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Article

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International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Hussain, Nor Ermawati/Mohd Shahidan Shaari et. al. (2018). Effects of retailing selling prices of petrol and diesel on food prices. In: International Journal of Energy Economics and Policy 8 (4), S. 28 - 32.

IJEEP
INTERNATIONAL JOURNAL OF ENERGY ECONOMICS AND POLICY
EJ EconJournals
ISSN: 2146-4553

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2018, 8(4), 28-32.

EconJournals

Effects of Retailing Selling Prices of Petrol and Diesel on Food Prices

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ABSTRACT

Oil is the main commodity for all countries in the world. Hence, the fluctuation in the price of the commodity has alarmed policy makers as it can cause severe problems such as food price inflation. The effects of oil prices on food prices have remained a topic of debate. Therefore this study aims to shed some light on the effects of oil prices (RON95, RON97, diesel) on food prices in Malaysia. The autoregressive distributed lag approach was employed and the results show that the price of petrol does not have any effect on food prices. The price of diesel was found to be detrimental to the economy as it can trigger inflation in the long run. However in the short run, the prices of petrol and diesel do not inflict any food price inflation in Malaysia. Therefore, the Malaysian government should control the price of diesel to avert any food price inflation in the long run.

Keywords: RON95, RON97, Diesel, Food Prices
JEL Classifications: Q18, Q3, Q31

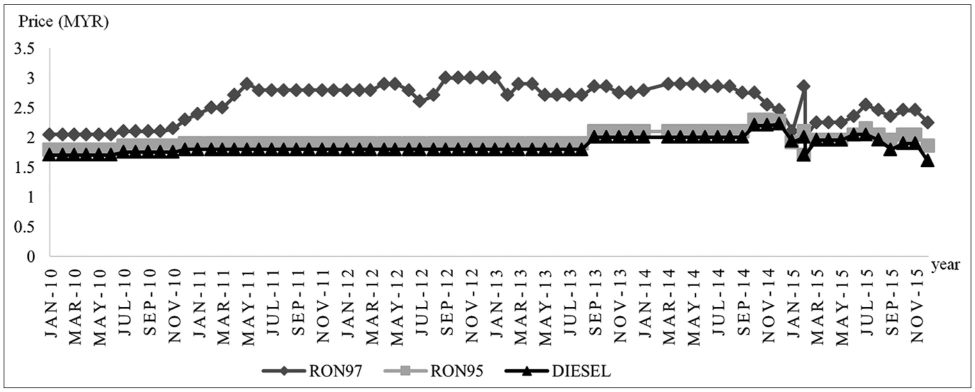
1. INTRODUCTION

The fluctuation of oil prices in the world has merited serious attention from policy makers. This fluctuation appears to threaten the economy in all over the world. Oil is perceived to be one of the main commodities used in generating economic activities. Therefore, any increase in the price can cause an alarming economic condition. The exorbitant increase in the price oil may drag the economy into recession (Tverberg, 2013). Ftiti et al., 2016 stated that a higher price of oil can affect economic growth. Cunningham (2016) argued that a higher oil price can benefit oil exporting countries as it can cause their revenue to escalate.

Several studies stated that an increase in the price of oil does not only affect economic growth but also affects inflation (Neely, 2015; Ali et al., 2012; Shaari, et al., 2012; LeBlanc and Chin, 2004). A higher price of oil can lead to inevitability of higher prices of goods, including that of agricultural products. Oil is not the main input in the industrial sector only but also in the agricultural sector. The sector requires oil to operate machinery and to transport agricultural products, namely food, to consumers. Therefore, oil price increases can affect food prices. Alom et al. (2011), Jebabli et al. (2014), Aye, (2015) believed that food prices will be influenced by oil prices. All of these studies investigated the effects of oil price using data on the crude oil price as the proxy for the price of oil. Although there are a large number of previous studies that investigated the effects of oil prices on food prices, the effects of disaggregate oil prices such as RON95, RON97 and diesel on food prices have yet to be explored. Therefore this study aims to examine the effects of those prices on food prices in Malaysia. A change in these retailing selling prices of petrol and diesel does not reflect the change in the crude oil price.

