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THE DETERMINANT OF LATENT INCOME ON WHO IS ELIGIBLE TO RECEIVE ENERGY SUBSIDY. A CASE IN MALAYSIA.

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ABSTRACT
Up to date the Malaysian government has been providing subsidy for various products like energy sources, health, food, education and so on. Among the subsidy given by the government, the most significant amounts go to energy subsidy. Misallocation of resources may lead to leakages and cause national deficit and eventually lead the country to bankruptcy. Therefore, the aim of this study is to identify the eligible individual to receive subsidy based on each energy resources. The study used cross sectional data collected from 500 respondents using structured questionnaire to determine the energy consumption of each energy source by households in urban and rural areas. The latent income threshold value determined indicates the benchmark used to examine the eligibility of subsidy recipient for each energy resource. The findings show that leakages exist in the consumption of energy when subsidies are given and not given. The latent income for urban area to receive energy subsidy should be distributed to those who earn below RM3000 while for rural area should be below RM1500.

JEL Classification System: H23, Q43, Q48
Keywords: *Energy subsidy, Eligibility, Latent threshold income, Elasticity, Malaysia.*

1. INTRODUCTION

An energy subsidy is defined as any government action that lowers the cost of energy production, raises the revenues of energy producers or lowers the price paid by energy consumers (IEA, OECD and World Bank Joint Report, 2010).

De Moor and Calamai (1997) defined that subsidies comprise all measures that keep prices for consumers below market level or keep prices for producers above market level or that reduce costs for consumers and producers by giving direct or indirect support. There are two types of economic policy interventions. First, government supports consumption by regulating domestic prices and keeping them below world market prices. Subsidized consumer prices increases domestic consumption and this excess demand may decrease foreign exchange revenues. Second, government may choose to subsidize production by imposing minimum prices above market level. Producers will expand supply and accelerate resource depletion while public budgets are tapped to pay the surpluses. Both types of policy interventions may exist at the same time and cause distortions that produce a fiscal deficit.

On the other hand, subsidy is usually given in a blanket basis without targeting the consumers who are eligible to receive it. Consumption pattern differs when a product is given subsidy with product that is not given subsidy. The difference in consumption pattern can lead to excess consumption, in other words leakages. Leakages can create economic problems like shortages, hoarding, smuggling and increase in government expenditure. The amount of subsidies is estimated that accounted to RM 33.2 billion in 2012 which increase as much as 278.56

percent compared to year 2007 with RM 8.77 billion.[1] If these unsustainable and consistent figures keep increasing, the Malaysian Prime Minister fears that the country's financial situation can lead to bankruptcy like Greece might become a reality.

Since energy subsidies occupy the most significant amount of total subsidy cost, Malaysian government recently tries to phase out certain types of fossil fuel subsidies due to failing to achieve their intended objectives. The inefficient distribution of energy subsidies may create fiscal burden on state budgets. Unsustainable financial burdens imposed on countries when governments import energy at world prices and sell it at lower and regulated prices domestically. In 2008, the expenditure on oil and gas imports hiked dramatically in many countries including Malaysia when the price of oil increased to its peak in the world market. Malaysia attempted to reduce subsidies during the decline in world prices after mid 2008 by avoiding inflation towards consumers.

As long as there is a government and it fulfills its role in collecting tax from its citizen, subsidy cannot be totally removed or eradicated. An energy subsidy allocation mechanism that can be administered efficiently and effectively should be designed to overcome issues and challenges faced by the government. Therefore, the aim of this study is to determine what is the effective energy subsidy allocation mechanism to distribute energy subsidy in Malaysia? The objective of this paper is to determine the extent of the affordability of the urban and rural households to energy cost with or without subsidies. With the findings, the distribution of the subsidies amongst different households according to income categories and other economic categories can assess its impact on public finances.

