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Responses of Firms and Households to Government Expenditure in Malaysia: Evidence for the Fuel Subsidy Withdrawal

(Tindak Balas Firma dan Isi Rumah ke atas Perbelanjaan Kerajaan: Bukti Pemansuhan Subsidi Bahan Api)

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ABSTRACT

This paper estimated the reactions of firms and households to the change of government expenditure from fuel subsidies to two alternative fiscal regimes, including the expansion of government expenditure on agricultural investment and direct cash transfers. Outcomes brought by the government expenditure changes to outputs of production for firms, together with the household consumption expenditure, were taken into account. This study was carried out by using a Löfgren-based computable general equilibrium (CGE) model. The findings showed that complete fuel withdrawal was found to have adverse impacts on firms and households. The withdrawal of subsidy brought a lackluster performance in domestic production. Firms that needed large amounts of fuel products to produce outputs were greatly affected. Besides, households of all segments faced large consumption loss. Nevertheless, the resulting adverse impacts on firms and households could be minimized with the implementation of mitigation measures along with the subsidy reform. The additional fund transfer to the agricultural sector had the merits of improving domestic production and minimizing the consumption loss of the population. In contrast, the direct cash transfer benefited the target population -- the medium- and low-income segments in the urban and rural areas.

Keywords: Fuel subsidy withdrawal (removal); computable general equilibrium (CGE) model; government expenditures on agricultural investment; government expenditures on direct cash transfers

ABSTRAK

Kertas ini menaksir tindak balas firma dan isi rumah ke atas perubahan perbelanjaan kerajaan dari subsidi bahan api kepada dua alternatif fiskal penempatan, termasuk penambahan perbelanjaan kerajaan ke atas sektor pertanian dan bantuan tunai secara langsung. Kesan yang dibawa oleh perubahan perbelanjaan kerajaan terhadap pengeluaran firma, bersamaan dengan perubahan perbelanjaan isi rumah telah diambil kira. Kajian ini dijalankan dengan menggunakan kaedah pemodelan perhitungan keseimbangan umum hasilan Löfgren et al. (2002). Hasil dapatan kajian menunjukkan bahawa pemansuhan keseluruhan subsidi bahan api didapati mempunyai kesan buruk ke atas firma dan isi rumah. Pemansuhan subsidi membawa prestasi yang suram kepada pengeluaran domestik. Firma yang memerlukan produk bahan api dalam jumlah skala besar untuk mengeluarkan output adalah sangat terkesan. Di samping itu, isi rumah bagi semua kumpulan menghadapi masalah hilang daya kepenggunaan. Namum begitu, impak yang buruk bagi firma dan isi rumah boleh diminimumkan dengan pelaksanaan pengukuran pengurangan bersama dengan pembaharuan subsidi. Penambahan pindahan dana ke sektor pertanian mempunyai merit dalam menyokong sektor pengeluaran domestik dan meminimumkan hilang daya penggunaan populasi. Sebaliknya, bantuan tunai secara langsung lebih memberikan faedah kepada populasi sasaran, iaitu golongan berpendapatan sederhana dan rendah di kawasan bandar dan luar bandar.

Kata kunci: Pemansuhan (penghapusan) subsidi bahan api; pemodelan perhitungan keseimbangan umum (CGE); perbelanjaan kerajaan ke atas sektor pertanian; perbelanjaan kerajaan ke atas bantuan wang secara langsung

INTRODUCTION

Business cycle fluctuation in the market economy encounters few unfavorable environments such as monopoly power and externalities interfering with the problems of equity and fairness. Thus, the presence of activist stabilization and economic intervention policies are important to optimize economic performance. A proper government intervention in the market induces an efficiency of resource reallocation and optimizes the overall well-being of society, accelerating economic growth (Fan & Rao 2003; Gregoriou & Ghosh 2009; Smith 2012; Mohanty 2012; Al-Fawwaz 2016). It is observable that the public sector expenditure in

agriculture, education, health and housing has not only positive effects in the long-run economic growth, but also the welfare level gets improved (Fan & Rao 2003; Gregoriou & Ghosh 2009; Harun et al. 2012; Gemmell et al. 2015). Recently, the International Monetary Fund's Managing Director, Christine Lagarde, urged for much government efforts to build more dynamic, resilient and inclusive economies (IMF 2019).

Many governments in both the developing and emerging countries incorporated fuel subsidy into the market economy to support domestic economic growth and enhance residents' standard of living, and the Malaysian government was no exception. Such government expenditure was desirable to justify the crucial role of fuel in poverty reduction and economic development (IEA et al. 2010). Keeping fuel prices low gave the firms an advantage to compete through the use of fuel as their combustible source and other inputs containing fuel inputs in the circular flow of industrial production. Also, households were able to access low fuel prices and consume other low-priced goods and services due to the low cost transmission (the result of comprising the low cost of fuel input in the production). In particular, the lower-income population (or the poor) would benefit from the more affordable cost of living (Ellis 2010; Chandra et al. 2012; El-Katiri & Fattouch 2015). Increasing purchasing power pushes up the production level and brings down the levels of unemployment and inflation.

Although subsidized fuel prices through decades have served Malaysia a good economic foundation to rapid economic expansion, this eventually carried an injudicious government expenditure on fuel in bulk. More than half of the government subsidies went to the use of fuel in the last three phases of the fuel subsidy era (Table 1), accounting for 56.0 percent for the period 2000 to 2004, 55.6 percent for the period 2005 to 2009, and 59.1 percent for the period 2010 to 2013. IEA (2015) claimed that such high fuel subsidization was actually the consequence of economic growth, urbanization and low cost of energy supply domestically. This situation became worse when there was a sharp increase in the world crude oil prices. For example, the statistical record (Table 1) shows a remarkable increase in government expenditure on fuel of nearly RM10 billion, resulting from the drastic growth of world crude oil prices in mid-2008. It was then pushed up to the extremely high level of about RM21.7 billion before the government stopped subsidizing fuel in December 2014.

TABLE 1. Government spending on fuel and percentage of total government subsidies in Malaysia, 1990-2013

Year	RM (billion)	%
1990-1994	0.10	16.3
1995-1999	0.30	31.6
2000-2004	2.41	56.0
2005-2009	9.95	55.6
2010-2013	21.7	59.1

Source: Malaysian Economic Statistics- Time Series by Department of Statistics Malaysia and various issues of Economic Reports from the Ministry of Finance, Malaysia.

