financial, and Insurance	5.26	8.18	15.14
Education, Health, and Other Services	8.16	9.34	13.42

Source: Author's Calculation

Figure 5.3 compares the estimated outcomes of the three types of simulations for all sectors in the economy. The trend of the prices for all 15 sectors is moderate and is recorded at approximately 10 percent. However, two sectors were extremely affected by GST implementation, communication and ICT and electricity and gas. All the simulations indicated that the sectoral prices of these two sectors increased to more than 20 percent.

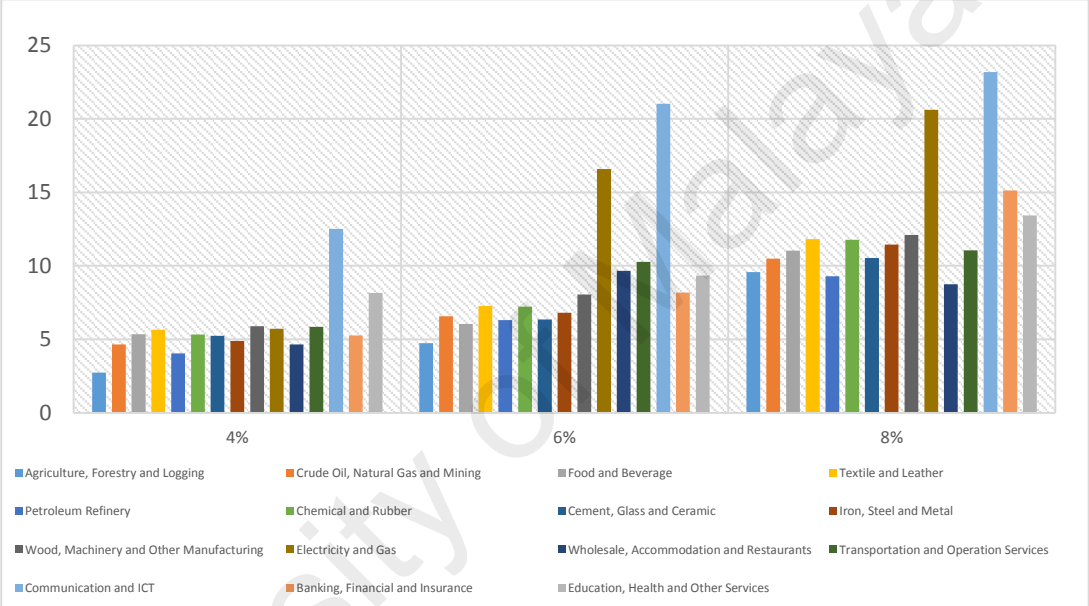

Figure 5.3: Sectoral Prices (%)

First, in Simulation 1, the least affected sector was agriculture, forestry, and logging because agriculture subsectors such as palm oil and rubber are export-oriented products. The government protects these kinds of industries because they contribute a substantial income to Malaysia's export (EPU, 2015a, p. 29). Both industries are among the important subsectors that can strengthen the value chain and produce final goods for foodstuff, healthcare, and rubber products. In addition, under the National Key Economic Areas, the government supports the agricultural sector to meet certain strategic goals, such as to increase market demand, increase farmers' income, and ensure national food security (The Performance Management and Delivery Unit, 2014,

p. 217). Note that GST imposition has little effect on the sectoral price because activities in this sector are monitored by the government. In Malaysia, the introduction of GST at 6 percent increases the price for specific products and reduces others (Siti Halimah, 2014; Wan, 2013).

The largest price hikes are in the communication and ICT sector at 12.52 percent, followed by education, health, and other services at 8.16 percent because both sectors are complementary to other remaining sectors in the economy. This means that communication and ICT and education, health, and other services are important as supporting sectors to strengthen the linkages between other sectors as well as among other sub-sectors. The communication and ICT sector benefits other sectors, such as healthcare, government, and business. Some models and measurements in crime and disease prevention are more effective when connected with big data provided by the communication and ICT sector (The Performance Management and Delivery Unit, 2014, p. 178). Similarly, the research and development (R&D) segment, which is under education, health, and other services, has exerted efforts to intensify other sectors. In fact, under R&D, the E&E industry has moved up the value chain to producing higher value-added products (Malaysian Investment Development Authority, 2015, p. 21). As a result, it enhanced the industry's overall competitiveness. Therefore, the increase in sectoral prices caused by GST imposition is normal for the market because the sectors are vital for other industries.

Second, in Simulation 2, the least affected sector was agriculture, forestry, and logging at 4.74 percent. The result is similar with that in Simulation 1, in which the prices of the sector was affected less by GST rate. The largest increment in prices was in the communication and ICT sector, which increased at 23.18 percent, followed by

electricity and gas at 20.61 percent. The development of communication and ICT is fundamental for Malaysia to switch from a middle-income to a high-income economy by 2020. In a global business environment, the communication and ICT sector is said to be beneficial to expanding the opportunities for new products or widening the global market (Bank Negara Malaysia, 2014b, p. 4). This potential will further boost the country's economic potential. Consistent and sufficient electricity supply is also important to generate economic growth. The government has revised the surcharge on electricity bills under a subsidy rationalization initiative (Suruhanjaya Tenaga, 2014b, p. 16). This revision aims to ensure that electricity and gas prices meet their cost of production. These amendments are favorable in the long-term structure of the economy. Therefore, these initiatives were applied for both sectors discussed above whose sectoral prices were rising, likewise a result of the additional costs incurred during the development of such enhanced programs. Therefore, GST is not the sole cause of the increment in price.

In Simulation 3, the least affected sector was wholesale, accommodation, and restaurants at 8.74 percent. This sector consists of industries such as wholesale, retail trade, and motor vehicle; accommodation; and restaurants. In fact, in 2015, the demand for the motor vehicle segment hiked to 7.6 percent due to the attractive incentives offered by dealers prior to GST implementation (Ministry of Finance, 2015a, pp. 3-2). Malaysia is recognized as one of the 10 most attractive countries for global shopping and tourism destination, which is supported by its strong domestic consumption and high tourist arrivals (The Performance Management and Delivery Unit, 2014, p. 84). The government also aims to attract 36 million tourists by 2020 under the Malaysia Tourism Transformation Plan. However, in the short term, the performance of this industry was interrupted due mainly to the hike in interest rate, the MH370 and MH17

tragedies, and finally, the GST implementation (The Performance Management and Delivery Unit, 2014, p. 85). The sectoral price of wholesale, accommodation, and restaurants had increased at a moderate pace owing to some of the recent issues mentioned above, but the price fluctuations were small and supported by sectoral growth led by wholesale and retail trade. The wholesale and retail trade grew by 7.8 percent during the first quarter of 2015 through consumption-related activities, particularly those prior to GST implementation (Ministry of Finance, 2015b, p. 4).

In short, sectoral price gradually increases as GST rate increases. Some sectors are affected less, while some are affected more. This finding is supported by Narayanan (1991); Narayan (2003); Pike, Lewis, and Turner (2009); Smart and Bird (2009); Renata and Sabina (2010); and Christandl, Fetchenhauer, and Hoelzl (2011), all of whom stated that when tax is charged, the price of the product increases. The results also seem consistent with consumption tax theory. However, in one case, namely, wholesale, accommodation, and restaurants, as GST rate increased at 8 percent, the prices slightly declined. This finding is in line with Siti Halimah (2014) and Wan (2013), who stated that the introduction of GST at 6 percent resulted in increased prices for certain products and reduced prices in others.

5.5 Sensitivity Analysis

The substitution elasticity parameters in the model resulted in 30 percent reduction and 30 percent increment. The simulation is only reported on changes in sectoral prices. Figure 5.4 presents the impact of this simulation.

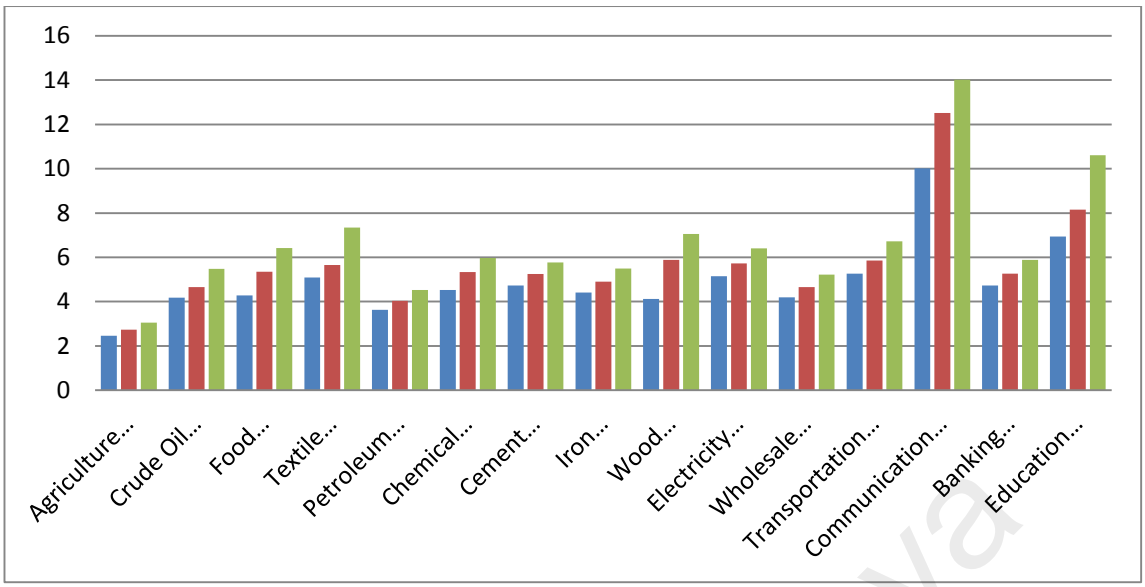

Figure 5.4: Sectoral Prices for Sensitivity Analysis (%)

Figure 5.4 shows that the sectoral prices generally moved in the same direction as the previous simulation. The magnitude changes were slightly lower and higher following the simulation applied on the values of the elasticity. The graph reveals that the least affected sector was the petroleum refinery sector, whereas communication and ICT remained the most affected sector.

5.6 Summary

This thesis suggests that the higher the GST rate imposed, the more negative the impact of GST on the 15 sectors. This trend can be observed from the results that the highest impact occurring in Simulation 3, then Simulation 2, and the lowest in Simulation 1. However, different sectors were affected differently.

CHAPTER 6: IMPACT OF GST ON MACROECONOMIC VARIABLES

6.1 Introduction

This chapter is the second part of the analysis in this thesis. This chapter will focus on the impact of GST on macroeconomic variables. Seven significant variables will be examined, namely, consumption, investment, government revenue, government expenditure, export, import, and GDP. Similar to the previous chapter, we conducted the analysis based on three simulations: Simulation 1 at 4 percent GST rate, Simulation 2 at 6 percent, and Simulation 3 at 8 percent. The succeeding sections will discuss these simulations in further detail.

6.2 Impact of GST on Macroeconomic Variables

This sub-section will examine the impact of GST on selected macroeconomic variables, as shown in Table 6.1.