Malaysia is one of the countries that imports food, and presently, Malaysia has moved towards the development of industrial crops such as palm oil, rubber, cocoa (Arshad and Shamsudin, 2006). Nevertheless, the increase in the price of crops recently has served as a great challenge to the country. This increase was due to the increase in the price of oil (Alom et al., 2011). The change in crude oil prices appears to be unpredictable, just like the price of petrol and diesel in Malaysia. After the subsidiary removal from oil, it fuelled a robust argument over the increase in the price. Figure 1

Figure 1: Oil price for RON97, RON95 and diesel



Source: Ministry of Domestic Trade, Co-operatives and Consumerism, 2016

shows the prices of RON95, RON97 and diesel in Malaysia from January 2010 to December 2015. Based on the Figure 1, it can be seen that the price of petrol and diesel in Malaysia exhibited fluctuations over the period. The lowest price of RON97 was 2.00 MYR (February 2015) and the highest price of RON97 was 2.90 MYR. For RON95, the lowest price over the period was 1.80 MYR and the highest price of RON95 was 2.30 MYR (October 2014 and November 2014, respectively). While the lowest diesel price was 1.60 MYR (December 2015) and the highest diesel price was 2.23 MYR (December 2014).

2. LITERATURE REVIEW

To shed some light on the effects of oil prices on food prices, numerous previous studies have been reviewed and divided into two perspectives. One is on the food prices and second is on the specific food prices such as maize, soybean, and corn. A large number of previous studies explored the effects of world oil prices on food prices in various countries and most of them found consistent findings (Alom et al., 2011; Khan and Ahmed, 2013; Jebabli et al., 2014; Aye, 2015). Alom et al. (2011) attempted to examine the effects of oil price on food prices in several countries such as Australia, New Zealand, Hong Kong, and Thailand. The VAR approach was employed to analyse the data from 1995 to 2010. In addition, this study divided the data into two periods: 1995–2001 and 2002–2010. The results showed that there is an effect of the world price on food prices in selected countries, however the magnitude of the effects for each country is different from each other. The distinguished magnitude is also dependent on the time horizons.

Khan and Ahmed (2013) investigated the connection between global food prices and oil prices from January 1990 to July 2011 in Pakistan. The study also incorporated several macroeconomic variables such as real income, inflation rate, exchange rate interest rate, etc., as their independent variables in their model. The structural vector autoregressive (VAR) approach was employed and the results showed that there is an undesirable effect of oil prices on food prices in Pakistan. Jebabli et al. (2014) investigated the effects of the world crude oil prices on food returns in the United States. The novelty of this study is that it included the effects of stock market price on food prices. The same method which is VAR, was employed to analyse the data from 1980 to 2012. The results consistently showed that crude oil prices can affect food returns albeit a little. Aye (2015) was also interested in investigating the effects of oil prices on food prices. The VAR approach was also employed to analyse the annual data from 2002 to 2014 collected from South Africa. The results showed that there is a significant effect of oil price changes on food prices in South Africa.

Several studies investigated the effects of oil prices on specific food prices, for example.

Ghaith and Awad (2011) investigated the effects of oil prices on food commodity prices such as maize, wheat, soybean and barley in Thailand, USA, Malaysia, Canada, U.K, Dubai and West Texas, from 1980 to 2009. The study employed the Johansen cointegration and Granger causality and the results showed that there is an effect of oil price on food commodities prices. Fernandez (2015) examined the effects on the prices of maize, soybean and sugar in the United States. The VAR approach was applied to analyse the monthly data from 1982 to 2012. The results showed that there is a relationship between oil price and soybean and maize prices. This suggests that an increase in oil price can cause the prices of soybean and maize to increase simultaneously. On the contrary, the oil price does not have any effect on sugar prices. Regardless of the method applied, Pei et al. (2017) supported that oil price can leave an effect on sugar price. The study investigated the effects of oil prices on sugar prices in Malaysia by using the vector error correction model (ECM) approach. Their findings showed that oil price can affect sugar price.

