



**The Effects of Oil Price on the Price of Selected
Intermediate Food Products in Malaysia**

by

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A thesis submitted in fulfillment of the requirements for the degree of
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**School of Business Innovation and Technopreneurship
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LIST OF ABBREVIATIONS

AD	Aggregate Demand
ADB	Asian Development Bank
ADF	Augmented Dickey and Fuller Test
AIC	Akaike Information Criterion
ARCH	Auto-regressive Conditional Heteroskedasticity
ARDL	Autoregressive Distributed Lag
AS	Aggregate Supply
BNM	Central Bank of Malaysia
BR1M	Bantuan Rakyat 1Malaysia
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Squares of Recursive Residuals
ECM	Error Correction Model
EMU	European Economic and Monetary Union
EU	European Union
GARCH	Generalized Auto-regressive Conditional
GDP	Gross Domestic Product
IMF	International Monetary Fund
KPDNKK	Ministry of Domestic Trade, Co-operatives and Consumerism
LM	Lagrange Multiplier Test
M2	Money Supply
OECD	Organisation for Economic Co-operation and Development
OP	Oil Price

PP	Phillips-Perron Test
RON	Research Octane Number
SBIC	Schwartz/Bayesian Information Criterion
VAR	Vector Autoregressive Model
WTI	West Texas Intermediate

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LIST OF SYMBOLS

α	Intercept Constant / Drift
δ	Coefficient Presenting Process Root
β	Correlation Coefficient on a Time Trend
t	Time period
θ_0	Vector of Parameter of Probability Distribution
ε_t	Noise Error Term
u_t	Error Term
R^2	Coefficient of Determination of a Linear Regression
χ^2	Critical Value
Δ	First Difference Operator
$\sum_{i=1}^n \chi_i (\Delta \ln P_{t-1})$	n = lag orders, $(\Delta \ln P_{t-1})$ = Positive Change in Prices of Intermediate Food Products, χ_i = Short-run Influence of Oil Price Increase on the Price of Intermediate Food Products
$f(\bullet)$	Price of Intermediate Food Products Function
σ_u^2	Variance

Kesan Harga Minyak Terhadap Harga Perantaraan Bagi Produk Makanan Yang Dipilih Di Malaysia

ABSTRAK

Kajian tentang kemeruapan harga minyak telah banyak dilakukan sebelum ini kerana ia boleh memberi kesan yang besar ke atas ekonomi. Kenaikan harga minyak boleh menyebabkan peningkatan harga barang lain. Gula, telur dan santan adalah barang perantaraan bagi produk makanan yang turut terjejas akibat peningkatan harga minyak. Kajian ini mengkaji tentang kesan harga minyak terhadap harga barang perantaraan bagi produk makanan yang dipilih di Malaysia. Kajian ini memfokuskan kepada tiga jenis harga minyak iaitu RON95, RON97 dan diesel. Harga minyak ini memberi kesan yang besar terhadap harga barang perantaraan makanan iaitu gula, telur dan santan di Malaysia. Tempoh sampel adalah 84 bulan iaitu daripada tahun 2008 hingga 2015. Hubungan di antara harga minyak dan harga barang perantaraan bagi produk makanan diukur dengan menggunakan pendekatan autoregrasi lat tertabur (ARDL) dan ujian sempadan (bound test). Keputusan ujian menunjukkan bahawa semua pembolehubah bersempadan bersama-sama (bound together) dalam jangka masa panjang. Keputusan juga menunjukkan bahawa dalam jangka masa panjang, harga RON97 mempengaruhi harga produk makanan perantaraan (gula, telur dan santan) di Malaysia. Walau bagaimanapun, harga diesel hanya memberi kesan ke atas harga gula sementara harga RON95 mempunyai hubungan yang negatif dan signifikan dengan harga gula sahaja. Keputusan ujian pembetulan ralat terma (ECM) menunjukkan bahawa harga diesel mempunyai hubungan positif dengan harga gula dalam jangka masa pendek. Keputusan menunjukkan bahawa harga RON97 boleh mempengaruhi harga telur dan santan di Malaysia. Walau bagaimanapun, pelarasan halaju bagi harga gula dan santan adalah lebih tinggi berbanding dengan harga telur yang pelarasan halajunya lebih rendah. Oleh itu, penemuan ini penting untuk mengekalkan harga minyak bagi mencapai keseimbangan di dalam harga barang perantaraan bagi produk makanan yang dipilih di Malaysia, seperti gula, telur dan santan.

