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Economic Dimensions of ASEAN's Energy Security

By

Praipol Koomsup



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## Petroleum Products Pricing and Its Impacts:

### View from an Oil-Importing Country<sup>1/</sup>

#### Introduction

During the past eight years the world has experienced two oil crises which were characterized by sharp oil price increases and sudden oil supply shortages in 1973/74 and again in 1979/80. The nominal price of oil has risen by over ten times and its real price has more than doubled.

Thailand is one of the developing countries which have to rely on oil for most of their energy need. During the past two decades oil has constituted at least 80 % of Thailand's total energy requirement. Other energy sources, all of which are found and developed locally, are hydropower, lignite, paddy husk, bagasse, charcoal and wood. Natural gas from the Gulf of Thailand just entered the energy picture a few months ago. Each of these non-oil energy sources still accounts for a small fraction of total energy consumption. And though there is a prospect of more use of natural gas, lignite and imported coal, oil will still be the main energy source which supplies at least half of Thailand's total energy need in the next decade.

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<sup>1/</sup>The author would like to acknowledge research assistance from Somboon Siriprachai, Linda Tangchai and Adisak Koopavornrerk.

With a very small discovered oil endowment in the country, Thailand has been importing almost all of its oil consumption. Since 1964 when the first local oil refinery started operating, crude oil has been imported and locally refined. In 1980 local refineries imported about 175,000 barrels per day of crude oil, mainly from the Middle East, and the locally refined oil products accounted for nearly 70% of total oil consumption. The remaining demand for oil was satisfied by finished petroleum products imported mostly from Singapore.

Being in a position of a net oil-importing country in which most of its energy requirement is met by imported oil, Thailand has been adversely affected by frequent disturbances in the world oil market. These disturbances occurred in the form of massive increases in world oil price by the OPEC, accompanied by disruptions in oil supply in the world market. It should be noted that most serious oil supply shortages were caused by political events in the Middle East, most notably the Arab oil embargo in 1973/74 and the Iranian crisis in 1979/80.

This article analyzes the impacts of oil price increases on the Thai economy since 1973. Some macroeconomic indicators and the pattern of oil consumption are examined with a view to relate them to oil prices. The government oil pricing policy and measures are also described, with a special

emphasis on the role of Taxes or subsidies on different oil products.

### Impacts of Oil Price Increases

In analyzing the economic impacts of changes in oil prices in oil-importing countries, it is useful to distinguish between the import price of oil and the final price paid by the oil consumers. Although these two prices usually move in the same direction, the magnitudes of their changes tend to vary.<sup>1/</sup> As shown in table 1, during the 1973-1981 period while the price of Arabian Light crude increased by fifteen times, the prices to consumers of premium gasoline and diesel oil (as well as other petroleum products not shown in the table) in Thailand increased by considerably lower percentages and with some time lags. The difference is due to the fact that other components in the retail prices of these petroleum products, namely refining cost, taxes, and marketing margins rose at lower rates than crude oil prices. Some of these other components even declined absolutely.

Moreover, there are differences in the direct impacts of the import price and the final consumer price. While change in the import oil price directly and immediately affect the balance of trade, the balance of payments, the financial

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<sup>1/</sup>The difference between the two prices is also observed in major industrialized countries, e.g. Canada and the United States. See Peter J. Quirk, "Managing the Demand for Energy in the Industrial World", in Finance and Development, December 1980, p.15.

position, and exchange rates, changes in the retail price of oil, which are mainly influenced by the import price, have direct impacts on inflation, the pattern of energy consumption and production, government revenue and expenditure, and activities in energy-related or energy-intensive sectors. Eventually such important macroeconomic variables as economic growth and stability, income distribution, and unemployment will be affected by these direct impacts of the two prices.

Some of the impacts of oil price changes on the Thai economy can be seen from the economic indicators for the 1970-1980 period shown in table 2. Since 1974 oil has become the biggest import item, and its share in total import value increased from about 10% before 1974 to 30% in 1980. The sharp price increases in 1974 and 1979 brought about large increases in import values - 50% and 40% in 1974 and 1979 respectively. Massive increases in the prices of imported oil has drastically reduced Thailand's import capacity. In 1980, for instance, Thailand had to spend 44% of its export earnings to purchase oil from abroad.

A trade gap, which has occurred every year for more than two decades, has been widened since after the first oil crisis. Increases in the balance of trade deficit were particularly high in 1974, 1975, 1977 and 1979, mainly because of oil import prices. After 1974 Thailand's balance of payments deficits occurred more frequently than in the previous



period. Nevertheless, the country's foreign exchange reserves expanded gradually every year, except for a slight decline in 1975. This has been possible due to substantial borrowings from international money markets. It should be noted that in recent years the Thai government was forced by sluggish world trade and higher prices of its imported oil to support its balance of payments by borrowing more from private capital markets and paying higher interest rates than in such official capital markets as the World Bank, the International Monetary Fund, and the Asian Development Bank.<sup>1/</sup> In contrast to the period before 1973, Thailand's foreign debt indicators, namely debt outstanding and debt service ratios, increased consistently after the first oil crisis. However, these foreign debt indicators are relatively low compared with other oil-importing developing countries, and are still the lowest in ASEAN.