Note: Fuel covers petrol, diesel and liquefied petroleum gas.

In fact, the fuel subsidy concealed the considerable high cost of supporting economic growth and enhancing society's well-being, bringing out issues of inefficiency and inequity. Low fuel prices discouraged private investment in energy-efficient solutions (IEA 2013, 2015; Laderchi 2014) and even distorted the production patterns of industries which increased the risk of inefficient resource allocation (Kosmo 1987; Lawal 2014; Barany & Grigonyte 2015; Sovacool 2017). In addition, fuel subsidies failed to benefit the needy while the rich households, who spent large proportions of income on fuel, benefitted the most (Arze del Granado et al. 2010; Anand et al. 2013; Umar & Umar 2013; Hakim et al. 2014; Feng et al. 2018). All these circumstances contributed to wasteful fuel consumption and dampened the large financial burdens of the government, imposing the need of reevaluating the existing fuel subsidy mechanism. The government's intention to diminish the outstanding debt burdens, in which bulk subsidies for fuel had to be removed, came up with the monthly fuel price adjustment for the widely used fuel RON95 and diesel based on the average world oil prices on 1 December 2014[1]. The fuel ceiling price mechanism was then set on a weekly basis instead of monthly at the end of March 2017. The weekly prices for fuel RON95 and diesel were maintained for some time at the affordable level of RM 2.20 and RM2.18 per liter respectively.

The government's spending switch from fuel subsidies created a window of opportunities to the sustainable development goals in the long-term, promoting the balance between economic growths, social well-being and protecting the environment (Merrill & Chung 2014). Nonetheless, it induced an unanticipated high inflationary effect in the near future that might lead to excessive burdens in the decision-making processes. Firms and individuals were under pressure to allocate resources of production and consumption. Most of the time, firms reduced the outputs of production and increased the output prices to reduce the possible profit loss, affecting the existing consumption level of the households. In other words, the fuel price hike, following the imposition of the fuel subsidy withdrawal, would affect the household not only through the direct purchase of fuel products such as petrol and diesel, but also through indirect effects through the consumption of other goods and services, that is the indirect embodiment of the uses of fuel products in production (Arze del Granado et al. 2010; Coady et al. 2015; Harun et al. 2018). Thus, the impacts on the severity of hardship faced by the poor and the low-income population who spend a large portion

of their incomes on consumption would then become much more pronounced, causing them to be least able to cope further. These possible undesirable impacts of increasing fuel prices addressed a need for the wise plan of mitigating measures to deal with it using extra subsidy savings from the reform (Merrill & Chung 2014).

All the extra revenues gained should be reallocated into efficient social interventions alongside the fuel subsidy withdrawal for protecting the vulnerable groups from fuel price hikes. Several measures and incentives were announced and introduced in the Malaysia Budget 2016, following a series of fuel price adjustment mechanisms, where the government revenues were envisaged to be allocated to rural development, the agricultural industry, education and health sectors, as well as the new 1 Malaysia people's aid scheme (BR1M 2016), replacing the previous expenditure on fuel. Nonetheless, it is crucial to identify the most effective mitigating measure that might have tangible results than just for the sake of inclusion. Thus, this study examined the impacts of reallocating the extra revenues which resulted from the fuel subsidy withdrawal to the agricultural sector and also direct cash assistance where cash was directly given to individual recipients as a one-off aid. The rationale behind the selection of the agricultural sector as the target sector was that the rural poor were mostly involved in agricultural activities (Bekhet 2010; Cervantes-Godoy & Dewbre 2010; Solaymani et al. 2013). Moreover, the identification of the agricultural sector with high inter-industrial linkage effects made it become important in improving the domestic supply chain (Holland et al. 2001; Bekhet 2010; Jaafar et al. 2015). On the other hand, the middle- and the low-income population were the targeted recipients of direct cash assistance in this study. The middle-income group which was neither rich nor poor should not be ignored because of the low-income group to avoid them falling into the poverty bracket with the future rise in the cost of living due to the fuel subsidy reform. Hakim et al. (2014) pointed out that the middle-class households get hurt the most where their real incomes decreased at the range of 10.9 and 11.3 percent with the 50.14 percent rise of the fuel prices, which was higher than that of the lower-and upper-class households.

Growing recognition of the effectiveness of government expenditure to accelerate economic growth and to help the poor revealed a need for research on this subject. To account for these circumstances, the main objective of this study was to estimate both the firms' and households' responses to the fuel subsidy reform by using a computable general equilibrium (CGE) model. To what extent has the volume of the firms' outputs and household consumption expenditure changed under the policy reform was studied. Another objective was to know which subsidy reallocation scheme-- investment in the agricultural sector or cash transfer-- would have the most benefit to the firms and households. These two alternative saving reallocations were taken into account, pairing with the complete fuel subsidy withdrawal. The remaining structure of the study was split into research framework (covering model specifications, data sources used, model closures, and simulation design), results and discussions, and concluding remarks.

LITERATURE REVIEW

Fuel subsidies, in practice, encourage excessive fuel consumption, accelerate the rising government expenditure, discourage the development of alternative fuel substitutes and ruin the quality of the environment, while the provision of the fuel subsidies is aimed to protect the poor. But, since most of the benefits of the fuel subsidies are captured by the higher-income population, fuel subsidies become largely ineffective means of redistributing income. The acknowledgement of the inefficient and ineffective fuel subsidies drew a note on the fuel subsidy withdrawal.

The implication of the fuel subsidy withdrawal would probably obtain significant socioeconomic benefits. By reducing or removing the fuel subsidies, countries that subsidize fuel consumption would enhance domestic energy efficiency, encourage the use of conservation technologies and bring a significant reduction of fiscal deficits. More fiscal space can also be created for better targeting of social assistance and development plans. Nonetheless, the reform should be planned and managed properly. The withdrawal of fuel subsidies poses a challenge to firms and households especially in the transitional period where all investment and consumption decisions are made in the true price signal. A significant number of studies addressed this concern, such as Clements et al. (2007), Hamid & Rashid (2012), Manzoor et al. (2012), Saari et al. (2013), Siddiq et al. (2014), Rentschler et al. (2017), Feng et al. (2018) and Moshiri & Santillan (2018) with a wide exploration of different analytical strategies and divergent time horizons. Attention was drawn to the low level of production of the firms in the face of rising input costs. Firms that consumed large amounts of fuel products in creating goods and services would be greatly affected. Prices of commodity that were produced would then increase to shift the additional fuel costs to the users. The resulting price hike in the produced outputs brought high inflation till the poor and the low-income population were hit the most at the consumer level.

