

Ten Years of Reforms: the Impacts of an Increase in the Price of Oil on Welfare

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Abstract

The Asian economic crisis that erupted in Indonesia in mid-1997 has resulted in fundamental changes in the structure of the Indonesian economy. For instance, although it was a controversial decision, the fuel subsidy has been extensively reduced since 2000 because of government budget constraints. This paper examines the decision of the government to eliminate the fuel subsidy (and increase the price of fuel) from 2000. It also measures to what extent such a decision has affected the level of people's welfare in 2005. Using regression analysis, the paper indicates that the decision of the government to increase the price of oil, together with several other variables, correlates negatively with the level of people's welfare. Based on these findings, it is recommended that the government should be careful in responding to the current conditions in the oil market where the world oil price fluctuates and has increased sharply. Instead of increasing the domestic fuel price, there are several actions that the government can take to respond to the increasing world oil price. Among them are implementing a cross-subsidy policy to redistribute income from higher to lower income groups, making comprehensive plans to increase and achieve lifting oil target, and intensifying efforts to diversify sources of energy.

Introduction

The Asian economic crisis that hit Indonesia in mid-1997 has forced the government to implement tight fiscal policies. To implement these tight fiscal policies, the government has eliminated various subsidies, such

as the subsidy for petroleum-derived household fuels and for electricity. The rationale for the policy is that by eliminating various subsidies, the economy would be stimulated to work more efficiently. In relation to the oil subsidy, this assumption about economic efficiency was supported by the fact that Indonesia has been shifting from an oil-exporting to an oil-importing country. As a net oil-importing country, fluctuations in the global price of oil have caused adverse pressures on the government's budget. Some studies (for instance, Adi 2003) show that the oil subsidy was only benefiting the rich rather than the poor. Likewise, subsidies for oil may stimulate inefficient consumption and create distortions in the economy; one result of oil price discrepancies has been to encourage and increase oil smuggling.

However, the elimination of the oil subsidy would also either directly or indirectly have a regressive effect on personal income, especially for the poor. Rising oil prices would force people to allocate and spend much more money on oil and fuel because demand for oil is price-inelastic. Moreover, an increase in the price of oil would, indirectly, induce an increase in the price of other commodities because oil is a significant input to the production process. Therefore, an increase in the price of oil is assumed to have an effect of driving cost-push inflation. These direct and indirect effects may result in a decrease in general welfare (Adam 2000).

Since mid-January 2007, the global price of oil has tended to increase. In mid-2007, the international oil price was higher than the price (USD72 a barrel) assumed in the government's budget.¹ Since the first quarter of 2008, the international oil price has been greater than USD100 per barrel. As a net oil-importing country, the increase in the price of oil to more than USD100 per barrel has put pressure on the economy and the budget. With regard to government finances, because of the increase in the international oil price, the subsidy by the government is becoming larger than predicted.

The increasing trend to higher international oil prices is predicted to continue in 2008. Sharp increases in the global demand for oil, particularly from China and India, have contributed significantly to increasing

1 Initially the oil price was assumed to USD63.

international oil prices. It was predicted that world oil consumption in 2008 would be 87.3 million barrels per day, or an increase of 1.5 million barrels per day compared with 2007. For Indonesia, such an increase in the price of oil may require increases in the amount allocated for subsidies in the the government budget. In this regard, the Economic Research Center of the Indonesian Institute of Sciences (P2E-LIPI), has predicted (on the assumption of the price of oil being USD63) that an increase in the price of oil up to USD90 would cause an increase in the oil and electricity subsidy from Rp73.3 trillion to Rp174.3 trillion.

Based on the aforementioned arguments, it is obvious that eliminating the oil subsidy, which might cause an increase in the price of oil, may mean that there must be a trade off between economic efficiency on the one hand and decreasing welfare payments on the other. The objective of this study is to examine the effect of an increase in the price of oil on welfare. This study will also explain important policy implications of what should be done by the government to respond to the current conditions in which the world oil price fluctuates and increases sharply.

