Part II

Economic Impact of Removing Energy Subsidies: A Quantitative Analysis

October 2016

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Part II

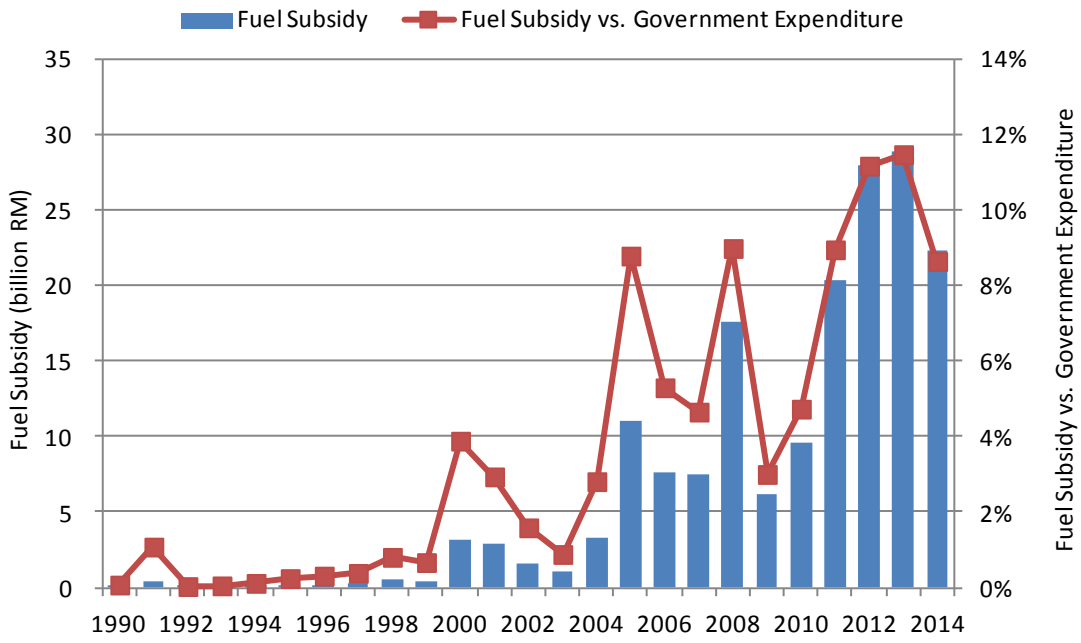
ECONOMIC IMPACT OF REMOVING ENERGY SUBSIDIES: A QUANTITATIVE ANALYSIS

2.1 Introduction

Energy is one of the main industrial sectors where prices are subsidised. The value of fossil fuel subsidies amounted to about US$500 billion globally in 2014, according to the International Energy Agency (IEA, 2015). While these subsidies can help low-income households use more energy, they could hinder the efficient use of such energy and weaken the competitiveness of alternative energy such as renewables. Many countries have worsening fiscal deficit due to the rapid increase in their domestic demand for fossil fuels.

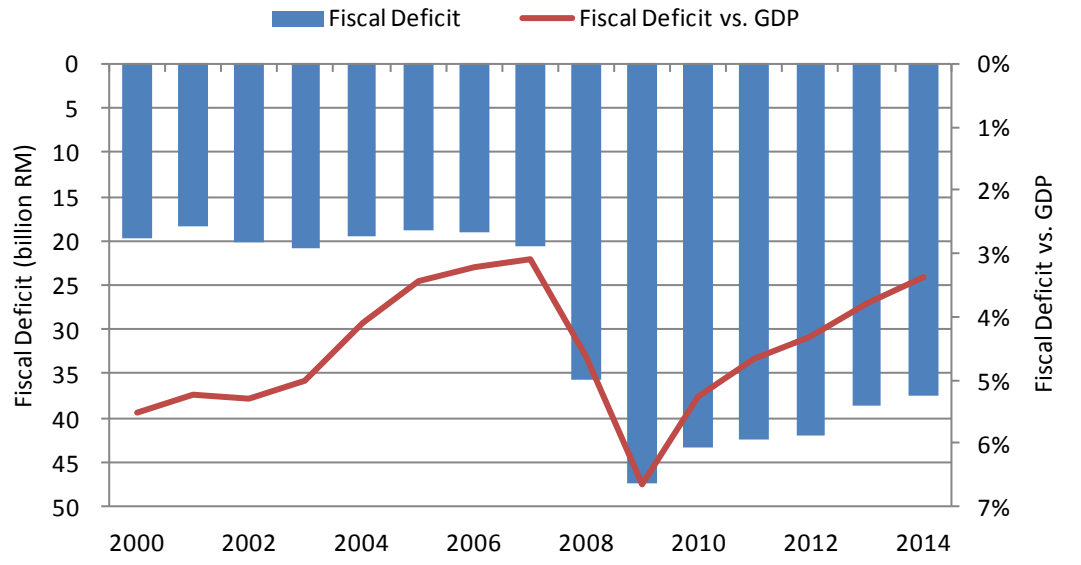
Malaysia, in particular, subsidises the natural gas of its power generation sector, mobility fuel of the road transport sector, and liquid petroleum gas for residential use. Figure 2.1 shows that petroleum subsidy alone amounted to over RM20 billion after 2010. Total fuel subsidies account for around 10 percent of total government expenditure. Direct fuel subsidies have increased significantly over the years, adding pressure on government finances. Malaysia's fiscal deficit of 4.5 percent of GDP was the second highest among Asia's 13 emerging economies in 2012, coming only after India (IISD, 2014). The government aims to reduce it to the national target of 3 percent by 2015 and 0 percent by 2020.

Figure 2.1. Fuel (Gasoline, Diesel, and Liquid Petroleum Gas) Subsidies from Government



Source: Hamid and Rashid (2012), and Maybank IB Research (2014).

Figure 2.2. Fiscal Deficit in Malaysia



Source: ADB (2015).

2.1.1 Objectives and Framework

Malaysia started its subsidy reform with a reduction in subsidies for fuel and sugar in 2010. Gasoline (RON97) and diesel oil prices gradually increased from RM2.05 and RM1.75 per litre in 2010, respectively, to around RM2.8 and RM2.2 per litre by 2014. On 1 December 2014, the government officially ended the subsidy for fuels and introduced the "managed float system." Nevertheless, the current gasoline and diesel oil prices are still much lower than the global average prices (GlobalPetrolPrices.com, 2015).

On electricity tariffs, the subsidy reform continues. The Special Industrial Tariff will be abolished by 2020 (Malaysia Government, 2015).

However, these policies could raise social problems. Removing subsidies means higher energy prices, which would affect the standard of living of low-income households. In the case of Indonesia, the rise in prices of petroleum products (gasoline, diesel oil, and kerosene) in 2000 led to violent demonstrations, including the burning of a gasoline station, student protests, abduction of two local-government employees, and strikes by public transport workers (IISD, 2010).

Policymakers should thus anticipate the possible economic impact of any price hikes so as to avoid a possible civil disturbance. For this purpose, this study measured the economic impact of removing energy subsidies using a Malaysian macroeconomic model. The resulting implications found by this study can be used by policymakers to set up appropriate action plans.

2.1.2 Report Structure

This report consists of five sections. Section 2 presents the overall structure of the economic model and methodology for this analysis. Section 3 shows economic impacts through three paths. The analysis of how removing energy subsidies impacts the economy is presented in Section 4. Lastly, Section 5 presents the policy implications based on this study's findings.

2.2 Methodology for Analysis

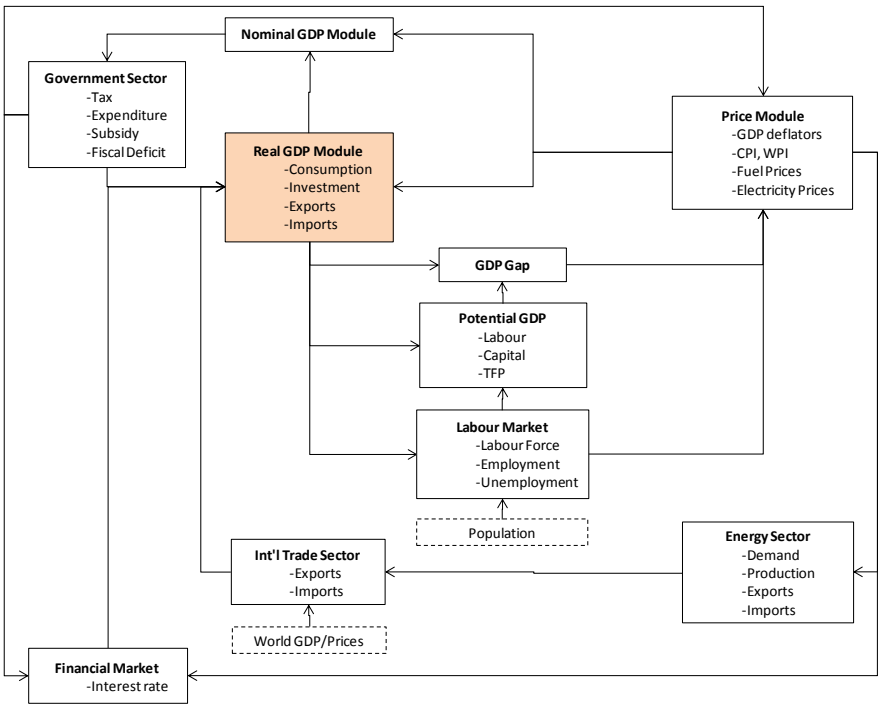
This study analyses the impacts of Malaysia's energy subsidy reform on the GDP, employment, and fiscal deficit. For this purpose, an econometric model was developed. This section presents the overall structure of the model and methodology for the quantitative analysis.

2.2.1 Macroeconomic Model

The developed econometric model is based on a Keynesian-type macroeconomic model (Figure 2.3). Real GDP, which describes the demand side composition such as consumption, investment, export and import, is central to the model. Price is one of the main modules in the analysis because higher energy prices brought about by subsidy removal can affect economic activities, such as private consumption.

The model looks at the government sector. Subsidy is an important component of government budget. It also covers the labour market as it measures the effects of subsidy reforms on employment.

Figure 2.3 Model Structure



Source: Authors.

This model also reviews the supply-side (potential) GDP, which is based on the growth account analysis. Higher/lower demand-side GDP leads to narrower/wider gap between supply-and demand-side GDP, which brings higher/lower general prices and eventually raises/reduces the GDP.

The model consists of 96 equations (96 endogenous variables) and 54 exogenous variables. Parameters for each equation were estimated by ordinary least square (OLS) regression. Estimation periods are between the 1990s and 2014, depending on data availability. Main sources are the 'Key Indicators for Asia and the Pacific' (ADB, 2015) for economic-related data and Malaysia Energy Information Hub (*Suruhanjaya Tenaga*) for energy-related data.