The development of the withdrawal of the fuel subsidy to encounter these challenges, including the supporting policy (the saving reallocation on mitigating measures) becomes essential to protect the affected population from future price increases. Widodo et al. (2012) emphasized that short- and long-run effects could be generated with the appropriate reallocation of extra savings into the strategic plans. They found that the four IDR 1 billion reallocation programs to sectors,

covering agriculture; trade; food and beverage, and tobacco industry; and education and health have positive economic impacts but with relatively smaller than IDR 1 billion fuel subsidy eliminations. Most studies promoted extended government expenditures on direct cash transfers distributed among the needy to maintain their current consumption level as stated by Breisinger et al. (2012), Widodo et al. (2012), Cooke et al. (2015), Sayed et al. (2015), Siddiq et al. (2015) as well as Feng et al. (2018). Nevertheless, according to Rentschler (2016), it was crucial to increase spending in the foundations for future development, as imposing cash transfers were not enough to actively benefit the poor under the subsidy reform. Besides of increasing government expenditures on four alternative sectors that mentioned in Widodo et al. (2012), Akinyemi et al. (2017) encouraged a policy switch from fuel subsidy to extending the government expenditures on infrastructure and technological development while Siddiq et al. (2015) justified the subsidy on Nigerian petroleum product production to replace the heavily use of imported petroleum products from European Union.

A significant number of Malaysian studies which addressed the subsidy changing economic impacts was mostly conducted before the introduction of the fuel subsidy withdrawal in December 2014. Specifically, only Hamid and Rashid (2012), Li et al. (2017) and Loo and Harun (2019) took account of the immediate saving reallocations in the Malaysian case. Hamid and Rashid (2012)[2], with the combination of an input-output model to access the fuel subsidy consumption sector, highlighted that the high direct cost impacts of removing fuel subsidies in a few industrial sectors, particularly petroleum refinery, wholesale and retail trade, and also motor vehicles in the medium term could be coped with further rechanneling of the extra government funds into productive energy sectors (that have high taxation coefficients) by speeding up the investment process. In contrast, Li et al. (2017) included the additional investment in infrastructure and the funds spent on education, health and other public services as well as the direct government transfer to compensate the lowest income group as the compensation option for the most disadvantaged group, while the recent study, Loo & Mukaramah (2019) explored the performance of the domestic sectors by focusing on production level, imported input and marketed output (included domestic sales and export). The inclusion of the mitigating measure in the present study differs from both the studies where the extra revenue collected from the sales tax from the use of petroleum refinery products was set to be allocated to the agricultural sector or direct cash transfer to the medium- and low-income population to cushion the sudden high prices. With the application of the CGE model, this study therefore, provides a comprehensive framework in evaluating the firm and household impacts on the government expenditure change where the direct and indirect effects are also taken into consideration.

RESEARCH METHODOLOGY

THE CGE MODELLING FRAMEWORK

A CGE model was developed, followed primarily the International Food Policy Research (IFPRI) CGE model[3], to estimate the extent of the responses of both firms and households to the policy switch, where the government pulled out the fuel subsidy expenditure and compiled with other further subsidy saving reallocations. The response of firms to the policy switch was estimated from the perspectives of volumes of firm's outputs[4]), whereas, the response of all households was evaluated in relation to consumption expenditure. The fuel subsidy withdrawal was expressed by increasing the sales tax rate in the use of petroleum refinery products to accumulate the same amount of revenue. The extra revenues from this (expenditure) reduction were then placed in other selected regimes, including the expansion of the government expenditure to the agricultural sector or direct cash assistance for the targeted recipients (middle- and low-income population). The results were discussed in the condition of perfect competitiveness, and only relative price and market-clearing condition matter, by comparing to the base calibration year 2010.

Three simulations were conducted as follows: (a) withdrawing government expenditure on fuel subsidies by 100 percent; (b) withdrawing government expenditure from fuel subsidies by 100 percent and then allocating the extra revenues gained to the agricultural sector (injecting extra intermediate inputs into the production) and (c) withdrawing government expenditure from fuel subsidies by 100 percent and then allocating the extra revenues gained to direct targeted transfers. These set-ups were then solved by using the General Algebraic Modeling System (GAMS) software.

Additionally, the mechanism interaction in the economy in the study followed the IFPRI CGE model with minor modifications to reach the objective of the study and reflect the economic context where some core equations were brought in, adjusted and grouped into production and trade block, institution block, price block and system constraint block as follows.

Price block links all endogenous prices to other prices and non-price variables in the model. The *numéraire* in the model is represented by the constant consumer price index (CPI) for domestically marketed outputs in Equation (1). It is clearly defined as a weighted sum of composite commodity prices (PQ_C) in the current period, where the weights are the proportions of each commodity in total demand ($cwts_c$). Equation (2) looks at the gross revenue for each output production unit (PA_a). The gross revenues are calculated by multiplying the prices of produced commodities ($PX_{a,c}$) and yield ($\theta_{a,c}$).Equation (3) illustrates the selling prices of output values for the allocation of foreign (export) and domestic

markets, $PX_c \bullet QX_c$. Thus, it is determined by the total value of domestic sales ($PDom_c \bullet QDom_c$) and exports ($PEx_c \bullet QEx_c$). Equation (4) interprets the sum of domestic spending on a commodity at domestic demand prices ($PQ_c \bullet QQ_c$). This is expressed as the total spending on domestic outputs and imports at the demand prices, $PDom_c$ and $P\mathrm{Im}_c$, but excludes the charge of sales tax for goods and services (tq).

$$\overline{CPI} = \sum_{c \in C} PQ_c \bullet cwts_c \tag{1}$$

$$PA_a = \sum_{c \in C} PX_{a,c} \bullet \theta_{a,c} \qquad a \in A \tag{2}$$

$$PX_c \bullet QX_c = PDom_c \bullet QDom_c + PEx_c \bullet QEx_c \quad c \in CX \tag{3}$$

$$PX_c \bullet (1 - tq_c) \bullet QQ_c = PDom_c \bullet QDom_c + P\mathrm{Im}_c \bullet Q\mathrm{Im}_c \quad c \in (CDom \cup C\mathrm{Im}) \tag{4}$$