Since oil consumed both directly and indirectly in order to provide energy in most economic activities, its prices increases would have a widespread impact on the cost of production, the cost of living, and the general level of inflation.

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<sup>1/</sup> This is true not only for Thailand, but also for other ASEAN countries. The foreign debt outstanding by the government sector in private capital markets for ASEAN as a group increased from 23% of total debt outstanding in 1974 to 41% in 1978. See Pranee Tinakorn, "Survey of Foreign Debts in the Government Sector of ASEAN", a paper (in Thai) presented at a workshop on Foreign Debts in Thailand at the Faculty of Economics, Thammasat University, April 3, 1980.

A study utilizing the 1975 input-output table of Thailand estimates the total effect of oil price increases on the cost of production in several economic activities. The estimated total effects of a 1% increase in the retail prices of petroleum products on production costs are as follows.<sup>1/</sup>

<u>Activity</u>	<u>Percentage increase in production cost</u>
Agriculture	0.0151
Fishery	0.1131
Mining	0.1484
Food	0.0078
Textiles	0.0117
Chemicals	0.0112
Electricity	0.5956
Water supply	0.0105
Construction	0.0234
Trade	0.0158
Hotels and restaurants	0.0032
Transportation and communication	0.3485
Other services	0.0059

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<sup>1/</sup> See The Nation, January 25, 1979.

The effect on production costs varies among different sectors depending on the magnitude of an oil-input coefficient or oil intensity in each sector. The results above indicate that the sectors which are most affected by oil price increases in terms of production costs are electricity, transportation, mining, and fishery. For these sectors, the production cost effect ranges from 0.6% for electricity to 0.1% for fishery. The oil price effects on other sectors, e.g. agriculture, food, and most service sectors, seem to be rather minimal because of low intensities in their oil usage.

Another study which uses the same set of input-output coefficients calculates the effects of a 74.80% rise in the average retail price of oil products in 1979 on production costs in more disaggregated sectors.<sup>1/</sup> The results of the second study as shown in table 3 confirm that the hardest hit sectors are electricity, transportation and mining. However, the estimated effects in every sector seem to be proportionately less than the ones found in the first study.

The results also show that production costs in major manufacturing industries were affected in varying degrees by the 1979 oil price increase: glass and glass products (17%),

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<sup>1/</sup> Poonsa-Nga Somboonpanya, et.al., The Pricing Policy for Oil, Electricity and Natural Gas in Thailand, submitted to the National Economic and Social Development Board (NESDB), April 1981.

ceramic (13%), non-ferrous metal (11%), cement (8%), paper pulp and paper (9%), textile (7%), and plastic products (7%). Among agricultural activities, the ones that were significantly affected are agricultural services<sup>1/</sup> (15%), and sea fishery (11%). In the transportation sector, marine transport would become relatively cheaper than land transport as marine transport cost was raised by a much lower percentage than land transport cost. This is confirmed by another study which concludes that a 100% increase in oil prices will increase the costs of road transport, railway transport and river transport by 25%, 15%, and 12% respectively.<sup>2/</sup>

It should be noted that these energy-intensive sectors or activities which are most affected by oil price increases are also the largest consumers of most oil products. For instance, the transportation sector consumes most of gasoline and diesel oil, while the electricity and manufacturing sectors burn over 95% of fuel oil. The cement industry, in particular,

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<sup>1/</sup> These services include ploughing, water pumping, etc. which have become increasingly mechanized, thus relying more on oil.

<sup>2/</sup> See Panich Sua-Sakul, et.al., The Impact of Oil Price Increases on Marine and Land Transportation, submitted to the NESDB.

consumes nearly half of the fuel oil used in the total manufacturing industry. The manufacturing industry is also the largest consumer of electric power - consuming over 60% of the electricity generated in each year.

One of the weaknesses in using the 1975 input-output table is that the oil input coefficients are not classified into different types of petroleum products. Therefore, while several different sectors tend to rely on different oil products for energy sources (e.g. gasoline and diesel oil in transportation, fuel oil in industries and electricity), the estimation of the effects on production costs using this input-output table will not reflect the real impact when the prices of these oil products increase at different rates. In practice, the actual prices of these oil products are averaged, and this average price is then used in the calculation.

The two studies on the oil price-production cost relationship also give estimates of the impact on some indicators of the cost of living. An increase in the retail prices of oil products of 10% is estimated to contribute to about 1.4% and 0.7% increases in the consumer price index and the wholesale price index respectively. The impact of the 1979 oil price increase is shown to have raised the consumer price index by over 5%, which is about half of the actual increase of the index in that year.