Oil Subsidy Policy

Starting in the early 1970s, the Indonesian government has been subsidising oil for 30 years. Windfall profits from rising oil prices, together with low levels of consumption, allowed the government to provide the subsidy. In addition, although net profits from oil production started to decrease from 1975 (that is, the rising costs of production reduced the revenue from sales), the government has continued to subsidise oil with the intention of maintaining the purchasing power of the poor. However, in line with an increase in the demand for oil, the government's budgeted amounts for the oil subsidy rose significantly. Indeed, for the past three years, the demand for oil has increased threefold (from more than 18 million kilolitres in 2002 to 57 million kilolitres in 2007). In addition, total subsidy payments peaked during 1997 financial crisis as the rupiah depreciated against the US dollar. The total amount for the oil subsidy reached Rp51 trillion in 2000, about Rp9 trillion higher than predicted. This caused budget forecasts to be out of line and increased distortions in the structure of the economy.

Responding to the increased price of oil, the government developed policies to reduce dependency on oil. To this end, the government reassessed the benefits of oil subsidies and showed its willingness to eliminate the oil subsidy. However, because this policy redirection may lead to changes in the structure and system of the Indonesian economy, it is being implemented gradually. Moreover, the focus of the subsidy, which had been on commodities, has been shifted to the welfare of the poor. A National Development Program (*Propenas*), promulgated in 2000, stated that eliminating the oil subsidy was to be achieved by 2004. Unfortunately, external factors (the global economy and fluctuation in the oil price) and internal changes (rising poverty rates and unemployment) have constrained the government from implementing the policy completely until recently.

In line with the elimination in the oil subsidy, the government has another scheme to compensate for the effect of rising oil prices. The policy was known as the ‘compensating program for oil subsidy elimination’ and was first implemented in 2000. Through this program, the government reallocates the oil subsidy to other programs, which are aimed at helping poor people and supporting other development programs. It is expected that the compensation program will also help the government to minimise its budget deficit.

Like the oil subsidy, compensating programs are principally to maintain the purchasing power of the poor because rising oil prices decrease their domestic welfare. The program covered various aspects when it was launched in 2000 (see Table 1). In 2000, there were eleven programs, including health, education, small business and other socially beneficial programs. However, in 2008, the programs were reduced to one only, that is, cash transfer (*Bantuan Langsung Tunai*).

Table 1
Targeted Communities for Compensating Programs for Oil Subsidy
Elimination
(PKPS BBM) 2000–2005

No.	Targeted Recipient	Form	2000	2001– 2004	2005		2008
					March	Oct.	May
1	Poor households	Cash transfer Rp100 000 /month/ household	✓	✓		✓	✓
2	Education	Scholarships		✓	✓		
3	Health	Health card for poor		✓	✓		
4	Public transport	Improving public service quality in the transport sector		✓			
5	SMEs	Revolving funds		✓			
6	Water and sanitation	<i>Clean water sanitation program</i>		✓			
7	Social	Support for elderly householders		✓			
8	Fisheries	Empowerment program for fishery community		✓			
9	Religious education	Scholarships for religious schools		✓			

Source: DESDM, various publications.

Rationalisation and Specification of Model

The previous sections have developed the hypothesis that an increase in the price of oil may have an adverse effect on welfare. To test this hypothesis, a multiple regression model will be employed. It is expected that the application of this model will enable the effect to be measured of an increase in the price of oil on welfare. However, it is important to note that welfare is not only affected by the price of oil but also by other

variables. Therefore, several other variables, which can be assumed to have effects on welfare, are also included in the model.

Single regression model can be written as follows (O'Donnell and Connors, 1996):

$$Y_i = X_i' \beta + \varepsilon_i \quad (1)$$

In which:

Y_i is the independent variable for people welfare i , X_i' is a vector ($K \times 1$) for *nonstochastic* independent variable observed, β is vector ($K \times 1$) for unknown parameter and ε_i is a *random error term*.

In relation to the dependent variable, there are many indicators that can be used to proxy welfare. This study uses the proportion of income spent for rice (Y_1) (as the staple food) and complementary food (Y_2) as the indicators for welfare.