Table 6.1: Macroeconomic Variables (%)

Variables	**4%**	**6%**	**8%**
Consumption	-1.22	-4.67	-9.99
Investment	-2.33	-3.02	-7.57
Government Revenue	6.26	8.77	12.05
Government Expenditure	5.68	8.64	11.68
Export	-1.15	-1.71	-2.64
Import	-1.83	-2.63	-4.83
GDP	-1.17	-1.76	-3.04

Source: Author's Calculation

Table 6.1 demonstrates the macroeconomic variables in three simulations. Two variables, government revenue and government expenditure, have a positive impact from all three simulations. Government expenditure trends show a similarity to revenue

trends. However, expenditure was maintained at a lower rate than revenue. The trend of the impact increases from Simulation 1 to Simulation 3. However, the majority of other variables are adversely affected by GST imposition. In general, consumption was the most negatively affected followed by investment. The remaining three variables, namely, export, import, and GDP, were less affected by GST for all the cases.

For simplicity, we transform Table 6.1 into Figure 6.1.

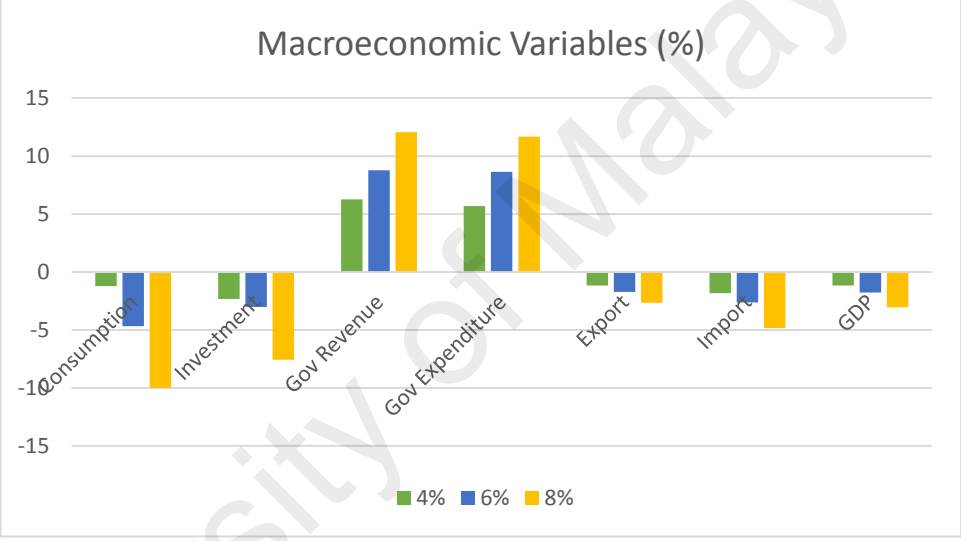

Figure 6.1: Macroeconomic Variables (%)

Figure 6.1 indicates the results of seven macroeconomic variables affected by GST.

6.2.1 Consumption

The more people purchase, the more they need to pay for tax (Hines and Desai, 2005; Narayanan, 2003). Thus, a person reduces his/her consumption as GST rate increases. In Simulations 1, 2, and 3, as GST rate increases, the consumption rate for goods and services reduces to 1.22, 4.67, and 9.99 respectively. According to consumer behavior theory, higher taxes lead to a higher price range and to a reduction in household demand, which may cause temporary effects on an economy.

The rise in prices normally causes consumers to reduce their discretionary spending. When GST was introduced in Malaysia in April 2015, households adjusted their spending because of the new tax implementation. Based on Bank Negara Malaysia (BNM) report, upon the introduction of GST in the second quarter of 2015, retail trade registered as the largest affected subsector. Meanwhile, predominantly affected commodities were consumer goods, mainly household equipment, food, beverages, and tobacco (Bank Negara Malaysia, 2014b, p. 7). Moreover, sales of passenger cars dropped by 10.8 percent compared to the same period in 2014. This drop can be confirmed by the lower growth rates in spending using both M1 and credit card at 8.4 and 0.6 percent, respectively (Buettner and Erbe, 2014).

After the introduction of GST, consumption patterns were transformed by the tax. Exogenous shocks also caused household spending adjustments to be more complicated. The adjustment was considerably difficult owing to the depreciation of the ringgit (Malaysia currency) and the collapse in commodity prices in 2014 to 2015, both of which contributed to the reduction in private consumption. These external shocks were unforeseen before GST implementation. Household purchases declined during the first six months of GST implementation. Consumer spending declined to 6.4 percent in the second quarter of 2015 and continued to decline to 4.1 percent in the third quarter (Bank Negara Malaysia, 2015, p. 24).

Prior to GST implementation, consumers increased their expenditure on necessities and durable items, such as electrical appliances, furniture, and passenger cars, because of the uncertainty of future prices. The decline in consumption also happened in New Zealand and Australia when the governments introduced GST. The rise in prices due to GST caused households to cut their spending. Retail trade, particularly consumer

products, was affected. Similarly, when the Japanese economy was in the early stage of recovery in 1994 after an economic downturn, the government increased VAT rate from 3 percent to 5 percent, which reduced consumer spending and decelerated its economic recovery.

6.2.2 Investment

As in the case of consumption, based on all three simulations, GST reduced investment by 2.33, 3.02, and 7.57 percent, respectively. In general, consumption expenditure will decline as GST rate increases. However, this effect will lead aggregate demand to depreciate. The slow growth in domestic demand cautions business sentiments and moderates private sector investment in the economy.

Investment moderately dropped when GST was introduced in 2015. The report by BNM noted that GFCF declined from 4.8 percent in 2014 to 3.7 percent in 2015. Investment in upstream mining was slow because of low and volatile oil prices and eventually affected the investment in oil and gas firms (Bank Negara Malaysia, 2015, p. 27). In addition, investment in dwellings marginally dropped from 9.9 percent in 2014 to 6.9 percent in 2015 because of the slower pace of construction activity (Bank Negara Malaysia, 2015, p. 27). Subsequently, the drop in investment contributed to a slower pace in the growth of aggregate demand.

New and ongoing projects in the manufacturing and service sectors, particularly in export-oriented industries, contribute to the investment performance of Malaysia (Bank Negara Malaysia, 2014b, p. 16). The BNM report states that, in 2015, the largest share of private investment was in service sectors (51 percent), which focus on projects in the distributive trade, telecommunication, transport and storage, and tourism-related

subsectors. On the other hand, the share in manufacturing sector was 24 percent. Manufacturing investment projects focus on petrochemical, natural gas, and E&E segments (Bank Negara Malaysia, 2015, p. 27).

The decline in investment is due to a series of developments, such as high factor costs, uncertainty of commodity prices, particularly in the oil and gas sector, weaker purchasing power of ringgit, and to a certain extent, the effects of GST (Kusumanto, 1989). In the case of 14 OECD countries, investment elasticity is a negative -0.66 (Cummins et al., 1996). Therefore, if tax increases by 10 percent, then it will reduce the aggregate investment by 6.6 percent.

6.2.3 Government Revenue and Government Expenditure

The magnitudes of the impact of GST rate increase government revenue gradually on the basis of the simulations. In Simulation 1, at 4 percent GST, government revenue increased at the rate of 6.26 percent. The trend demonstrates progress as the revenue continues increasing to 8.77 and 12.05 percent in Simulations 2 and 3, respectively. The main contribution of GST is increasing government tax revenue (Smart, 2007; Smart and Bird, 2009; Vermeend et al., 2008).

GST implementation has broadened the sources of revenue because it improves tax compliance when the number of registered companies increases. Based on the 2015 BNM Annual Report, government revenue and the increment attributed from the GST collection had increased by 0.8 percent. This tax revenue can counterbalance the loss in petroleum tax revenue owing to lower oil prices. Hence, oil is not a long-term reliable resource because it is depleting gradually. Furthermore, oil price is highly volatile in the world market. Indeed, the contributions from oil-related revenue have declined from 41

percent in 2009 to 30 and 21.5 percent in 2014 and 2015, respectively. The rate is projected to further decrease to almost 13 percent in 2016 (Bank Negara Malaysia, 2015, p. 123).

Governments need resources (i.e., tax revenue) to finance their expenditures. In Simulation 1, the government spends 5.68 percent when GST was at 4 percent. The expenditure increases as GST rate increases. Specifically, when GST rate increases, government spending grows by 8.64 and 11.68 percent in Simulations 2 and 3, respectively. The hike in GST rate stimulates the increase in revenue and expenditure. If the government expenditure is lesser than its revenue, the government will have a surplus.

According to the 2014 BNM Annual Report, the government has scaled down on supplies, asset purchases, and subsidy rationalizations and has spent money more wisely and prudently as the oil price dropped (Bank Negara Malaysia, 2014, p.93). The government has considered only selected and highly effective projects for developmental purpose. It has also prioritized highly convenient public transportation, technology, and telecommunications projects (Bank Negara Malaysia, 2015, p. 123). These projects have a large multiplier effect and will be implemented in the 11th Malaysian Plan (2016–2020).

A strong positive relationship exists between GST and government revenue (Jangra and Narwal, 2014). Government revenue increases as GST rate increases (Pagan, Soydemir, & Tijerina-Guajardo, 2001; Onaolapo, Aworemi, & Ajala, 2013; Amir et al., 2013). Countries such as Singapore, Thailand, and Indonesia have proven that GST can

generate a stable flow of revenue and be an effective tool in strengthening government finances even during economic breakdown (Bank Negara Malaysia, 2015, p. 24).

6.2.4 Export and Import

For the external sector, export and import declined when GST was imposed, and the rate increased according to the simulations. In Simulation 1, at 4 percent GST, export and import decreased at the rates of -1.15 and -1.83 percent, respectively. This outcome shows a downward trend as the export and import continued to decrease from -1.71 and -2.63 percent in Simulation 2 to -2.64 and -4.83 percent in Simulation 3, respectively.

The 2015 BNM Annual Report states that the decline in trade volume was affected by the global changes in the economy. This decline was coupled with weak commodity prices, depreciation of the ringgit, slow demand for commodities, and commodity-related manufactured products (Bank Negara Malaysia, 2015, p. 17). During the first eight months of 2015, when GST was introduced in Malaysia, export and import contracted by 1.4 and 2 percent, respectively (Ministry of Finance, 2015a, pp. 3-1). For instance, the exports of manufactured goods were weighed down due to the slower growth in E&E products and the non-E&E segment (Bank Negara Malaysia, 2015, p. 17). Table 5.1 presents the contribution of export-oriented industries, including agriculture, mining, and manufacturing sectors, in the decline of production.

The import of intermediate goods dropped due to the decline in fuel-related inputs and the demand for resource-based manufactured exports. However, imports of capital goods moderately increased for investment activity (Bank Negara Malaysia, 2015, p. 45). In addition, a total reduction in imported goods was due to the purchasing power collapse shown by the decline in consumption expenditure as GST was implemented.