Import price in equation (5) was derived by using world import prices (pwm_c), import tariff (tm_c) and exchange rate (EXR). The assumption of constant import price was made since Malaysia is a small country that does not have any influence on world prices. This led the tariff rate and world import prices to be held constant, whereas, both domestic import prices and exchange rate are held to be flexible. Next, export price in equation (6) was derived by using world export prices (pwe_c), export tax (te_c) and exchange rate (EXR).

$$P\mathrm{Im}_C = pwm_c \bullet EXR(1 + tm_c) \qquad c \in C\mathrm{Im} \tag{5}$$

$$PEx_C = (1 + te_c)\, pwe \bullet EXR \qquad c \in CEx \tag{6}$$

Production and trade block deals with a few important production decisions a firm (an activity) makes to maximize profits subject to a set of production technologies. Moreover, the significant feature of separating both the commodities and the activities allows any activity to be able to produce multiple commodities, and any commodity was able to be produced by multiple activities in the CGE model. The Leontief production function was employed, meaning the inputs of value-added and intermediate inputs were used in fixed proportions. Besides, the separate functions, relating to the aggregate value added and intermediate inputs, adopted the CES production function. Equations (7) and (8) express the Leontief functions of demands for disaggregate intermediate inputs and the volume of outputs. The former is the multiplication of fixed input coefficients of demand ($ica_{c,a}$) and the quantity of aggregate intermediate input (QINTA_a). The latter is the product of yields ($\theta_{a,c}$) multiplied by activity levels.

$$QINT_{c,a} = ica_{c,a} \bullet QINTA_a \quad \alpha \in A,\ c \in C \tag{7}$$

$$QX_{a,c} = \theta_{a,c} \bullet QA_a \quad \alpha \in A,\ c \in CX \tag{8}$$

The assumption of imperfect transformability of the domestic output allocation to exports and domestic sales were constrained by the constant elasticity of the transformation (CET) function. Equations (9) and (10) address the allocation of produced outputs (QX_c) to domestic sales and exports. It is identical to the CES function, but does not include the negative elasticity of substitution. Next, both Equations (11) and (12) define the Armington functions for composite supply (QQ_c). This is limited to domestic outputs and imports only. Exponent ρ in both equations is the elasticity of substitution between exports and domestic sales (equation 9 and 10) as well as imports and domestic outputs (equation 11 and 12).

$$QX_C = \alpha_c^t \bullet (\delta_c^t \bullet QEx_c^{\rho_c^t} + (1 - \delta_c^t) \bullet QDom_c^{\rho_c^t})^{\frac{1}{\rho_c^t}} \quad c \in (CDom \cap CEx) \tag{9}$$

$$\frac{QEx_c}{QDom_c} = \left(\frac{PE_c}{PD_c} \bullet \frac{1 - \delta_c^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t - 1}} \qquad c \in (CDom \cap CEx) \tag{10}$$

$$QQ_C = \alpha_c^q \bullet (\delta_c^q \bullet QM_c^{-\rho_c^q} + (1 - \delta_c^q) \bullet QD_c^{-\rho_c^q})^{-\frac{1}{\rho_c^q}} \quad c \in (CDom \cap C\mathrm{Im}) \tag{11}$$

$$\frac{Q\mathrm{Im}_c}{QDom_c} = \left(\frac{PDom_c}{P\mathrm{Im}_c} \bullet \frac{\delta_c^q}{1 - \delta_c^q} \right)^{-\frac{1}{1 - \rho_c^q}} \tag{12}$$

Institution block presents the functions related to all the income and expenditure transactions of inter-institutions. Households, firms and the government shaped the domestic institutions in the model, together with the ROW. To highlight the government's role, the fiscal account was first defined in both Equations (13) and (14). The government accumulated the revenues (Equation 13) from factor incomes (tf_f), direct taxes ($TINS_i$), activity taxes (ta_a), sales taxes (tq_c), export duties (te_c), import tariff (tm_c) and transfers from the ROW. These accumulations were then spent prudently by the government (Equation 14) on consumption, subsidies and transfers to other institutions to reach an optimum use of the government resources.

$$\begin{aligned} YGOV = {} & \sum_{i \in INSDGN} TINS_i \bullet YI_i + \sum_{f \in F} tf_f \bullet YF_f + \\ & \sum_{a \in A} ta_a \bullet PA_a \bullet QA_a + \sum_{c \in C} tq_c\ PQ_c \bullet QQ_c + \\ & \sum_{c \in CE} te_c \bullet pwe_c \bullet QEx_c \bullet EXR + \\ & \sum_{c \in CM} tm_c \bullet pwm_c \bullet Q\mathrm{Im}_c \bullet EXR + \\ & \sum_{f \in F} YIF_{gov,f} + trnsfr_{gov,row} \bullet EXR \end{aligned} \tag{13}$$

$$EGOV = \sum_{c \in C} PQ_c \bullet QGOV_c + \sum_{u \in INSDGN} trnsfr_{i,gov} \bullet CPI \tag{14}$$

Equations (15) and (16) present the total factor incomes for each factor (capital and labor) where factor incomes (*tf*) and transfers (*trnsfr*) from other institutions were the main income sources for both households and firms. The ROW, which is the representation of the foreign sector in the model, defines all trade and transfer payments from or to the ROW in foreign currency. Thereby, the difference between foreign currency spending and receipt defines the current account equilibrium (foreign saving). Specifically, the total household consumption expenditure (*QHOH*) on goods and service is illustrated in Equation (17) that is the remaining incomes after subtracting direct taxes, transfers and savings.

$$YIF_{i,f} = shif_{i,f} \bullet [(1 - tf_f) \bullet YF_f - trnsfr_{row,f} \bullet EXR] \quad i \in INSD;\ f \in F \tag{15}$$

$$YF_f = \sum_{a \in A} WF_f \bullet \overline{WFDIST}_{f,a} \bullet QF_{f,a} \quad f \in F \tag{16}$$

$$QHAH_h = \left(1 - \sum_{i \in INSDGN} shii_{i,h}\right) \bullet (1 - MPSh) \bullet (1 - TINS_h) \bullet YH_h \quad h \in H\text{OH} \tag{17}$$

System constraint block discusses the market equilibriums in the model. Equation (18) assesses the equilibrium in the factor market, balancing the total quantity demanded (QF) and the total quantity supplied (QFS) for each factor (constant). The equilibrium between the quantities supplied and demanded of the composite commodity is presented in Equation (19). Equation (20) displays the current-account equilibrium, balancing the earning and spending of foreign exchange for the country. Since foreign savings (*FSAV*) and trade deficit were assumed to be constant in the market-clearing condition, the current-account equilibrium was decided just by the flexible (real) exchange rate (*EXR*).