Table 2.1 shows the model's performance (final test) for the last 5 years. The Root Mean Squared Error for GDP, the main variable, is 2.1 percent, which is quite a good result. Other main variables also showed low Root Mean Squared Errors, which are at less than 5 percent.

Table 2.1. Final Test Performance (Root Mean Squared Error for 2010-2014)

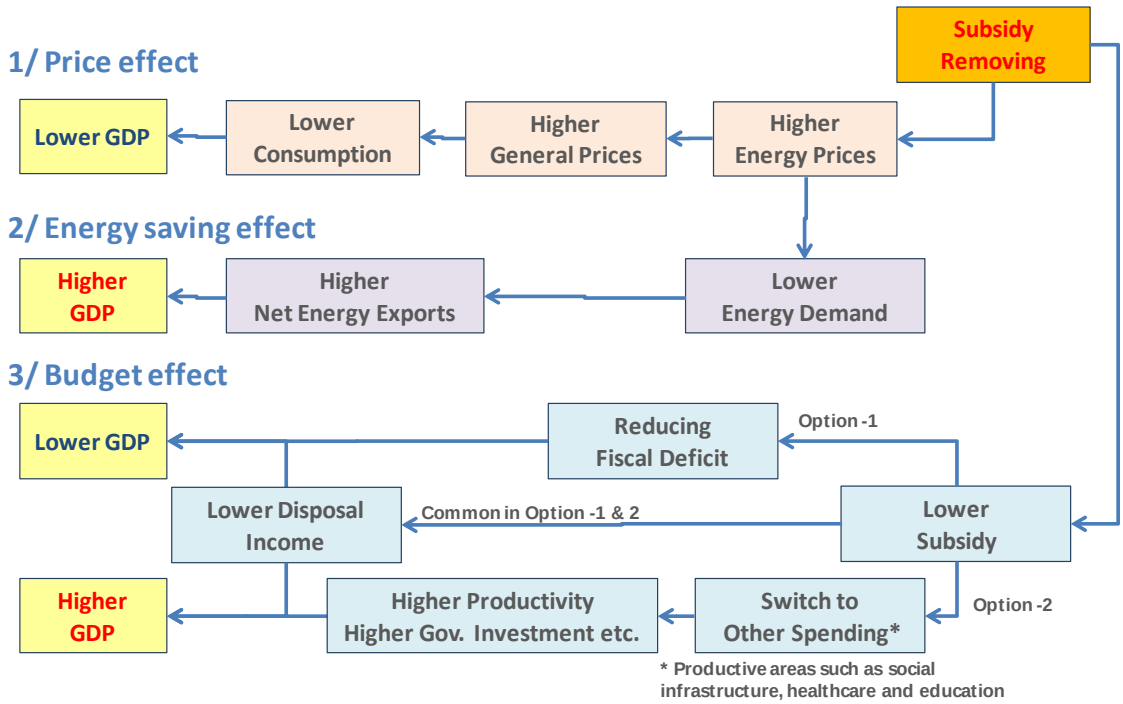
Real GDP	2.1%	Nominal GDP	1.7%
Real Private Consumption	0.5%	Nominal Private Consumption	1.3%
Real Private Investment	4.5%	Nominal Private Investment	4.5%
Real Exports	1.3%	Nominal Exports	1.8%
Real Imports	2.5%	Nominal Imports	2.6%
GDP Deflator	1.3%	Interest rate	4.8%
CPI	1.1%	WPI	1.9%
Government Expenditure*	0.0%	Government Revenue	1.0%
Employment	3.5%	Unemployment	7.7%

*exogenous variable
Source: As provided by this study's authors.

2.2.2 Three Paths Affecting the Economy

This study's model focuses on three paths where the economy (mainly GDP) will be affected once subsides are removed: the price effect, energy saving effect, and budget effect (Figure 2.4). Their effects on GDP vary. While the price effect will negatively affect GDP, the energy saving's effect will be positive. The budget effect depends on how the budget will be used. Total impact on GDP depends on how large each of their respective effect will be.

Figure 2.4. Three Effects of Subsidy Reform on GDP

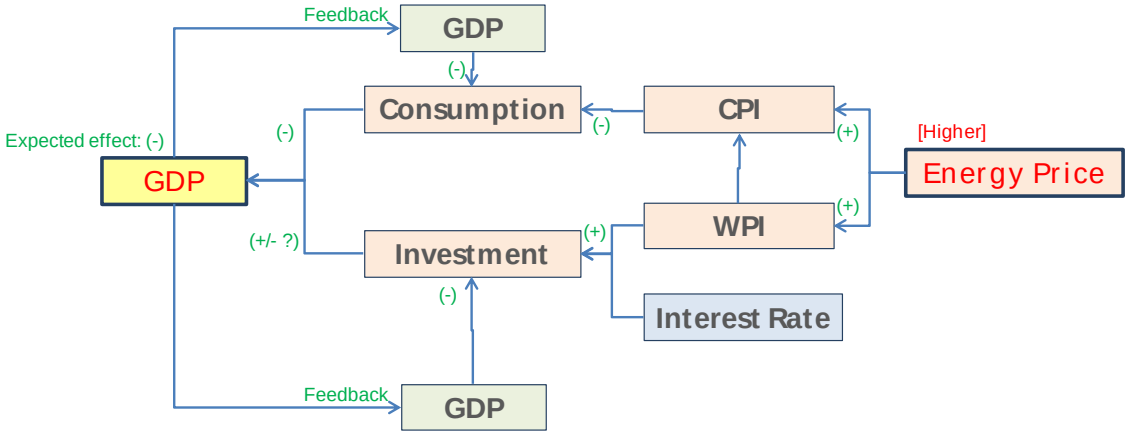


Source: As provided by this study's authors.

Price effect

Removing the subsidies can raise the prices of electricity, gasoline, and diesel oil. These higher energy prices then lead to higher general prices as reflected in the CPI and WPI. These can affect GDP negatively once consumption and exports lessen while imports increase. On the other hand, the effect on investment depends on which has the larger effect; the one from lower real interest rate (which comes from higher WPI) or another from lower GDP. However, the total price effect is expected to be negative.

Figure 2.5. Flow Chart on Price Effect



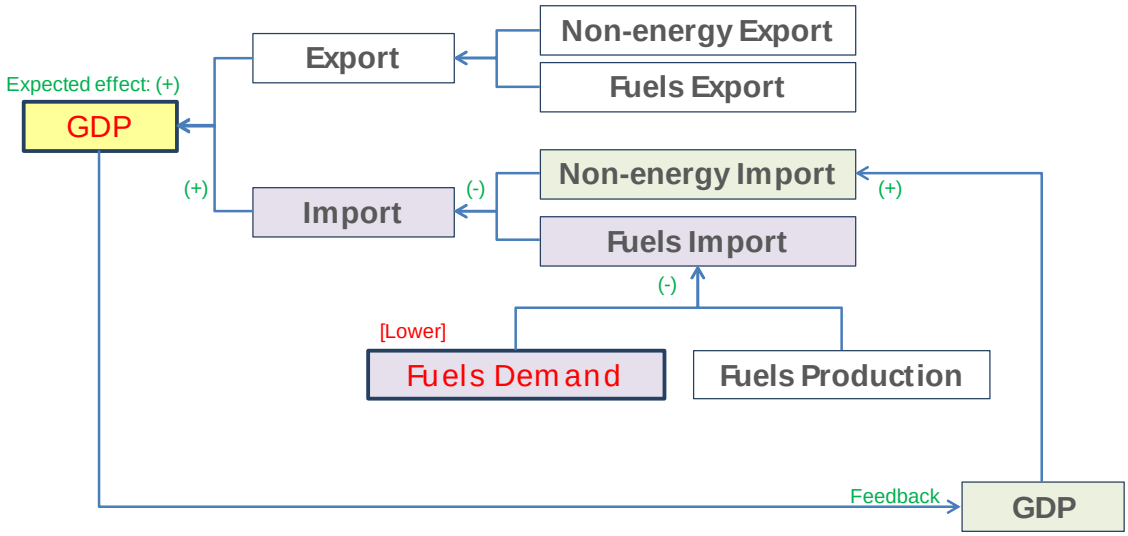
Source: As provided by this study's authors.

Energy saving effect

When energy prices increase after the removal of subsidies, energy demand goes down. A lower electricity demand then affects the demand for input fuel used for power generation. In this study, the affected input fuel is assumed to be natural gas only.

Lower gasoline and diesel oil demand directly affects the primary oil demand. They can affect GDP positively through lower imports or higher exports, with domestic fuel production assumed to remain unchanged.

Figure 2.6. Flow Chart on Energy Saving Effect



Source: Authors.

Budget effect

When subsidies are removed, the GDP is negatively affected as such reduces disposal income.

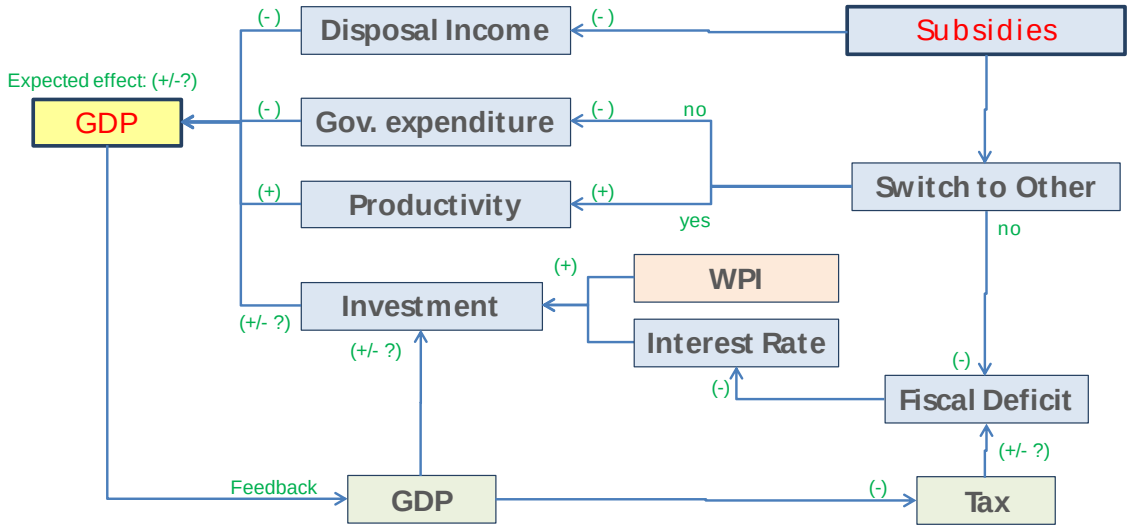
However, the total budget effect depends on how the Malaysian government will use the remaining budget from the unused subsidies. If the fund is saved to reduce the nation's fiscal deficit, the GDP will be negatively affected as such lowers government's spending.

On the other hand, an improvement in the fiscal deficit can lower interest rate, which then boosts investment. The positive effect from this recourse is expected to be too small, though, that it will hardly offset the negative budget effects.