On one hand, the case of the US shows that VAT increases exports (Nicholson, 2013). On the other hand, in China, the amount of export increased when the tax rebate rate was given to exported commodities (Chandra and Long, 2013). However, the external sectors were negatively affected by GST, as in the case of developed and developing countries (Hines and Desai, 2005) and of 27 OECD countries (Keen and Syed, 2006).

6.2.5 GDP

GDP is a function of aggregate demand consisting of consumption expenditure, investment, government expenditure, and net export. In Simulations 1, 2, and 3, as GST rate increased, GDP reduced from -1.17, -1.76, and -3.04, respectively. This decrease was due to the aforementioned largest fall in consumption and investment. The drop in the external sector likewise affected growth negatively.

However, results show that GST has affected government expenditure positively. In general, an increase in government expenditure is funded by government revenues. Hence, government expenditure hikes aggregate demand and leads to growth in the goods market. To implement a fiscal policy, the government may issue several government bonds, which, in turn, will provide feedback on the money market. Thereafter, it will lead to an increase in interest rate and cost of borrowing, resulting in investment collapse (as shown in Table 6.1). A positive growth in government expenditure offset by a negative growth in investment leads to the decrease in GDP.

This result corresponds to the findings of Poulson and Kaplan (2008) that the growth of GDP is negatively related to marginal tax rate. In Nigeria, VAT significantly affected

economic growth (Emmanuel, 2013). In the long run, a positive relationship existed between GST and GDP (Smart, 2007).

6.3 Sensitivity Analysis

A 30 percent reduction and 30 percent increment from the Armington CES and CET functions are applied in the model. The effect of this simulation is reported on changes in several macroeconomic variables. Figure 6.2 presents the findings of the new simulation.

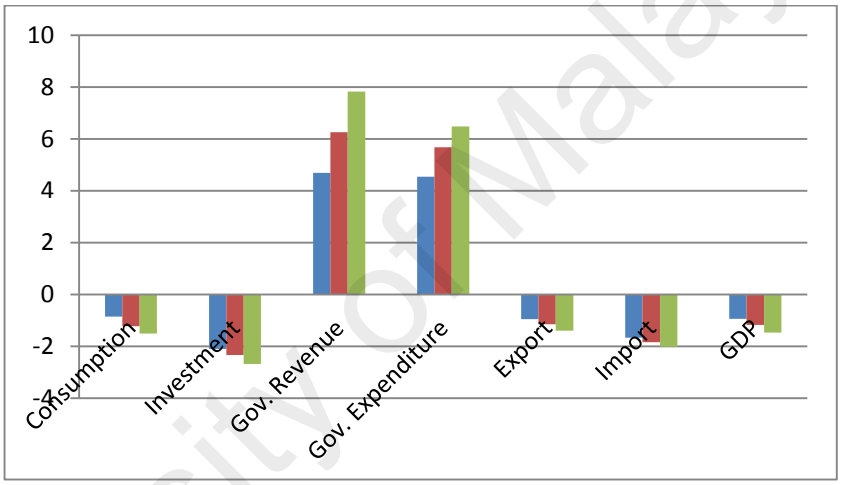

Figure 6.2: Macroeconomic Variables for Sensitivity Analysis (%)

The same trend can be observed on these variables, similar with the previous simulation. Five of the variables negatively affected GST, whereas the rest were positively related. A reduction in value of the elasticity parameters decreased the effect of GST on the macroeconomic variables, whereas an increment in value increased the impact on the variables. This simulation mostly affected government revenue.

6.4 Summary

Figure 6.1 exhibits the impact of GST on the macroeconomic variables on the basis of three simulations. Government revenue and government expenditure were positively related to GST from all the simulations, as shown in the ongoing increasing trend from Simulation 1 to Simulation 3. However, government expenditure was maintained below government revenue; hence, the government faced surplus budget as the GST was implemented. On the other hand, the majority of variables were adversely affected by the imposition of GST. Consumption expenditure had the largest negative effect followed by investment. The remaining three variables, namely, export, import, and GDP, were less affected by GST for all the cases.

CHAPTER 7: GST AND ITS IMPACT ON HOUSEHOLD WELFARE

7.1 Introduction

This chapter explains the welfare measurement of households. The households are divided into three groups: lower-, middle-, and higher-income groups. Equivalent variation is calculated for each household to indicate the welfare gains or losses affected by GST. Similar simulation exercises were conducted as in previous analyses.

7.2 Equivalence Variations

GST would affect household welfare regardless of the existing level of income groups. Table 7.1 shows the results of the simulations with the corresponding GST rates. The EV ratio in the table indicates the changes in welfare that would be faced by the corresponding households.

Table 7.1: Percentages of Welfare Effect (%)

Income Groups	4%	6%	8%
Lower Income	-0.20	-0.75	-1.60
Middle Income	-0.44	-1.68	-3.60
Higher Income	-0.58	-2.24	-4.80

Source: Author's Calculation

Table 7.1 shows the results of the welfare effects faced by the three types of income groups. In Simulation 1, when GST was charged at 4 percent, the effect on the lower-income group was at -0.20 percent, the middle income group at -0.44 percent, and the higher-income group at -0.58 percent. All the groups experienced welfare losses from GST implementation. The least affected was the lower-income group, whereas the most affected was the higher-income group.

In Simulation 2 at 6 percent GST rate, all the groups experienced further welfare losses. The indices (numbers) slightly increased from the range of -0.75 to -2.24 percent. Simulation 2 shows the same trend; the lower-income group was less affected than the middle- and higher-income groups.

As in Simulation 2, Simulation 3 also indicated a similar trend of the lower-income group suffering the least impact while the higher-income group suffers a huge impact when GST was fixed at 8 percent. The welfare losses increased in the range of -1.60 to -4.80 percent. An increase in GST rates increased welfare losses. According to Whalley and Zhang (2005), when the GST base expanded in China, consumer welfare somehow worsened. Similarly, in Lebanon, VAT increase significantly affected the inequality and poverty in the country (Salti and Chaaban, 2010).

In addition, the decline in household welfare has been proven in the previous section on private consumption. Table 6.1 shows that GST imposition negatively affected private consumption. The increase in GST rate decreased consumption expenditure. Hence, household welfare decreased when the consumption declined.

In 2015, the cost of living slightly increased, which might have been the effect of the first year of GST introduction. This outcome is also due to inflation, which averaged at 4 percent in 2015. The escalating cost of living and staggered nominal wages have explicitly affected income inequality in Malaysia.

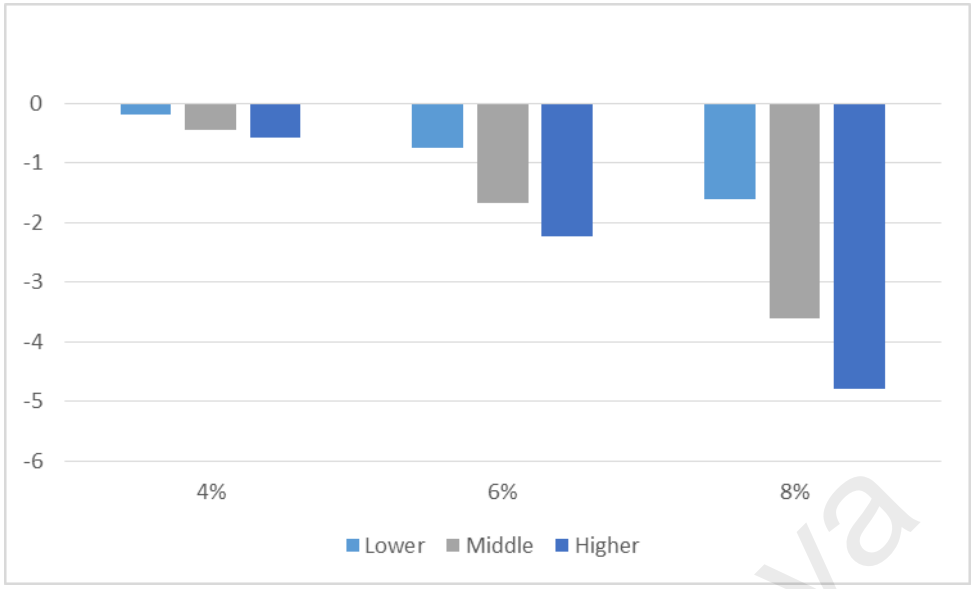

Figure 7.1: Percentages of Welfare Effect (%)

Figure 7.1 shows that the changes in percentages of welfare loss continuously increased for all income groups from all simulations. The lower-income group at 4 percent GST rate experienced the lowest welfare loss, whereas the higher-income group at 8 percent GST rate experienced the highest welfare loss. Thus, GST is somehow a type of progressive tax, wherein higher-income groups pay more than lower-income groups. Ballard et al. (1987) found that consumption tax is progressive, with the rich burdened with more tax than the poor.

As discussed above, higher-income groups were more affected by GST than lower-income groups, an outcome that might be due to their larger purchasing power. According to the Household Expenditure Survey published by the Malaysian Department of Statistics, in 2012, lower-income earners spent most of their income on food and utilities. Hence, lower-income groups were at the highest risk for the consumption of necessity goods. On the other hand, higher-income groups spent more on transportation. This finding shows that most expenditure by lower-income groups is

on necessity goods. The rest of the expenditures went to other normal and luxury items, which were highly consumed by middle- and higher-income groups.

Furthermore, people earning less than RM1,000 spent 30 percent of their income on food, whereas those whose monthly income was above RM10,000 allotted only 5 percent (Lau et al., 2013). The lower-income groups spent half of their income on essential goods, but the middle- and higher-income groups only allocated a minimal portion of their income on necessity goods. Therefore, these groups consumed almost the same amount of approximately RM500 for these types of goods. On the other hand, the remainder of their income was spent on other types of goods. Meanwhile, the middle- and higher-income groups still had 95 percent of their income to use. Hence, they tended to use more money for other products, which then resulted in them paying higher taxes. Therefore, higher-income groups have a large change in equivalent variation, a result that is contrary to that of most studies on consumption taxes in Section 3.3.3.

Progressive tax in the case of Malaysia is based on three factors. The first is government intervention in controlling the price of some necessity goods. The second is the direct cash-assistance package, such as the Bantuan Rakyat 1 Malaysia (BRIM), which helps reduce the cost of living for lower-income and some middle-income groups. However, BRIM only provides temporary relief and is not ideal for the long-term. The third is the increased spending of the middle- and higher-income groups, thus leading to more taxes being paid.

Moreover, to help minimize the extra financial burden and the rising cost of living, the government introduced several efforts through welfare enhancement in one of the

objectives in the 11th Malaysia Plan and the 2015 fiscal policy. The government assists lower- and middle-income groups by supporting their consumption activities. The efforts include increments in various fiscal transfers, increasing the minimum wage, and providing income tax relief (EPU, 2015b, pp. 3-20).

Therefore, (1) the lower the GST rate, the less the welfare loss, while the higher the GST rate, the greater the welfare loss; and (2) the lower-income group was less affected than the middle- and higher-income groups from all simulations. This conclusion was supported by the research conducted by the Ministry of Finance and Royal Malaysian Customs Department, which reported that GST in Malaysia is naturally progressive (Siti Halimah, 2014; Tholasy, 2014). In the case of Serbia and Pakistan under their 2003 tax reform, these countries experienced a progressive tax system when their respective governments applied the zero-rate mechanism and exempted supplies to some essential goods and services.