2. LITERATURE REVIEW

Malaysia was a traditional primary commodity supplier of rubber, tin, timber and palm oil during 1960s. The Malaysian government emphasized on diversification and modernization of agriculture and mineral sectors as well as manufacturing sector in the economic development plan. Later, it has transformed into a net oil-exporting country at the middle of 1970s. The oil sector increased from 4 percent in 1970 to 16 percent in 1979 among the export earnings. This was due to the dynamics of government policy and the flourishing oil commodities. However, this situation was expected to boost the commodities' prices.

At the decade of 1980, Malaysian government encountered periods of shock and adjustment in the economic development. The external shock occurred when deterioration in world trade caused recession in the OECD. Meanwhile the internal shock incurred by the attempt of the Malaysian government to counter the external shock by using fiscal expansion. This caused high deficits and inflation to the country. The increment of payments deficit and debt burden established an unsustainable situation and compelled the government to make an adjustment to the economy. One of the measures taken was to raise the domestic energy price of diesel and kerosene.

Hope and Singh (1995) claimed that the impact of the increment of diesel prices in industrial sectors depended on the share of diesel in the production cost, the elasticity of output demand in each sector and the substitution possibilities among the energy sources. The impact on industrial output would be small if the share of diesel was low in the production cost. Besides, when the price of diesel raised, there was a greater substitution of diesel by electricity. Most of the industrial sectors used diesel in power generation equipment and induce the problem of insufficient capacity, loss in production as well as labor force and damage in electric motors.

Besides, kerosene and electricity were the main energy sources used in the household sector. Two important impacts of increment kerosene price were the welfare consequences for households and the subsidy effect. To determine welfare consequences, the information of the share of energy in total household expenditure depended on income level, urban or rural nature and geographic location was needed. Meanwhile, the price of elasticity could also be used to calculate the welfare consequences for each household. Moreover, the subsidy effect of kerosene price increased during the reformation was evident due to the domestic prices were higher than the border prices.

The study also indicated that increasing the energy price will bring the macroeconomic impacts on the consumer price index (CPI) and this would be followed by the response of nominal wage towards CPI. The findings revealed that the increment prices of kerosene and diesel only brought low impact on CPI. This was because the energy price has lack of response to the food price which is the main item in CPI. This also showed that the impact is low in agricultural sector. On the other hand, the wage rates increases when the energy prices

[1] Data obtained from the Ministry of Domestic Trade, Co-operatives and Consumerism Malaysia.

increases. The expansionary fiscal policies and property boom caused a tight labor market that raised the wage rates. Besides, the exchange rate also increased and caused the loss of international competitiveness in the manufacturing sector.

Chandran, Sharma, and Madhavan (2010) used two different models to investigate the nexus of electricity consumption and GDP in Malaysia. One dummy variable was included which was the Asian financial crisis that had a significant effect on the real GDP. The results found that Engle-Granger cointegration for Model 1 and Johansen multivariate cointegration for Model 2 indicated at least one cointegration when real GDP was the dependent variable at 5 percent significant level. This showed that there was a long run relationship between GDP and energy consumption. However, when energy consumption and price index as the dependant variables, there was no long run relationship found between the independent variables.

Moreover, the results of the Granger causality test showed that energy consumption and price index had a significant impact on GDP in the short run at 1 percent and 10 percent level for both models. The estimated error correction term (ECT) with the significant value also confirmed the existence of long run equilibrium between GDP with energy consumption and price index. In the estimation of the long run elasticity of the two models, energy consumption was found to have a positive impact on economic growth in Malaysia. The estimated 1 percent increase in energy consumption might lead to 0.68 to 0.79 percent increase in real GDP.

Lin and Jiang (2010) claimed that when there is economic growth, there is a massive increase in the demand for energy. The energy that was also distinguished as renewable and non-renewable energy. Non-renewable energy is a cost to the industry as well as the country but renewable energy can be an excellent investment to the firm and the country. According to Wu (2009) when price of the energy increases, it encourages the efficient usage of energy. Subsidy for energy provided by the government will reduce cost push inflation. It will artificially hold the price below the market level. This affirmed that subsidy was given to overcome market failure that exists due to externality, produce domestic market, and avoid unemployment.