$$\sum_{a \in A} QF_{f,a} = \overline{QFS}_f \tag{18}$$

$$QQ_c = \sum_{a \in A} QINT_{c,a} + \sum_{h \in H} QHOH_{c,h} + QGOV_c + QINV_c + qdst_c + QT_c \tag{19}$$

$$\sum_{c \in CM} pwm_c \bullet Q\text{Im}_c + \sum_{f \in F} trnsfr_{row,f} = \sum_{c \in CE} pwe_c \bullet QEx_c + \sum_{i \in INSD} Qtrsfr_{i,row} + \overline{FSAV} \tag{20}$$

4 main closures revealed the balance conditions for markets for the factors, the government, the ROW and saving-investment. To conduct short-term analysis, the quantity of each supply factor was constant and activity-specific (mobile)[5] in the factor market, with the assumption of full employment condition. Moreover, the real exchange rate and current-account balance were held constant where the difference between exports and imports was only a factor in affecting the market equilibrium of the foreign sector (the ROW). Marginal propensity to save (MPS) was assumed constant in this study and investment was flexible enough to adjust to equal the saving value. This means that saving-driven investments took place in the market equilibrium of saving-investment for all non-government institutions. The assumptions of flexible fiscal savings and constant direct taxes were held in the equilibrium of the government account. Any reduction in government expenditure would increase its revenues which, in turn, would be spent entirely on other alternative regimes to reach the targeted objectives. This allowed a policy switch from subsidizing the fuel subsidies to extending the government expenditure to other arrangements, which was the focus of this paper. In other words, the difference between current revenues and expenditure of the government determines the fiscal savings.

To develop a CGE model, a social accounting matrix (SAM) was firstly built by using the latest input-output table for the base year of 2010 (basic reference year). There were a lot of studies developed their own SAM model for practical analysis in Malaysia, for example, Harun et al. (2012) and Hassan et al. (2016) studied the implication of Goods and Service Tax (GST) on firms and households. The structure of the built SAM model in this study covered a series of accounts: 17 sectors, factors (labor and capital), six household groups, firms, the government, indirect tax, saving-investment and the rest of world (ROW). The 17 aggregated sectors were Agriculture; Mining and quarrying; Manufacturing dairy products; Food processing; Manufacturing food and beverage; Manufacturing textile and leather products; Manufacturing wood products; Manufacturing tobacco, paper products and printing; Manufacturing rubber and chemical products; Manufacturing materials[6]; Manufacturing electrical and electronic products; Manufacturing machines, vehicles and others; Manufacturing petroleum refinery; Energies; Construction; Transportation; and Services. These 17 sectors of activity and commodity were the aggregation from the 2010 IO table with 124 total production sectors for activity and commodity. The aggregation was made based on the Malaysia Classification of Products by Activities (MCPA) 2009. Furthermore, Malaysian households were classified into rural low-, rural medium-, rural high-, urban low-, urban medium- and urban high-income groups, based on the income-class definition for B40, M40 and T20 stated by the Department of Statistics Malaysia in 2014.

Understanding the SAM should be given priority before going through the CGE model because the CGE modeling framework was not only similar to the SAM model, but also those coefficients and exogenous components follow exactly the SAM model. Other elasticity values such as elasticity of substitution between capital and labor, and output allocations have been taken mainly from Solaymani et al. (2014). Besides, all initial prices at the equilibrium level in the CGE model are assumed to be one.

TABLE 2. Changing aggregate outputs in the industries (Percent)

Sectors	Scenario 01	Scenario 02	Scenario 03
Agriculture	-2.29	0.10	-2.41
Mining and quarrying	11.44	-5.14	11.31
Manufacturing dairy product	13.26	-1.63	13.07
Food processing	4.78	-0.18	4.71
Manufacturing food and beverage	47.91	-1.23	47.20
Manufacturing textile and leather	-7.56	-8.52	-7.44
Manufacturing wood product	-53.99	14.08	-53.45
Manufacturing tobacco, paper products and printings	-1.44	-2.70	-1.37
Manufacturing rubber and chemical products	-3.87	-48.59	-3.83
Manufacturing materials	-9.45	88.24	-9.30
Manufacturing electrical and electronic equipments	8.40	6.68	8.27
Manufacturing machine, vehicles and others	-1.19	0.37	-1.17
Manufacturing petroleum refinery	-14.63	2.01	-14.35
Energies	-1.49	-6.22	-1.42
Construction	3.48	30.20	3.41
Transportation	0.03	19.92	0.03
Services	-5.68	-0.84	-5.56
Average values	-0.50	1.99	-0.47

*Source: Author's calculation.

EMPIRICAL RESULTS AND DISCUSSIONS

EFFECTS OF GOVERNMENT EXPENDITURE CHANGES ON THE FIRM'S OUTPUT

Table 2 pictures the impacts of changing government expenditure on output volumes in real terms (inflation-adjusted). The output effect of the subsidy change was estimated in terms of percentage changes from the basic year 2010.

A negative output growth occurred when government expenditure on fuel subsidies was pulled out totally in Scenario 01 (without any further subsidy saving reallocation) with an average reduction of 0.5 percent in domestic outputs. The withdrawal of fuel subsidies reduced the aggregate outputs for the majority of the manufacturing sector, ranging from –1.19 to –53.98 percent. Specifically, the *wood product* manufacturing sector showed a significant negative growth rate with a reduced rate of 54 percent. The wood product sector that was normally small-scale production (mainly focused on primary processing activities and the production of generic products) was greatly dependent on fuel products as a core combustible material to operate conventional technologies. Therefore, it was vulnerably exposed to the fuel subsidy withdrawal. Besides, the manufacturing of *petroleum refinery* had the second highest reduced rate as the price hike had lowered the fuel consumption for the country, followed by the manufacturing of *materials* that was petroleum intensive.

However, firms in food factories such as *food and beverage* manufacturing sector had positive output growth. Electricity instead of fuel was the main source of running industrial operations. Driving private vehicles was also significantly affected by the subsidy reform. People tended to choose public transportation especially those who were living in areas well-facilitated with a diversity of public transportation modes such as in the Klang Valley. Hence, the *transportation sector* had a positive output growth as public transport became more attractive.