Other countries apply a reduced rate of consumption tax to certain necessities in order to minimize the tax burden on the lower-income group. In the United Kingdom, the standard VAT rate imposed is 20 percent on the majority of products; however, a reduced rate of 5 percent is charged on items such as electricity and mobility aids for the elderly. Meanwhile, in Australia, the government introduced tax reduction and some material benefits to their residents (Lau et al., 2013). Furthermore, the elimination of a reduced VAT rate in Germany provides some redistributive effects to its people (Boeters, Böhringer, Büttner, & Kraus, 2010).

7.3 Sensitivity Analysis

This section presents the results from the simulation experiments of the sensitivity analysis described in Section 4.8. The new simulation can be observed on the changes in percentage of the welfare effect. Figure 7.2 shows the impact of this simulation.

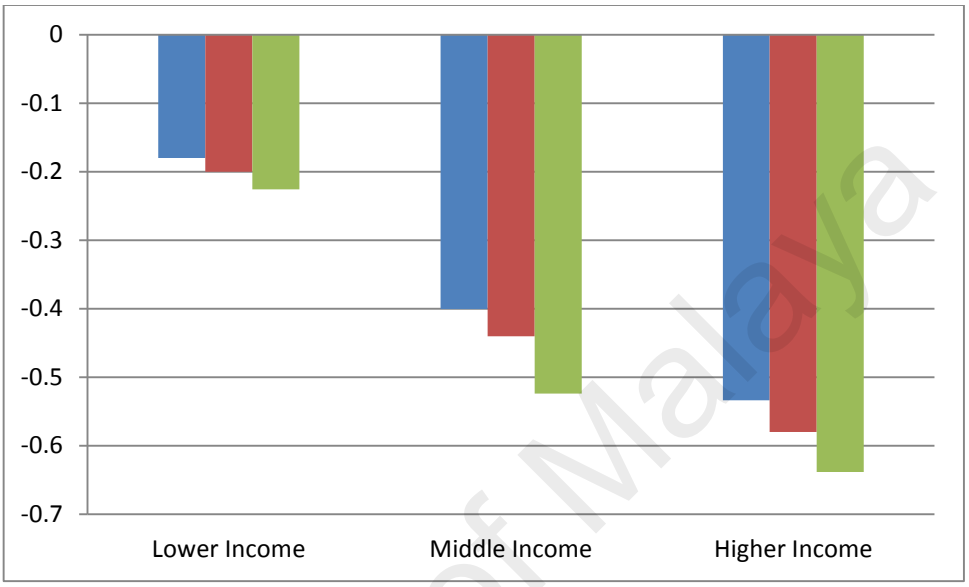

Figure 7.2: Percentages of Welfare Effect for Sensitivity Analysis (%)

Figure 7.2 illustrates the findings of the new adjustment made in the model. The magnitude changes are similar to those in the main model, showing that the lower-income group is less affected by the GST. In addition, welfare and elasticities are correlated.

7.4 Summary

In general, GST implementation decreased household welfare in Malaysia. However, an increase GST rates would affect the society. The lower-income group is less affected than the higher-income group. However, GST implementation has generally worsened the welfare of all income groups because GST is taxed at an expanded base and covers

more items than the former SST. These findings will help the government select the best method for their policy plan. The next chapter will conclude the study by summarizing the major findings and providing several policy implications.

CHAPTER 8: CONCLUSIONS AND POLICY IMPLICATIONS

8.1 Introduction

This chapter concludes the findings obtained from three chapters: Chapters Five, Six, and Seven. Several suggestions and policy implications are also provided to improve the policy implementation of the Malaysian GST.

8.2 Conclusions

This study examines the impact of GST on the Malaysian economy. The study has three objectives. First, it investigates consequent changes in sectoral responses, including output, sales, and prices for 15 main sectors. Second, it presents the results of GST impact on seven macroeconomic variables, which are consumption, investment, government revenue, government expenditure, export, import, and GDP. Third, it discusses the impact of GST on household welfare. The CGE model is utilized to stimulate the GST impact. The model uses a simple comparative static model. Three simulations at different GST rates are conducted in the study to examine GST impact: Simulation 1 at 4 percent GST rate, Simulation 2 at 6 percent, and Simulation 3 at 8 percent.

For the first objective of the study, GST negatively affected the sectoral production and sales yet positively affected sectoral prices for the entire economic sector. GST reduced both sectoral production and sales while leading to an increase in sectoral prices. Generally, the higher the GST rate introduced, the greater the impact on each sector. The effect can be observed in ascending order, with the highest impact of GST occurring in Simulation 3, followed by Simulation 2, and finally Simulation 1.

Sectoral production and sales showed a relatively similar trend. The highest decline in production and sales was from the electricity and gas sector. This sector is significantly affected by GST because electricity power is generated by natural gas, 45 percent of which were used to generate electricity in 2013. Moreover, most of the demand for electricity is mainly driven by the industrial and commercial sectors. In 2014 and 2015, the prices of electricity, gas, and other fuels resulted in the increase in cost of electricity supply. Therefore, production and sales from this sector dropped, as reflected in the high cost and the effect of the new tax introduced as GST. These results are consistent with consumption tax theory.

On the contrary, the least affected sectors in terms of production and of sales were petroleum refinery and textile and leather, respectively. Remarkably, GST positively affected the production and sales of education, health, and other services. This effect is due to the service sectors, which coordinate and support other sectors in the economy. Hence, GST imposition did not negatively affect this sector but improved production and sales.

Additionally, sectoral prices rose as GST rate increased. Hence, GST positively affects sectoral prices. The communication and ICT sector price largely increased because of the rise in GST rate. Meanwhile, the E&E industry under R&D projects ascended the value chain by producing higher value-added products and enhanced the industry's overall competitiveness. Therefore, a price increase is normal for such an important sector, and demand determines price increase.

The price of the agriculture, forestry, and logging sector was less affected by GST because agriculture subsectors such as palm oil and rubber are export-oriented products.

The government protects these two kinds of industries because they contribute a substantial income to Malaysian exports. The imposition of GST has a minimal effect on the sectoral price because policy makers monitor and include the sector in important plans to benefit the country.

For the first objective, considering sectoral production, sales, and prices, the sectors most affected by GST were communication and ICT and electricity and gas. These two sectors are important for any emerging economy. GST may affect the growth of technology, which is the basis of a knowledge-based economy. On the contrary, the least affected sectors were agriculture, forestry, and logging and petroleum and natural gas. Both sectors are included in primary sectors, which are the backbone for the country's economic prosperity and development. Therefore, the minimal effect of GST on these sectors is a good indication for policy makers to compose a good plan for the country. Authorities can easily realize which sector the GST will contribute more revenue to and when the sector will achieve their objective.

For the second objective of the impact of GST on macroeconomic variable, most of the factors were adversely affected by GST. GST is inversely related to consumption, investment, export, import, and GDP, and the most affected was consumption. Households adjusted their spending when GST was first implemented. The rise in prices normally caused households to spend less for the product, in line with theory of consumer behavior.

However, government revenues and expenditures were positively related. GST implementation broadened the sources of revenue. For example, the number of registered companies has increased. The country was also benefitted when the hike in

government collection compensated for the fall in other economic variables. Furthermore, the government would utilize GST revenue to increase expenditure by operating and developing expenditure for the welfare of the public and to spur the economy.

The least affected factors were exports and imports. For the first few months of GST implementation, both export and import contracted to some extent. In addition, a total reduction in imported goods was due to the fall in purchasing power shown by the decline in consumption expenditure.

Third, this study analyzed the impact of GST on household welfare according to the three income groups: lower-, middle-, and higher-income groups. The welfare effects declined and all the income groups displayed the same pattern or trend based on simulation results. Household welfare worsened when GST was imposed. Moreover, higher-income groups were more affected than lower-income groups due to their larger consumption power. High-income earners spent most of their income on products. The more they spent, the more they paid for GST.

The rise in GST rates likewise led to a rise in welfare losses. When GST rate is high, households pay more and the loss is greater compared to a low GST rate. Hence, GST in Malaysia is progressive, which is good for both the government and the public because the government can collect more money from high-income earners. The collected revenue can be invested for the benefit of the public, which can increase their welfare especially for lower-income groups.

8.3 Policy Implication

Various scenarios can be measured in this study as mentioned in the literature review, such as the effect of the reform on sectoral employment, the Gini coefficient, and other alternative scenarios like revenue-neutral tax reform. However, the study identified only three major objectives most relevant to the Malaysian economy. GST implementation requires attention from the authorities. Therefore, this section on policy implication discusses the possible success of GST and how authorities can apply and improve it to benefit the entire country and increase social welfare.

GST is a new tax reform implemented in Malaysia since 2015. The government and the public encountered several challenges in implementing and accepting the new reform, respectively. The introduction of GST not only aimed to increase revenue but to improve the efficiency of the tax system as well. GST has succeeded in broadening the country's revenue base, which is one of the motivations for considering GST implementation in Malaysia. GST has also overcome the inherent weaknesses in the old tax system, namely, SST, especially because the majority of industries are subject to pay for GST.

As indicated in the 2015 BNM Annual Report, the increase in GST revenue can offset the loss in petroleum tax revenue owing to lower oil prices. The aim of the policy is to reduce the reliance on the direct tax. The significant contribution of GST can gradually counterbalance the revenue from petroleum and income taxes. In addition, GST has succeeded in improving tax compliance because the number of registered companies has increased. The businesses which were considered under the shadow economy have now contributed to the tax collection. GST has broadened the sources of government revenue and the economy in general.

The increase in government revenue can be one of the vibrant advantages for the country. It could counterbalance the adverse effects from GST. With the budget surpluses, money may be invested to promote export-oriented industries, particularly for E&E products. The authorities may also use the money to stimulate import-substitution industries, especially in the manufacturing sector. Therefore, GST may induce money to come in to the country, and the country will not be greatly affected from the global changes and the depreciation of the ringgit.

The government can also use its revenue to provide incentives to the sectors of agriculture, forestry, and logging and crude oil, natural gas, and mining to produce good-quality products in economies of scale. Thus, revenue utilization is promoted to the foreign sector market because GST has less effect on these sectors, which is a good indicator for the economy. The less impact GST has on these sectors the larger the amount of production, the increase in product consumption, and the increase in export rate. Thus, the economy will expand when a rise in the demand of primary products occurs.

GST has the largest effect on the communication and ICT and electricity and gas sectors. Hence, policymakers should pursue the best policies that enhance these two service sectors because the country depends on service sectors as engines to other sectors in growing the economy. Ultimately, these sectors will provide more income to the country through GST; revenue will increase, which, in turn, will aid in reducing the national deficit.

With a high GST collection, the government can improve the national education and health sectors, both of which are primary indicators of economic development.

Enhancing the quality for both sectors and providing fundamental need and public amenities will provide a better future for the society. Similarly, the authorities will be able to facilitate them to ensure stability, environmental care, security, and energy challenges. This effect, in turn, will improve the welfare of society and help achieve fiscal sustainability and economy growth.