Moreover, energy consumption can also differ according to economic status of a nation. A study of Dube (2003) revealed that 20 percent of the people in Zimbabwe in the urban area are poor. They could not get access to electricity. Thus, alternative energy was used. 52.3 percent of the energy used was kerosene and fuel wood as the main source of energy. The situation was worse in the rural area. Only 0.5 percent used electricity or LPG cooking gas. Both electricity and kerosene were measured below the marginal cost.

The analysis was based on the monthly energy cost and the initial energy cost. The data collected were energy source used, income categories, energy used, monthly cost and energy budget from the total household expenditure. The findings revealed that different household income had different level of ability to pay. Large portion of the urban poor income earners were devoted to energy expenditure compared to the non-poor on non electrical energy. Energy cost incurred by the poor on non-electrical energy sources could cover the current subsidized electricity costs.

In the developing countries, energy subsidies are widespread as a reason to enable the affordability of the poor households in energy consumption. However, the effectiveness of subsidies is usually neglected. Kebede (2006) examined the importance of subsidies on kerosene and electricity affordable among Ethiopian urban households. The study was extended by comparing the purchasing power of households with the estimated fuel cost. The results revealed that both poor and non-poor households could afford to purchase kerosene when subsidy was distributed. When the kerosene subsidy was removed, there was not much difference in affordability of kerosene even for poor households. Meanwhile, subsidies given also did not improve the affordability of kerosene to the households in urban areas.

In India, the energy demand kept increasing due to the growth of population. Besides, the development of industry and transport sectors could also incur the increment of energy demand. Due to the declining availability and cost competitiveness of traditional fuels such as fuel wood, most households transited to use modern fuels such as LPG and kerosene for cooking while electricity for lighting or household electric appliances like televisions, refrigerators and so on (Thukral and Bhandari, 1994). The study examined the extent of subsidizing LPG and kerosene and the possibilities of increasing LPG prices. The Cost, Insurance and Freight (CIF) prices were considered as LPG and kerosene are imported. The net economic benefit (NEB) to government was computed when one additional tone of LPG is available or its kerosene equivalent.

The findings showed that changes in the costs of facilities for import, storage, handling and transportation were smaller than changes in CIF price differentials of LPG and kerosene. To compute government's net profit, 1.65

tonnes of kerosene was replaced by one tonne of LPG. The researchers found that government would encounter 50 percent chance of financial loss under soft market conditions if LPG consumption was promoted. But, under firm market conditions, government kept to gain profit and it reflected the real fuel consumption levels. The study also indicated that LPG subsidization was 65 percent higher than kerosene under soft market conditions. This underlines the fallacy of the subsidy policy since LPG was mostly used by the middle to higher income urban households. Subsidy on LPG was only lower under firm market conditions.

The study conducted by Adam and Lestari (2008) aimed to measure the effect of an increase in the oil price on welfare in Indonesia. The model was $Y_i = X'_i \beta + \varepsilon_i$, where Y_i is the dependent variable for people welfare i, X'_i is a vector for nonstochastic independent variable, β is vector for unknown parameter and ε_i is a random error term. The study used primary data from the survey of 200 respondents in two provinces which were Central Java and Bengkulu. Central Java has more advanced transport infrastructure compared with Bengkulu. This indicated that respondents in Central Java were easier to access to oil. The method used was multi-stage random sampling.

The findings in this study showed that the only variable of compensating funds was correlated positively with the portion of income spent on rice and side dishes. Meanwhile the other variables like consumption of oil, access to oil, and main source of income in fishing industry and public transport sector were found to have negative relationship with the dependent variable. Besides, access to oil and main source of income in fishing industry were found to be insignificant in influencing the consumption of rice and side dishes respectively. The incident may due to the measurement errors that respondents were unable to recall the information of their consumption of oil, food and side dishes.

In addition, an increase in the oil price would decrease the people's welfare where the consumption of rice and side dishes reduced by 0.139 and 0.204 respectively. This was due to the people who spent more on oil that the demand for oil was inelastic in price. Thus, increasing compensating funds was believed to increase welfare by compensating people to buy rice and side dishes. Meanwhile, main source of income in public transport sector had the highest impact on consumption of rice and side dishes when the oil price increased.