Theoretically, according to the principle of marginal propensity to consume, Engle's law says that there will be a decrease in the welfare of people when the proportion of income spent for food increases, and the proportion of income spent for non-food decreases. In contrast, there will be an increase in the welfare of people when the proportion of income spent for food decreases, and the proportion of income spent for non-food items increases.

However, several studies (for instance, Zamroni (ed.) 2003) found that the nominal income of most the respondents did not change along with the increase in the price of oil. Moreover, oil can be classified as a price-inelastic commodity (Kurtubi 2008). Consequently, along with the principle of production possibility frontier, when income does not change and oil is known to be a price-inelastic commodity, it can be assumed that the relation between oil consumption and food will be negative. In other words, an increase in the price of oil would increase the proportion of household income spend on oil and therefore this may reduce the amount of income that can be spent on food. The bigger the proportion of income spent on oil, the smaller the proportion of income spent for food. Hence, this study assumes that welfare will decrease

when the proportion of income spent on food decreases.

The aforementioned explanation is explicit; an increase in the price of oil is one of the independent variables expected to have a significant effect on welfare. However, as noted previously, the price of oil is not the only variable that affects welfare. Consequently, this study will also take into account other variables. Among them are compensation funds, access to oil, and employment in industries that are oil-reliant; in this case, fishing and public transport.

Theoretically, a compensation fund (*Bantuan Langsung Tunai*) is the fund provided by a government to poor people to shield them from the adverse effects of an increase in the price of oil or, for that matter, to negate any other economic disadvantage. However, not all poor people are able to benefit from the fund; there are conditions that must be met before households are eligible for funding. Accordingly, it is predicted that the food consumption function will be different between people who do and do not get compensation benefits. Related to this function, it is expected that compensation funds will have a positive effect on welfare. In other words, a household that benefits from the fund will have more money to spend on food compared with those that do not.

Access to oil is another independent variable that can influence welfare. The reason for including access to oil as an independent variable is based on the situation where an increase in the price of oil was usually followed by an oil shortage in some provinces. There are various reasons why oil supply fell in some provinces. For example, in Bengkulu, it occurred not only because of sedimentation in Pulau Baai which makes it difficult for oil tankers to load and unload but also because of the oligopolistic structure in the oil market.² In Bengkulu there are only three main oil distributors, and these three have family connections. Such an oligopolistic market allows the possibility of speculation. For example, it is highly likely that the three oil distributors in Bengkulu have an agreement to restrict oil supply in search of higher prices (rent seeking behaviour).

When the distributors agree to restrict oil, it reduces supply to the market,

2 Pulau Baai is the major port in Bengkulu.

and it will cause the price of oil to increase to higher than normal. This condition will, in turn, cause households to reallocate their budgets and spend more money for oil and less for food. Consequently, it is predicted that in times when it is hard to get oil for household use (supply is down or price is up) then there will be a reduction in household welfare.

In addition to factors such as an increase in the price of oil, compensating funding, and access to oil, the characteristics of the industry that is the main source of a household's income can also influence welfare. People who work in oil-dependent sectors will be affected more adversely than those who work in less oil-dependent sectors. Therefore, it is to be expected that the more people involved in an oil-dependent industry, the more probable it is that there will be negative effects on their welfare because of rising oil prices.

To sum up, the proportion of income spent on foods, namely rice (Y_1) and complementary food (side dishes) (Y_2) as the indicators for welfare are hypothesised to be affected by the proportion of income spent on oil, compensation funds, access to fuel, and the industrial characteristics of the main source of income. In this regard, the relation between dependent variables (proportion of income spent on rice and side dishes) and independent variables (proportion of income spent on oil, compensating funds, access to fuel, and the characteristic of the main source of income which is fishing-related or public transport) is summarised in Table 2.

Table 2
Estimated Relation between Independent Variables and Consumption of Rice and Side dishes

Variable	Relation
Constant	Positive/negative (+/-)
Consumption of oil	Negative (-)
Compensation funds	Positive (+)
Access to oil	Negative (-)
Fishing	Negative (-)
Public transport	Negative (-)

Source: Summary of Rationalisation and Specification of Model.