The government has other ways to use the remaining budget initially allocated as energy subsidy. It can use the fund to invest in social infrastructure, or spend on healthcare and education, instead of using it to reduce the fiscal deficit. In this case, the budget effect will be positive since higher government consumption and investment will improve GDP directly (in national accounts) while the decrease in subsidies affects indirectly the GDP through private consumption and investment. Also, investment in infrastructure and expenditure for education can boost economic productivity in the short and long term.

The government can also use the fund to subsidise other sectors, such as low-income households. However, this study's model cannot further delve into this option since there are not enough data to disaggregate the economic activities (such as disposal income and private consumption) between lower-income households and their higher-income counterparts.

Figure 2.7. Flow Chart on the Budget Effect



Source: Authors.

2.2.3 Methodology and Case Setting

To be able to measure the impact on Malaysia's macroeconomy, estimates are first done on the reference case, wherein it is assumed that the subsidy is still in effect. Next, other cases are considered under various assumptions.

The impact of a subsidy phaseout is measured per case and compared with the results of the reference case. Such effects are measured via three paths – price effect, energy saving effect, and budget effect – separately. In estimating the price and the energy saving effects, fiscal neutrality is assumed from the reference case. For the budget effect, two assumptions on how the government will use the unused subsidy budget are identified: (i) the government will use it to reduce the fiscal deficit; or (ii) the government will use the fund for other sectors – e.g. to invest in social infrastructure or to spend on education. The total impact through the three paths are then measured simultaneously.

Table 2.2 Cases in This Study

0/ Reference Case	
1/ Price effect	
2/ Energy saving effect	
3/ Budget effect	Reducing fiscal deficit
	Switching to other spending
4/ Total effect	Reducing fiscal deficit
	Switching to other spending

Source: As provided by this study's authors.

2.3 Impacts via Three Paths

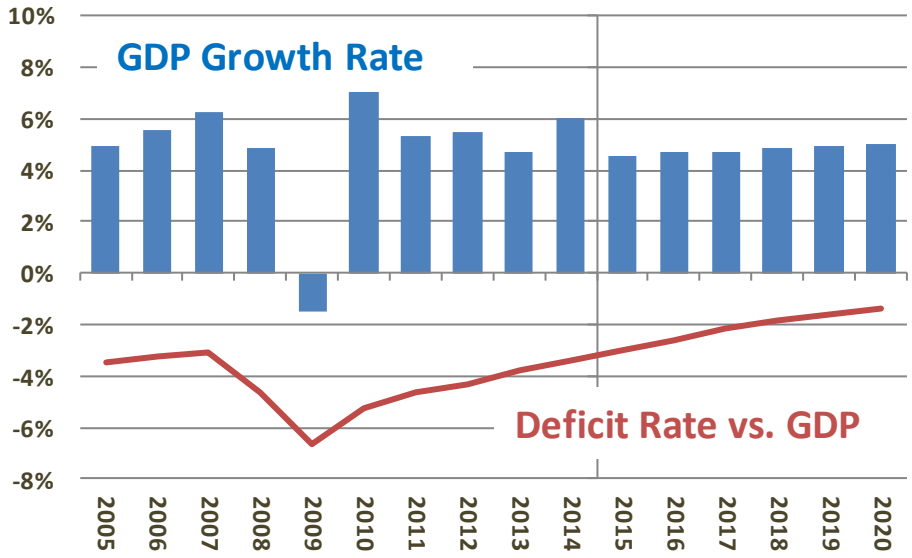
This section looks at how the removal of energy subsidies impacts the Malaysian macroeconomy. As mentioned in the previous section, the reference case is first presented before the impact of subsidy removal is measured per effect path. To evaluate the effect on the economy, this study focuses on main economic indices such as the GDP, CPI, employment, and fiscal deficit.

2.3.1 Reference Case

The reference case is used as a baseline for this study. It is assumed that the subsidy amount and energy prices remain unchanged from the 2014 level. The World Economic Outlook (IMF, 2015) is used as reference for assumptions on the global economic situation and international fossil fuel prices while World Population Prospects (UNDP, 2015) is referred to for data on population growth.

Although lower economic growth is expected in the coming years for Malaysia, the rate should still hover around 5.0 percent (Figure 2.8). Average inflation rate (CPI) will accelerate to 3 percent (from 2.5 percent in the last 5 years) mainly due to the implementation of the Goods and Services Tax (GST) in 2015. The labour market will improve with higher employment and lower unemployment rates. Although the subsidy remains in place, the nation's fiscal situation will improve. Fiscal deficit against GDP will decrease from 3.4 percent in 2014 to 1.4 percent in 2020, as compared with the national target of 0 percent (Table 2.3).

Figure 2.8. GDP Growth Rate and Fiscal Deficit Rate in Reference Case



Source: ADB (2015) and IEEJ estimation.

Table 2.3. Summary of Reference Case

		Actual		Forecast	CAGR (%)	
		2010	2014	2020	2010-2014	2014-2020
GDP	RM bil. (2010 price)	821	1,013	1,342	5.4	4.8
Private Consumption	RM bil. (2010 price)	395	525	724	7.4	5.5
Private Investment	RM bil. (2010 price)	108	200	299	16.7	6.9
Gov. Consumption	RM bil. (2010 price)	103	138	174	7.4	4.0
Gov. Investment	RM bil. (2010 price)	76	64	78	-4.3	3.3
Exports	RM bil. (2010 price)	714	771	896	1.9	2.6
Imports	RM bil. (2010 price)	583	676	830	3.8	3.5
CPI	Y2010=100	100	111	132	2.5	3.0
WPI	Y2010=100	100	109	123	2.2	2.0
Interest Rate	%	2.8	3.2	3.1	* 0.4	* -0.2
Gov.Revenue	RM bil.	160	221	334	8.4	7.2
Gov.Expenditure	RM bil.	203	258	358	6.2	5.6
Fiscal Deficit	RM bil.	-43	-37	-24	-3.6	-7.2
Fiscal Deficit Rate vs. GDP	%	-5.3	-3.4	-1.4	* 1.9	* 2.0
Employment	1000 person	11,900	13,532	15,579	3.3	2.4
Unemployment	1000 person	404	400	426	-0.3	1.1
Unemployment Rate	%	3.3	2.9	2.7	* -0.4	* -0.2

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Unemployment	1000 person	404	400	426	-0.3	1.1
Unemployment Rate	%	3.3	2.9	2.7	* -0.4	* -0.2

Note: The figures with "*" are shown as changes (percentage points) for interest rate, fiscal deficit rate and unemployment rate.

Source: ADB (2015) and authors' estimation.

2.3.2 Economic Impacts through Three Paths

This section looks at the effect of subsidy removal on three paths: the price effect, energy saving effect, and the budget effect. In evaluating the overall impact on the economy, this study turns to main economic indices such as the GDP, CPI, employment, and fiscal deficit.

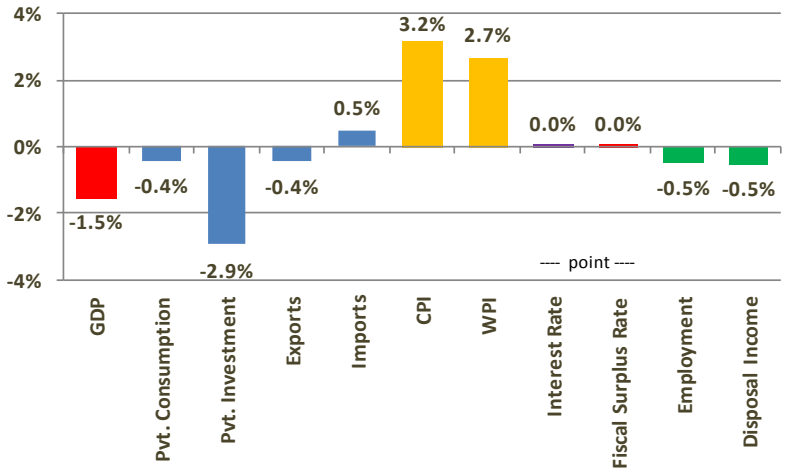
Price effect

A removal of subsidies means higher electricity, gasoline, and diesel oil prices. The energy price would increase by 22 percent to 30 percent, according to some sources in Malaysia. In this paper's analysis, electricity and fuel prices are assumed to increase by 25 percent starting 2016.

These higher energy prices bring up general prices by around 3 percent (CPI by 3.2 percent; WPI by 2.7 percent) by 2020 (Figure 2.9), compared with the reference case. Such affect GDP negatively by lowering consumption and exports, and increasing imports.

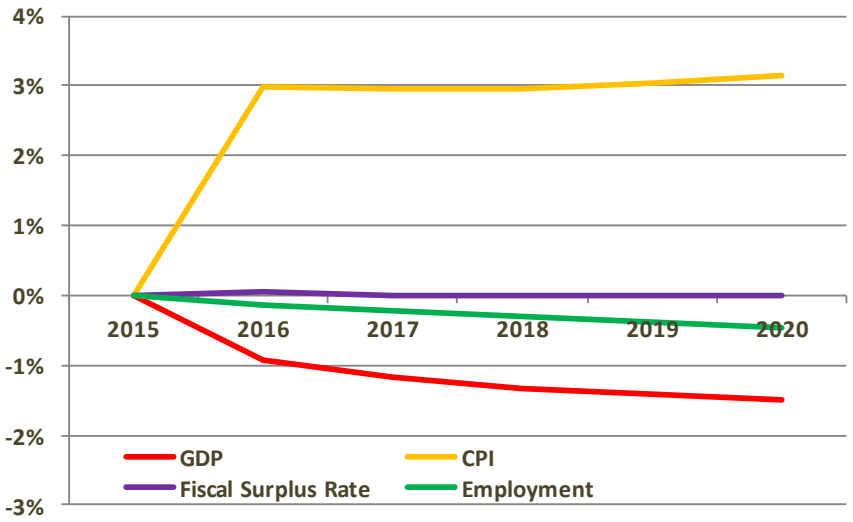
Any positive effect on investment from lower real interest rates is too small that it can hardly offset the slower GDP growth effect. The impact on the economy gradually spreads (Figure 2.10), where GDP is expected to taper by 1.5 percent in 2020. Employment drops by 0.5 percent. Since fiscal neutrality is assumed, fiscal deficit remains unchanged (but fiscal surplus rate against GDP improves slightly due to the higher nominal GDP).