3. METHODOLOGY

The study aims to examine the distribution of subsidies among different economic group. This includes the amount of subsidy that should be given and who should receive it. A pilot study was conducted on 60 respondents using an open ended questionnaire. In Section A, the gender, the location of their origin (urban and rural), the number of dependents, the level of education and their marital status were enquired. At Section B, the costs of household expenditures were estimated. At Section C, the estimate of each type of energy consumed with or without subsidy is estimated. In other words it needs to measure the impact of subsidies on energy use.

The affordability of each energy use based on various income categories. Initially the types of energy consumed are determined. This is followed by the primary and the secondary use of each energy. This confirms the level of each type of energy consumed according to importance for each sector (urban and rural). The amount of energy currently consumed with subsidy and the estimated amount of energy consumed without the subsidy will provide the excess consumption of each type of energy. The difference between the two figures will estimate the excess consumption as well as the burden incurred by the energy suppliers and the government. This will be followed by the monthly energy costs and the initial energy costs based on the purchasing power (income) of each household.

Data on the expenditure pattern of the urban and rural household based on each income category. The items included in the expenditure as necessities are the cost of energy (petrol, diesel, electricity, kerosene), rent/mortgage, food, health, education, transport and travel, long term commitment payments and utility bills. Data on the demographic factors like income of the household and the number of dependents are also calculated. Based on the information obtained using a structured questionnaire, the values of the following variables are derived. The income per capita obtained by dividing income earned by each household with the number of dependents in the family. A monthly subsidized and non-subsidized cost of energy to the mean energy budget share of each household category. The monthly subsidized and non-subsidized costs of energy compared to the mean of expenditure. Monthly cost of each energy as a percentage of each energy budget share. Income per capita for each household = f(cost of each energy/total energy cost, monthly cost of the energy/monthly income, monthly household expenditure/monthly income, monthly energy cost/monthly household expenditure, quantity of each energy consumed without subsidy). The parameter obtained from each independent variable mentioned above represents elasticity. As such how sensitive is the changes in the subsidy would affect the monthly cost of

energy, the monthly household expenditure, the quantity of energy consumed and the income per capita can be estimated based on each income category. Finally, the threshold value of income is determined.

4. FINDINGS

4.1 Monthly Household Expenditure Over Monthly Income

Table 1 shows the percentage of monthly household expenditure in various usages over the earned monthly income in urban and rural area. Loan instalment expenditure occupies 22.41 percent and 18.6 percent of the monthly income in urban and rural area respectively, which is the highest usage of a household expenditure. Obviously, urban household seems to spend higher in loan instalment compared to rural household. Next, energy expenditure accounted to the second highest usage of a household expenditure in both urban and rural area. The usage percentages for urban and rural area are fairly same, which indicate 12.12 percent and 12.06 percent of the total monthly income respectively. This is followed by the food expenditure in urban and rural areas that comprise 10.63 percent and 10 percent. Meanwhile utility expenditure also accounts to the fairly same percentage of the monthly income in urban and rural area which is 3.9 percent and 3.16 percent respectively. However, it can be clarified that the energy, food and utility expenditures in urban household are still higher than the rural household because of the high income earned by urban residents compared to rural residents.

Besides, urban household spend 3.76 percent of their monthly income for entertainment expense while rural households spend only 1.94 percent in entertainment. This is because of the different type of lifestyle carried out in the urban area. Meanwhile, urban household seems to emphasize on educational by spending 2.9 percent of their monthly income for education. They spend for their children's tuition fee or transportation to school and also buying books. Rural households only spend 1.43 percent of their income for education because school uniform, books and also transportation are all subsidized by the government. On the other hand, urban households spend 2.57 percent of their monthly income for investment, 1.46 percent for health and 1.19 percent for clothing. In the similar vein, rural households spend fewer expenses compared to urban household which comprise of 0.17 percent for investment, 1.06 percent for health and 0.13 percent for clothing. The rural residents low expenses due to subsidized health care given by the government. In contrast, rural household has higher expense (0.94 percent) than urban household (0.53 percent) on the public transport. This explains that rural residents are frequently use public transport due to the lower cost compared to urban residents who prefer to use their own transport.