The government could also impose an appropriate tax rate to the society. GST would be a useful complement to the economy when it is charged at a minimum rate. Primarily, a charge of at least 6 percent is a reasonable initial rate. If the rate is high or fluctuates, the impact on the economy will worsen. In addition, the lower the GST rate is imposed in the economy, the lower the welfare. Hence, a low GST will make a household pay less. The loss is minimal compared to the high GST rate. Therefore, the recommendation is to have GST imposed at a lower rate, which should remain unchanged for at least five years. For example, the Singaporean government has gained public acceptance and stability in its revenue collection after keeping its rate constant at 3 percent for almost nine years.

Policymakers should pursue policies promoting price stability in conjunction with tax reform. GST has affected household consumption through inflationary pressures. If the government can restrict inflation to a certain extent, it could support the lower- and middle-income earners. As inflation decreases, relative income increases. Subsequently, their consumption ability will increase, which in turn would benefit them and promote the economy. At the same time, the richest groups will also increase their demand and they will pay for more taxes as their spending increases. Therefore, an increase in the amount of expenditure made by most of the households increases GST collection.

Accordingly, this outcome will support the national economy and increase the GDP in general.

Importantly, the economy will grow if the government spends the revenues wisely. Governments at all levels should be aware of the consequences for households in facing such policy shifts. The expenditure must be targeted to the necessities without any discrimination, particularly to the poor. Prudent and productive use of the revenue may be redistributed in the best way to the right persons. The authorities should place GST revenue as a benchmark to measure government spending, so that it will manage its expenditure and reduce its deficit budget.

REFERENCES

Aamir, M., Qayyum, A., Nasir, A., Hussain, S., Iqbal Khan, K., & Butt, S. (2011). Determinants of Tax Revenue: A Comparative Study of Direct Taxes and Indirect Taxes of Pakistan and India. *International Journal of Business and Social Science, 2*(19), 173-178.

Abel. (1982). Dynamic Effects of Permanent and Temporary Tax Policies in a Q Model of Investment. *Journal of Monetary Economics, 9*(3), 353-373.

Abel, Bernanke, B., & Croushore, D. (2013). *Macroeconomics* (8th ed.), London: Pearson.

Ahmad Husni, M. H. (2013). *Malaysia's Income Distribution Inequality 'Still High'*. Retrieved from http://www.thestar.com.my/business/

Asian Development Bank. (2006). *Tax Reform and the Self Assessment.* http://www.adbi.org/files/2006.07.malaysia.tax.reform.self.assessment.paper.pdf

Adelman, I., & Robinson, S. (1978). *Income Distribution Policy in Developing Countries: A Case of Korea*: Stanford University Press.

Ahluwalia, M. S., & Lysy, F. J. (1979). Welfare Effects of Demand Management Policies: Impact Multipliers Under Alternative Model Structures. *Journal of Policy Modeling, 1*(3), 317-342.

Ahmad, M. (2014). Opening Speech. In S. Wong, S. Teoh & T. K. Ramnath (Eds.), *The ISIS National Forum on Malaysia's Goods and Services Tax (GST): Possible Lessons from the United Kingdom and Singapore* (Vol. PP 5054/11/2012 (031098), pp. 16). Kuala Lumpur: Institute of Strategic and International Studies (ISIS) Malaysia.

Al-Amin, A. Q., Abdul Hamid, J. & Chamhuri, S., 2008. A Computable General Equilibrium Approach To Trade And Environmental Modelling In The Malaysian Economy. *MPRA Paper 8772.* University Library of Munich, Germany.

Al-Amin, A. Q., Chamhuri, S., & Abdul Hamid, J. (2009). Computable General Equilibrium Techniques for Carbon Tax Modelling. *American Journal of Environmental Science, 5*(3), 330–340.

AlShehabi, O. H. (2012). Energy and Labour Reform: Evidence from Iran. *Journal of Policy Modeling, 34*(3), 441-459.

Amanuddin, S., Muhammad Ishfaq, M. R., Afifah, A. H., Nur Fatin, Z., & Nurul Farhana, M. F. (2014). Educators' Awareness and Acceptance Towards Goods and Services Tax (GST) Implementation in Malaysia: A Study in Bandar Muadzam Shah, Pahang. *International Journal of Business, Economics and Law, 4*(1).

Ames, B., Brown, W., Devarajan, S., & Izquierdo, A. (2001, August). Macroeconomic Policy and Poverty Reduction. *International Monetary Fund and the World Bank*, Retrieved from http://www.imf.org/external/pubs/ft/exrp/macropol/eng/.

Amir, H., Asafu-Adjaye, J., & Ducpham, T. (2013). The Impact of the Indonesian Income Tax Reform: A CGE Analysis. *Economic Modelling, 31*, 492-501.

André, F. J., Cardenete, M. A., & Romero, C. (2010). *Designing Public Policies: An Approach Based on Multi-Criteria Analysis and Computable General Equilibrium Modeling* (Vol. 642). Springer Science & Business Media.

Andrikopoulos, A. A., Brox, J. A., & Georgakopoulos, T. A. (1993). A Short-Run Assessment of the Effects of VAT on Consumption Patterns: The Greek Experience. *Applied Economics, 25*(5), 617-626.

Aronson, J. R., Johnson, P., & Lambert, P. J. (1994). Redistributive Effect and Unequal Income Tax Treatment. *The Economic Journal*, 262-270.

Arrow, K. J., & Debreu, G. (1954). Existence of an Equilibrium for a Competitive Economy. *Econometrica: Journal of the Econometric Society*, 265-290.

Arrow, K. J., & Hahn, F. (1971). *General Competitive Analysis*. San Francisco: Holden-Day.

Arsić, M., & Altiparmakov, N. (2013). Equity Aspects of VAT in Emerging European Countries: A Case Study of Serbia. *Economic Systems, 37*(2), 171-186. Retrieved from 10.1016/j.ecosys.2012.12.003

Arthur, O. S., Steven, M. S., & Stephen, P. (2010). *Macroeconomics: Principles, Applications and Tools*: Prentice Hall.

Auriol, E., & Warlters, M. (2012). The Marginal Cost of Public Funds and Tax Reform in Africa. *Journal of Development Economics, 97*(1), 58-72.

Ballard. (1988). The Marginal Efficiency Cost of Redistribution. *The American Economic Review*, 1019-1033.

Ballard. (2000). How Many Hours Are in a Simulated Day? The Effects of Time Endowment on the Results of Tax-Policy Simulation Models. *Michigan State University, 28*, 13-14.

Ballard, Fullerton, D., Shoven, J. B., & Whalley, J. (1985). *General Equilibrium Analysis of Tax Policies. In a General Equilibrium Model for Tax Policy Evaluation.* University of Chicago Press.

Ballard, C. L., Scholz, J. K., & Shoven, J. B. (1987). The Value-Added Tax: A General Equilibrium Look at Its Efficiency and Incidence. *The Effects of Taxation on Capital Accumulation* (pp. 445-480): University of Chicago Press.

Ballentine, J. G., & McLure, C. E. (1980). Taxation and Corporate Financial Policy. *The Quarterly Journal of Economics*, *94*(2), 351-372.

Bank Negara Malaysia. (2010). *Balance of Payment 2010.* Kuala Lumpur: Bank Negara Malaysia. Retrieved from http://www.bnm.gov.my/

Bank Negara Malaysia. (2012). *Monthly Statistical Bulletin: Federal Government Revenue.* Retrieved from http://www.bnm.gov.my/

Bank Negara Malaysia. (2014a). *Monthly Statistical Bulletin: Federal Government Revenue.* Retrieved from http://www.bnm.gov.my/

Bank Negara Malaysia. (2014b). *BNM Annual Report 2014.* Kuala Lumpur: Bank Negara Malaysia. Retrieved from http://www.bnm.gov.my/

Bank Negara Malaysia. (2015). *BNM Annual Report 2015.* Kuala Lumpur: Bank Negara Malaysia. Retrieved from http://www.bnm.gov.my/

Barjoyai, B. (1993). *Malaysian Tax Policy: Applied General Equilibrium Analysis*. Petaling Jaya: Pelanduk Publications.

Bernardi, L., Fraschini, A., & Shome, P. (2007). *Tax Systems and Tax Reforms in South and East Asia.* Retrieved from books.google.com.my/books?isbn=1134168322

Bird, R., Martínez-Vázquez, J., & Torgler, B. (2005). Value-Added Taxes in Developing and Transitional Countries: Lessons and Questions. *ITP Paper, 505*.

Blanchard, O. J., & Fischer, S. (1989). *Lectures on Macroeconomics*: MIT Press.

Blundell, R. (2009). Assessing the Temporary VAT Cut Policy in the UK. *Fiscal Studies, 30*(1), 31-38.

Boeters, S., Böhringer, C., Büttner, T., & Kraus, M. (2010). Economic Effects of VAT Reforms in Germany. *Applied Economics, 42*(17), 2165-2182.

Bond, T., & Hughes, C. (2013). *A-level Economics Challenging Drill Solutions*: Yellowreef Limited.

Bovenberg, A. L. (1987). Indirect Taxation in Developing Countries: A General Equilibrium Approach. *Staff Papers - International Monetary Fund 34*(2), 333-373.

Bröcker, J. (2004). Computable General Equilibrium Analysis in Transportation Economics. In *Handbook of Transport Geography and Spatial Systems* (Pp. 269-289). Emerald Group Publishing Limited.

Broer, D. P., & Lassila, J. (1997). Pension Policies and Public Debt in Dynamic CGE Models. *Physica-Verlag*.

Buettner, T., & Erbe, K. (2014). Revenue and Welfare Effects of Financial Sector VAT Exemption. *International Tax and Public Finance, 21*, 1028–1050.

Cardenete, M. A., Guerra, A.-I., & Sancho, F. (2012). *Applied General Equilibrium: An Introduction*. London, New York: Springer.

Cardenete, M. A., & Sancho, F. (2003). An Applied General Equilibrium Model to Assess The Impact of National Tax Changes on a Regional Economy. *Review of Urban & Regional Development Studies, 15*(1), 55.

Caspersen, E., & Metcalf, G. (1995). Is a Value Added Tax Progressive? Annual Versus Lifetime Incidence Measures. *National Bureau of Economic Research.*

Chadha, R. (2009). *Moving to Goods and Services Tax in India: Impact on India's Growth and International Trade* (No. 23071).

Chandra, P., & Long, C. (2013). VAT Rebates and Export Performance in China: Firm-Level Evidence. *Journal of Public Economics, 102*, 13-22.

Charles, I. J. (2014). *Macroeconomics*. New York:W.W. Norton & Co.

Chen, Y. K. (2012). The Progressivity of the Malaysian Personal Income Tax System. *Kajian Malaysia, 30*(2), 27-43.

Choong, K. F., & Edward, W. S. K. (2011). A Study on Self-Assessment Tax System Awareness in Malaysia. *Australian Journal of Basic and Applied Sciences, 5*(7), 881-888.