The finding of Scenario 2, where the complete withdrawal of fuel subsidies was paired with an incremental agricultural investment (extra intermediate inputs were injected into agricultural sector), enhanced overall domestic production. Domestic production was on an expansion path where an average increased rate of nearly 2 percent was recorded. In the agricultural sector, the incremental agricultural investment improved the production capacity, although at a low pace (with only 0.10 percent increase in output). The expanding agricultural production then led to an immediate increase in demand for intermediate non-agricultural goods used as its inputs and final demand. Thus, the growing *agricultural sector* stimulated other complementary sectors such as the *material* manufacturing sectors that supply essential equipment and appliances to the agricultural production. The highest output growth was shown by the material sector, amounting to 88.24 percent. Nevertheless, firms in the *rubber and chemical* manufacturing sectors had the greatest negative rate of 48.59 percent. This could possibly be explained by the argument that the incremental agricultural investments promoted environment-friendly agricultural practices than by using chemical inputs such as synthetic fertilizers and pesticides. On top of that, the agro-based manufacturing sectors[7] that were heavily reliant upon agricultural outputs as their raw materials, did not have

a compatible improvement with the growing agricultural sector. The aggregate marketed output for the agro-based manufacturing sectors decreased, ranging from –0.18 to –8.52 percent.

The allocation of the extra revenues to direct cash transfers (Scenario 03) had a minimal impact on the firms' outputs. This allocation produced an average reduction in outputs of 0.47 percent. According to Razak et al. (2013), the cash transfers promoted effectively the smooth consumption of the targeted groups during the transitional period of the subsidy reform. Normally, the recipients of cash transfers tended to spend them entirely than keeping them as savings. When this happened, the firms tended to raise the commodity prices than increase the output production in the face of the sudden excessive domestic demands to accumulate high profits.

EFFECTS OF GOVERNMENT EXPENDITURE CHANGES ON HOUSEHOLD CONSUMPTION EXPENDITURE

Table 3 reports the changing Malaysian household consumption expenditure under the change of government subsidy expenditure. The withdrawal of government expenditure through fuel subsidies brought substantial consumption loss to all households. The high-income segments were affected greatly which were recorded at –12.31 percent for urban areas and –12.08 for rural areas. Low-income segments were also severely affected possibly due to the high indirect effects through the high prices incurred on the other goods and services particularly the basic and necessary items. Similar results were also found in Arze del Granado et al. (2010), Hamid & Rashid (2012), Solaymani et al. (2013), Razak et al. (2014), and Rentschler's (2016).

Reallocating the extra revenues to the agricultural sector in Scenario 02 minimized the loss of consumption expenditure for the medium- and high-income segments in the rural and urban areas. On the contrary, the consumption loss of the low-income rural segment increased to –12.29 percent. The additional government investment in the agricultural sector encouraged the adoption of new technologies, increasing agricultural productivity. Installation of the new technologies simultaneously resulted in a decline in hired labor as the affected low-income rural segments were mostly primary agricultural workers with low skills. Thus, their received wages greatly affected their consumption expenditures.

The reallocation scheme of direct cash assistance enhanced the consumption expenditure of both the medium- and low-income groups than the complete withdrawal of fuel subsidies (Scenario 03). The existing consumption loss was reduced due to the nominal incomes increased with the support of direct financial assistance provided by the government. Meanwhile, the high-income segments were not affected as they were not the targeted group for this transfer scheme. Direct cash transfer was, in principle, the most direct and efficient way to compensate the targeted segments by improving their private consumption especially in short-run (Siddiq et al., 2014, Feng et al., 2018).

CONCLUSIONS

Fuel subsidies had been once considered as an amazing tool and used most widely to support economic growth and reduce poverty. Hence, the government's decision of withdrawing fuel subsidies would have an impact on firms and households. The hike in fuel prices, following the government's withdrawal of fuel subsidies, imposed extra burdens on firms through the use of embodied fuel inputs. Thus, firms that required large amounts of embodied fuel inputs to produce goods and services were greatly affected, indicating decreases in the level of production. They needed not only fuel products directly to run their plant operations, but also other inputs for the indirect use of fuel products in their production. Furthermore, the high-income households who spent most of their incomes on fuel consumption would be hit the most if the government withdrew the fuel subsidies completely.

Growing government expenditure on agricultural investment stimulates the overall growth in domestic industries, accompanied by high levels of outputs of production. The motivation of adopting advanced

TABLE 3. Household consumption expenditures in real terms (percent)

Real household consumption	Scenario 1	Scenario 2	Scenario 3
Low-income urban households	-11.28	-11.26	-10.94
Medium-income urban households	-11.87	-10.69	-11.60
High-income urban households	-12.31	-10.77	-12.31
Low-income rural households	-11.43	-12.29	-11.16
Medium-income rural households	-11.78	-11.14	-11.54
High-income rural households	-12.08	-11.16	-12.08
Average values	-11.79	-11.22	-11.61

*Source: Author's calculation.

technologies to enhance agricultural productivity would replace some jobs, affecting those low-income rural segments that live and deal with the primary industry. The decreases in consumption loss for them become severe with the affected wages.

Distributing direct cash transfer is considered to be the fastest and direct way (for the short run) to temporarily maintain the living standards of those who receive it, after the fiscal change. Thus, high-income segments who are not targeted recipients of cash transfer are not affected. Firms are likely to produce less output in the hope of setting high output prices to maximize profits.

Understanding the evidence based on the fuel subsidy reform affecting the firms and households is beneficial to policy-makers in designing more effective subsidy reforms. The incorporation of appropriate mitigation measures into the subsidy reform is needed to increase the momentum for the reform.

NOTES

1 The monthly fuel price adjustment was first introduced for the fuel RON97 in July 2010 (the subsidies for fuel was cut for the first time to reduce the budget deficits).

2 Specifically, the increased sales tax on composed commodities of petroleum refinery and electricity and gas was the proxy for removing fuel prices (or, rising fuel prices) (Hamid & Rashid, 2012).

3 This IFPRI CGE model was originally developed and formulated by Löfgren et al. (2012) to carry out policy analysis of food and trade issues in developing countries with a few specific features such as separating the activities from the commodities for production.

4 The firm's outputs are the produced outputs that allocated on exports and domestic sales.

5 The factor is activity-specific the factor market is divided and each activity (producer) is forced to hire the observed, base-year quantity. It would be preferable to conduct a short-run analysis or when there are significant quality differences between the units of a factor that are employed in different activities.