Figure 2.9. Price Effect (vis-à-vis the Reference Case) in 2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

Figure 2.10. Price Effect (vis-à-vis the Reference Case), 2015-2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

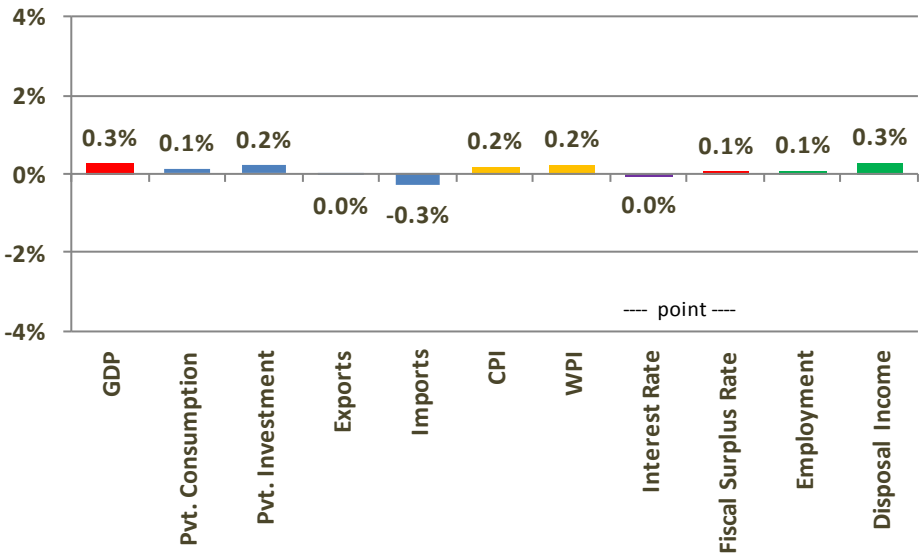
Energy saving effect

Once the subsidies are removed, the ensuing higher energy prices are expected to change the behaviours of energy consumers. That is, consumers would have lower energy demand. Assuming price elasticity is -0.1, energy demand would decrease by 2.5 percent.

In domestic primary demand basis, natural gas (Note: The study assumes that this is the only input fuel for power generation) would decrease by 2 percent due to the lower electricity demand. For primary oil, which includes other oil products, demand will decrease by 1.5 percent. In the analysis, it is assumed that half of this reduction in demand occurs in 2016 while the remainder happens in 2017 due to the ratchet effect and the lead time needed to change to more efficient appliances since higher energy price induces more efficient appliances.

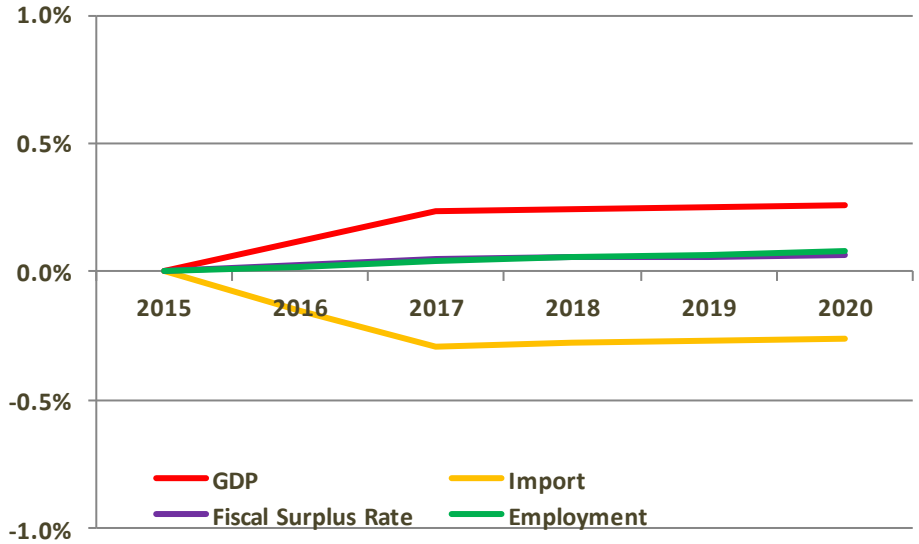
Lower fuel demand further leads to lower fuel imports, assuming the domestic fuel production remains unchanged. Total imports decrease by 0.3 percent in 2020 (Figure 2.11), compared with the reference case. Consequently, GDP is affected positively. The positive impact on GDP, however, is relatively small at 0.3 percent increase by 2020.

Figure 2.11. Energy Saving Effect (vis-à-vis the Reference Case) in 2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

Figure 2.12. Energy Saving Effect (vis-à-vis the Reference Case)



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimated provided by this study's authors.

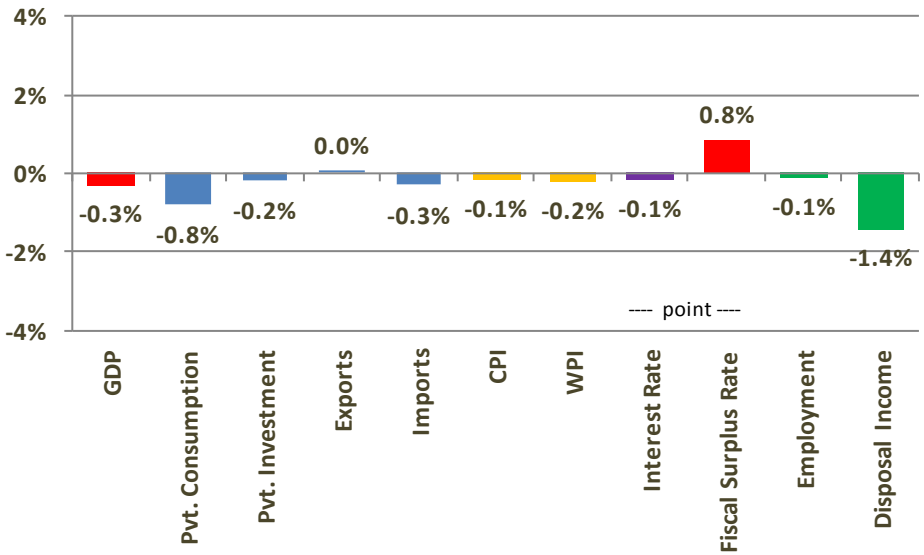
Budget effect

The subsidy value for the energy sector (gasoline and diesel oil for road transport sector) will decrease by RM15 billion when the reform in Malaysia is completed, according to KeTTHA, and this study's estimation. The budget effect depends on how the Malaysian government would use the unused subsidy budget once the subsidies are stopped.

To measure the effects by policy decisions, two extreme assumptions were made: (i) That the government will use the remaining subsidy budget to reduce fiscal deficit; and (ii) That the government will use the funds to spend on other sectors (e.g. investment in social infrastructure and expenditure for education). In this study's analysis, this subsidy reduction is assumed to take place in 2016.

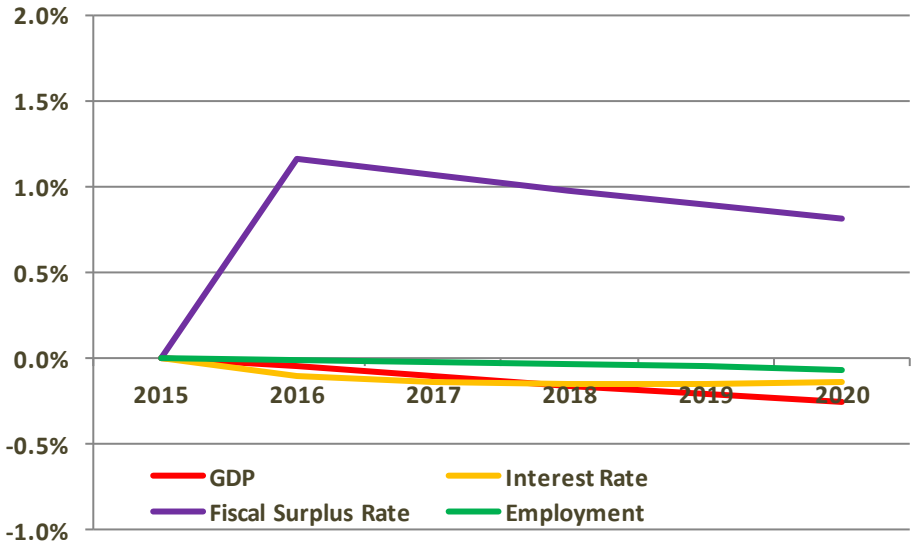
First, this study measured the impact if the government opt to use all of the subsidy amounts towards reducing fiscal deficit. In this case, removing the subsidies brings about 1.4 percent lower real private disposal income and 0.8 percent lower private consumption in 2020 (Figure 2.13), compared with the reference case. A lower consumption reduces GDP by 0.3 percent and employment by 0.1 percent. On the other hand, the fiscal deficit rate as a percentage GDP improves by 0.8 percentage point. Although this option can lower the interest rate (by 0.1 percentage point), the positive effect on investment is so small that it is overwhelmed by the slower GDP effect.

Figure 2.13. Budget Effect of Option to Reduce the Deficit (vis-a-vis the Reference Case), 2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

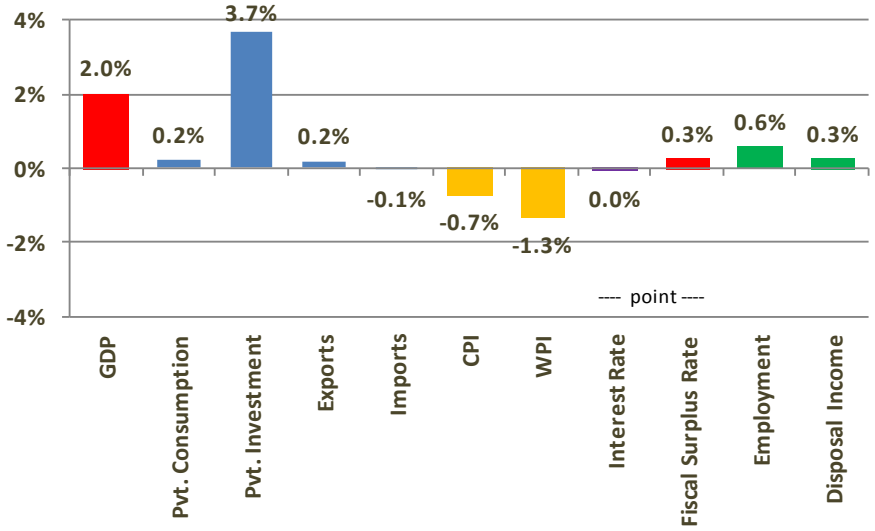
Figure 2.14. Budget Effect of Option to Reduce the Deficit (vis-à-vis the Reference Case), 2015-2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

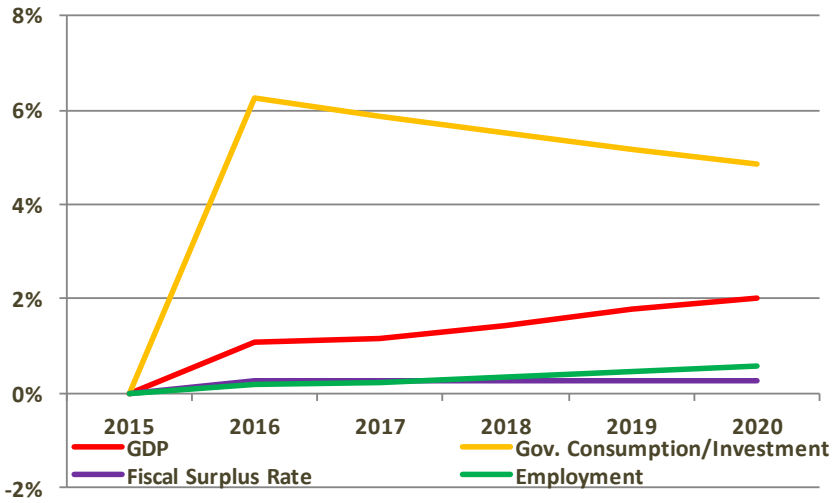
Next, this study measured the effect if the government uses all of the energy subsidy to spend on other sectors (i.e. invest in social infrastructure and spend on education). In this case, switching the subsidies to other expenditures leads to a higher GDP (by 2.0 percent in 2020), as shown in Figure 2.15. Employment also increases by 0.6 percent. However, disposal income increases by only 0.3 percent.