Except for the proportion of income spent on oil, all the independent variables are dummies. Therefore, the function of welfare can be written as follows:

$$Y_1 = f(X_1, X_2, X_3, X_4, X_5) \quad (2)$$

$$Y_2 = f(X_1, X_2, X_3, X_4, X_5) \quad (3)$$

In which:

Y_1 = The proportion of income spent on rice,

Y_2 = The proportion of income spent on side dishes,

X_1 = The proportion of income spent on oil,

X_2 = 1 if the respondent obtained compensating funds; 0 otherwise,

X_3 = 1 if the respondent had difficulties in access oil; 0 otherwise,

X_4 = 1 if the respondent works in public transport; 0 otherwise,

X_5 = 1 if the respondent works in the fishing industry; 0 otherwise.

Source of Data

This study relies mainly on primary data. These data were collected by surveying 200 respondents in three places in two provinces; Semarang and Cilacap (Central Java) and Kota Bengkulu (Bengkulu). These locations represent two different distribution chains, one within Java and one outside. Central Java is relatively developed with a better transport infrastructure compared with Bengkulu. Therefore, this is an indication that the distribution chain in Central Java is more advanced than Bengkulu. This difference in distribution infrastructure would affect access to oil; people in Bengkulu may have more difficulties getting oil than these in Central Java.

The survey was conducted for seven months (April to October 2007) using an applying multi-stage random sampling procedure. There were 200 respondents: 69 respondents from the fishing industry; 66 respondents from household businesses in food and beverages; and 65 respondents from public transport sectors.

Unfortunately, of the 200 respondents, 50 either did not give any response or gave invalid answers to the questions about their consumption patterns.

This was probably because the rising oil price examined was the oil price increase in 2005. Consequently, it was difficult for respondents to recall events of that time. These respondents were excluded from the analyses, leaving only 150 respondents in the model.

Estimation Analysis

As expected, the regression analysis indicates that the signs of the coefficients of all independent variable are in line with previous argument (Table 2). As can be seen in Table 3, except for compensating funds, all other independent variables (the proportion of income spent on oil, access to oil, and the oil-reliant characteristics of main source of income) correlate negatively with the proportion of income spent on rice and side dishes. More important, the Durbin–Watson test also indicates a reliable number of non-autocorrelation in the regression equation.

Table 3

Estimation for Consumption of Rice and Side dishes Function

<i>Variable</i>	<i>Rice</i>	<i>Side dishes</i>
Constant	32.048***	26.548***
	(18.854)	(27.577)
Consumption of Oil	-0.139***	-0.214***
	(-3.069)	(-6.079)
Compensation Fund	3.282**	7.034***
	(2.058)	(8.649)
Access to Oil	-0.879	-2.822***
	(-0.671)	(-2.369)
Main source of Income:		
Fishery	-13.632***	-0.781
	(-7.488)	(-0.804)
Public Transport	-19.394***	-2.191**
	(-9.862)	(-2.155)
N	150	150
Degree of freedom	144	144
R ²	0.672	0.443
Durbin-Watson Statistic	1.969	1.467

Source: Authors' calculation

Notes:

1. t-ratios are given in parentheses
2. * Statistically significant at 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

However, Table 3 also shows that the value of R^2 , particularly for the side dishes regression function, is relatively low. It may be because consumption of side dishes is affected by many other independent variables not included in the model. Moreover, there are two variables, that is, access to oil in the function of rice and main source of income in the function of side dishes, are statistically insignificant to influence the consumption for rice and side dishes. Further studies are needed to resolve this matter. Yet, several explanations are worth consideration. One of them can be that there were collection and measurement errors. These errors are highly likely to occur because many respondents had difficulty recalling information about changes in their consumption. Indeed, as noted previously, 50 respondents (25 per cent of the total) did not respond completely or validly when they were asked about the change in their consumption of oil, food and side dishes.