The Effects of Oil Price on the Price of Selected Intermediate Food Products in Malaysia

ABSTRACT

A fluctuation in the oil price has been addressed by numerous previous studies as it can have great impacts on economies. An increase in oil price can result in a higher price of other goods. Sugar, egg and coconut milk are the intermediate food products that can be inevitably affected due to a higher oil price. Therefore, this present study aims to investigate the effects of oil price on the price of selected intermediate food products in Malaysia. This research narrows the focus of the investigation, to concentrate on the three types of oil price: RON95, RON97 and diesel. These oil price can major contribute to the price of selected intermediate food products (sugar, egg and coconut milk) in Malaysia. The sample period covers 84 months from 2008 to 2015. The relationship between oil price and the price of selected intermediate food products is examined by using the linear autoregressive distributed lag (ARDL) bound test. The bound test was conducted and the results show that all the variables in functional form framework are bound together in the long-run. It was also ascertained that in the long-run, the price of RON97 influences the prices of selected intermediate food products (sugar, egg and coconut milk) in Malaysia. Nevertheless, the price of diesel affects only the price of sugar, whereas RON95 is negatively and significantly associated with the price of sugar alone. The error-correction terms test results reveal that the price of diesel is positively correlated with the price of sugar respectively in the short-run. On the other hand, the findings found that the prices of RON97 significantly influenced the prices of egg and coconut milk in Malaysia. However, the prices of sugar and coconut milk had adjusted at a higher speed compared with the price of egg which had adjusted at a lower speed. Therefore, these findings are important for the government to control the price of oil in order to achieve the stability of the price of selected intermediate food products in Malaysia such as sugar, egg and coconut milk.

CHAPTER 1

INTRODUCTION

1.1 The Background of the Study

Petroleum is one of the main natural resources and it is flammable liquid made from crude oil (Energy Information Administration, 2016). It can be found underground and composed of a complex mixture of hydrocarbons of various molecular weights and other liquid organic compounds (Riva and Atwater, 2016). It takes a long time to form, suggesting that the petroleum we use today has been formed many years ago. This liquid contains massive energy. Petroleum is the main commodity and indispensable to generate economic activities. A shortage of this utmost input can leave deleterious effects on economy.

One of the main petroleum products is gasoline or known as petrol. Petrol is an energetic material which is always used by people for daily activities. This type of liquid is transparent-derived liquid, and it is composed of organic compounds extracted from the fractional distillation of petroleum. There are few types of petrol products used in Malaysia, namely, RON95, RON97 and RON100. These types of petrol are usually used for vehicles such as cars, lorries and busses. The quality of petrol is dependent on the Research Octane Number (RON), implying that the risk of vehicles' engine to break down becomes higher when the number of octane de-escalates.

Another common petroleum product used by people is diesel. The purpose of using this liquid almost similar to gasoline. It is used for certain transports such as trucks,

lorries, and busses. This liquid is not alternatively derived from petroleum, despite the fractional distillate of petroleum fuel oil.

Petroleum products are also vital for the world economy (Noordin, 2009). This is because this fuel energy is the main natural resources. Nowadays, the trade of petroleum products occurs across the globe. Many people use petroleum products for daily tasks. Therefore, the fluctuation of petrol price in these recent years has opened to criticism among experts since it can trigger the higher cost of production for many petroleum-based goods (Ibrahim and Said, 2012). Jee et al. (2010) stated that it is crucial to have profound understanding of the oil price movement. The persistent and long lasting changes can expose the producers and industrial consumers to various risks.