Figure 2.15. Budget Effect of Switching to Other Spending Items (vis-à-vis the Reference Case) in 2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

Figure 2.16. Budget Effect of Switching to Other Spending Items (vis-à-vis the Reference Case), 2015-2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

Subsidy is defined as income transfers to private sectors from the government, which is generally considered as a negative tax in the national accounts.

Removing the subsidy will indirectly affect private consumption. Per this study's model, removing the subsidy can lower the disposable income in the national accounts. In general, a RM1 decrease in income does not decrease private consumption by an equivalent value. Private consumption will decline by less – by RM0.5 only, for example – depending on the consumption propensity.

On the other hand, a RM1 increase in government consumption (or investment) directly drives up GDP by RM1. The direct positive effect of higher government consumption and investment on the GDP will overwhelm the indirect effect of lower private consumption.

2.4 Overall Economic Impact

Although removing the energy subsidies will lead to higher energy prices and reduce energy demand, such also allows the government to have policy options – for example, to reduce fiscal deficit or to switch it to other expenditure types. This section now shows the overall effect via the three identified paths under the assumption that the energy subsidy will end in 2016.

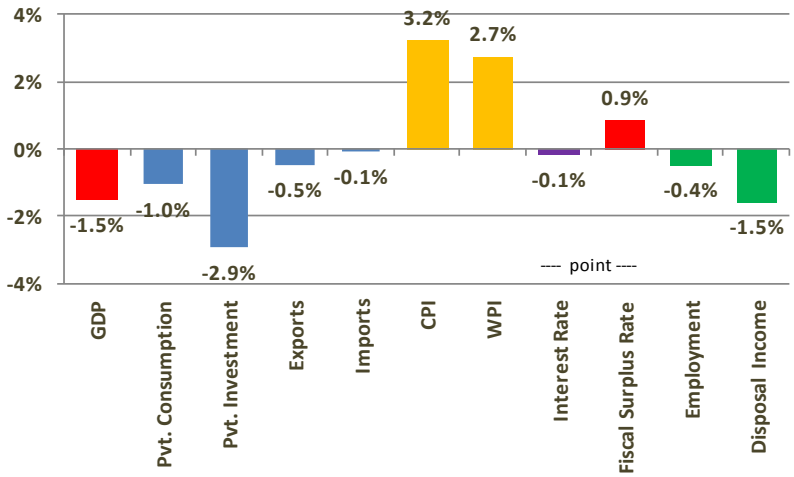
2.4.1 Total Effect Brought by Reduced Deficit

First, this study measures the impact on the Malaysian economy once the government removes the energy subsidies and reduces fiscal deficit. Findings show that the fiscal deficit as a percentage of GDP improves by 0.9 percentage points to 0.5 percent in 2020, while GDP

and employment are negatively affected by 1.5 percent and by 0.4 percent, respectively (Figure 2.17), compared with the reference case.

The negative price and budget effects overwhelm the positive energy saving effect. General prices increase by around 3 percent, while the Malaysian economy slows down. Improving the fiscal deficit, thus, leads to a lower interest rate (by 0.1 percentage point). Its positive effect on investment, however, is too small to compensate for the slower GDP effect.

Figure 2.17. Economic Impact of Removing Energy Subsidies, Reducing Deficit (vis-à-vis the Reference Case) in 2020

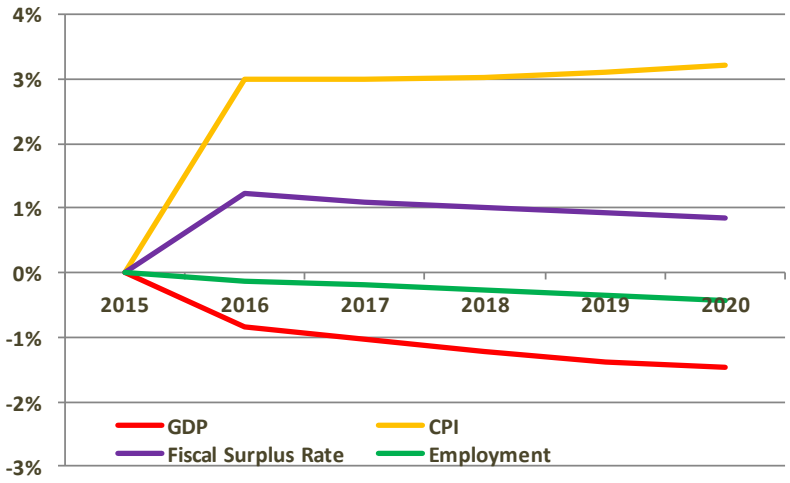


Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.

Source: Estimated provided by this study's authors.

The negative impact on GDP gradually spreads (Figure 2.18) due to prevailing high prices. The improved fiscal deficit slows down after the first year (2016) because the lower GDP leads to lower tax revenue. The economic deterioration will last beyond 2020.

Figure 2.18. Economic Impact of Removing Energy Subsidies, Reducing Deficit (vis-à-vis the Reference Case), 2015-2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimates provided by this study's authors.

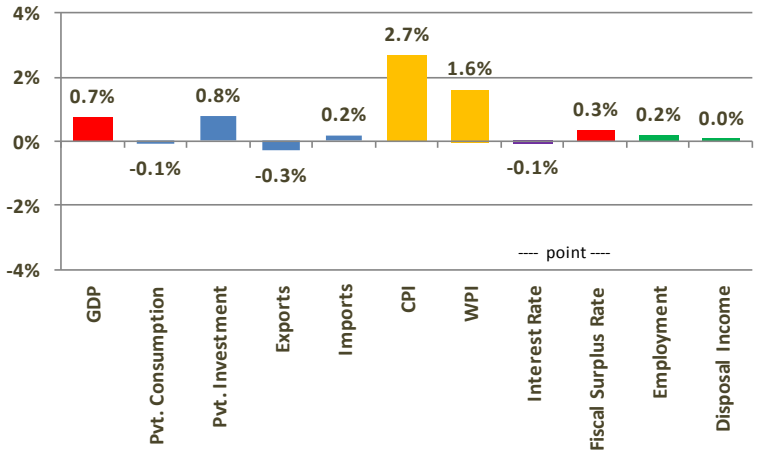
2.4.2 Total Effect Due to Shift to Other Forms of Spending

Next to be measured is the impact on the economy if the government removes the subsidies and reallocates the funds to other sectors (i.e. investment in social infrastructure and expenditure on education). In this case, the positive budget and energy saving effects are larger than the negative price effect.

Results show that GDP and employment increase by 0.7 percent and by 0.2 percent, respectively, in 2020. Consumer prices rise by 2.7 percent (Figure 2.19) – a rate that is lower than if the funds are to be used to reduce deficit – due to higher economic productivity. Fiscal deficit improves by 0.3 percentage points due to a higher tax revenue, thanks to the higher GDP.

The positive impact on GDP gradually increases (Figure 2.20). During the first year (2016), the negative impact of the price hike on consumption is relatively large. However, higher economic productivity through better infrastructure and education mitigates the price increase and eventually accelerates the GDP growth.

Figure 2.19. Economic Impact of Removing Energy Subsidies and Switching to Other Public Spending Items (vis-à-vis the Reference Case) in 2020

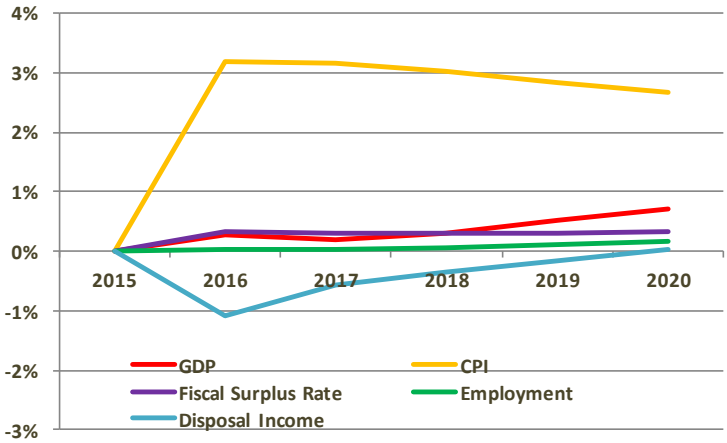


Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.

Source: Estimates provided by this study's authors.

Note that the positive impact on the economy varies across sectors. The eliminated subsidies and higher prices can lead to lower real private disposable income despite the higher GDP. Such negative effect will extend until 2019 and then turn slightly positive by 2020. Thus, the lower disposable income may be viewed by the masses as a social issue for a couple of years after subsidies are removed.

Figure 2.20. Economic Impact of Removing Energy Subsidies and Switching to Other Public Spending Items (vis-à-vis the Reference Case), 2015-2020



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.

Source: Estimated provided by this study's authors.

This section has just shown the results of two policy options on the unused subsidy budget. The differences in the two results are quite significant. One lowers GDP (by -1.5 percent

compared with the reference case) but shows a fiscal deficit improvement (0.9 percentage points), while the other leads to higher GDP (by 0.7 percent) but with lesser improvement in the fiscal deficit (0.3 percentage point).

These two assumed policy options are on opposite ends of the spectrum. In reality, the government would more likely take a reasonable approach that is midway the two scenarios, allowing for a less extreme (i.e. milder) impact on the economy.

2.5 Conclusion and Implications

How the subsidy reform impacts the economy was measured here by using Malaysia's macroeconomic model. In assessing the overall effects, two policy options on how to use the subsidy budget were assumed. These are: (i) That the Malaysian government will use all of the subsidy budget to reduce its fiscal deficit; and (ii) That the government will use the budget to finance expenditures in other sectors (i.e. by investing in social infrastructure and spending on education). The results of this analysis showed significant differences.

The first assumed option shows lower GDP (-1.5 percent compared with the reference case) but leads to an improvement in the fiscal deficit numbers (0.9 percentage point). Meanwhile, the second options showed a higher GDP (by 0.7 percent) but with lesser improvement on the fiscal deficit (0.3 percentage point) (Table 5.1.1). Thus, the second option presents a better picture than the first one.