Apart from the technicalities, the remaining 150 respondents form a group quite large enough for regression analysis. Because a large number of respondents were surveyed and included in the regression analysis, the results provide a valid basis for further empirical analysis. As can be seen in Table 3, an increase in the price of oil would decrease welfare. Other things being equal, an increase in the proportion of spending on oil of 1 per cent (because of an increase in the price of oil) would make people reduce their spending for rice and side dishes by 0.139 and 0.204 respectively.

Among the independent variables, the estimated coefficient of compensation funds is the only variable that has a positive sign. This suggests that in the situation where real income of people decreased because of an increase in the price of oil, compensating funds could be as important buffer to enable people to buy food.

In addition, sources of income are the variables that have the largest impact on the consumption of rice and side dishes. This is shown by the coefficient of fisherman and people involved in public transportation variables that have the largest magnitude of impact on consumption. For example, in Y_1 (consumption for rice), the estimated coefficient for people involved in public transport ($\beta_5 = -19.394$) is 22 times larger

than the estimated coefficient for people who said they had difficulty in acquiring oil ($\beta_3 = -0.879$). This comparison can be interpreted as suggesting that the decrease in the proportion of income spent on rice for people who are employed in the public transport sector is 22 times higher than for those others who mentioned that they had difficulty in acquiring oil.

Table 3 indicates that the decrease in the proportion of income used to consume rice and side dishes for people who engaged in the public transport sector is larger than for those who are involved in fishing. This may be because the industrial characteristic of these two main sources of income is different. It means that people who work as fishermen have a higher probability of providing their side dishes by themselves than do those who work as drivers.

Moreover, the study also revealed how people respond to the increase in the price of oil. Fishermen in Central Java who once used diesel fuel adjusted to the increase in the price of oil by changing the composition of their fuel. They use a mixture of kerosene and diesel fuel instead of straight diesel fuel so the fuel costs are lower.³ According to them, it is more economical to use a mixture of kerosene and diesel. Therefore, fishermen in Central Java modify their engines to make them suitable for mixed fuel.

In Bengkulu, the study did not find fishermen who made similar adjustment to those made by fishermen in Central Java. In Bengkulu, fishermen used unadulterated diesel as the main fuel for their boat. Therefore, they had to buy fuel at current prices. This, in turn, forced them to buy less fuel because their income did not increase. Moreover, because they used less fuel, their available fishing areas became smaller over time and consequently the size of their catch decreased.

The study also revealed that the increase in the price of oil is not the only variable in influencing fishermen's welfare. In fact, some fishermen interviewed mentioned that the increase in the price of oil could be accepted were their income to increase to compensate for the increase

3 Fishermen in Central Java call this mixed fuel as 'IREK' (*Irit dan Ekonomis*), which means 'savings and economy'.

in the cost of oil. Unfortunately, the market price for fish has not been improving and this prevents incomes increasing in the fishing industry. Illegal practices and market failure because of imperfections in the market structure, strongly influence the welfare of fishermen. Collusion among traders at fish markets lowers the real price for fish. Fishermen must sell their fish as soon as possible because fish is a highly perishable commodity; its sale cannot be delayed and sellers must accept the price that is offered.

Furthermore, it is common that the market structure in the auction place is owned by a few sellers who can control prices. Therefore, fishermen have to sell their fish to the buyers at the current price, which is set by a cartel.

Unlike the fishing industry, the public transport sector in both provinces tends to have no scheme for income or supply adjustments. Respondent who were of public transport drivers or public motorcycle drivers did not make any adjustment regarding to their fuel use because petrol or diesel fuel is the main fuel for transport. The only adjustment that people engaged in the transport sector can make is to raise fares. However, an increase in fares decreases the number of passengers (and income).

Although transport and fishing can be classified as oil-dependent sectors, the ability to adjust fuel consumption explains why the increase in the price of oil has less effect on the latter (fishing) than the former (transport). The changes in the patterns of food consumption are larger in the former (transport) than in the latter (fishing). From a policy point of view, this implies that more programs are urgently required that are committed to reducing the dependency of various sector on oil by diversifying sources of energy.