1.1.1 The Overview of RON95, RON97 and Diesel Prices in Malaysia

Malaysia is a country that enjoys relatively low oil price over the years due to the subsidies on fuel provided by the Malaysian government. However, the removal of the oil subsidies had triggered the increase in the price of oil, namely, RON95, RON97 and diesel especially in 2008, 2010 and 2014. In Malaysia, there are a few types of petroleum products that are being used in Malaysia, namely RON95, RON97, and diesel. These types of petroleum products are always used by Malaysians for their daily activities. Therefore, a fluctuation in oil price can be harmful to our economy.

Figure 1.1 shows the prices of RON95, RON97 and diesel in Malaysia from 2008 to 2015. In June 2008, the price of RON97 went up from RM1.92 to RM2.70 per litre. Therefore, to reduce the government's expenditure, the Malaysian government had decontrolled the prices of RON95 and RON97 from 1st November 2008. The sharp rise

in petrol price had resulted in inflation for all consumer products such as food and transportation (Shaari et al., 2012). According to a report by the Central Bank of Malaysia (2009) and Construction Industry Development Board Malaysia (2009), a rise of 5.4% in inflation was due to the sharp rise in the prices of petrol and food.

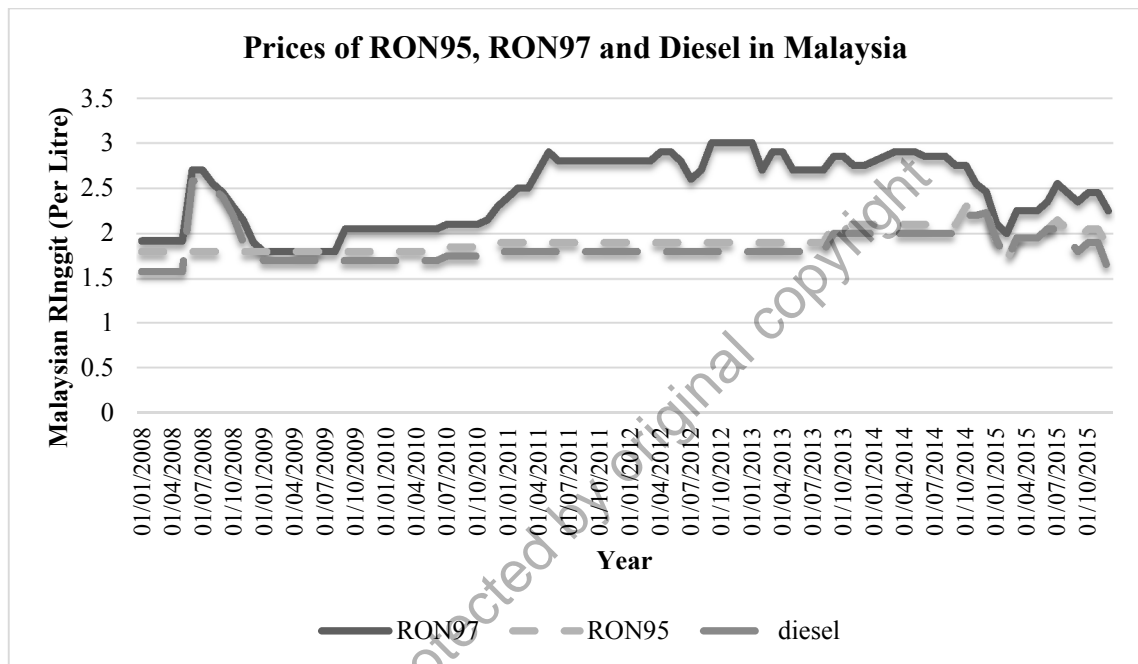


Figure 1.1: Prices of RON95, RON97 and diesel in Malaysia.
(Source: Ministry of Domestic Trade, Co-operatives and Consumerism, 2016)