However, removing subsidies and higher prices results in lower real private disposable income despite the higher GDP. The negative effect will last for a couple of years after the subsidies are removed.

This study focused on how the economy can be affected through three paths – price effect, energy saving effect and budget effect – once energy subsidies are removed. Results show a negative price effect – i.e., higher general prices (around 3 percent) and lower GDP (-1.5 percent) in the next five years.

On the other hand, the positive energy saving effects are somehow small, improving the GDP by 0.3 percent only.

In the analysis of the budget effect, results showed that using the subsidy budget to reduce the fiscal deficit has a negative impact on Malaysia's economy since it lowers GDP by 0.3 percent although it will indeed improve the fiscal deficit by 0.8 percentage points in terms of the ratio against GDP. On the other hand, the option to reallocate the subsidies for other government forms of spending brings a positive impact on the economy (2.0 percent higher GDP).

Table 2.4. Economic Impact of Removing Energy Subsidies (vis-à-vis the Reference Case) in 2020

	Effect of Three Paths				Total Effect	
	Price Effect	Energy Saving Effect	Budget Effect		with Reducing Deficit	with Switching to Others
			with Reducing Deficit	with Switching to Others		
GDP	-1.5%	0.3%	-0.3%	2.0%	-1.5%	0.7%
Private Consumption	-0.4%	0.1%	-0.8%	0.2%	-1.0%	-0.1%
Private Investment	-2.9%	0.2%	-0.2%	3.7%	-2.9%	0.8%
Exports	-0.4%	0.0%	0.0%	0.2%	-0.5%	-0.3%
Imports	0.5%	-0.3%	-0.3%	-0.1%	-0.1%	0.2%
CPI	3.2%	0.2%	-0.1%	-0.7%	3.2%	2.7%
WPI	2.7%	0.2%	-0.2%	-1.3%	2.7%	1.6%
Interest Rate	* 0.0%	* -0.0%	* -0.1%	* -0.0%	* -0.1%	* -0.1%
Fiscal Surplus Rate vs. GDP	* 0.0%	* 0.1%	* 0.8%	* 0.3%	* 0.9%	* 0.3%
Employment	-0.5%	0.1%	-0.1%	0.6%	-0.4%	0.2%
Real Disposal Income	-0.5%	0.3%	-1.4%	0.3%	-1.5%	0.0%

Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimated provided by this study's authors.

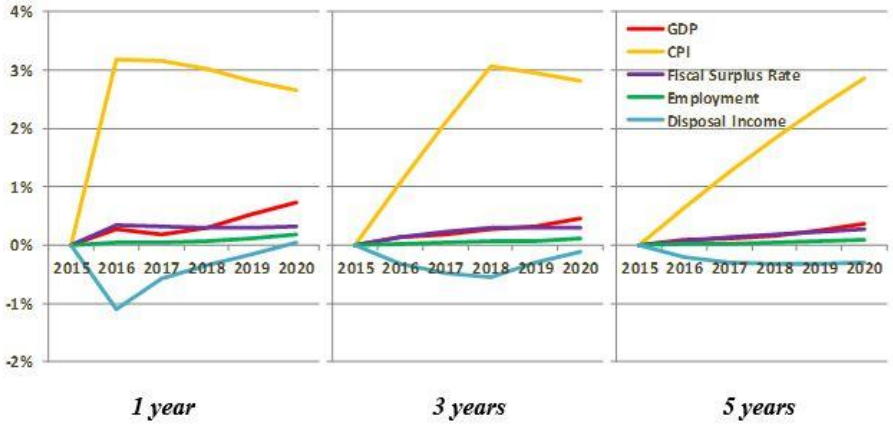
2.5.1 Implications

Subsidies can lead to economic inefficiencies, which results in misallocation of resources. Hence, removing them can make the economy more efficient and healthier. This study affirms this expectation by using a macroeconomic model and showing that an appropriate subsidy reform can accelerate economic growth and reduce fiscal deficit.

Both economic stability and fiscal reform are important issues to Malaysia's policymakers, as they have to strike a balance between the two. The fuel subsidy reform could improve energy efficiency and help the shift toward renewable energy, which can then strengthen Malaysia's energy security, mitigate climate change, and increase its net fuel exports. All these bring a positive impact on the economy.

Reallocating the use of the subsidies to other government expenditures can boost the economy, although it is important to consider which sectors it has to be allocated to. The budget should be used for economic growth, such as investing in social infrastructure, healthcare and education.

Figure 2.21. Economic Impact of Removing Energy Subsidies and Switching to Other Public Spending Items, by Time Period (vis-à-vis the Reference Case)



Note: Changes for interest rate and fiscal surplus rate are shown as percentage points.
Source: Estimated provided by this study's authors.

Note that the positive impact on the economy varies across sectors. Higher general prices result in lower real private disposable income despite the higher GDP. Such negative effect will last for a couple of years following the removal of subsidies, which may raise social problems. It is, thus, very important to mitigate the negative impact.

This study identified extreme cases/assumptions and looked at the impact at every time period (1 year, 3 years, and 5 years) after subsidies are removed. The negative impact on real disposable income varies across these cases.

The implications identified in this study can help policymakers set up appropriate action plans on how to deal with Malaysia's energy subsidies. It can take a reasonable approach towards how to use the funds freed up by the subsidy reforms across several years, enough to soften the expected impact on the economy.