Policy Implication

The government of Indonesia has been applying several action plans and policies to respond to and mitigate the negative effects of a trend to higher oil prices on the Indonesian economy. For instance, the government has launched an economic package, known as nine steps,

to secure the economy in 2008 (Table 4). More, the government has a policy to encourage motorists to convert their vehicles to use petrol with a lower octane rating, especially in Jabodetabek. This conversion was expected to save government up to Rp6 trillion. Unfortunately, the government finally decided to increase the price of oil at the end of May 2008.

Table 4
Nine Steps to Secure the Indonesian Economy in 2008

Actions	Expected Saving
1 Utilising Reserve Funds for APBN 2008	Rp 6 trillion
2 Saving Departments/Non-Departments Budgets	Rp 11.7 trillion
3 Prioritising Departments/Non-Departments Budgets	Rp 4 trillion
4 Remedying Production and Consumption Parameters for Oil and Electricity	Rp 6 trillion
5 Improving Efficiency of Pertamina & PLN	
6 Optimising Government Revenue (taxes and profits of BUMN)	Rp 24 trillion
7 Sharing and Utilising Windfall Profits from Regions that produce Oil and Gas	Rp 2.8 trillion
8 Relaxing Deficit by Creating more Government Bonds	
9 Creating Fiscal Incentives for the Real Sector	

Source: Abimanyu and Megantara. 2008. *Mengamankan APBN 2008* [Securing APBN 2008]

In addition, the government's oil policy seems to be spasmodic. In means that many instruments in the government's oil policy are seemingly only designed to have a temporary effect, and could generate other problems. This suggests that the government does not have a master plan to deal with the issue of oil comprehensively and clearly. This also explains why, when the government adopts an oil policy, it causes debate and controversy in the community because the community does not know the rationale for the policy.

One of the most urgent oil policies in Indonesia is diversification of the sources of energy. Like many other countries, Indonesia still relies heavily on oil as the main source of energy. In an attempt to reduce the dependency on oil, the government has implemented a conversion program from kerosene to gas. However, when the program was

launched and introduced, there were many problems because the community was reluctant to support the policy. Accordingly, the results of the program are not impressive. To the end of 2007, of the target of six million cylinders of LPG, the achievement rate was only 50 per cent (Damayanti 2008).

The fact that the results of the implementation of the conversion program is not impressive suggests that the program was not well planned. Indeed, the lack of awareness of the government to disseminate the advantages, safety and compatibility of gas are frequently attributed as the factors that impeded the successful implementation of the program (Damayanti 2008). Hence, it is important for the government to disseminate information to the community about the benefits, advantages and the importance of the program before it is launched. The government should also examine in advance the socio-economic behaviour of community energy consumption habits.

In addition, it is important to note that the government energy policy should not be a short-term policy that is only intended to eliminate criticism and controversy from the community, compensation funds are an example of this. It is important to note that social security policies should not be related to increases in the price of oil. The increase in price of oil is a matter of fact that happens around the world. A compensating fund is a policy related to social security, which has to be conducted regardless other policies and any oil price shocks. The decision in October 2005 to increase the price of oil can be regarded as an example of this policy formulation. As explained in the previous section, the estimation result showed that the policy to increase the price of oil had a negative effect in that it decreased the welfare of people. Therefore, a decision to increase the price of oil should be the last option.

There are more ways for the government to respond to the increase in the global oil price without decreasing the welfare of people. One way is to design a comprehensive road map to increase and achieve goals for reducing oil consumption. During the past eight years, Indonesian lifting for oil has been decreasing. It is apparent that the government had difficulties in meeting its lifting targets. A bad investment climate

is believed to be one factor affecting conditions adversely because law enforcement and regulation constraints impeded investors from increasing their oil-refining capacity (Basri 2007; Kurtubi 2008). In addition, several studies have shown that lower lifting would cause greater effects on budget deficits compared with the increase in the price of oil. Indeed, as Basri (2007) pointed out, when the price of oil increases by USD10 per barrel, it would increase the government budget deficit by only Rp1 trillion, but when lifting less than 50 000 barrels, the target would increase the government deficit by Rp10 trillion.