3. METHODOLOGY

The main focus of this study is the price of petrol (RON97 and RON95), diesel, food price and money supply in Malaysia. This study used secondary data in the form of monthly time series from January 2010 to November 2015. While the method used is the autoregressive distributed lag (ARDL). The main equation for this study is:

$$\ln FP_t=\beta_0+\beta_1 \ln R97_t+\beta_2 \ln R95_t+\beta_3 \ln D_t+\beta_4 \ln M3_t+\varepsilon_t \quad (1)$$

Whereas FP is food price, R97 is RON97 price, R95 is RON95 price, D is diesel price, M3 is money supply, t is year and y used seconThe unit root tests are conducted to see the stationary of dependent and independent variables at level and first differentiation. All the variables will be tested for stationary before moving to the next step. Using the augmented Dickey-Fuller 1981 test, if there is no unit root, then H1 is accepted and H0 should be rejected and vice versa. After that, the ARDL model introduced by Pesaran et al. (2001), was employed to see the relationship between short-term and long-term between the dependent variable and independent variables. So based on Equation (1), the model for this ARDL is:

$$\ln FP_t=\beta_0+\beta_1\ln R97_t+\beta_2\ln R97_{t-1}+\beta_3\ln R95_t+\beta_4\ln R95_{t-1}+\beta_5\ln D_t+\beta_6\ln D_{t-1}+\beta_7\ln M3_t+\beta_8\ln M3_{t-1}+\delta_1\ln FP_{t-1}+\varepsilon_t \quad (2)$$

When the time lag is 1, then

$$\ln FP_{t-1}=\beta_0+\beta_1\ln R97_{t-1}+\beta_2\ln R97_{t-2}+\beta_3\ln R95_{t-1}+\beta_4\ln R95_{t-2}+\beta_5\ln D_{t-1}+\beta_6\ln D_{t-2}+\beta_7\ln M3_{t-1}+\beta_8\ln M3_{t-2}+\delta_1\ln FP_{t-2}+\varepsilon_{t-1} \quad (3)$$

Substitute FP_{t-1} (Equation 3) into Equation (2):

$$\ln FP_t=\beta_0+\beta_1\ln R97_t+\beta_2\ln R97_{t-1}+\beta_3\ln R95_t+\beta_4\ln R95_{t-1}+\beta_5\ln D_t+\beta_6\ln D_{t-1}+\beta_7 M3_t+\beta_8 M3_{-1}+\delta_1[\beta_0+\beta_1\ln R97_{t-1}+\beta_2\ln R97_{t-2}+\beta_3\ln R95_{t-1}+\beta_4\ln R95_{t-2}+\beta_5\ln D_{t-1}+\beta_6\ln D_{t-2}+\beta_7\ln M3_{t-1}+\beta_8\ln M3_{t-2}+\ln FP_{t-2}+\mu_{t-1}+\mu_t$$

$$\ln FP_t=\beta_0+\beta_1\ln R97_t+\beta_2\ln R97_{t-1}+\beta_3\ln R95_t+\beta_4\ln R95_{t-1}+\beta_5\ln D_t+\beta_6\ln D_{t-1}+\beta_7\ln M3_t+\beta_8\ln M3_{t-1}+\delta_1\beta_0+\delta_1\beta_1\ln R97_{t-1}+\delta_1\beta_2\ln R97_{t-2}+\delta_1\beta_3\ln R95_{t-1}+\delta_1\beta_4\ln R95_{t-2}+\delta_1\beta_5\ln D_{t-1}+\delta_1\beta_6\ln D_{t-2}+\delta_1\beta_7\ln M3_{t-1}+\delta_1\beta_8\ln M3_{t-2}+\delta 1\ln FP_{t-2}+\delta_1\mu_{t-1}+\mu_t \quad (4)$$

Suppose that $|\beta_2|<1$ is replaced in Equation 4 and then Equation (5) is obtained as follows:

$$\ln FP_t=\gamma+\beta_1\ln R97_t+\beta_3\ln R95_t+\beta_5\ln D_t+\beta_7\ln M3_t+\sum_{i=1}^{\infty}\delta_1^{i-1}(\beta_2-\delta_1\beta_1)\ln R97_{t-i}+\sum_{i=1}^{\infty}\delta_1^{i-1}(\beta_4-\delta_1\beta_3)\ln R95_{t-i}+\sum_{i=1}^{\infty}\delta_1^{i-1}(\beta_6-\delta_1\beta_5)\ln D_{t-i}+\sum_{i=1}^{\infty}\delta_1^{i-1}(\beta_8-\delta_1\beta_7)\ln M3_{t-i}+\varepsilon_t \quad (5)$$