4.2 Monthly Cost Of Leakages

According to Table 2, cost of leakages can be determined by the multiplication of quantity of leakages with the subsidies given. Quantity of leakages is the difference between quantity consumed with subsidy and quantity that consumers would consume without subsidy. Subsidy refers to the subtraction between price with subsidy and price without subsidy. From the data given, electricity obviously encounters the highest excess consumption in both urban and rural areas. The costs of leakages are RM21.07 and RM17.84 per household respectively. This reveals that most of the households in Malaysia use electricity in squander. Another apparent excess energy consumption is petrol which conducts leakages cost of RM11.78 and RM8.56 per household in urban and rural areas respectively. The cost of leakages for petrol is high due to subsidies given is high. Compared to diesel consumption, the cost of leakages is low in urban and rural areas since less subsidies are given. Excess consumption for LPG amounted to around 2 kg per household in both areas. Besides, leakages for kerosene only occur in rural area not in urban area due to only rural citizen use kerosene nowadays. In overall, cost of leakages per household is higher in urban area compared to rural area where the excess consumption is higher.

4.3 Monthly Energy Consumption For Each Income Group

Table 3 shows the percentage of monthly energy consumption according to income category in the urban area while Table 4 indicates the percentage of monthly energy consumed based on each income group per household in rural area. In regard to petrol consumption in urban area, income groups of RM3001-RM4500 and RM4501 and above holds the highest percentage which consists of 40.50 percent and 38.87 percent respectively from their income. This shows that majority households with high income spend almost 40 percent of their income for the use of petrol in urban area. In contrast situation in rural area is different where income group of RM1501-RM3000 demand for petrol carries the highest percentage which is 52.25 percent. This group of household is usually referred to as the middle and low income group.

In addition, consumers from the high income category of RM4501 and above, spend the highest amount of diesel which amounted for 69.42 percent of their income in the urban area. Diesel consumers in rural area mostly belong to the middle and low income groups which refer to the income range of RM1501-RM3000 and RM3001-RM4500 which total up to a percentage of 39.29 percent and 53.57 percent of their total income respectively. This is because high income group in Sabah usually use diesel for transportation (4 wheel drive)

and also as their resource for their livelihood. As for the high consumption of diesel in the rural area, it is mainly used for their livelihood like fishing.

Furthermore, households with income RM4501 and above are the highest percentage of electricity consumers in urban area while the highest consumption in rural area refers to RM1501-RM3000 which is the middle income group. Both groups achieve 45.84 percent and 45.62 percent respectively. In the urban area, electricity is consumed for lighting, air-conditioning as well as cooking. Meanwhile in the rural area, electricity is consumed only for the purpose of lighting.

Income group of RM3001-RM4500 consumes the most LPG in urban area which amounts to a total of 44.63 percent. Meanwhile, 52.95 percent households with income between RM1501-RM3000 are the highest consumers for LPG in the rural area. In urban area, there is no household spend on kerosene while mainly household consume kerosene in rural area from income group of RM1501-RM3000. Kerosene is used for the purpose of cooking in the rural area.

In conclusion, petrol is a source of energy largely consumed by the high income group in the rural and the urban area. Electricity is highly used by the high income group in the urban area but in the rural area it is used by the middle income group. As for the usage of kerosene, no kerosene is consumed in the urban area but in the rural area it is consumed by the middle income group. Finally, LPG is a source of energy consumed for cooking. In the urban area, the high income group has replaced LPG with electricity meanwhile LPG is still used by the income category of RM3001 and RM4500. LPG is mainly used by the middle income group in the rural area because in the rural area they use firewood and charcoal as their source of energy. The percentage of petrol, electricity and also diesel is found to be extremely low for the low income group in the rural area as well as the urban area. With this we can conclude that leakages are taking place because the subsidy is directly to the high income group instead of the low income group in Kota Kinabalu.