6 Sector of manufacturing materials covered sector of manufacturing cement, glass and ceramic, together with sector of manufacturing iron, steel and metal.

7 The agro-based manufacturing sectors in this study included dairy products, food processing, food and beverage, textile and leather, wood products, rubber products, together with the tobacco, paper products and printings.

REFERENCES

Akinyemi, O., Alege, P.O., Ajayi, O.O., Adediran, O.S. & Urhie, E. 2017. A simulation of the removal of fuel subsidy and the performance of the agricultural sector in Nigeria using a dynamic Computable General Equilibrium Approach. *Covenant Journal of Business and Social Sciences* 8(1): 60-70.

Al-Fawwaz, T.M. 2016. The impact of government expenditures on economic growth in Jordan (1980-2013). *International Business Research* 9(1): 99-105.

Anand, R., Coady, D., Mohammad, A., Thakoor, V. & Walsh, J.P. 2013. *The fiscal and welfare impacts of reforming fuel subsidies in India*. International Monetary Fund Working Paper WP/13/128.

Arze del Granado, J., Coady, D. & Gillingham, R. 2010. *The unequal benefits of fuel subsidies: A review of evidence for developing countries*. International Monetary Fund Working Paper WP/10/202.

Barany, A. & Grigonyte, D. 2015. Measuring fossil fuel subsidies. *ECFIN Economic Brief* 40: 1-13.

Bekhet, H.A. 2010. Ranking sectors changes of the Malaysian economy: Input-output approach. *International Business Research* 3(1): 134-143.

Breisinger, C., Engelke, W. & Ecker, O. 2012. Leveraging fuel subsidy reform for transition in Yemen. *Sustainability 4*: 2862-2887.

Cervantes-Godoy, D. & Dewbre, J. 2010. *Economic importance of agriculture for poverty reduction*. OECD Food, Agriculture and Fisheries Working Papers, No. 23.

Chandra, A., Laan, T., Lang, K., Liebert, T. & Wooders, P. 2012. Reforming fossil-fuel subsidies to reduce waste and limit CO_2 Emissions while protecting the poor. *Research report*. International Institute for Sustainable Development.

Clements, B., Jung, H.S. & Gupta, S. 2007. Real and distributive effects of petroleum price liberalization: The case of Indonesia. *The Developing Economies* 45(2)*:* 220-237.

Coady, D., Flamini, V. & Sears, L. 2015. *The unequal benefits of fuel subsidies revisited: Evidence for developing countries*. IMF Working Paper No. WP/15/250.

Cooke, E.F.A., Hague, S., Tiberti, L., Cockburn, J. & El Lahga, A.R. 2015. Estimating the impact on poverty of Ghana's fuel subsidy reform and a mitigating response. *Journal of Development Effectiveness.*

Department of Statistics Malaysia. 2014. *Malaysia Economic Statistics- Time Series*. https://www.dosm.gov.my (accessed January 2018).

El-Katiri, L. & Fattouch, B. 2015. *A brief political economy of energy subsidies in the Middle East and North Africa*. Oxford Institute of Energy Studies Paper: MEP 11.

Ellis, J. 2010. *The effect of fossil-fuel subsidy reform: A review of modeling and empirical studies*. https://www.iisd.org/*gsi*/sites/default/files/effects_ ffs.pdf (accessed 14 February 2017).

Fan, S. & Rao, N. 2003. *Public spending in developing countries: Trends, determination, and impact.* Environment and Production Technology Division of International Food Policy Research Institute Discussion Paper No.99.

Feng, K.S., Hubacek, K., Liu, Y., Marchán, E. & Vogt-Schilb, A. 2018. Managing the distributional effects of energy taxes and subsidy removal in Latin America and the Caribbean. *Applied Energy* 225: 424-436.

Gemmell, N., Kneller, R. & Sanz, I. 2015. *Does the composition of government expenditure matter for long-run GDP levels?* Victoria University of Wellington Public Finance Working Paper No. 10.

Gregoriou, A. & Ghosh, S. 2009. The impact of government expenditure on growth: Empirical evidence from a heterogeneous panel. *Bulletin of Economic Research* 61(1): 95-102.

Gregory, P.R. & Stuart, R.C. 1999. *Comparative Economic System* (6th ed.). Boston: Houghton Mifflin Company.

Hakim, R.A., Ismail, R. & Razak, N.A.A. 2014. Fuel subsidy rationalization: The perils of the middle class in Malaysia. *Jurnal Ekonomi Malaysia* 48(2): 83-97.

Hamid, K.A., & Rashid, Z.A. 2012. Economic impacts of subsidy rationalization Malaysia. In *Energy market integration in East Asia: Theories, electricity sector and subsidies* edited by Y. Wu, X. Shi & F. Kimura. Research Project Report 2011-17. Economic Research Institute for ASEAN and East Asia, Jakarta.

Harun, M., Sallahuddin, H & Che Mat, S.H. 2018. Pursuing more sustainable energy consumption by analyzing sectoral direct and indirect energy use in Malaysia: An input-output analysis. *International Journal of Economics and Management* 12(2): 501-210.

Harun, M., Zakariah, A.R. & Azali, M. 2012. Constructing a social accounting matrix framework to analyse the impact of pulic expenditure on income distribution in Malaysia. *Jurnal Ekonomi Malaysia* 46(2): 63-83.

Hassan, A.A.G., Saari, M.Y., Utit, C., Hassan, A. & Harun, M. 2016. Estimating the impact of GST implementation on cost of production and cost of living in Malaysia. *Jurnal Ekonomi Malaysia* 50(2): 15-30.

Holland, D., Figueroa, E. & Gilbert, J. 2001. The role of agriculture and food processing in the Chilean economy: Results from an input-output analysis. *Estudios de Economía* 28(2): 293-308.

International Energy Agency, Organization of the Petroleum Exporting Countries, Organization for Economic Co-operation and Development, & World Bank. 2010. Analysis of the scope of energy subsidies and suggestions for the G-20 initiative. Prepared for submission to the G-20 Summit Meeting, Toronto, 26-17 June.

International Energy Agency. 2013. *World Energy Outlook-2013 Special Report: Southeast Asia Energy Outlook*. https://webstore.iea.org/weo-2013-special-report-southeast-asia-energy-outlook (accessed 23 March 2015).

International Energy Agency. 2015. *World Energy Outlook- 2015 Special Report: Southeast Asia Energy Outlook*. https://webstore.iea.org/weo-2013-special-report-southeast-asia-energy-outlook (accessed 23 February 2016).