Whereas $\gamma=\beta_0(1+\delta_2+\delta_1{}^2+\delta_2{}^2+\ldots\infty)=\beta_0/(1-\delta_1)$ and $\varepsilon_t=\mu_t+\delta_1\mu_{t-1}+\delta_1{}^2\mu_{t-2})+\ldots\infty$, while the differentiation model as follows:

$$\Delta\ln FP_t=\alpha+\beta_1\Delta\ln R97_t+\beta_2\Delta\ln R95_t+\beta_3\Delta\ln D_t+\beta 4\Delta\ln M3_t+\mu_t \quad (6)$$

Boundary tests are conducted to see the difference between F-statistic and critical values. If the F-statistic value is less than the critical value, then H0 will be accepted at a certain level, and *vice versa*. Next, the Wald test was conducted aims to identify long-term relationship between the variables (Abdullah and Habibullah, 2008). The relationship between the dependent variable and the independent variable is as follows:

$$\ln FP_t=\beta_0+\beta_1\ln FP_{t-1}+\beta_2\ln R97_{t-1}+\beta_3\ln R95_{t-1}+\beta_4\ln D_{t-1}+\beta_5\ln M3_{t-1}+\beta_{9,i}\sum_{i=1}^{p}\Delta\ln FP_{t-i}+\beta_{10,i}\sum_{i=1}^{q1}\Delta\ln R97_{t-i}+\beta_{11,i}\sum_{i=1}^{q2}\Delta\ln R95_{t-i}+\beta_{12,i}\sum_{i=1}^{q3}\Delta\ln D_{t-i}+\beta_{13,i}\sum_{i=1}^{q4}\Delta\ln M3_{t-i}+\beta U_t \quad (7)$$

Where Δ is the first differentiation stage and equation (4.17) can also be considered as the ARDL model where this model is known as a model (p, q1, q2, q3, q4). The Akaike information criterion is used to select the lag to continue the study. The ECM test is to detect the existence of a long-term ECM as well as to see the short-term relationship that exists between independent variables and dependent variables. The ECM is as follows:

$$\ln FP_t=\mu+\sum_{i=1}^{p}\varnothing_i\Delta\ln FP_{t-i}+\sum_{j=1}^{q=1}\varphi_j\Delta\ln R97_{t-j}+\sum_{m=1}^{q=2}\gamma_m\Delta\ln R95_{t-m}+\sum_{p=1}^{q=3}\eta_p\Delta\ln D_{t-p}+\sum_{r=1}^{q=4}\mu_r\Delta\ln M3_{t-r}+vecm_{t-1}+\varepsilon_t \quad (8)$$

Where ϕ, φ, γ, η, and μ is a dynamic coefficient for the short term while v is a speed adjustment for long-term error correction. Finally, the diagnostic and cumulative sum of recursive residual (CUSUM) tests and cumulative sum of square of recursive residuals (CUSUMSQ) will be executed.

4. RESULTS

4.1. Unit Root Test Results

The unit root test is conducted to find out the stationarity of all the data selected in this study. The results is recorded in Table 1. Based on the Table 1, it can be learnt that all the variables are not significant at level for both intercept with and without trends, and thus they are not stationary except for RON95. At first difference, the data are significant, and thus they are stationary for both intercept and intercept with trend.

4.2. ARDL

The Bound test must be conducted prior to the ARDL test. This test is compulsorily conducted to see the presence of cointegration. The results for the Bound test is recorded in Table 2. Based on the Table 2, the results show that the value of test statistic is higher than upper Bound at a significant level of 2.5%. Therefore, there

Table 1: Unit root test results

Variables	Intercept		Intercept+Trend	
	Level	First different	Level	First different
Diesel	2.458855	7.2768*	2.405163	7.329222*
RON97	1.833817	7.256798*	1.488713	7.490991*
RON95	2.819971***	7.733150*	3.970212**	7.730698*
M3	0.936171	9.718928*	1.410553	9.731209*
FP	0.319862	8.200879*	3.057938	8.160994*

*,** and ***indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% significance level respectively

is an existence of a long-run relationship between the independent variables and dependent variable. Then, we can proceed with the ARDL approach to see which dependent variable can affect food prices in the long run.

Table 3 shows the results of long-run relationship using ARDL approach. Based on the Table 3, it can be seen that money supply is significantly connected with food prices. It means that an increase in money supply can results in higher food prices in the long run. Apart from that, diesel is also significantly associated with food prices with the coefficient value of 4.716. Therefore a 1% increase in diesel can cause food prices to increase by 4.7% in the long run. Other than that, RON95 and RON97 does not have any significant on food prices.