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Appendices

Appendix 2-A. Model's Equations

```
'----------REAL EXPENDITURE----------
GDP=CP+CG+IP+IG+JP+EXC-MC
YD=YD.N/CP.P
CP=136994.1+.104234*(YD)+1.23178*(W/CP.P)-152736.9*(CP.P/CP.P(1))+.857120*(CP(1))-
25260.1*(DUM09)
't-value   (4.43) (2.60) (.97) (-6.01) (16.19) (-5.60)
' OLS   (2003-2014)   R^2=.999   SD= 2,908.58   DW= 2.993
CG=CG.N/CG.P
IPG=IP+IG
IP=-70991.3+.184550*(CP+EXC-MC)+.121602*(R*K(1)/IP.P)-585.769*(INTLR-
DOT(IP.P))+.445014*(IP(1))-16404.6*(DUM06)-
16596.9*(DUM08)+31749.8*(DUM13+DUM12)
't-value   (-2.53) (1.67) (.64) (-1.09) (3.97) (-.88) (-.76) (2.05)
' OLS   (1998-2014)   R^2=.859   SD= 17,413.5   DW= 1.764
IG=IG.N/IG.P

'---EXPORT---
EXC=EXC_OIL+EXC_GAS+EXC_COAL+EXC_OTH
EXC_OIL=.000310+1.91005*(CREX)
'            (.23)        (23065629.25)
' OLS   (1997-2013)   R^2=1.   SD= .000955   DW= 2.937
CREX=-68231.7+82380.2*(WLD_GDP/WLD_GDP(1))-
71.0611*(POIL/WLD_GDP.P)+.245821*(CREX(1))-3662.81*(DUM11)
't-value   (-4.82) (5.77) (-4.28) (2.03) (-3.80)
' OLS   (2001-2012)   R^2=.924   SD= 794.2920   DW= 2.315
EXC_GAS=-.005335+1.38560*(NGEX)
'            (-3.00)     (24245504.64)
' OLS   (1997-2013)   R^2=1.   SD= .001118   DW= 2.881
NGEX=6417.10+.000567*(WLD_GDP)-
500.059*(PGAS/WLD_GDP.P)+9596.68*(DUM10+DUM11)+2035.15*(DUM07+DUM09)
't-value   (1.63) (4.56) (-1.80) (11.02) (2.08)
' OLS   (1997-2014)   R^2=.949   SD= 1,072.51   DW= 1.674
EXC_COAL=.0000006+.519352*(CLEX)
'            (1.20)      (157944053.61)
' OLS   (1997-2013)   R^2=1.   SD= .0000013   DW= 2.224
EXC_OTH=729043.8+.002264*(WLD_GDP)-
728033.4*(EXC.P_OTH/WLD_GDP.P/EXR)+69131.3*(DUM07+DUM08)-42854.6*(DUM10)-
11321.7*(DUM12)
't-value   (5.64) (.79) (-.82) (3.81) (-1.43) (-.43)
' OLS   (2004-2014)   R^2=.712   SD= 21,838.9   DW= 2.682

'---IMPORT---
MC=MC_OIL+MC_GAS+MC_COAL+MC_OTH
MC_OIL=.000116+1.91005*(CRIM)
'            (.35)        (43585537.21)
```

```
' OLS   (1997-2013)   R^2=1.   SD= .000475   DW= 1.112
MC_GAS=-.0000413+1.38560*(NGIM)
'           (-.33)      (58876493.20)
' OLS   (2003-2013)   R^2=1.   SD= .000188   DW= 1.933
MC_COAL=.0000066+.519352*(CLIM)
'           (.15)       (101485184.57)
' OLS   (1997-2013)   R^2=1.   SD= .0000950   DW= 2.479
MC_OTH=313482.8+.058238*(YD.N/MC.P_OTH)-
107734.9*(MC.P_OTH/MC.P_OTH(1))+.617294*(MC_OTH(1))-81071.2*(DUM01)-
25854.9*(DUM03)+66209.1*(DUM04)-57464.9*(DUM09+DUM10)
't-value   (2.29) (.91) (-.97) (4.17) (-2.81) (-.96) (2.57) (-2.68)
' OLS   (2000-2014)   R^2=.852   SD= 23,617.1   DW= 2.028

'----------PRICES & WAGE----------
GDP.P=GDP.N/GDP
CP.P=.005282+.009972*(CPI)
'         (.14)       (28.58)
' OLS   (2010-2014)   R^2=.995   SD= .002767   DW= 1.471
CPI=0.0288*CPI_ELEC+0.0877*CPI_GSL+(1-0.0288-0.0877)*CPI_OTH
CPI_ELEC=CPI_ELEC(1)*ELE_D.P/ELE_D.P(1)
CPI_GSL=CPI_GSL(1)*GASO.P/GASO.P(1)
ELE_D.P=ELE_D.P_TMP*ELE_D_CHANGE
GASO.P=GASO.P_TMP*GASO_CHANGE
CPI_OTH=(-17.7628+.098514*(WPI)+21.8927*(GDP_GAP)+.900299*(CPI_OTH(1))-
1.49693*(DUM07)-2.52259*(DUM10)-2.03720*(DUM12))*(1+GST.R)
't-value   (-.61) (1.47) (.75) (7.86) (-1.56) (-2.41) (-2.14)
' OLS   (2002-2014)   R^2=.989   SD= .844259   DW= 2.063

WPI=0.0613*WPI_ENE+(1-0.0613)*WPI_OTH
ELE_I.P=ELE_I.P_TMP*ELE_I_CHANGE
DIESEL.P=DIESEL.P_TMP*DIESL_CHANGE
WPI_ENE=WPI_ENE(1)*(ELE_I.P/860*8659+DIESEL.P/8365*8647)/(ELE_I.P(1)/860*8659+DIE
SEL.P(1)/8365*8647)
'8659 ktoe for Elec Demand and 8647 for Diesel in Industry+Transport+Commercial in 2013
'860 kcal/kWh, 8365 kcal/L
WPI_OTH=(-
47.3478+41.6939*(MC.P)+.019208*(WPI_ENE+WPI_ENE(1))+70.1746*(GDP_GAP)+.404212*
(WPI_OTH(1))-3.43639*(DUM09)+6.42719*(DUM08))*(1+GST.R)
't-value   (-.46) (1.42) (.18) (.65) (1.15) (-.53) (1.31)
' OLS   (2003-2014)   R^2=.935   SD= 2.96723   DW= 2.614

CG.P=.052216+.709236*(CP.P)+.249149*(CG.P(1))
'         (1.49)      (4.45)        (1.65)
' OLS   (2000-2014)   R^2=.978   SD= .022317   DW= 1.603
IG.P=IP.P
IP.P=-.030793+.007157*(WPI)+.294869*(IP.P(1))
'         (-.52)      (3.88)       (1.84)
' OLS   (2000-2014)   R^2=.96   SD= .030745   DW= 1.935
JP.P=-.654472+.021910*(WPI)+3.12836*(DUM08)
```

```
'          (-.72)      (2.14)        (4.62)
' OLS   (1997-2014)   R^2=.639   SD= .640773   DW= 2.372
INTLR=.088782+1.56274*(IP.P/IP.P(1))-9.25385*(DEFICIT.R)+.405036*(INTLR(1))-
1.15500*(DUM09)-.515240*(DUM10)
't-value   (.16) (2.92) (-1.63) (11.05) (-5.03) (-2.70)
' OLS   (1998-2014)   R^2=.938   SD= .175114   DW= 1.445
EXC.P_OIL=.0000000+.003979*(POIL*EXR)
'              (.32)        (39651697.61)
' OLS   (1997-2013)   R^2=1.   SD= .0000000   DW= 1.229
EXC.P_GAS=.0000000+.028618*(PGAS*EXR)
'              (.88)        (53246303.99)
' OLS   (1997-2013)   R^2=1.   SD= .0000000   DW= .899
EXC.P_COAL=.0000000+.003137*(PCOAL*EXR)
'              (-.23)      (49646683.04)
' OLS   (1997-2013)   R^2=.983   SD= .042778   DW= .873
EXC.P_OTH=.063427+.005808*(WPI)+.319809*(EXC.P_OTH(1))
'              (.98)        (3.70)        (1.59)
' OLS   (1999-2013)   R^2=.931   SD= .032100   DW= 2.095
EXC.P=EXC.N/EXC
MC.P_OIL=.0000000+.000524*(POILM)
'             (.26)        (61894900.60)
' OLS   (1997-2013)   R^2=1.   SD= .0000000   DW= 2.237
MC.P_GAS=.0000000+.000722*(PGASM)
'             (-.26)      (28054288.87)
' OLS   (2003-2013)   R^2=1.   SD= .0000000   DW= 1.791
MC.P_COAL=.0000000+.001925*(PCOALM)
'              (.65)        (50450906.99)
' OLS   (1997-2013)   R^2=1.   SD= .0000000   DW= 2.031
POILM=POIL*EXR*7.6
PGASM=PGAS*EXR*39.6526
PCOALM=PCOAL*EXR*1.6291952
MC.P=MC.N/MC

'----------GOVERNMENT EXPENDITURE----------
TAX=(3377.27+.144955*(GDP.N)-12933.1*(DUM10)+7478.02*(DUM12))*(1+GST.R)
'        (1.20)      (33.34)          (-2.83)          (1.58)
' OLS   (1998-2014)   R^2=.988   SD= 4,312.00   DW= 1.576
NON_TAX=-4369.22+.037996*(GDP.N)+.717986*(EXC.N_OIL)+14882.0*(DUM09)-
9944.38*(DUM05)+3507.26*(DUM13)-3602.97*(DUM08)
't-value   (-2.72) (7.10) (4.70) (5.45) (-3.41) (1.16) (-1.17)
' OLS   (1997-2014)   R^2=.979   SD= 2,551.99   DW= 2.516

GOV.REVN=TAX+NON_TAX
CG.N=CG.N_TEMP*(1-
GOV_SWITCH)+CG.N_TEMP*CG.P/CG.P_REF*GOV_SWITCH+SUB_CHANGE*CG_SWITCH*SU
B_CG_SHARE
IG.N=IG.N_TEMP*(1-
GOV_SWITCH)+IG.N_TEMP*IG.P/IG.P_REF*GOV_SWITCH+SUB_CHANGE*IG_SWITCH*(1-
SUB_CG_SHARE)
```

```
GOV.EXPD=CG.N+IG.N+SUBSIDY_TTL
SUBSIDY_TTL=SUBSIDY_FUEL+SUBSIDY_OTH-SUB_CHANGE
DEFICIT=GOV.REVN-GOV.EXPD
DEFICIT.R=DEFICIT/GDP.N
ICG.N_TEMP=CG.N_TEMP+IG.N_TEMP

'----------NOMINAL EXPENDITURE----------
GDP.N=CP.N+CG.N+IPG.N+JP.N+EXC.N-MC.N
YD.N=GDP.N-TAX+SUBSIDY_TTL

CP.N=CP*CP.P
IPG.N=IP.N+IG.N
IP.N=IP*IP.P
JP.N=JP*JP.P
EXC.N=EXC.N_OIL+EXC.N_GAS+EXC.N_COAL+EXC.N_OTH
EXC.N_OIL=EXC_OIL*EXC.P_OIL
EXC.N_GAS=EXC_GAS*EXC.P_GAS
EXC.N_COAL=EXC_COAL*EXC.P_COAL
EXC.N_OTH=EXC_OTH*EXC.P_OTH
MC.N=MC.N_OIL+MC.N_GAS+MC.N_COAL+MC.N_OTH
MC.N_OIL=MC_OIL*MC.P_OIL
MC.N_GAS=MC_GAS*MC.P_GAS
MC.N_COAL=MC_COAL*MC.P_COAL
MC.N_OTH=MC_OTH*MC.P_OTH

'----------LABOUR----------
LF=(.032649+.029867*(GDP/10^6)+.878526*(LF(1)/POP(1))-.002177*(DUM01))*POP
'           (.50)       (1.36)              (4.70)                (-.25)
' OLS   (1999-2014)   R^2=.87   SD= .007766   DW= 1.768

L=LF-U
U=LF*URATE/100
URATE=8.67037-7.79287*(GDP/GDP(1))+.807552*(URATE(1))+.164604*(DUM13)
'          (7.70)      (-7.55)               (5.43)              (1.84)
' OLS   (2009-2014)   R^2=.938   SD= .071709   DW= 2.218
W=-15045.3-
590.531*(URATE)+266.498*(CPI)+.561209*(W(1))+1890.45*(DUM08)+1405.07*(DUM12)
'     (-1.15)    (-.61)          (1.63)        (2.06)         (2.03)          (1.86)
' OLS   (2000-2014)   R^2=.989   SD= 638.9795   DW= 1.424

'----------GDP potential ----------
'LOG(GDP/L)=.891909+.608065*(LOG(K*0.9/L))+.013494*(TIME)+.055003*(DUM04+DUM05
+DUM06+DUM07+DUM08)
't-value   (.95) (3.10) (5.02) (6.74)
' OLS   (1998-2014)   R^2=.986   SD= .013709   DW= 1.279
'TFP_ACTUAL=EXP(LOG(GDP)-(.608065*LOG(K*0.9)+(1-.608065)*LOG(L)))
'LOG(GDP_PTL)=.891909+.608065*LOG(K)+(1-
.608065)*LOG(LF)+.013494*(TIME)+.055003*(DUM04+DUM05+DUM06+DUM07+DUM08)
GDP_PTL=EXP((.608065*LOG(K)+(1-.608065)*LOG(LF))+LOG(TFP_ACTUAL))
```

```
GDP_GAP=GDP/GDP_PTL

DOT(TFP_ACTUAL)=.208288+.024018*(DOT(IP(1)+IP(2)))+.026667*(DOT(IG(1)+IG(2)))+.1795
17*(DOT(CG_EDU(1)+CG_EDU(2)+CG_EDU(3)))+.125098*(DOT(TFP_ACTUAL(1)))+1.64641*(
DUM02+DUM03+DUM04)-7.05964*(DUM09)-1.53803*(DUM13)
't-value   (.30) (.61) (.60) (2.65) (1.54) (2.88) (-10.38) (-2.22)
' OLS   (2002-2014)   R^2=.926   SD= .582566   DW= 2.494
R=-.288791+.136564*(TFP_ACTUAL)+.186299*(R(1))-.021746*(DUM09)
'     (-4.55)     (4.85)                (1.09)         (-2.00)
' OLS   (2000-2014)   R^2=.943   SD= .007947   DW= 1.119
K=.0000000+.946106*(K(1))+IPG
'          (.00)        (792.82)
' ROLS  (2000-2014)   R^2=.999   SD= 8,356.45   DW= .749
CG.N_EDU_TMP=CG.N_TEMP*CG_EDU_SHARE
CG.N_EDU=CG.N_EDU_TMP+SUB_CHANGE*CG_SWITCH*SUB_CG_SHARE
CG_EDU=CG.N_EDU/CG.P
CG_EDU_STCK=CG_EDU+CG_EDU_STCK(1)

'----------ENERGY----------
CRIM=CRPD-CRPR+CREX+CRSD
NGIM=NGPD-NGPR+NGEX
CLIM=CLPD-CLPR+CLEX+CLSD
CRPD=CRPD_TMP*CRPD_CHANGE
NGPD=NGPD_TMP*NGPD_CHANGE
CLPD=CLPD_TMP*CLPD_CHANGE
```