The CPI growth rate figures in table 2 clearly show that inflation rates after 1973 are significantly higher than those in previous years. Inflation was particularly high in 1973/74 and 1979/80 when the import and domestic prices of oil went up very steeply. It is therefore reasonable to conclude that oil price increases are one of the important factors which cause cost-push inflation in Thailand.

Despite the adverse impacts of the oil crises on the economy, Thailand's economic growth performance has not been seriously affected. Since 1974 the economy has been able to maintain the average growth rate of about 7% per annum, which is comparable with the rest of ASEAN and is relatively high among oil-importing developing countries: (See table 2) This may be partly due to its ability to borrow from abroad to finance high growth rates. In addition, the "commodity boom" in 1974, partly precipitated by the oil crisis, pushed up prices of Thailand's major primary exports, e.g. rubber, tin, sugar and rice. This boom plus the fact that Thailand has been able to boost its industrial exports helped to cushion the adverse impacts of the oil crises on the economy. Moreover, there is an evidence which indicates that since 1974 Thailand has been relying relatively less on energy to fuel

economic growth. A study by Siddayao <sup>1/</sup> shows that the elasticity of energy consumption with respect to GDP for Thailand declined from 2.7 for the 1965-1973 period to 1.05 for the 1974-1978 period.

The pricing of different oil products directly affects the pattern of oil consumption because substitution among different oil products is technically possible to some extent, e.g. a substitution between gasoline and LPG in passenger cars, and kerosene can be mixed with diesel oil in transport use. Table 4 displays the retail price structure and net tax or subsidy <sup>2/</sup> of five representative oil products in Thailand, including dates of price changes from 1973 up to early 1981. As shown in the table, gasoline is more heavily taxed than other products, as it is regarded to be a "less essential" product which is mostly consumed by the well-to-do. Subsidies are now given to kerosene, fuel oil <sup>3/</sup> and LPG, mainly for distributional and political reasons. For instance, kerosene is

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<sup>1/</sup> See Corazon Siddayao, "Oil Prices, the External Debt and Economic Growth", a paper presented at Input-Output Research Association Conference on Industrial International Trade, in Singapore, 13-16 April, 1981, pp. 14-15.

<sup>2/</sup> The net tax and subsidy is the sum of taxes and oil fund, both of which are explained in some detail below.

<sup>3/</sup> Apart from the subsidy given to the general consumers of fuel oil, the government also gives additional subsidy to the fuel oil and the diesel oil used by the Electricity Generation Authority of Thailand (EGAT). Both types of subsidy are drawn from the oil fund.

mostly consumed by the rural poor, LPG is used in cooking by the urban population, and fuel oil is burnt in power plants and factories. These products are regarded to be more essential and politically sensitive since their prices have substantial impacts on the cost of living of the majority, particularly the poorer section of the economy.

Table 5 shows the annual average retail prices and their percentage changes of the five oil products in Thailand from 1973 up to October 1981. Large changes occurred in 1974, 1979 and 1980 when the average prices increased by 74%, 40% and 53% respectively. The prices remained stable throughout the year of 1976, and their rates of increase were minimal in 1975. It can be observed that the oil products which are subsidized in 1980/81 are those whose rates of increase in price are relatively low in most year except in recent years when the government tried to reduce their rates of subsidy.

The relatively low price of LPG has induced more use of it, as witnessed by consistently large increases in consumption. (See table 6) Differences between the retail prices of LPG and gasoline, due to high tax rates on gasoline and subsidy for LPG, have encouraged substitution of LPG for gasoline in road transport. It is estimated that at least 10,000 taxis in Bangkok are presently using LPG as a fuel substitute for gasoline. It is believed that more diesel oil



has been used instead of gasoline because of price differences, but our consumption data do not clearly show such interfuel substitution. The consumption of fuel oil seems to depend on the pattern of energy use in electricity generation. Its consumption rapidly increased in 1977 because more fuel oil has to be burnt in power plants to supplement hydro lectric power whose supply was low due to a serious drought in that year. Supply constraints resulting from disruption in oil import supply can reduce the use of fuel oil, some of which has to be imported in the finished form, as witnessed by reductions in 1974 and 1979.

As far as total oil consumption is concerned, the rational response to price increases in an oil-importing country like Thailand is to reduce oil consumption, or at least to reduce its growth rate, and switch to other cheaper energy resources. Having been dependent on oil for energy for at least two decades, it is rather difficult in the short run for the country to choose such a response. Changes in the consumption pattern of energy, either in transport or industry or power generation, will take years, for these involve substantial investment; and it will be very costly to achieve in the short run.

However, as noted above, events in the past show that sudden increases in world oil prices were always accompanied by serious oil supply shortages in the world market. These events exogenously restricted oil import and consumption in Thailand as well as in other oil-importing countries. As a result, oil consumption in Thailand was reduced and its total energy consumption grew at very low rates. The consumption of oil products in Thailand dropped slightly in 1974 and 1980; and its total energy consumption grew by less than 2% in 1974, compared with the average growth rate of 15% per year during the 1970-73 period. These reductions seemed to be directly related to the oil supply disruption caused by external factors, and perhaps had little to do with price responses.