International Monetary Fund. 2019. A delicate moment for the global economy: Three priority areas for action. https://www.imf.org/en/News/Articles/2019/03/29/sp040219-a-delicate-moment-for-the-global-economy (accessed 11 June 2019).

Jaafar, A.H., Salleh, N.H.M. & Manaf, Z.A. 2015. Intersectoral linkages in oil palm industry between Malaysia and Indonesia. *Jurnal Ekonomi Malaysia* 49(1): 25-35.

Kosmo, M. 1987. *Money to burn? The high costs of energy subsidies*. World Resource Institute.

Laderchi, C.R. 2014. *Transitional policies to assist the poor while phasing out inefficient fossil fuel subsidies that encourage wasteful consumption.* Contribution to G20 Finance Ministers and Central Bank Governors. The World Bank.

Lawal, Y. O. 2014. Subsidy removal or deregulation: Investment challenge in Nigeria's petroleum industry. *American Journal of Social and Management Science*.

Li, Y.Z., Shi, X.P. & Su, B. 2017. Economic, social and environmental impacts of fuel subsidies: A revisit of Malaysia. *Energy Policy* 110: 51-61.

Ling, P.K., Jamal, O., & Noorasiah, S. 2012. Macroeconomics and industry effect of an increase in fuel price in Malaysia. Paper presented at Proceedings of the Malaysian National Economic Conference VII, 4-6 June, Ipoh, Perak, Malaysia.

Lofgren, H., Lee, R.H., & Robinson, S. 2002. *A standard computable general equilibrium (CGE) model in GAMS*. Washington, DC: International Food Policy Research Institute. Retrieved from http://www.ifpri.org/publication/standard-computable-general-equilibrium-cge-model-gams-0

Loo, S.Y. & Harun, M. 2019. Fuel subsidy abolition and performance of the sectors in Malaysia: A computable general equilibrium approach. *Malaysia Journal of Economic Studies* 56(2): 303-326.

Manzoor, D., Shahmoradi, A. & Haqiqi, I. 2012. An analysis of energy price reform: A CGE approach. *OPEC Energy Review* 36(1): 35-54.

Merrill, L. & Chung, V. 2014. *Financing the sustainable development goals through fossil-fuel subsidy reform: Opportunities in Southeast Asia, India and China*. International Institute for Sustainable Development Working Paper.

Ministry of Energy, Green Technology and Water, Malaysia. Green technology master plan Malaysia 2017-2030. Putrajaya: Federal Government Administrative Centre.

Ministry of Finance. 2015a. *Economic Report 2014/2015*. Kuala Lumpur: Percetakan National Berhad.

Ministry of Finance. 2015b. *Malaysian Economy First Quarter 2015*. Kuala Lumpur: Percetakan National Berhad.

Mohanty, S.K. 2012. Economic growth, exports and domestic demand in India: In search of a new paradigm of development. In *Moving toward a new development model for East Asia- The role of domestic policy and regional cooperation* edited by Y. Zhang, F. Kimura, & S. Oum. Research Project Report 2011-10. Economic Research Institute for ASEAN and East Asia, Jakarta.

Moshiri, S. & Santillan, M.A.M. 2018. The welfare effects of energy price change due to energy market reform in Mexico. *Energy Policy* 113: 663-672.

Razak, A.R., Kamaruddin, R., & Khalili, J.M. (2013, April). *Bantuan Rakyat Satu Malaysia (BR1M): Consumption pattern and the relationship between acceptances, perception towards government sincere incentives and political motives.* Paper presented at 2nd International Islamic Business, Kuala Lumpur, Malaysia.

Razak, N.A.A., Ismail, R., & Hakim, R.A. 2014. Is there a case for fuel subsidy removal in Malaysia? *International Journal of Economics* 2(4): 1-13.

Rentschler, J. 2016. Incidence and impact: The regional variation of poverty effects due to fossil fuel subsidy reform. *Energy Policy* 96: 491-503.

Rentschler, J., Kornejew, M. & Bazilian, M. 2017. Fossil fuel subsidy reforms and their impacts on firms. *Energy Policy* 108: 617-623.

Saari, M.Y., Shuja, N. & Rahman, I.A. 2013. Evaluation of impacts of the rise in energy prices on costs of production and living expenses in Malaysia. *Malaysian Journal of Economic Studies* 50(1): 1-20.

Sayed, L.E., Sayegh, W., Saliba, E. & Stephen, J. 2015. *Fossil fuel subsidies in Lebanon: Fiscal, equity, economic and environmental impacts*. Ministry of Environment- United Nations Development Programme.

Siddiq, K., Aguiar, A., Grethe, H., Minor, P. & Walmsley, T. 2014. Impacts of removing fuel import subsidies in Nigeria on poverty. *Energy Policy* 69(C): 165-178.

Siddiq, K., Minor, P., Grethe, H., Aguiar, A. & Walmsley, T. 2015. *Impacts on poverty of removing import subsidies in Nigeria*. Policy Research Working Paper No. 7376. The World Bank.

Smith, M. 2012. Demand-led Growth Theory: An Historical Approach. *Review of Political Economy* 24(4): 543-573.

Solaymani, S., Kardooni, R., Fatimah, K. & Sumiani, Y. 2014. Economic and environmental impacts of energy subsidy reform and oil price shock on the Malaysian transport sector. *Trade Behaviour and Society* 2(2).

Solaymani, S., Fatimah, K. & Roza, H.Z. 2013. Evaluating the role of subsidy reform in addressing poverty levels in Malaysia: A CGE poverty framework. *The Journal of Development Studies* 50(4): 556-569.

Sovacool, B.K. 2017. Reviewing, reforming, and rethinking global energy subsidies: Towards a political economy research agenda. *Ecological Economics* 135*:* 150-163.

Umar, H.M. & Umar, M.S. 2013. An assessment of the direct welfare impact of fuel subsidy reform in Nigeria. *American Journal of Economics* 3(1): 23-26.

Widodo, T., Sahadewo, G.A., Setiastuti, S.U. & Chaerriyah, M. 2012. Energy market integration in East Asia: Theories, electricity sector and subsidies. In *Cambodia's electricity sector in the context of regional electricity market integration* edited by Y. Wu, X. Shi & F. Kimura. Research Project Report 2011-10. Economic Research Institute for ASEAN and East Asia, Jakarta.

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