Appendix 2-B. List of Variables

Variables	Contents	Unit	Data available	
CAP.EXPD	Govt Expenditure - Capital	million ringgit	1990	2014
CG	Real Govt Consumption	million ringgit	1990	2014
CG.N	Nominal Govt Consumption	million ringgit	1990	2014
CG.N_EDU	Govt. Expenditure Education and training	million ringgit	1990	2014
CG.N_EDU_TMP	CG.N_EDU	million ringgit	1990	2014
CG.N_TEMP	CG.N	million ringgit	1990	2014
CG.P	Deflator Govt Consumption	CY2010=1	1990	2014
CG.P_REF	CG.P	million ringgit	1990	2014
CG_EDU	CG.N_EDU/CG.P	million ringgit	1990	2014
CG_EDU_SHARE	CG.N_EDU/CG.N	%	1990	2014
CG_EDU_STCK	Stock Education	million ringgit	1990	2014
CG_EDU_TMP	CG_EDU	million ringgit	1990	2014
CG_SWITCH	1= subsidy switching to CG, 0= none		1990	2014
CLEX	Export Coal	ktoe	1990	2014
CLIM	Import Coal	ktoe	1990	2014
CLPD	Primary Demand Coal	ktoe	1990	2014
CLPD_CHANGE	Coal demand Change Rate	Reference=1	1990	2014
CLPD_TMP	CLPD	ktoe	1990	2014
CLPR	Production Coal	ktoe	1990	2014
CLSD	Statistics Difference Coal	ktoe	1990	2014
CP	Real Private Consumption	million ringgit	1990	2014
CP.N	Nominal Private Consumption	million ringgit	1990	2014
CP.P	Deflator Private Consumption	CY2010=1	1990	2014
CPI	Consumer Price Index	CY2010=100	1990	2014
CPI_ELEC	CPI Electricity	CY2010=101	1990	2014
CPI_GSL	CPI Gasoline	CY2010=102	1990	2014
CPI_OTH	CPI Others	CY2010=103	1990	2014
CREX	Export Oil	ktoe	1990	2014
CRIM	Import Oil	ktoe	1990	2014
CRPD	Primary Demand Oil	ktoe	1990	2014
CRPD_CHANGE	Oil demand Change Rate	Reference=1	1990	2014
CRPD_TMP	CRPD	ktoe	1990	2014
CRPR	Production Oil	ktoe	1990	2014
CRSD	Statistics Difference Oil	ktoe	1990	2014
CUR.EXPD	Govt Expenditure - Current	million ringgit	1990	2014
D.N	Consumption of fixed capital	million ringgit	1990	2014
DEFICIT	Fiscal Surplus/Deficit	million ringgit	1990	2014
DEFICIT.R	Fiscal Surplus/Deficit Rate vs GDP	ratio	1990	2014
DIESEL.P	Diesel Price	RM/Liter	1990	2014

Variables	Contents	Unit	Data available	
DIESEL.P_TMP	DISEL.P	RM/L	1990	2014
DIESL_CHANGE	Diesel price change rate	Reference=1	1990	2014
DUM00	Dummy 2000		1990	2014
DUM01	Dummy 2001		1990	2014
DUM02	Dummy 2002		1990	2014
DUM03	Dummy 2003		1990	2014
DUM04	Dummy 2004		1990	2014
DUM05	Dummy 2005		1990	2014
DUM06	Dummy 2006		1990	2014
DUM07	Dummy 2007		1990	2014
DUM08	Dummy 2008		1990	2014
DUM09	Dummy 2009		1990	2014
DUM10	Dummy 2010		1990	2014
DUM11	Dummy 2011		1990	2014
DUM12	Dummy 2012		1990	2014
DUM13	Dummy 2013		1990	2014
DUM14	Dummy 2014		1990	2014
DUM90	Dummy 1990		1990	2014
DUM91	Dummy 1991		1990	2014
DUM92	Dummy 1992		1990	2014
DUM93	Dummy 1993		1990	2014
DUM94	Dummy 1994		1990	2014
DUM95	Dummy 1995		1990	2014
DUM96	Dummy 1996		1990	2014
DUM97	Dummy 1997		1990	2014
DUM98	Dummy 1998		1990	2014
DUM99	Dummy 1999		1990	2014
ELE_D.P	Electricity Domestic Price	RM/kWh	1990	2014
ELE_D.P_TMP	ELE_D.P	RM/kWh	1990	2014
ELE_D_CHANGE	Electricity domestic price change rate	Reference=1	1990	2014
ELE_I.P	Electricity Industry Price	RM/kWh	1990	2014
ELE_I.P_TMP	ELE_I.P	RM/kWh	1990	2014
ELE_I_CHANGE	Electricity industry price change rate	Reference=1	1990	2014
EXC	Real Exports	million ringgit	1990	2014
EXC.N	Nominal Exports	million ringgit	1990	2014
EXC.N_COAL	Nominal Export - Coal	million ringgit	1990	2014
EXC.N_GAS	Nominal Export - Gas	million ringgit	1990	2014
EXC.N_OIL	Nominal Export - Oil	million ringgit	1990	2014
EXC.N_OTH	Nominal Export - Others	million ringgit	1990	2014
EXC.P	Deflator Exports	CY2010=1	1990	2014

Variables	Contents	Unit	Data available	
EXC.P_COAL	Deflator Export - Coal	CY2010=1	1990	2014
EXC.P_GAS	Deflator Export - Gas	CY2010=1	1990	2014
EXC.P_OIL	Deflator Export - Oil	CY2010=1	1990	2014
EXC.P_OTH	Deflator Export - Others	CY2010=1	1990	2014
EXC_COAL	Real Export - Coal	million ringgit	1990	2014
EXC_GAS	Real Export - Gas	million ringgit	1990	2014
EXC_OIL	Real Export - Oil	million ringgit	1990	2014
EXC_OTH	Real Export - Others	million ringgit	1990	2014
EXR	Foreign Exchange Rate	RM/USD	1990	2014
GASO.P	Gasoline Price	RM/Litre	1990	2014
GASO.P_TMP	GASO.P	RM/Litre	1990	2014
GASO_CHANGE	Gasoline price change rate	Reference=1	1990	2014
GDP	Real GDP	million ringgit	1990	2014
GDP.N	Nominal GDP	million ringgit	1990	2014
GDP.P	Deflator GDP	CY2010=1	1990	2014
GDP_GAP	GDP/GDP_PTL		1990	2014
GDP_PTL	EXP(.891909+.608065*LOG(K)+(1-.608065)*LOG(LF)	million ringgit	1990	2014
GOV.EXPD	Govt Expenditure	million ringgit	1990	2014
GOV.REVN	Govt Revenue	million ringgit	1990	2014
GOV.REVN_REF	Govt revenue in reference	mil. RM	1990	2014
GOV_SWITCH	1=fiscal neutrality from reference, 0=none		1990	2014
GST.R	GST rate	%	1990	2014
ICG.N_TEMP	IG.N+CG.N	million ringgit	1990	2014
IG	Real Govt Investment	million ringgit	1990	2014
IG.N	Nominal Govt Investment	million ringgit	1990	2014
IG.N_TEMP	IG.N	million ringgit	1990	2014
IG.P	Deflator Govt Investment	CY2010=1	1990	2014
IG.P_REF	IG.P	million ringgit	1990	2014
IG_SWITCH	1= subsidy switching to IG, 0= none		1990	2014
INTLR	Interest Rate	%	1990	2014
IP	Real Private Investment	million ringgit	1990	2014
IP.N	Nominal Private Investment	million ringgit	1990	2014
IP.P	Deflator Private Investment	CY2010=1	1990	2014
IPG	Real Investment	million ringgit	1990	2014
IPG.N	Nominal Investment	million ringgit	1990	2014
IPG.P	Deflator Investment	CY2010=1	1990	2014
JP	Real Inventory Investment	million ringgit	1990	2014
JP.N	Nominal Inventory Investment	million ringgit	1990	2014
JP.P	Deflator Inventory Investment	CY2010=1	1990	2014
K	Real Gross Capital Stock	million ringgit	1990	2014

Variables	Contents	Unit	Data available	
L	Employment	thousand	1990	2014
LF	Labour Force	thousand	1990	2014
LW.N	Compensation of employees	million RM	1990	2014
MC	Real Imports	million ringgit	1990	2014
MC.N	Nominal Imports	million ringgit	1990	2014
MC.N_COAL	Nominal Import - Coal	million ringgit	1990	2014
MC.N_GAS	Nominal Import - Gas	million ringgit	1990	2014
MC.N_OIL	Nominal Import - Oil	million ringgit	1990	2014
MC.N_OTH	Nominal Import - Others	million ringgit	1990	2014
MC.P	Deflator Imports	CY2010=1	1990	2014
MC.P_COAL	Deflator Import - Coal	CY2010=1	1990	2014
MC.P_GAS	Deflator Import - Gas	CY2010=1	1990	2014
MC.P_OIL	Deflator Import - Oil	CY2010=1	1990	2014
MC.P_OTH	Deflator Import - Others	CY2010=1	1990	2014
MC_COAL	Real Import - Coal	million ringgit	1990	2014
MC_GAS	Real Import - Gas	million ringgit	1990	2014
MC_OIL	Real Import - Oil	million ringgit	1990	2014
MC_OTH	Real Import - Others	million ringgit	1990	2014
NGEX	Export Gas	ktoe	1990	2014
NGIM	Import Gas	ktoe	1990	2014
NGPD	Primary Demand Gas	ktoe	1990	2014
NGPD_CHANGE	Gas demand Change Rate	Reference=1	1990	2014
NGPD_TMP	NGPD	ktoe	1990	2014
NGPR	Production Gas	ktoe	1990	2014
NGSD	Statistics Difference Gas	ktoe	1990	2014
NON_TAX	Govt Revenue - Non-Tax	million ringgit	1990	2014
PCOAL	International Coal Price	$/t	1990	2014
PCOALM	Import Coal Price	RM/toe	1990	2014
PGAS	International Gas Price	$/MMBTU	1990	2014
PGASM	Import Gas Price	RM/toe	1990	2014
POIL	International Oil Price	$/bbl	1990	2014
POILM	Import Oil Price	RM/toe	1990	2014
POP	Population	thousand	1990	2014
R	YC.N/K	%	1990	2014
SUB_CG_SHARE	subsidy switching share of CG	%	1990	2014
SUB_CHANGE	Subsidy Change from reference	million ringgit	1990	2014
SUBSIDY_FUEL	Subsidy for Fuel	million ringgit	1990	2014
SUBSIDY_OTH	Subsidy for Others	million ringgit	1990	2014
SUBSIDY_TTL	Subsidy Total	million ringgit	1990	2014
TAX	Govt Revenue - Tax	million ringgit	1990	2014

Variables	Contents	Unit	Data available	
TFP_ACTUAL	EXP(LOG(GDP)-(.608065*LOG(K*0.9)+(1-.608065)*L		1990	2014
TIME	Time Trend	1990=0	1990	2014
U	Unemployment	thousand	1990	2014
URATE	Unemployment Rate	%	1990	2014
W	LW.N/L*1000	ringgit	1990	2014
WLD_GDP	Real World GDP	Mil. US$	1990	2014
WLD_GDP.N	Nominal World GDP	Mil. US$	1990	2014
WLD_GDP.P	Deflator World GDP	2005=100	1990	2014
WPI	Wholesale Price Index	CY2010=100	1990	2014
WPI_ENE	WPI Energy	CY2010=100	1990	2014
WPI_OTH	WPI Others	CY2010=100	1990	2014
YC.N	Business income	million ringgit	1990	2014
YD	(GDP.N-TAX+SUBSIDY_TTL)/CP.P	million ringgit	1990	2014
YD.N	GDP.N-TAX+SUBSIDY_TTL	million ringgit	1990	2014