From Figure 1.1, the increasing trend can be seen for RON97 with the increase of 41% over the period of September 2009 to May 2011. In July 2010, the government of Malaysia announced that the price of RON97 was determined by the global oil price which was under the managed float mechanisms (Central Bank of Malaysia, 2011). This led to the increase of 25 cents per litre in the price of RON97 in Malaysia. Furthermore, the oil subsidy revision in Malaysia was implemented on December 4, 2010, causing the reduction of 5% in the subsidy for RON95. Thus, the price of RON97 increased by 50 cents to RM2.80 per litre from January to July, 2011 (Central Bank of Malaysia, 2012).

However, the price of RON97 grew sharply at the rate of 15.38% from RM2.60 per litre in July 2012 to RM3.00 per litre in September 2012 due to the hike of the world's oil price in the market (Central Bank of Malaysia, 2013a). Further, the price of RON97 increased from RM2.70 in August, 2013 to RM2.85 in September, 2013. However, the increase in the price of RON97 was lower than the increased in the prices of RON95 and diesel in 2013 due to the increasing supply of oil in the world market from the OPEC member countries (Central Bank of Malaysia, 2014a). The reduction in the subsidy for RON95, RON97 and diesel aggravated the burden for Malaysians especially the low-income group. Hence, to reduce the burden for those in the low-income group, the Malaysian government announced the BR1M (Bantuan Rakyat 1Malaysia), a program that was introduced to curb the increasing cost of living pressures experienced by low-income group in 2010 (Central Bank of Malaysia, 2013b).

Since mid-2014, the global oil price dropped by 50% due to surge in oil supply and a weak demand (Institute For Energy Research, 2015). To enhance the country's revenue and to take advantage of the lowest oil price, the government of Malaysia has officially ended the subsidy of all fuels including RON95, RON97 and diesel on 1st December 2014. Nonetheless, the elimination of subsidy for RON95, RON97 and diesel has triggered most Malaysians. The inflation rate in 2015 was affected by the implementation of the new pricing mechanism for petrol prices in which there was an influence of global oil price into domestic prices that had affected the domestic fuel products in Malaysia (Central Bank of Malaysia, 2015). Fluctuation of oil prices kept happening starting from January to December 2015. Until recent times, the issue of oil prices never seems to end in Malaysia.

1.1.2 The Overview the Price of Selected Intermediate Food Products in Malaysia

Malaysia has several price of intermediate food products to support economic development. Sugar, egg, and coconut milk are the main intermediate food products in Malaysia. These selected intermediate food products are considered as having a high consumption rate over the previous periods (Institute for Public Health, 2014).