Cross subsidisation from high to low income communities is another policy for lowering budget deficits. This could be done by changing the subsidy system for some types of fuels that are consumed mostly by those on high incomes. The root of the problem in the Indonesian subsidy system is using a non-differentiated subsidy system. It means that there is no specific criterion to decide who is and who is not eligible for a subsidy (Adam 2000). This suggests that all people receive the benefits the subsidy. Accordingly, as Adi et al. (2003) revealed, the oil subsidy was mainly benefiting the rich not the poor.

Before the last oil increase in May 2008, the international market price for premium-grade petrol Indonesia was Rp7400 a litre. However, the price for premium petrol in Indonesia at that time was only Rp4500 a litre. Thus, there is subsidy of Rp2900 a litre. If we assume that each private car uses 10 litres of premium fuel a day, the owners of the private cars enjoy a subsidy of Rp29 000 per day or Rp812 000 per month (28 days).

A simple calculation, as explained above, shows that the government oil (premium) subsidy goes not to the right people, but rather it goes, in a large part, to the owners of private cars. Thus, efforts of the government to limit the consumption of premium fuel by the owners of private cars may contribute significantly to saving and strengthening the government budget. In this regard, one possible action of the government is to force the owners of private cars to pay the international market price for premium-grade motor fuel.

In line with the reduction in the oil subsidy for the owners of private cars, the government should balance its policy by allocating a greater subsidy for public transport. It is a serious problem that public transport in Indonesia provide bad service for passengers. Problems of bad infrastructure, traffic jams, lack of facilities and poor maintenance contribute to the complex problem of public transport. Therefore, a cross subsidy could be one way of improving the quality of public transport in terms of service and safety so that private transport users would switch to public transport. As a consequence, there would be less private transport and more public transport use, and subsequently this would lower the national dependence on oil.

Conclusion

The study has examined the effect of the increase in the price of oil on welfare. By using regression analysis, the examination in the preceding sections shows that the increase in the price of oil together with other variables, that is, access to oil, and the industry that is the main source of income, affected welfare adversely. In contrast, compensating funds positively affected the welfare. The examination has also indicated that the effect of an increase in the price of oil on household welfare for two different economic sectors varies one from the other. The transport sector experienced a greater decrease in welfare than fishing.

Furthermore, the preceding sections also suggest that the government should have an innovative and comprehensive energy policy to adapt to the current increase in the global oil price. Instead of increasing the oil price, there are other options for the government in responding to the increase in the global oil price, options that do not decrease general welfare. One of the recommended policies is to plan how to achieve the lifting target by improving the investment climate to encourage the increase in refinery capacity.

In addition, the econometric analysis has implicitly indicated the importance of reducing the dependency on oil by diversifying sources of energy. Therefore, in an attempt to diversify sources of energy, various

efforts, such as a biofuel program and conversion from kerosene to liquid petroleum gas (LPG), should be a main government priority. However, it should be pointed out that the government should first explain to the community the rationale underlying these programs.

Finally, cross subsidy from high to low income groups is necessary to help the government reduce its budget deficit. In this regard, the government can encourage, and force, people to shift their petrol use from low to a high octane grade that must be bought at the international market price. By doing so, the government can reallocate its budget to provide more subsidy to the public transport sector. Moreover, by providing more subsidies to the public transport sector, it makes it possible for the sector to improve the quality of its services. This, in turn, may encourage users of private transport to use the public transport services, and this may improve efficiency in the consumption of oil.