Christandl, F., Fetchenhauer, D., & Hoelzl, E. (2011). Price Perception and Confirmation Bias in the Context of a VAT Increase. *Journal of Economic Psychology, 32*(1), 131-141.

Cordano, A. L. V., & Balistreri, E. J. (2010). The Marginal Cost of Public Funds of Mineral and Energy Taxes in Peru. *Resources Policy, 35*(4), 257-264.

Crawford, I., Smith, S., & Webb, S. (1993). *VAT on Domestic Energy*. The Institute for Fiscal Studies. London: KKS Printing.

Cummins, J. G., Hassett, K. A., & Hubbard, R. G. (1996). Tax Reforms and Investment: A Cross-country Comparison. *Journal of Public Economics, 62*(1), 237-273.

Curtis, L. J., & Kingston-Riechers, J. (2010). Implications of the Introduction of the Goods and Services Tax for Families in Canada. *Canadian Public Policy, 36*(4), 503-520.

Dahmardeh, N., Shahraki, M., & Ghaderi, S. (2012). A Study of the Impact of Saving on Macroeconomic Variables in Iran (CGE Model). *International Journal of Economics and Finance, 4*(2), 204.

De Melo, J., & Tarr, D. G. (1992). *A General Equilibrium Analysis of US Foreign Trade Policy*. Cambridge, MA: MIT Press

Demery, D., & Harrigan, F. (1985). A Social Accounting Matrix for Malaysia, 1978. *For Internal Circulation*.

Department of Statistics. (2010). *Labour Force Survey Report, 2010.* Kuala Lumpur: Jabatan Perangkaan Malaysia.

Department of Statistics. (2010). *National Accounts 2010.* Kuala Lumpur: Jabatan Perangkaan Malaysia.

Department of Statistics. (2012a). *Findings of the Household Income Survey (HIS) 2012.* Kuala Lumpur: Jabatan Perangkaan Malaysia.

Department of Statistics. (2012b). Mean Monthly Household Income by Strata, Malaysia, 2009 & 2012. *Findings of the Household Income Survey (HIS) 2012*. Kuala Lumpur: Jabatan Perangkaan Malaysia.

Dervis, K., De Melo, J., & Robinson, S. (1981). A General Equilibrium Analysis of Foreign Exchange Shortages in a Developing Economy. *The Economic Journal, 91*(364), 891-906.

Devarajan, S., Jitsuchon, S., & Sussangkarn, C. (1991). A Value Added Tax (VAT) in Thailand: Who Wins and Who Loses? *TDRI Quarterly Review, 6*(1), 12-16.

Dietl, H. M., Jaag, C., Lang, M., Lutzenberger, M., & Trinkner, U. (2010). Impact of VAT Exemptions in the Postal Sector on Competition and Welfare. *University of Zurich Institute for Strategy and Business Economics Working Paper*(145).

Di John, J. (2006). The Political Economy of Taxation and Tax Reform in Developing Countries (No. 2006/74). *Research Paper, UNU-WIDER, United Nations University (UNU).*

Economic Planning Unit. (2013). *Table 6 - Gini Coefficient by Ethnicity, Strata and State, Malaysia, 1970-2012.* Retrieved from http://www.epu.gov.my/en/household-income-poverty

Economic Planning Unit. (2015a). *The Malaysian Economy in Figures 2015.* Kuala Lumpur: Economic Planning Unit.

Economic Planning Unit. (2015b). *Eleventh Malaysia Plan 2016-2020. Anchoring Growth on People.* Kuala Lumpur: Percetakan Nasional Malaysia Berhad.

Ee, K. H. (1982). *Income Distribution and Unemployment in Malaysia: A Dual Economy (CGE) Model* (Doctoral Dissertation, Princeton University).

Emmanuel, U. C. (2013). The Effects of Value Added Tax (VAT) on The Economic Growth of Nigeria. *Journal of Economics and Sustainable Development, 4*(6), 190-201.

Engel, E. M., & Skinner, J. (1996). Taxation and Economic Growth. *National Tax Journal, 49*(4), 617-642.

Engel, E. M., Galetovic, A., & Raddatz, C. E. (1999). Taxes and Income Distribution in Chile: Some Unpleasant Redistributive Arithmetic. *Journal of Development Economics, 59*, 155-192.

Engel, E. M., Galetovic, A., & Raddatz, C. E. (2001). A Note on Enforcement Spending and VAT Revenues. *Review of Economics and Statistics, 83*(2), 384-387.

Faizulnudin, H. (2012). *Implikasi GST Kepada Pengguna*. Paper Presented at the Persidangan GST 2012 'Cukai Barang & Perkhidmatan' Reformasi & Transformasi Cukai, Johor Bahru.

Fatt, C. K., & Khin, E. W. S. (2011). A Study on Self-Assessment Tax System Awareness in Malaysia. *Australian Journal of Basic and Applied Sciences, 5*(7), 881-888.

Feldstein, M., Slemrod, J., & Yitzhaki, S. (1980). The Effects of Taxation on The Selling of Corporate Stock and The Realization of Capital Gains. *The Quarterly Journal of Economics, 94*(4), 777-791.

Feldstein, M. S., & Krugman, P. R. (1990). International Trade Effects of Value-Added Taxation. *Taxation in the Global Economy* (pp. 263-282): University of Chicago Press.

Ferreira Filho, J. B. S., Vieira dos Santos, C., & do Prado Lima, S. M. (2007). Tax Reform, Income Distribution and Poverty in Brazil: An Applied General Equilibrium Analysis. *MPIS, Working Paper 2007-26*.

Field, A. J., & Wongwatanasin, U. (2007). Tax Policies' Impact on Output, Trade and Income in Thailand. *Journal of Policy Modeling, 29*(3), 361-380.

Freebairn, J. (2011). A Better and Larger GST? *The Economic and Labour Relations Review 22*(3), 85-100.

Fullerton, D., & D.L. Rogers. (1993). *Who Bears the Lifetime Tax Burden?*. Brookings Institution Press.

Gábriel, P., & Reiff, A. (2006). The Effect of the Change in VAT Rates on the Consumer Price Index. *MNB Bulletin, 1*(2), 14-20.

Gemmell, N. (1988). Tax Systems, Tax Revenue and Growth In LDCS: A Review of Empirical Evidence. *Intereconomics, 23*(2), 84-90.

Gemmell, N., & Morrissey, O. (2005). Distribution and Poverty Impacts of Tax Structure Reform in Developing Countries: How Little We Know. *Development Policy Review, 23*(2), 131-144.

Giesecke, J. A., & Nhi, T. H. (2010). Modeling Value-Added Tax in the Presence of Multi-Production and Differentiated Exemptions. *Journal of Asian Economics, 21(2)*, 156-173.

Go, D. S., Kearney, M., Robinson, S., & Thierfelder, K. (2005). An Analysis of South Africa's Value Added Tax. *World Bank Policy Research Working Paper 3671*.

Goode, R. B. (1984). *Government Finance in Developing Countries.* New York: Brookings Institution Press.

Gordon, R. H., & Nielsen, S. B. (1997). Tax Evasion in an Open Economy. Value-added vs. Income Taxation. *Journal of Public Economics, 66*(2), 173-197.

Gordon, R. H. (2006). *Macroeconomics* (Tenth ed.). Boston: Pearson International Edition.

Gourdon, J., Hering, L., Monjon, S., & Poncet, S. (2014). Export Management and Incomplete VAT Rebates to Exporters: The Case of China. *Development, 117*.

GST Malaysia. (2014). *GST Zero Rated Exemption Supply List.* Retreived from http://www.gstmalaysia.co/gst-zero-rated-exemption-supply-list/158/

Hamilton, B., & Whalley, J. (1989). Reforming Indirect Taxes in Canada: Some General Equilibrium Estimates. *The Canadian Journal of Economics, 22*(3), 561-575.

Harberger, A. (1962). The Incidence of the Corporation Income Tax. *The Journal of Political Economy,* 215-240.

Harrison, G. W. (2000). *Using Dynamic General Equilibrium Models For Policy Analysis* (Vol. 248). North-Holland.

Hassan, Z. A. (1995, November). Measurement of Welfare Change: A Review. *Center for Agricultural and Rural Development, Iowa State University, Working Paper 95-WP 141*.

Hernández, G. (2012). Payroll Taxes and the Labor Market: A Computable General Equilibrium Analysis. *Latin American Journal of Economics, 49*(1), 99-123.

Hicks, J. R. (1939). The Foundations of Welfare Economics. *The Economic Journal, 49*(196), 696-712.

Hines Jr, J. R., & Desai, M. A. (2005). *Value-Added Taxes and International Trades: The Evidence*. Unpublished Manuscript.

Hines Jr, J. R., & Summers, L. H. (2009). How Globalization Affects Tax Design. *Tax Policy and the Economy, 23*(1), 123-158.

Hossain, M. (1995). The Equity Impact of the Value Added Tax in Bangladesh. *IMF Staff Papers No. 2,* pp. 411-430.

Huizinga, H. (2002). A European VAT on Financial Services? *Economic Policy, 17*(35), 497–534.

Hussain, K. (2014). Questions and public Interactions. In S. Wong, S. Teoh & T. K. Ramnath (Eds.), *The ISIS National Forum on Malaysia's Goods and Services Tax (GST): Possible Lessons from the United Kingdom and Singapore* (Vol. PP 5054/11/2012 (031098)). Kuala Lumpur: Institute of Strategic and International Studies (ISIS) Malaysia.

Ikhsan, M., Trialdi, L., & Syahrial, S. (2005). The New Indonesian Tax Reform Initiatives: Mediating Two Competing Proposals. *Faculty of Economics University of Indonesia: Institute for Economic and Sosial Research*.

International Gas Union (2015). World LNG Report. Retrieved from http://www.igu.org/sites/default/files/node-page-field_file/IGU-World%20LNG%20Report-2015%20Edition.pdf

International Monetary Fund. (2014). Asia and Pacific - Sustaining the Momentum: Vigilance and Reforms. *Regional Economic Outlook.* World Economic and Financial Surveys.

Isaacson, E., & Keller, H. B. (1994). *Analysis of Numerical Methods*. Courier Corporation.

Ismail, S. (1988). *Consumption and Trade-Related Taxes In Malaysia*. Kuala Lumpur: Institute of Strategic and International Studies (ISIS) Malaysia.

Jaafar, A. H., Al-Amin, A. Q., Azam, M. N., Mazumder, M. N. H., Kari, F., & Yeasmin, M. (2011). The Multidimensional Impacts of External Price Shocks on Macroeconomic Variables: Malaysian Experiences from Recession to Economic Instability. *African Journal of Business Management*, *5*(20), 8057.

Jalata, D. M. (2014). The Role of Value Added Tax on Economic Growth of Ethiopia. *Science, Technology and Arts Research Journal*, *3*(1), 156-161.

Jangra, A., & Narwal, K. P. (2014). Application of CGE Models in GST: A Literature Review. *International Journal of Economic Practices and Theories*, *4*(6), 970-978.

Jayakumar, A. (2012). A Study on Impact of Value Added Tax (VAT) Implementation in India. *World*, *2*(5).