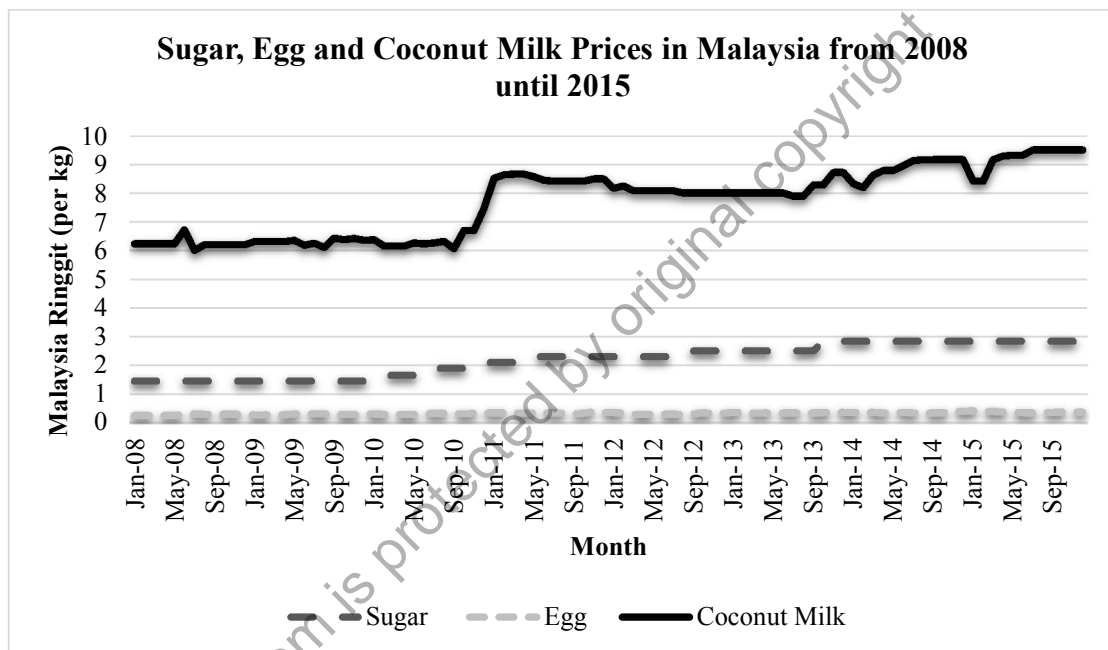


Figure 1.2: Intermediate Food Products Price in Malaysia.
(Source: Ministry of Domestic Trade, Co-operatives and Consumerism, 2016)

Figure 1.2 shows the price of selected intermediate food products for three main intermediate food products in Malaysia: sugar, egg, and coconut milk. Sugar acts as an essential item for human being. Attempting to prevent spikes in sugar price, price hikes in sugar-related goods, and to lessen the burdens of Malaysians, the government has increased subsidy of sugar. Referring to the Figure 1.2, the sugar price has increased consistently from January 2008 to December 2014. The price of sugar grew sharply

increased by 14% from RM2.50 to RM2.84 per kilogram in October 2013. A sharp increase in fuel and sugar prices occurred after the government reduced the subsidies for fuel and sugar in September until October 2013 in order to enhance country's revenue (Department of Information Malaysia, 2013). On the other hand, the reduction of sugar subsidy also act as a strategy to reduce the rate of diabetes in Malaysians (Tun Haji Abdul Razak, 2013).

Price of eggs hiked by 17% from September to December, 2014. Besides that, coconut milk price grew steadily from 2008 to 2014. From December 2010 to March 2011, the coconut milk price grew by 16%. The increased of demand for coconut milk had led to the shortage of supply of coconut milk which prompted the price of coconut milk to rise (Federal Agricultural Marketing Authority, 2011). Furthermore, the price of coconut milk rose by 6% from March 2011 to August 2014. The price remained stable at RM9.17 in the end of December 2014. Malaysia is a multi-racial country consisting of Malays, Chinese, Indians and numerous indigenous people. Hence, there are several types of festival celebrations in Malaysia such as Hari Raya Aidilfitri, Chinese New Year, and Deepavali. Coconut milk is widely used in dishes prepared during the festive seasons. Thus, the price of coconut milk rose due to the increasing demand during peak festive seasons such as Ramadan.

1.2 The Research Problem

Various economic problems such as higher cost of living might emerge if there is no price control on oil. A rising oil price can lead to an increase in production costs, thus suppliers should adjust the price of goods so that they can maintain their profits. As a result, the cost of increasing oil falls on consumers. Governments should play an important role in ensuring that the high cost of living problem will not be rampant. Higher food prices can result in increasing burden of households as their spending needs to be increased in order to purchase foods especially for those households with low income (Alem and Soderbom, 2011). It was insurmountably difficult to deal with the problems. Countries with higher oil price might face inflation and it will have deleterious effects on the economy.

Since many issues arise due to the increase in oil price, some countries such as Malaysia subsidized oil. Nevertheless, in order to ensure its financial stability and improve its economic efficiency, the Malaysian government gradually removed subsidies from this commodity (International Monetary Fund, 2015). The reduction in the subsidy on oil triggered indignation among oil consumers (Central Bank of Malaysia, 2014b). Most people incurred the cost of increasing oil price. The rising prices for RON95, RON97 and diesel in Malaysia caused many people including economists to cast aspersions on the government.