4.4 Multiple Regression Analysis

4.4.1 Petrol

The four variables in the Table 5 are found to be significant in explaining the changes of income per capita (logipc) in the urban area at 5 percent significance level. Among the four variables, the ratio of the monthly household expenditure over income of household (logmhei), the ratio of the monthly energy cost over monthly household expenditure (logmecmhe) and the ratio of the petrol cost over the total energy cost (logpetec) indicate the negative relationships with income per capita, while the quantity of petrol consumed (logquanpet) has a positive relationship with income per capita in urban household.

When there is 1 percent increase in the ratio of the monthly household expenditure to income (logmhei), the monthly energy cost over the monthly household expenditure (logmecmhe), and the ratio of petrol cost over total energy cost (logpetec), the income per capita of the urban household decreases in the descending ranks as much as 1.085 percent, 0.952 percent and 0.46 percent respectively. In contrast, every increase of 1 percent in the quantity of petrol consumed (logquanpet) would also increase the monthly income per capita in urban area by 0.37 percent. This means that income per capita of the households in urban area is sensitive towards the changes in the household expenditure but they cannot avoid the consumption that makes it not sensitive to the cost of petrol due to elasticity.

In contrary with the petrol consumption of urban household, only the ratio of the monthly energy cost over monthly household expenditure (logmecmher) is significant in explaining the changes of the income per capita (logipc) in rural area at 5 percent significance level (refer to Table 6). The other four variables are insignificant. This means the increase of 1 percent in the ratio of the monthly energy cost over the monthly household expenditure (logmecmher) would cause the reduction of 0.863 in the income per capita of the rural household. This indicates a negative relationship between the variables.

4.4.2 Diesel

Table 7 shows that among all the independent variables, the ratio of the monthly energy cost over income (logmeci) and the quantity of diesel consumed (logquandie) are significant in explaining the changes in the income per capita (logipc) in the urban area at 5 percent significance level. All other variables are insignificant. When quantity of diesel consumed increases by 1 percent, it can increase the income per capita of the household in the urban area as much as 0.478 percent. This indicates though there is a positive relationship between the quantity of diesel consumed with the income per capita of the household, but it is found to be inelastic. This means the changes in the income per capita is not sensitive towards changes in consumption of diesel. Therefore, the decision to remove subsidy for diesel on the urban household should be enforced by the Malaysian government. When there is 1 percent increase in the ratio of the monthly energy cost over income, the income

per capita of the urban household decreases as much as 1.349 percent. This also indicates the monthly energy cost is sensitive towards income per capita. This means that subsidy may need to be given to prevent the cost pull inflation take place in the country.

Meanwhile, Table 8 shows that among the four independent variables, the quantity of diesel consumed (logquandie), the ratio of the monthly energy cost over monthly household expenditure (logmecmhe), the ratio of the diesel cost over the total energy cost (logdietec) and the ratio of the monthly household expenditure over income of the household (logmhei) are insignificant predictors of the changes in the income per capita (logipc) in the rural area at 5 percent significance level.

4.4.3 Electricity

The four variables in the Table 9 are found to be significant in explaining the changes of income per capita (logipc) in the urban area at 5 percent significance level. However, the ratio of the monthly household expenditure over income of household (logmhei) and the ratio of the monthly energy cost over monthly household expenditure (logmecmhe) indicate a negative but strong relationship with income per capita. When there is 1 percent increase in the logmhei and logmecmhe, the income per capita of the urban household decreases as much as 1.102 percent and 0.968 percent respectively.

Meanwhile, the ratio of the electricity cost over the total energy cost (logelectec) also indicates a negative but moderate relationship with income per capita. The increase of 1 percent in the ratio of the electricity cost over total energy cost (logelectec) would decrease income per capita of the urban household by 0.492 percent. In contrast, the quantity of electricity consumed (logquanelec) has a positive relationship with income per capita in urban household. One percent of increase in the quantity of electricity consumed in the urban area (logquanelec) can also boosts up the income per capita by 0.341 percent. This indicates that changes in the household income per capita in the urban area is not sensitive towards changes in the cost of electricity because it could be a necessary product for them.