Table 4 shows the results for the short-run relationship using the ARDL Approach. The results show that money supply is related to food prices as it is significant at 5%. It suggests that as a higher money supply, food prices will be on the rise. Besides, the prices of RON95, RON97, and diesel are not significantly related to food prices. This means that an increase in the disaggregate oil prices does not have any effect on food prices in the short run. The value of ECT is negative and significant, thus it confirms the existence of cointegrated relationship. Its coefficient is −0.915 and this means that the deviations from the long-run equilibrium among the variables are corrected by 9% within a month.

Table 2: Bounds test

Null hypothesis		
Test statistic	**Value**	**K**
F statistic	4.48	4
Critical value Bounds		
Significance	**|0 Bound**	**|1 Bound**
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Table 3: Long-run relationship

Variable	Coefficient	Std. Error	t-statistic	P
RON97	15.690861	18.513147	0.847552	0.4000
M3	0.000035	0.000005	6.605006	0.0000*
RON95	1.570265	18.255216	0.086017	0.9317
Diesel	4.715794	2.287206	2.061814	0.0435**
C	7.739047	10.902500	4.378725	0.0000*

* and **indicate significant at 1% and 5% significant level

Table 4: Short-run relationship

Variable	Coefficient	Std. error	T-statistic	P
RON97	−1.358346	1.441726	−0.942167	0.3498
M3	0.000003	0.000001	2.127322	0.0374**
RON95	0.123056	1.445181	0.085149	0.9324
Diesel	−0.162318	0.516540	−0.314241	0.7544
ECT	−0.915091	0.437505	−2.091612	0.0406**

* and **indicate significant at 1% and 5% significant level. ECT: Error correction term

Table 5: Diagnostic tests results

Test statistic	F-statistic (P)
Breusch-Godfrey Serial Correlation LM Test	0.489082 (0.949674)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.602938 (0.7718)

To see the goodness of our model, several diagnostic tests are conducted. The results are recorded in Table 5. Based on the Table 5, it can be seen that the result for Breusch-Godfrey Serial Correlation LM test indicates that it is significant. Therefore, there is no autocorrelation in our model. Besides, the Heteroskedasticity test based on Breusch-Pagan-Godfrey is also performed and the result show that it is also not significant. It indicates that there is no heterokedasticity in our model. Based on the two tests, it can be concluded that the model is good to explain the results.

Figures 2 and 3 shows the CUSUM and the CUSUMSQ, respectively. Based on the Figures 2 and 3, it can be seen that the plots within the Boundaries suggest that the model is good.

5. CONCLUSION

This study aims to investigate the effects of petrol and diesel prices on food prices in Malaysia, using monthly data from 2010 to 2015. There are several tests conducted in this study. First is the unit root test, and the results show that all the variables are not stationary at level for both intercept and intercept with trends, except for RON95. When the test is conducted at first difference, the data become stationary. Second is the Bound test, and the results show that there is a cointegrated relationship, implying an existence of a long-run relationship between disaggregate oil prices and food prices. Then, the long-run test using ARDL approach is conducted and the results show that an increase in the prices of diesel and money supply can trigger food price inflation in the long run. Besides, a rise in the prices of RON95 and RON97 do not have any effect on food prices in the long run. The short-run test

Figure 2: Cumulative sum of recursive residual

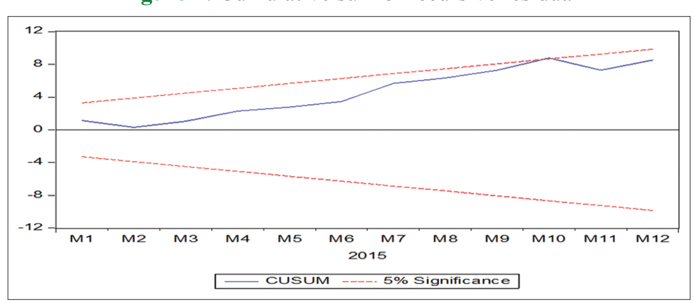
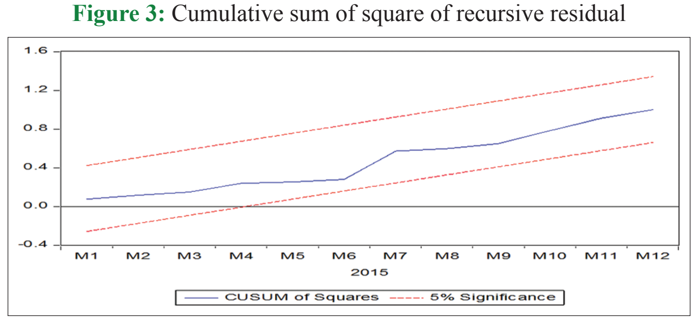


Figure 3: Cumulative sum of square of recursive residual



using ARDL approach is also conducted and the results indicate that higher prices of disaggregate oil do not lead to food price inflation in the short run.