However, consumption of some oil products in Thailand was reduced in the first half of this year, even though oil import supply was not restricted as there has been an oil glut in the world market. The figures in table 6 indicate that less gasoline and diesel oil was consumed in the first five months of 1981, compared with the same period of 1980. The 9% reduction in gasoline consumption can be attributed to a rather steep increase in its price early this year, coupled with some quantitative measures aimed mainly at the use of passenger cars, e.g. limits on the operating time of gas stations,

and a reduction of highway speed limit. A drop in diesel oil use was probably due to a shift from trucks to boats and barges for cargo transport. The three subsidized products, i.e. kerosene, fuel oil and LPG, still registered significant gains in consumption. However, the overall consumption of liquid oil products increased by only 5% - a rather low growth rate compared with those in the past normal supply years.

While it is not certain whether this slowdown in oil use is long-lasting, the experience in the first half of this year proves that price increases alone can, to some extent, curb oil consumption.

Oil Pricing Policy

a) Policy objectives

In a market where there is perfect competition with no distortions, a simple microeconomic theory tells us that an equilibrium price will be obtained and consumers will maximize their utility while producers and sellers will earn their normal profit. The problem of shortages or surpluses will disappear. Any government intervention is not necessary because government decisions will never achieve an equilibrium which is superior to that achieved by decisions made by consumers and producers.

In the real world, perfect competition is a rarity and distortions do exist. The world oil market is very much influenced by the monopolistic actions of the OPEC cartel and major oil multinational corporations. Competition in Thailand's oil market is perhaps less than perfect. These factors plus the fact that oil has become an economically and politically important commodity lead to government intervention in the form of price control, taxes or subsidies, oil stockpiling, and various quantitative restriction measures.

Governments in most oil-importing countries have tried to use oil pricing policy and other restrictive measures to discourage excessive oil consumption. The policy which sets domestic oil prices in order to reflect higher cost of imported oil is very difficult to implement. There is an understandable reluctance to impose hardship on low and middle income population by raising oil prices. In Thailand, the pricing of oil products has become such a **sensitive** political issue because of its significant impact on the cost of living that one government was brought down in 1980 after it sharply raised the retail prices of oil products and electricity. In setting oil prices, the government is caught in a situation in which it has to trade off among different conflicting policy objectives, e.g. a trade-off between an equitable burden distribution of higher cost of living on various income groups and the saving of foreign exchange spent on imported oil. Conflicting policy objectives stem from the fact that there are arguments both for and against keeping oil prices high.

The high-price proponents advocate that oil pricing policy should ensure that the price of oil in various uses reflect its real economic cost in order to promote energy

conservation and efficiency, and foreign exchange saving. A premium can be charged over and above the economic price of oil where uncertainties in import oil supply exist. This is to accelerate a shift away from oil and avoid or reduce the shock effects caused by sudden disruptions in oil supply. Oil pricing should also encourage more use of indigenous energy resources and spur investment in exploration and development of local energy resources. Moreover, in the case where taxes are imposed on some oil products, the government can earn additional tax revenue which help financing more and better public services.

On the other hand, there is a pressure on the government to use some restraints in raising oil prices. The arguments for low oil prices are mainly based on distributional grounds. For instance, the impact of oil price increases on inflation adversely affects the poor and fixed-income earners by creating inequitable burden of higher cost of living on different income classes. The impact can be large enough to cause social and political discontent. The higher cost of production resulting from oil price increases may hurt some small and numerous producers who cannot fully pass on the burden to consumers due to the lack of their market bargaining power. These arguments may call for a pricing policy which

subsidizes the use of oil by the unfortunate groups of consumers and producers. In practice, it is administratively difficult to implement a policy which differentiates the price of an oil product in different uses or among different types of users. Even when there is no price differentiation for the same type of oil product, subsidies can lead to energy inefficiencies and undesirable inter-fuel substitution. Keeping oil prices low by subsidization may be a short run political solution, but it will make a long run economic solution difficult, or even impossible.

However, there is a pure economic case for price subsidy on some oil products in a situation where are externalities in the use of some traditional fuels. For instance, the use of charcoal and wood are still common in rural areas where these resources are almost free goods to the users. If the prices of commercial fuels, particularly oil products, are too high, there will be more use of charcoal and wood which leads to the problem of deforestation. Subsequently, a social cost will be incurred in the form of environmental, ecological and soil problems affecting agriculture and various aspects of the rural life. It might be better to enact a law which prevents forest destruction,

hence making these fuels more expensive; but this is difficult to enforce when the pressure of growing population on land is already great.

b) Policy measures

The government imposes a price control on all oil products because it regards them as being vital to the livelihood of the population. Though it is debatable whether this price control is desirable, one cannot deny that for political and economic reasons, some of which are noted above, the government should have some influence on domestic oil prices.