Johansen, L. (1960). *A Multi-Sectoral Study of Economic Growth* (Vol. 82). Amsterdam: North-Holland.

Johansson, Å., Heady, C., Arnold, J., Brys, B., & Vartia, L. (2008). Taxation and Economic Growth. *OECD Economics Department Working Papers, No. 620, OECD Publishing, Paris.* http://dx.doi.org/10.1787/241216205486.

Jomo, K. S. (2000). Malaysia's Privatisation Experience. In Booth, A., & Ash, R. (Eds.), *The Economies of Asia, 1950-1998: The Four Tigers*. London: Routledge.

Jorge, M.-V., & McNab, R. M. (2000). The Tax Reform Experiment in Transitional Countries. *National Tax Journal, 53,* 273-298.

Keen, M., & Lockwood, B. (2010). The Value Added Tax: Its Causes and Consequences. *Journal of Development Economics, 92*(2), 138-151.

Keen, M., & Syed, M. M. H. (2006). *Domestic Taxes and International Trade: Some Evidence*: International Monetary Fund.

Kehoe, T. J., & Serra-Puche, J. (1983). A Computational General Equilibrium Model with Endogenous Unemployment: An Analysis of the 1980 Fiscal Reform in Mexico. *Journal of Public Economics, 22*(1), 1-26.

Keller, W. J. (1980). *Tax Incidence: A General Equilibrium Approach* (Vol. 134). North-Holland.

Khazali, A. (2014). Is the Malaysian Goods and Services Tax Regressive?, *The Star Online*. Retrieved from http://www.thestar.com.my/business/business-news/2014/04/07/is-the-malaysian-gst-regressive-the-gst-aims-to-overcome-the-inefficiency-of-the-indirect-tax-syste/

Kopcke, R., Tootell, G., & Triest, R. (2006). *The Macroeconomics of Fiscal Policy* (Vol. 1). The MIT Press.

Kusumanto, B. (1989). *Incidence of Value-added Tax in Indonesia: A General Equilibrium Analysis* (Doctoral Dissertation, University of Illinois).

Lau, Z. Z., Tam, J., & Heng-Contaxis, J. (2013). The Introduction of Goods and Services Tax in Malaysia: A Policy Analysis *CPPS Policy Paper Series* (pp. 29).

Ignacio, L. L. (2002). *A General Equilibrium Analysis of Value-Added Tax Reforms in the Philippines.* (Doctoral Dissertation, The George Washington University, Columbia).

Lee, W. L. (2012). *Income Tax Cut Expected to Pave Way for GST*. Retrieved from http://www.themalaysianinsider.com/malaysia/article/income-tax-cut-expected-to-pave-way-for-gst-say-experts/

Lent, G. E., Casanegra, M., & Guerard, M. (1973). The Value-Added Tax in Developing Countries. *Staff papers / International Monetary Fund*, *20*(2), 318-378.

Liau, Y. S. (2013). *Ringgit Heads for Fourth Monthly Drop on Current-Account Concern.* Retrieved from https://www.bloomberg.com/news/articles/2013-08-30/

Lim, K.-H., & Ooi, P. Q. (2013, October). *Implementing Goods and Services Tax in Malaysia*. 1-51. Retrieved from http://www.penanginstitute.org/gst/

Lim, K.-H. (2014). Are Consumption Taxes Really More Efficient and Resilient? In S. Wong, S. Teoh & T. K. Ramnath (Eds.), *The ISIS National Forum on Malaysia's Goods and Services Tax (GST): Possible Lessons from the United Kingdom and Singapore* (Vol. PP 5054/11/2012 (031098)). Kuala Lumpur: Institute of Strategic and International Studies, Malaysia.

Lindholm, R. W. (1970). The value added tax: A Short Review of The Literature. *Journal of Economic Literature, 8*(4), 1178-1189.

Lockwood, B. (2011). Estimates from National Accounts Data of the Revenue Effect of Imposing VAT on Currently Exempt Sales of Financial Services Companies in the EU. In How The EU VAT Exemptions Impact the Banking Sector. *PWC-Study*. Retrieved from http://www.pwc.com/en_GX/gx/financial-services/pdf/2011-10-18_VAT_Study_final_report.pdf.

Loganathan, N., & Roshaiza, T. (2007). Have Taxes Led Government Expenditure in Malaysia? *Journal of International Management Studies, 2*(2), 99-113.

Lundborg, P. (1984). The Nexus between Income Distribution, Trade Policy, and Monopoly Power: An Assessment of the Tin Market. *Journal of Policy Modeling, 6*(1), 69-79.

Mabugu, R. (2005, June). Fiscal Policy Design In South Africa: An Intertemporal CGE Model with Perfect Foresight. In *4th PEP Research Network General Meeting* (pp. 13-17).

Mark, H., & El-Ganainy, A. (2012, March). Fiscal Policy: Taking and Giving Away. *Finance & Development. IMF Working Paper.* Retrieved from http://www.imf.org/

Malaysia External Trade Development Corporation. (2014). Matrade Annual Report 2014. Retrieved from http://www.matrade.gov.my/

Malaysian Investment Development Authority. (2014). *Malaysia Investment Performance Report 2014*. Retrieved from http://www.mida.gov.my/

Malaysian Investment Development Authority. (2015). *Malaysia Investment Performance Report 2015*. Retrieved from http://www.mida.gov.my/

Malaysian Investment Development Authority. (2015a). *Food Technology and Sustainable Resources.* Retrieved from http://www.mida.gov.my/home/food-technology-and-sustainable- resources/ posts/

Ministry of Finance. (1960-2013). *Various Issues of Economic Report*. Public Sector Finance: Ministry of Finance Malaysia. Retreived from http://www.treasury.gov.my/

Ministry of Finance. (2014a). *Economic Report 2014/2015*. Economic Performance and Prospects: Ministry of Finance Malaysia. Retreived from http://www.treasury.gov.my/

Ministry of Finance. (2014b, May). *Preparing for Malaysia GST Implementation 2015.* Paper Presented at the Malaysia National Forum on GST, Matrade, Kuala Lumpur.

Ministry of Finance. (2015a). *Economic Report 2015/2016*. Kuala Lumpur: Ministry of Finance. Retreived from http://www.treasury.gov.my/

Ministry of Finance. (2015b). *Laporan Ekonomi Malaysia Suku Tahun Pertama 2015*. Kuala Lumpur: Ministry of Finance. Retreived from http://www.treasury.gov.my/

Mohd Rizal, P. & Mohd Adha, I. (2011). The Impact of Goods and Services Tax (GST) on Middle Income Earners in Malaysia. *World Review of Business Research, 1*(3), 192-206.

Mohd Yusof, S., Dietzenbacher, E., & Los, B. (2014). Income Distribution Across Ethnic Groups in Malaysia: Results from a New Social Accounting Matrix. *Asian Economic Journal*, *28*(3), 259-278.

Mushi, D. P. (2009). *The Value Added Tax: Annual vs Lifetime Perspective: Evidence from Tanzania Household Data* (Doctoral Dissertation, Colorado State University).

Mwega, F. M. (1985). *A General Equilibrium Analysis of Tax Incidence in Kenya* (Doctoral Dissertation, University of Illinois).

Narayan, P. K. (2003). The Macroeconomic Impact of the IMF Recommended VAT Policy for the Fiji Economy: Evidence from a CGE Model. *Review of Urban & Regional Development Studies*, *15*(3), 226-236.

Narayanan, S. (1991). *The Value Added Tax In Malaysia: The Rationale, Design & Issues* (1st ed.). Malaysia: Institute of Strategic and International Studies (ISIS) Malaysia.

Narayanan, S. (1996). Fiscal Reform in Malaysia: Behind a Successful Experience. *Asian Survey, 36*(9), 869-881.

Narayanan, S., Sua, T. Y., Raman, S. R., Alavi, K., Yee, C. L., Abdullah, N., Husin, A. (2007). The Challenges of Raising Revenues and Restructuring Subsidies in Malaysia. *Kajian Malaysia, 25*(2), 1-28.

Nicholson, M. W. (2010). *Value-Added Taxes and US Trade Competitiveness*. FREIT Working Paper.

Nicholson, M. W. (2013). The Impact of Tax Regimes on International Trade Patterns. *Contemporary Economic Policy, 31*(4), 746-761.

Nie, H., Fang, M., & Li, T. (2010). China's Value-Added Tax Reform, Firm Behavior and Performance. *Frontiers Of Economics In China, 5*(3), 445-463.

Nik Rosnah, W. A., (2010). *Public Sector Reform In Malaysia-Addressing the Inequalities?* Presented at The 28th International Congress of Administrative Sciences IIAS-IASIA, 12-17 July 2010, Bali, Indonesia.

Nor Hafizah, A. M., & Azleen, I. (2013). Goods and Services Tax (GST): A New Tax Reform in Malaysia. *International Journal of Economics Business and Management Studies, 2*(1), 12-19.

Onaolapo, A. A., Aworemi, R. J., & Ajala, O. A. (2013). Assessment of Value Added Tax and Its Effects on Revenue Generation in Nigeria. *International Journal of Business and Social Science, 4*(1), 220-225.

Pagan, J. A., Soydemir, G., & Tijerina-Guajardo, J. A. (2001). The Evolution of VAT Rates and Government Tax Revenue in Mexico. *Contemporary Economic Policy, 19*(4), 424-433.

Pauw, K., & Leibbrant, M. (2012). Minimum Wages and Household Poverty: General Equilibrium Macro-Micro Simulations for South Africa *World Development, 40*(4), 771-783.

Pechman, J. A. (1985). *Who Paid the Taxes, 1966-85?*. Washington, DC: The Brookings.

Pereira, M. W. G., & Teixeira, E. C. (2010). Economic Impacts of Brazilian Indirect Tax Reduction: An Analysis of the Competitiveness Within Mercoeuro. *Studia Universitatis Babes-Bolyai, Oeconomica, 55*(1), 1-20.

Piggot, J. (1980). *A General Equilibrium Evaluation of Australian Tax Policy* (Doctoral Dissertation, University of London).

Piggott, J. R., & Whalley, J. (1977). General Equilibrium Investigations of UK Tax Subsidy Policy: A Progress Report. *Studies in Modern Economic Analysis*, Basil Blackwell, Oxford, 378-401.

Pike, R., Lewis, M., & Turner, D. (2009). Impact of VAT Reduction on the Consumer Price Indices. *The Labour Gazette, 3*(8), 17-21.

Poulson, B. W., & Kaplan, J. G. (2008). State Income Taxes and Economic Growth. *Cato Journal, 28*(1), 53.

Premchand, A. (1983). *Government Budgeting and Expenditure Controls: Theory and Practice*: International Monetary Fund.

Ragayah, M. Z. (1988). A General Equilibrium Model of the Malaysian Redistributive Policies. *Jurnal Ekonomi Malaysia, 17*, 49-71.

Ragayah, M. Z. (1988). A General Equilibrium Approach to Fiscal Incidence and Redistribution Policies in West Malaysia. Ph.D Thesis, Vanderbilt University, USA.