In contrary with the electricity consumption of urban household, only the ratio of the monthly energy cost over income of the household (logmeci) in rural area is significant in explaining the changes of the income per capita (logipc) at 5 percent significance level (Refer to Table 10). The other four variables are insignificant. This means the increase of 1 percent in the ratio of the monthly energy cost over income (logmeci) would cause the income per capita of the rural household to decrease as much as 0.631 percent. This indicates a negative relationship between the variables. This indicates in the rural household the consumption of electricity is only directed to certain income category but not in the low income category. The changes in the price of electricity do not seem to influence their consumption.

4.4.4 LPG

Table 11 shows that among all the independent variables, the ratio of monthly energy cost over monthly household expenditure (logmecmhe), the ratio of the monthly energy cost over income (logmeci) and the ratio of the LPG cost over the total energy cost in the urban area are significant in explaining the changes in the income per capita (logipc) at 5 percent significance level. Meanwhile the quantity consumed of LPG is insignificant. When the ratio of monthly energy cost over monthly household expenditure increases 1 percent, the income per capita in urban area will increases 0.583 percent. When the ratio of LPG monthly cost over the total energy cost increases 1 percent, income per capita of the household will decrease 0.486 percent. Besides, 1 percent increase in the monthly energy cost over income of the household will decline as high as 1.266 percent in income per capita of the urban household. This also indicates that energy cost is sensitive to income per capita of the households.

Among all the independent variables in Table 12, only the ratio of the monthly energy cost over income (logmeci) in the rural area is significant in influencing the changes of the income per capita (logipc) at 5 percent significance level. The other four variables are insignificant. When there is 1 percent increase in the ratio of the monthly energy cost over income, the income per capita of the rural household decreases as much as 0.836 percent. This indicates a negative relationship between the variables.

5. CONCLUSION

It can be concluded that leakages does exists in the consumption of energy when they are given subsidy and when subsidy are not given. This firstly indicates the financial burden experience by the government by providing these subsidies to households when the resource is not used efficiently. The highest leakages can be experienced in the usage of electricity followed by petrol. Based on the elasticity value both the energy source creates not sensitive changes to their household income per capita both in the rural as well as the urban area. The

usage for both of energy mentioned above is also found to be high among the high income group compared to the low income group who totally depend on public transport. As such the subsidy given to the public in a blanket basis is distorted because it is highly consumed by the high income group. Therefore, the latent income for the rural area to receive subsidy for both electricity and petrol should be below RM1500. Meanwhile the latent income for the urban area to receive energy subsidy should be distributed to those who earn below RM3000. LPG and also diesel is usually used for the purpose of livelihood by the low income households in the rural and urban areas. Thus, both this energy should be given subsidy because it can control the effect of cost pull inflation in taking place in the country.

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Appendix

Table 1: Percentage of Monthly Household Expenditure over Monthly Income

Household Expenditure	Area (%)	
	Urban	Rural
Loan Instalment	22.41	18.6
Energy	12.12	12.06
Food	10.63	10
Utility	3.9	3.16
Entertainment	3.76	1.94
Education	2.9	1.43
Investment	2.57	0.17
Health	1.46	1.06
Clothing	1.19	0.13
Public Transport	0.53	0.94

Table 2: Monthly Cost of Leakages

	Urban	Rural
Energy	Cost of Leakages (RM)	Cost of Leakages (RM)
Petrol (liter)	11.78	8.56
Diesel (liter)	0.28	0.55
Electricity (kW)	21.07	17.84
LPG (kg)	0.61	0.70
Kerosene (kg)	0	2.96
Total	**33.71**	**30.61**

Table 3: Percentage of Monthly Energy Consumption for Each Income Group in Urban Area