For locally refined products in Thailand, the government controls prices at two levels, namely retail prices and ex-refinery prices. Excise, municipal and business taxes are collected at different rates for different types of product.<sup>1/</sup> In addition, there is a component called the "oil fund" which is equivalent to a variable tax or subsidy allowing the government to change the ex-refinery price without changing

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<sup>1/</sup> A business tax has been exempted for locally refined products since February 1979.



other components, particularly the retail price. The remaining component of the retail price is a marketing margin which includes marketing costs and profits of oil traders. Therefore, the breakdown of retail price components for a locally refined product is as follows:

$$\begin{aligned} \text{Retail Price} = & \text{Ex-Refinery Price} + \text{Municipal and} \\ & \text{Business taxes} + \text{Oil Fund} + \text{Marketing} \\ & \text{Margin} \end{aligned}$$

There is no import tax on crude oil import. For imported refined products, the government collects an import tax as well as business and municipal taxes. The rates of these taxes are based on the "import price" set by the government on the basis of c.i.f. prices. The retail price components of an imported refined product are as follows:

$$\begin{aligned} \text{Retail Price} = & \text{Import Price} + \text{Import Tax} + \text{Municipal} \\ & \text{and Business Taxes} + \text{Oil fund} + \\ & \text{Marketing Margin} \end{aligned}$$

The oil fund collected from (or paid to) local refineries and importers usually differs to equalize the marketing margins and the retail prices of both locally refined and imported finished products. The difference is due to the fact that

taxes on both products are slightly different and the ex-refinery prices are lower than the import prices for most types of product. These differences can be seen in table 7 which shows the retail price components of five oil products, both locally refined and imported, as applied from September 1981 up to the present.

It is clear that the Thai government has been trying to control not only the retail prices of oil products, but also those components in the prices. Therefore, it is interesting to examine these components individually.

Ex-refinery price:

Prior to the first oil crisis in 1973/74 the government set the ex-refinery price for the biggest local refinery (The Thai Oil Refining Company or TORC) by using the following formula:

Ex-refinery price = F.O.B. ex-refinery price in  
Singapore + Singapore-Bangkok  
transport cost + insurance cost  
+ losses (0.5% of c.i.f. Bangkok  
price)

After the world oil price began rising very sharply at the end of 1973, transport and insurance costs, including

losses, were taken out of the formula. Since then the ex-refinery price in Thailand has been tied with the Singaporean f.o.b. ex-refinery price (or posting price), though the prices still differ slightly for some products. Thailand's ex-refinery prices are now based on the average of the posting prices of four major oil refineries to calls (Shell, Esso, Mobil and British Petroleum) in Singapore. Because Singapore is the biggest refining center in the region and is likely to have the economies of scale which ensure efficiency, such a price setting formula should force local refineries to be as efficient as those in Singapore. One interesting issue is whether this method of ex-refinery price determination is appropriate. Different conditions in the two countries, e.g. the prices of crude oil imported, oil demand patterns, refinery yield patterns, and domestic cost components in refineries, may require differences in their ex-refinery prices. It has been observed that an incentive provided to Thailand's local refineries for producing fuel oil is relatively greater than for diesel oil; and this contributed to shortages in diesel oil in the past and will lead to fuel oil surpluses in the future when lignite and natural gas will substitute for much of fuel oil used in electricity generation.<sup>1/</sup> Price

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<sup>1/</sup> See Thailand: Energy Issues and Prospects, a World Bank report, May, 1980, pp. 76-78.

differentials among different products as well as among different refineries need to be considered by taking into account various cost and demand differences.

#### Taxes and oil fund

Before the first oil crisis, taxes were the biggest component which was added to the ex-refinery prices of all oil products. All taxes as percentages of ex-refinery prices range from over 100% for gasoline and LPG to 30% for diesel oil. (See table 8) After December 1973 these percentages began to decline as the government tried to reduce the oil tax burden in order to soften the impact of import prices on domestic prices. Retail prices remained stable from December 1975 to March 1977, and the relative tax shares reached the lowest level for gasoline and diesel oil during that period. These shares picked up gradually until early 1980 when the political pressure which caused a change in the government pushed them down again. At present, fuel oil, decosene, and LPG are subject to only minimal taxes, while the tax shares on gasoline and diesel oil are about half of those in early 1973.

Oil is one of the very few commodities which bring substantial tax revenue to the government. The excise tax revenue from oil products is in fact the largest among various types of excise tax. As a percentage of total tax revenue, the revenue from oil excise tax seemed to be directly related to oil price increases after 1974. It went down from 7.2% in 1974 to 6.5% and 6.3% in 1975 and 1976 respectively when domestic oil prices remained constant; then it climbed up to 8.4% and 12.9% in 1979 and 1980 respectively when oil prices were substantially raised. (See table 9) The revenue from import tax on oil products follows a similar pattern, reaching the lowest level of about 1% of total tax revenue in 1975 and 1976. The revenue from both taxes as a percentage of total tax revenue was 16% in 1980 - higher than in previous years. This seems to imply that high domestic oil prices have been caused not only by the OPEC's action but also by the government's action, intentional or not, of shifting its tax base towards oil products.