These findings can shed some light on the issue of the effects of oil prices on food prices in Malaysia. Policy makers can formulate the right policies to ensure that food price inflation will not transpire. The Malaysian government does not need to control the prices of RON95 and RON97 as these prices will not inflict any inflation on the economy. The price of diesel merits the government's control in order to cushion the blow of food price inflation in Malaysia.

REFERENCES

Abdullah, H., Habibullah, M.S. (2008), Ko-Integrasi Pertumbuhan Ekonomi dan Dasar Fiskal di Malaysia dan Indonesria: Pendekatan Ujian Sempadan Autoregresi Lat Tertabur (ARDL). Prosiding PERKEM III, 2008.

Ali, S.A., Ramzam, M., Razi, M., Bhatti, A.G. (2012), The impact of oil prices on food inflation in Pakistan. Interdisciplinary Journal of Contemporary Research in Business, 3(11), 123-140.

Alom, F., Ward, B.D., Hu, B. (2011), Spillover Effects of World Oil Prices on Food Prices: Evidence for Asia and Pacific Countries. Proceedings of the 52nd Annual Conference New Zealand Association of Economists. p29.

Arshad, F.M., Shamsudin, M.N. (2006), Implication of Oil Price Increase on the Malaysian Food System. Country Report.

Aye, G.C. (2015), The effect of oil price uncertainty on food price in South Africa. International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 9(5), 1380-1385.

Cunningham, N. (2106), The Economy Needs Higher Oil Prices-Goldman Sachs. Oil and Energy News. Available from: http://www.Oilprice.com.

Fernandez, A., Gonzalez, A., Rodriguez, D. (2015), Sharing a ride on the commodities roller coaster: Common factors in business cycles of emerging economies. IMF working papers WP/15/280.

Ftiti, Z., Guesmi, K., Teulon, F., Chouachi, S. (2016), Relationship between crude oil prices and economic growth in selected OPEC countries. The Journal of Applied Business Research, 32(1), 11-22.

Ghaith, Z., Awad, I. M. (2011), Examining the long term relationship between crude oil and food commodity prices: Co-Integration and causality. International Journal of Economics and Management Sciences, 1(5), 62-72.

Jebabli, I., Arouri, M., Teulon, F. (2014), On the Effects of World Stock Market and Oil Price Shocks on Food Prices: An Empirical Investigation Based on TVP-VAR Models with Stochastic Volatility. Working Paper Series No. 2014-209.

Khan, M.A., Ahmed, A. (2013), Macroeconomics effects of global food and oil price shocks to the Pakistan economy: A structural vector autoregressive (SVAR) analysis. The Pakistan Development Review, 50(4), 1-26.

LeBlanc, M., Chin, M.D. (2004), Do high oil prices presage inflation? The evidence from G-5 countries. Economic Research Service, 4, 1-25.

Ministry of Domestic Trade, Co-operatives and Consumerism. (2016), Portal. Available from: http://www.kpdnkk.gov.my.

Neely, C.J. (2015), How Much Do Oil Prices Affect Inflation?. Economic Synopses 10.

Pei, T.L., Shaari, M.S., Ahmad, T.S.T., Junoh, M.Z.M. (2017), Do Oil price changes matter to sugar price in Malaysia. International Journal of Applied Business and Economic Research, 15(5), 75-86.

Pesaran, M.H., Shin, Y., Smith, R.J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics, 16, 289-326.

Shaari, M.S., Hussain, N.E., Abdullah, H. (2012), The effects of oil price shocks and exchange rate volatility on inflation: Evidence from Malaysia. International Business Research, 5(9), 106-112.

Tverberg, G. (2013), How High Oil Prices Lead to Recession. Our Finite World. Available from: https://www.ourfiniteworld.com/2013/01/24/how-high-oil-prices-lead-to-recession/.