In July, 2010, Malaysian government was to eliminate RON97 subsidies, whereas in December, 2014 was to remove RON95 and diesel subsidies. The subsidy reform program caused the price of oil to increase to higher than normal. For example, the price of RON97 hiked by 2.4% after removed subsidy from RON97 in July, 2010. Furthermore,

the price of diesel hiked by 1.7% after the removal of subsidy from diesel in December, 2014.

The production of food is dependent on transportations which consumes oil. The contemporary methods in the agriculture sectors requires oil products to run machineries and to transport inputs to farms, and deliver finished products to consumers. Oil price are the main factors in determining the production costs of agricultural commodities and food. Besides, a higher oil price can hike up the cost of raw materials purchased from the manufacturers. It is clear that the relationship between oil price and cost of production is strongly inextricable, and thus affects the price of selected intermediate food products.

Food prices would inevitably soar as they are inextricably associated with oil products. Oil price increase can contribute to an increase in the price of food. Sugar, egg and coconut milk are an essential ingredients in preparing dishes in Malaysia. Most food products such as sugar, egg, and coconut milk will be affected by the increase in oil price in Malaysia. After September, 2013, the increase of 20 cents per litre for RON95 and diesel had undesirable effects on the price of several goods in Malaysia. This included the price of selected intermediate food products. The price of sugar for one kilogram increased by a whopping 14%. Whereas, the price of an egg rose by a whopping 3% (Ministry of Domestic Trade, Co-operatives and Consumerism, 2016). The increase in intermediate food products prices can contribute to the increase in the price of finished food products.

Most previous studies were only concerned about the effects of oil price on food price (Dillon and Barrett, 2015; Ibrahim, 2015; Balcilar et al., 2014). However, the effects of oil price on the selected intermediate food products particularly sugar, egg and coconut milk prices should also be addressed. An increase in the price of these selected

intermediate food products can result in higher food prices, namely bread, noodles, *roti canai*, *roti jala* and *kuih*; the staple breakfast for most Malaysians. Besides, intermediate food products contributed to good tastes, colour and baking essential of finished foods. Price of intermediate food products is important and it will bring impact on poverty level in regional level. According to a report by Institute for Public Health (2014), sugar (55.9%) and eggs (70.6%) were recorded most frequently consumed food items among Malaysian adults daily and weekly respectively.

However, there are slight differences compared to previous studies that explore the relationship between the effects of oil price and the prices of selected intermediate food products. Undeniably, the intermediate food products such as sugar, eggs and coconut milk are the main input in food production in Malaysia that contribute significantly to the development of the Malaysian economy.

A fluctuation in oil price can indirectly affect the price of these selected intermediate food products. This study focuses on three intermediate food products which are sugar, egg and coconut milk as these three products exhibit a fluctuation in price while the others such as salt and wheat flour do not. Salt and wheat flour are giffen good. Apart from that, this study also focuses on disaggregate oil price (RON95, RON97 and diesel) instead of aggregate oil price.

1.3 Research Questions

There are three research questions in this study. These questions are related to the effects of the oil price on the price of selected intermediate food products in Malaysia.

The specific research questions of this study are:

1. Is there any short-run relationship between oil price and the price of selected intermediate food products?
2. Is there any long-run relationship between oil price and the price of selected intermediate food products?
3. What is the speed of adjustment of the oil price that affects the price of selected intermediate food products?

1.4 Objectives of the Study

In the study of the effects of oil price (RON95, RON97 and diesel) on the price of selected intermediate food products (sugar, eggs, and coconut milk) in Malaysia, there are several specific objectives to be achieved. These objectives are:

1. To examine the short-run relationship between oil (RON95, RON97 and diesel) prices on the price of selected intermediate food products (sugar, egg, and coconut milk).
2. To investigate the long-run relationship between oil (RON95, RON97 and diesel) prices on the price of selected intermediate food products (sugar, egg, and coconut milk).