References

Books and Journals

- Adi, W. 2003. 'Kebijakan Penetapan Harga BBM dan Mekanisme Subsidi [Oil Price Policy and Subsidy Mechanism]', in Zamroni (ed.). *Dampak Pengurangan Subsidi BBM terhadap Kondisi Ekonomi Masyarakat [The Impact of Oil Price Elimination on Welfare]*. Jakarta: Pusat Penelitian Ekonomi (P2E)–LIPI, pp. 13–32.
- Chandrawati, N. 2007. 'Krisis Energi dan Keamanan Pasokan Energi [Energy Crisis and Oil Stock Sustainability]'. *Analisis CSIS*. Vol. 36, No. 1: 74–91.
- Ermawati, Tuti. 2007. 'Dampak Kenaikan Harga BBM terhadap Sektor Transportasi [Impact of Oil Price on Public Transportation]', in Esta Lestari (ed.). *Pengaruh Kebijakan Harga Energi terhadap Kegiatan Ekonomi dan Kesejahteraan Masyarakat: Dampak Kenaikan Harga BBM [The Impact of Energy Price on the Economy and Welfare]*. Jakarta: Pusat Penelitian Ekonomi (P2E)–LIPI.
- Lestari, Esta. 2003. 'Dampak Pengurangan Subsidi BBM terhadap Perekonomian Makro [Impact of Oil Subsidy Elimination on Economy]', in Zamroni (ed.). *Dampak Pengurangan Subsidi BBM terhadap Kondisi Ekonomi Masyarakat [The Impact of Oil Subsidy Elimination on Welfare]*. Jakarta: Pusat Penelitian Ekonomi (P2E)–LIPI.

- O'Donnell, CJ and Connor, DH. 1996. 'Predicting the Severity of Motor Vehicle Accident Injuries Using Model of Ordered Multiple Choice'. *Accident Analysis and Prevention*. Vol. 28, No. 6: 739–53.
- Purwanto. 2007. 'Dampak Kenaikan Harga BBM terhadap Nelayan [Impact of Oil price on Fishery]', in Esta Lestari (ed.). *Pengaruh Kebijakan Harga Energi terhadap Kegiatan Ekonomi dan Kesejahteraan Masyarakat: Dampak Kenaikan Harga BBM [The impact of Energy Price on the Economy and Welfare]*. Jakarta: Pusat Penelitian Ekonomi (P2E)–LIPI.
- Samuelson, PA and Nordhaus, WD. 1990. *Economics*, McGraw-Hill Inc.
- Zamroni (ed.). 2003. *Dampak Pengurangan Subsidi BBM terhadap Kondisi Ekonomi Masyarakat [The Impact of Oil Subsidy Elimination on Welfare]*. Jakarta: Pusat Penelitian Ekonomi (P2E)–LIPI.

Newspapers

- Adam, L. 2000. 'Dilema Pengurangan Subsidi BBM [Eliminating Oil Subsidy: a Dilemma]'. *Republika*, 12 March.
- Basri, F. 2007, 'Konversi Premium itu Muslihat Baru [Premium Conversion is Cheating]'. *Kompas*, 10 December.
- Damayanti, D. 2008. 'Kinerja Ekonomi 2008 Terancam Harga Minyak [Performance of the Economy in 2008 is affected by the International Oil Price]'. *Kompas*, 5 January.
- Kurtubi, 2008. 'Gejolak Harga Minyak dan APBN 2008 [Fluctuation of Oil Price and Government Budget in 2008]'. *Seputar Indonesia*, 7 January.
- Prijambodo, B., 2007. 'Risiko Ekonomi Dunia Tahun 2008 [The World Economy Risk in 2008]'. *Kompas*, 7 December.

Websites

- Abimanyu, A and Megantara, A. 2008. 'Mengamankan APBN 2008 [Securing 2008 Budget]'. <http://www.fiskal.depkeu.go.id/webbkf/kolom/detailkolom.asp?NewsID=N799537213>, accessed 8 January 2008.
- International Energy Agency, 2007. 'Annual Energy Outlook 2008 with Projection to 2030.' <http://www.eia.doe.gov/oiaf/aeo/overviews>, accessed 7 January 2008.
- International Oil Daily, 2008. 'Your Comprehensive Daily Oil and Gas News Briefing for the Global Petroleum Industry'. http://www.energyintel.com/publicationhomepage.asp?publication_10=31, accessed 7 January 2007.