Because the taxes on oil product are indirect taxes, most of the oil tax burden would fall on oil final users. And like other indirect taxes, the oil taxes tend to be regressive, thus creating relatively larger burden on the poor

than on the rich. But since the government taxes the types of oil product used mainly by the rich (e.g. gasoline) at higher rates than those used mostly by the poor (e.g. kerosene and fuel oil), the degree of tax regressivity should be reduced or even reversed. There is a study<sup>1/</sup> which tries to assess the distributional impact of oil products in Thailand in 1973. Using the 1971 input-output table, the study shows that while most gasoline is consumed directly and indirectly by the above-average income class, other oil products (diesel, kerosene and fuel oil) are mainly consumed both directly and indirectly by the below-average income class. It finds that even with differential tax rates on oil products, the poor still had to pay oil taxes as a percentage of income slightly higher than the rich. The effective oil tax rate for the poor ranges from 2% - 4% of income, while it is around 2% of income for the rich.

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<sup>1/</sup> See The Distributional Impact of Taxes on Petroleum Products in Thailand, 1973, Wantana Panitpiboon, M.A. thesis, Faculty of Economics, Thammasat University, 1978.

Apart from the oil taxes mentioned above, there is another type of government levy called the oil fund. This fund was set up in 1974 when the government collected the oil company's windfall profit arising from higher retail prices of the "old cost" oil stock. In 1975 the government began to collect the oil fund from oil users by adding it as another component of the retail price. The component is a positive levy every time the government raises the controlled retail prices, and it will be reduced when ex-refinery prices are raised, as a result of higher oil import prices, in order to keep the retail prices constant. For kerosene, fuel oil and LPG, the retail prices and taxes have been set at such low levels that the oil fund becomes negative, i.e. subsidies are given by drawing from the oil fund, until there is another round of retail price adjustment. At present these subsidies from the oil fund, for these oil products are such that their retail prices are lower than their import prices, indicating that new price adjustments are forthcoming. (See table 7) It is only for gasoline that the oil fund remains positive all the time. (See table 8) From 1975 to 1977 and from 1979 to early this year, payments were drawn from the oil fund to subsidize the prices of fuel oil and diesel oil used by the EGAT to keep down the price of electricity. These subsidies,

the rates of which were quite high,<sup>1/</sup> are the main cause of a continuous and large deficit in the oil fund. It is estimated that the oil fund deficit amounted to 3,600 million baht at the end of 1980. To the extent that electricity is used mainly by people in big cities, particularly Bangkok, these large subsidies would benefit only city dwellers, perhaps at the expense of the rural sector, thus worsening the distribution of oil tax burden.

One may question the government's strategy of raising oil prices by also including the oil fund in retail prices. This strategy means that the new price levels will have to be high enough so that the oil fund can be adjusted downwards to stabilize domestic prices when imported oil is getting more expensive. An alternative strategy is to raise domestic prices every time import prices move upwards. Therefore, price adjustments will be more frequent and the average prices over time may be lower than in the first strategy.

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<sup>1/</sup> In 1979, for instance, the price paid by the EGAT for fuel oil was 1.58 baht/litre while the market price was 2.86 baht/litre. The subsidy amounted to 1.28 baht/litre or nearly 50% of the market price.



The question is whether one price strategy will have a greater impact on inflation than the other. The answer depends on the nature of price speculation and the accuracy with which all actors in the economy (including the government) can anticipate changes in import prices.

The above analysis indicates that government taxation or subsidization plays a big role in oil price movements. Some economic guidelines should be suggested to enable the government to set the "optimal" tax and subsidy rates on oil products. For instance, the objective of an oil price policy is to maximize the saving of foreign exchange spent on imported oil, subject to some constraints related to the impact of oil prices on inflation, government revenue, and other important variables. Such a programming exercise needs more knowledge on oil demand elasticities, the elasticities of consumer price index and government revenue with respect to oil prices, and the structure of domestic oil market.

#### Marketing margin

The marketing margin is supposed to include storage cost, transport cost, other marketing costs, and oil traders' normal profits. If the margin is too low, the profits will be squeezed and supply problems may emerge in the form of lower import supply, fewer gas stations, oil adulteration,

and black market. On the other hand, if the margin is too high, oil traders may earn excessive profits. The government, therefore, has to deal with the question as to what the marketing margin should be. So far, there is no government agency which has been assigned to study this question on a continuous basis. In practice, the margin set is based on the cost information occasionally given by oil companies, with no independent research to check its accuracy and reliability. This does not mean that the margin allowed by the government has been excessive. On the contrary, the margin for premium gasoline actually declined during the 1973 - present period, and the margins for other products increased slightly. (See table 10) While the actual oil marketing costs are likely to have increased significantly during the period, the small increases in the margin would squeeze the profits earned by oil traders and dealers. Unless the profits were above normal before 1973, this means that the supply problems mentioned above will become serious in the future.