Rasiah, R. (2014). Impact of GST on the Poor and Underprivileged. In S. Wong, S. Teoh & T. K. Ramnath (Eds.), *The ISIS National Forum on Malaysia's Goods and Services Tax (GST): Possible Lessons from the United Kingdom and Singapore* (Vol. PP 5054/11/2012 (031098), pp. 16). Kuala Lumpur: Institute of Strategic and International Studies (ISIS) Malaysia.

Refaqat, S. (2003). Social Incidence of the General Sales Tax in Pakistan. *International Monetary Fund, Washington, DC. IMF Working Paper 03/216.*

Renata, D., & Sabina, H. (2010). Impact of Value Added Tax on Tourism. *International Business & Economics Research Journal (IBER), 9*(10).

Robinson, S., Kilkenny, M., & Hanson, K. (1990). The USDA/ERS Computable General Equilibrium (CGE) Model of The United States. *Staff Report-Economic Research Service, United States Department of Agriculture*(AGES 9049).

Robinson, S., Yu´nez-Naude, A., Hinojosa-Ojeda, R. u., Lewis, J. D., & Devarajan, S. (1999). From Stylized To Applied Models: Building Multisector CGE Models for Policy Analysis. *North American Journal of Economics and Finance 10* 5–38.

Roshaiza, T., & Loganathan, N. (2008). Causality Between Tax Revenue and Government Spending in Malaysia. *The International Journal of Business and Finance Research, 2*(2), 63-73.

Ruebling, C. E. (1973, September). A Value Added Tax and Factors Affecting Its Economic Impact. *Federal Reserve Bank of St. Louis Review*.

Rutherford, T. F., Light, M. K., & Díaz, G. A. H. (2002). *A Dynamic General Equilibrium Model for Tax Policy Analysis in Colombia*: Departamento Nacional de Planeación.

Sahoo, A., & ten Raa, T. (2012). Wage-Productivity Differentials and Indian Economic Efficiency. *Economic Modelling, 29*(2), 341-348.

Saira, K., Zariyawati, M. A., & Yoke-May, L. (2010). An Exploratory Study of Goods and Services Tax Awareness in Malaysia. *Political Managements and Policies in Malaysia*, 265-276.

Salti, N., & Chaaban, J. (2010). On The Poverty and Equity Implications of A Rise in The Value Added Tax: A Microeconomic Simulation For Lebanon. *Middle East Development Journal, 2*(01), 121-138.

Salvatore, D. (2009). *Principles of Microeconomics.* General Equilibrium and Welfare Economics (pp. 623). Oxford University Press.

Sánchez, M., & Vos, R. (2007). Informative Note on Elasticities and Calibration of MAMS. *Development Policy and Analysis Division, Department of Economic and Social Affairs, New York.*

Serra-Puche, J. (1979). *A Computational General Equilibrium Model for The Mexican Economy: An Analysis of Fiscal Policies* (Doctoral Dissertation, Yale University).

Shah, A., & Whalley, J. (1991). Tax Incidence Analysis of Developing Countries: An Alternative View. *The World Bank Economic Review, 5*, 535-552.

Shoven, J. B., & Whalley, J. (1972). A General Equilibrium Calculation of the Effects of Differential Taxation of Income From Capital in The US. *Journal of Public Economics, 1*(3), 281-321.

Shoven, J. B., & Whalley, J. (1984). Applied General-Equilibrium Models of Taxation and International Trade: An Introduction and Survey. *Journal of Economic Literature, 22*(3), 1007-1051.

Shoven, J. B., & Whalley, J. (1992). *Applying General Equilibrium*. Cambridge University Press.

Singh, V. (1992). *Malaysian Taxation: Administrative and Technical Aspects*. Kuala Lumpur: Longman.

Singh, V. (2002). Issues Relating to Self-Assessment. *Taxation & Compliance Costs in Asia Pacific Economies*, 269-277.

Singh, V. (2014). Are Consumption Taxes Really More Efficient and Resilient? In S. Wong, S. Teoh & T. K. Ramnath (Eds.), *The ISIS National Forum on Malaysia's Goods and Services Tax (GST): Possible Lessons from the United Kingdom and Singapore* (Vol. PP 5054/11/2012 (031098), pp. 16). Kuala Lumpur: Institute of Strategic and International Studies, Malaysia.

Siti Halimah, I. (2014, Sept). *The Malaysian GST Model*. Paper presented at the International Seminar on GST at Sasana Kijang, Kuala Lumpur.

Smart, M. (2007). The Economic Impacts of Value Added Taxation: Evidence from the HST Provinces. *Queen's University-John Deutsch Institute Working Paper*.

Smart, M., & Bird, R. M. (2009). The Economic Incidence of Replacing a Retail Sales Tax with a Value-Added Tax: Evidence from Canadian Experience. *Canadian Public Policy, 35*(1), 85-97.

Summer, L. H. (1981). Taxation and Corporate Investment: A q-Theory Approach. *Brookings Papers on Economic Activity, 1*, 67-140.

Suruhanjaya Tenaga. (2014a). *Maklumat Prestasi dan Statistik Industri Pembekalan Elektrik di Malaysia 2014.* Putrajaya: Suruhanjaya Tenaga. Retrieved from http://meih.st.gov.my/

Suruhanjaya Tenaga. (2014b). *Peninsular Malaysia Electricity Supply Industry Outlook 2014.* Putrajaya: Suruhanjaya Tenaga. Retrieved from http://meih.st.gov.my/

Suruhanjaya Tenaga. (2016). *Peninsular Malaysia Electricity Supply Industry Outlook 2016.* Putrajaya: Suruhanjaya Tenaga. Retrieved from http://meih.st.gov.my/

Swenson, D. L. (1994). The Impact of US Tax Reform on Foreign Direct Investment in the United States. *Journal of Public Economics*, *54*(2), 243-266.

Swire, M. (2007). *Malaysia to Continue Cutting Corporate Tax*. Hong Kong: Tax-News.com. Retrieved from http://www.tax-news.com/

Tait, M. A. A. (1988). *Value Added Tax: International Practice and Problems*: International Monetary Fund.

Tan, S. K. (2012). *Rasional Pelaksanaan GST*. Paper presented at the Persidangan GST 2012 'Cukai Barang & Perkhidmatan' Reformasi & Transformasi Cukai, Johor Bahru.

Tanzi, V. (1987). Fiscal Policy, Growth, and Design of Stabilization Programs. *External Debt, Savings, and Growth In Latin America* (pp. 121-141): International Monetary Fund and Instituto Torcuato di Tella Washington, DC and Buenos Aires.

Tejvan, P. (2013). *Keynesian Economics.* Retrieved from http://www.economicshelp.org/blog/6801/economics/keynesian-economics/

The Economist. (2006). *Guide to Economic Indiocators. Making Sense of Economics* (6th ed.). London: Profile Books Ltd.

The European Commission. (2013). *The Role of Tax Policy in Times of Fiscal Consolidation*.

The National ICT Association of Malaysia (PIKOM) Report. (2015). *ICT Strategic Review Series for 2015/2016* (Vol. 7). Kuala Lumpur: Kementerian Komunikasi dan Multimedia Malaysia & Persatuan Industri Komputer Multimedia Malaysia.

The Performance Management and Delivery Unit (Pemandu) (2012). *Economic Transformation Programme Annual Report 2012*. Kuala Lumpur: Prime Minister's Department.

The Performance Management and Delivery Unit (Pemandu) (2013). *Economic Transformation Programme Annual Report 2013.* Kuala Lumpur: Prime Minister's Department.

The Performance Management and Delivery Unit (Pemandu) (2014). *Economic Transformation Programme Annual Report 2014.* Kuala Lumpur: Prime Minister's Department.

Tholasy, S. (2012). *Masalah dan Kesan GST Ke Atas Ekonomi Negara*. Paper presented at the Persidangan GST 2012 'Cukai Barang & Perkhidmatan' Reformasi & Transformasi Cukai, Johor Bahru.

Tholasy, S. (2014). High Income Family Pays More GST, *The Malay Mail Online*. Retrieved from http://www.nbc.com.my/gst/high-income-family-pays-more-gst/

Vermeend, W., van der Ploeg, R., & Timmer, J. W. (2008). *Taxes and the Economy. A Survey of the Impact of Taxes on Growth, Employment, Investment, Consumption and the Environment.* Cheltenham, UK and Massachusetts, USA: MPG Books Ltd.

Wan, L. W. (2013, Dis). *Mekanisme Pelaksanaan GST*. Paper presented at Pasca Bajet Negara, INTAN Kampus Utama Bukit Kiara, Kuala Lumpur.

Webb, A. (2014). GST in Malaysia - Learning From The UK and Singapore Experiences. In S. Wong, S. Teoh & T. K. Ramnath (Eds.), *The ISIS National Forum on Malaysia's Goods and Services Tax (GST): Possible Lessons from the United Kingdom and Singapore* (Vol. PP 5054/11/2012 (031098), pp. 16). Kuala Lumpur: Institute of Strategic and International Studies (ISIS) Malaysia.

Wee, C. H. (2006). *Fiscal Policy and Inequality in Malaysia*. Kuala Lumpur: University of Malaya Press.

Whalley, J., & Zhang, S. (2005). VAT Base Broadening when the Location of some Consumption is Mobile. *Economics Letters, 87*(2), 199-205.

Wong & Partners. (2010). *Highlights of the Malaysian Budget 2011*. Retrieved from http://www.wongpartners.com/

World Bank. (2003). *The Impact of Economic Policies on Poverty and Income Distribution: Evaluation Techniques and Tools* (L. P. d. S. a. F. Bourguignon. Ed.).

World Bank. (2012). *Tax Revenue (% of GDP).* Retrieved from http://data.worldbank.org/indicator/gc.tax.totl.gd.zs

Xiao, J., & Wittwer, G. (2009). *Will an Appreciation of the Renminbi Rebalance the Global Economy?: A Dynamic Financial CGE Analysis*: Monash University, Centre of Policy Studies and the Impact Project.

Xinqiaoa, P., Shuanga, L., Chaoyanb, H., Haiyanga, Z., & Lianga, M. (2009). Studying on the Welfare Effects of VAT and Business Tax [J]. *Economic Research Journal, 9*, 007.

Yeah, K. L., Yanagida, J. F., & Yamauchi, H. (1994). Evaluation of External Market Effects and Government Intervention In Malaysia's Agricultural Sector: A Computable General Equilibrium Framework. *Agricultural Economics*, *11*(2-3), 237-256.

Yusuf, A. A., Djoni, H., & Wawan Hermawan, Y. (2008). AGEFIS: Applied General Equilibrium for Fiscal Policy Analysis. *Bandung: Center for Economics and Development Studies, Department of Economics, Padjadjaran University*.

Zee, H. H. (2006). A Note on Global Taxes and Aid for Development. *Journal of Economic Studies*, *33*(1), 5-11.

Zhai, F., & He, J. (2008). Supply-side Economics in the People's Republic of China's Regional Context: A Quantitative Investigation of Its VAT Reform. *Asian Economic Papers*, *7*(2), 96-121.