Energy (%) Income (RM)	Petrol	Diesel	Electricity	LPG	Kerosene
750 and below	0	0	0	0	0
751 – 1500	1.44	0	0.32	0.83	0
1501 – 3000	19.19	10.62	20.07	23.14	0
3001 – 4500	40.50	19.96	33.77	44.63	0
4501 and above	38.87	69.42	45.84	31.40	0

Table 4: Percentage of Monthly Energy Consumption for Each Income Group in Rural Area

Energy (%) Income (RM)	Petrol	Diesel	Electricity	LPG	Kerosene
750 and below	0	0	0	0	0
751 – 1500	3.1	0	3.02	3.92	0
1501 – 3000	52.25	39.29	45.62	52.95	76.92
3001 – 4500	31.01	53.57	39.28	31.37	23.08
4501 and above	13.64	7.14	12.08	11.76	0

Table 5: Regression Analysis of Petrol Consumption in Urban Area

Variables	B	Std. Error	Sig.
(Constant)	2.990	0.948	0.003
logquanpe	0.370	0.159	0.026
logmecmhe	-0.952	0.259	0.001
logpetec	-0.460	0.202	0.029
logmhei	-1.085	0.228	0.000

a. Dependent Variable: log(income per capita at each household)

Table 6: Regression Analysis of Petrol Consumption in Rural Area

Variables	B	Std. Error	Sig.
(Constant)	3.819	1.691	0.039
logmecmhe	-0.863	0.361	0.030
logpetec	-0.688	0.532	0.215
logmhei	-0.597	0.392	0.148
logquanpe	0.196	0.193	0.326

a. Dependent Variable: log(income per capita at each household)

Table 7: Regression Analysis of Diesel Consumption in Urban Area

Variables	B	Std. Error	Sig.
(Constant)	2.956	1.052	0.011
logmecmhe	0.590	0.294	0.059
logmeci	-1.349	0.207	0.000
logdietec	-0.149	0.280	0.601
logquandie	0.478	0.162	0.008

a. Dependent Variable: log(income per capita at each household)

Table 8: Regression Analysis of Diesel Consumption in Rural Area

Variables	B	Std. Error	Sig.
(Constant)	8.057	2.609	0.021
logquandie	-0.358	0.492	0.494
logmecmhe	-0.146	0.387	0.719
logdietec	0.131	0.347	0.719
logmhei	-0.208	0.376	0.601

a. Dependent Variable: log(income per capita at each household)

Table 9: Regression Analysis of Electricity Consumption in Urban Area

Variables	B	Std. Error	Sig.
(Constant)	2.338	1.277	0.076
logquanelec	0.341	0.160	0.040
logmecmhe	-0.968	0.260	0.001
logelectec	-0.492	0.227	0.037
logmhei	-1.102	0.232	0.000

a. Dependent Variable: log(income per capita at each household)

Table 10: Regression Analysis of Electricity Consumption in Rural Area

Variables	B	Std. Error	Sig.
(Constant)	4.771	1.708	0.014
logquanelec	0.092	0.227	0.692
logmeci	-0.631	0.255	0.026
logelectec	-0.166	0.395	0.681
logmhei	0.214	0.332	0.529

a. Dependent Variable: log(income per capita at each household)

Table 11: Regression Analysis of LPG Consumption in Urban Area

Variables	B	Std. Error	Sig.
(Constant)	4.095	0.770	0.000
logmecmhe	0.583	0.214	0.010
logmeci	-1.266	0.183	0.000
loglpgtec	-0.486	0.117	0.000
logquanlpg	0.013	0.143	0.927

a. Dependent Variable: log(income per capita at each household)

Table 12: Regression Analysis of LPG Consumption in Rural Area

Variables	B	Std. Error	Sig.
(Constant)	2.017	1.667	0.248
logmeci	-0.836	0.310	0.018
loglpgtec	-0.735	0.339	0.050
logmhei	0.068	0.328	0.839
logquanlpg	0.495	0.265	0.084

a. Dependent Variable: log(income per capita at each household)