#### Concluding Remarks

The oil pricing policy in Thailand involves the government's attempt to intervene in every activity in the domestic oil market. The main intention is to tax the luxury of the rich and subsidize the necessity of the poor, while

at the same time taking into account uncertainties in supply and price in the world oil market. Decisions have been made on the basis of political expediency at the expense of genuine economic efficiency.

It is the role of an economist to point out that the energy problem is an economic problem which cannot be solved without taking economic factors into consideration.

A proper oil pricing policy is one of several policies which are essential to a real solution to the problem. Before such a policy can be formulated, we need to know and understand thoroughly various economic and social aspects of oil prices, e.g. their impacts on the pattern of energy use, energy conservation, and other economic and social human behaviors. Though this article analyzes some of these aspects, a number of unanswered questions raised should indicate that more study, particularly at a micro level, is badly needed.

Table 1: ARABIAN CRUDE OIL PRICE AND RETAIL OIL PRICES IN THAILAND,  
1973-1981.

Date of Price Change	Arabian Light Crude Oil Price		Thailand Retail Price			
	\$/Barrel	Index	Premium Gasoline		High Speed Diesel Oil	
			฿/litre	Index	฿/litre	Index
January 1, 1973	2.09	1.00	2.10	1.00	0.98	1.00
April 1, 1973	2.19	1.045	-	-	-	-
June 1, 1973	2.28	1.092	-	-	-	-
July 4, 1973	-	-	2.30	1.095	1.05	1.071
November 14, 1973	-	-	2.69	1.281	1.41	1.439
December 17, 1973	-	-	3.01	1.833	1.60	1.633
January 1, 1974	8.32	3.977	-	-	-	-
February 27, 1974	-	-	3.62	1.724	2.33	2.378
March 17, 1974	9.30	4.445	-	-	-	-
May 17, 1974	9.60	4.589	-	-	-	-
September 19, 1974	9.80	4.685	-	-	-	-
October 3, 1974	10.15	4.852	-	-	-	-
November 1, 1974	10.46	5.000	-	-	-	-
October 1, 1975	11.50	5.497	-	-	-	-

Table 1 Continued

Date of Price Change	Arabian Light Grude Oil Price		Thailand Retail Price			
	\$/Barrel	Index	Premium Gasoline		High Speed Diesel Oil	
			฿/litre	Index	฿/litre	Index
January 1, 1977	12.09	5.779	4.22	2.010	2.64	2.694
March 15, 1977	-	-	-	-	-	-
July 1, 1977	12.704	6.073	-	-	-	-
March 9, 1978	-	-	4.98	2.371	-	-
January 1, 1979	13.339	6.376	-	-	-	-
January 31, 1979	-	-	5.60	2.667	3.03	3.092
July 1, 1979	18.00	8.604	-	-	-	-
July 12, 1979	-	-	7.84	3.733	4.71	4.806
November 1, 1979	24.00	11.472	-	-	-	-
January 1, 1980	26.00	12.428	-	-	-	-
February 10, 1980	-	-	9.80	4.667	7.12	7.266
March 20, 1980	-	-	9.80	4.667	6.54	6.673
May 14, 1980	28.00	13.397	-	-	-	-
September 1980	30.00	14.354	9.80	-	6.54	-
December 16, 1980	32.00	15.311	-	-	-	-
January 21, 1981	-	-	11.90	5.667	7.39	7.541

Table 2: Economic Indicators, 1970-1980

## THAILAND

Indicators	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Growth rate of real GDP (%)	6.9	8.1	4.3	9.4	5.0	7.7	8.2	7.2	10.0	6.9	6.0
2. Debt Outstanding/GDP (%)	4.9	5.2	4.9	4.2	3.8	4.2	5.0	5.6	8.2	n.a.	n.a.
Debt Service/Export Earnings (%)	4.8	4.3	3.5	3.1	2.2	3.0	2.6	3.1	4.1	n.a.	n.a.
Debt Service/GDP (%)	.60	.58	.55	.52	.45	.52	.53	.64	.86	n.a.	n.a.
3. Total Exports (Baht million)	14,772	17,275	22,491	32,226	49,799	45,007	60,797	71,198	82,400	106,881	132,100
Total Imports (Baht million)	27,009	26,794	30,875	42,184	64,044	66,835	72,877	94,177	108,550	153,934	190,100
Balance of Trade (฿ million)	-12,237	-9,519	-8,384	-9,958	-14,245	-21,828	-12,080	-22,979	-26,150	-47,053	-58,000
Balance of Payment(\$ million)	-126.7	-30.3	175.4	41.8	393.2	-140.2	-4.1	-369.5	-653.8	-396.2	258.0
4. International Reserves (\$ million)	906	877	1,052	1,306	1,858	1,775	1,893	1,915	2,557	3,129	3,055
5. Petroleum Grude and Products (Baht million)											
- Import	2,329	2,721	3,116	4,661	12,571	14,233	16,695	20,777	22,881	32,647	58,700
(% of total imports)	(8.6)	(10.2)	(10.1)	(11.0)	(19.6)	(21.3)	(22.9)	(22.4)	(21.0)	(21.2)	(30.9)
6. Growth Rate of Consumer Price Index (%)	0.3	2.1	3.9	11.8	23.3	4.1	4.9	8.4	9.7	9.9	20

Sources: The 1970-1978 data are obtained and calculated from Asian Development Bank, Key Indicators of the Developing Member Countries of ADB, April 1979, and Pranee Tinakorn, "Survey of Foreign Debts in the Government Sector of ASEAN", a paper presented at a workshop on Foreign Debts in Thailand at the Faculty of Economics, Thammasat University, April 3, 1980. The 1979-1980 data are extracted from Bank of Thailand, Annual Economic Report, 1979, 1980.

Table 3: Impact on Production Cost and Consumer Price Index in 1979

Impact on Cost of Production

1. Agriculture		3.32%
- Agricultural service	15.05%	
- Sea Fisheries	10.89%	
- Rice	2.14%	
- Sugar Cane	3.07%	
- Poultry	7.48%	
2. Mining		12.18%
- Tin	14.54%	
- Fluorite	13.92%	
- Coal & Lignite	13.48%	
- Quarry	11.90%	
3. Manufacturing Industry		9.24%
- Glass & Glass Products	16.86%	
- Ceramics	13.46%	
- Non-Ferrous Metal	10.55%	
- Cements	7.76%	
- Paper Pulp, Paper & Paper Board	9.03%	
- Textile	6.83%	
- Plastic Products	6.56%	
4. Electricity		33.65%
5. Water Supply		8.28%
6. Banking		1.48%
7. Construction		5.88%
- Pipe laying, Parking lots etc.	9.66%	
- Power Plant & Transmission System Construction	7.86%	
- Non-residential construction	4.75%	
8. Trade		2.18%
- Wholesale	2.72%	
- Retail	1.54%	

Table 3. Continued.

9. Transportation		23.80%
- Merchandise Transport By Road	26.85%	
- Passenger Transport By Road	18.84%	
- Passenger Transport By Water	15.48%	
10. Services		1.32%
- Goods Storage	7.31%	
- Municipal	7.70%	

Impact on Consumer Price Index

1. Food & Beverages		2.93%
2. Clothing		4.61%
3. Furniture, Household appliances		8.90%
4. Health-care & Personal services		2.40%
5. Public Transport		17.84%
6. Entertainments, Reading & Education		0.89%
7. Tobacco & Alcoholic Drinks		1.36%
	Aggregate	5.27%

Sources: Poonsa-Nga Somboonpanya, et. al., The Pricing for Oil, Electricity and Natural Gas in Thailand, submitted to the NESDB, April 1981.



Table 4: Retail Price and Net Tax or Subsidy <sup>1/</sup>

Unit : Baht/litre  
(except LPG : Baht/kg.)

	Premium Gasoline		Kerosene		High Speed Diesel Oil		Fuel Oil 600"		LPG	
	Retail Price	Tax (Subsidy)	Retail Price	Tax (Subsidy)	Retail Price	Tax (Subsidy)	Retail Price	Tax (Subsidy)	Retail Price	Tax (Subsidy)
1 January 1973	2.10	0.91	1.34	0.39	0.98	0.16	-	-	4.00	0.59
4 July 1973	2.30	0.91	1.45	0.39	1.05	0.16	-	-	4.00	0.59
14 November 1973	2.69	1.12	1.78	0.41	1.41	0.18	-	-	4.00	0.59
17 December 1973	3.01	1.44	1.78	0.41	1.60	0.37	-	0.49	4.00	0.59
27 February 1974	3.62	1.47	2.41	0.45	2.33	0.41	-	0.61	4.00	0.59
10 December 1975	3.62	0.93	2.41	0.13	2.33	0.14	1.49	-0.11	4.00	0.59
15 March 1977	4.22	1.44	2.68	0.33	2.64	0.32	1.66	0.001	4.90	0.13
9 March 1978	4.22	1.14	2.68	0.26	2.64	0.24	1.66	-0.09	4.90	0.18
31 January 1979	5.60	2.57	3.06	0.143	3.03	0.52	1.86	0.09	4.90	0.26
13 July 1979	7.84	3.66	5.12	1.17	4.88	1.10	3.04	0.28	7.72	1.06
10 February 1980	9.80	4.43	6.71	1.40	7.39	2.28	3.78	0.31	10.47	1.48
20 March 1980	9.80	4.43	5.70	0.39	6.54	1.45	3.78	0.31	9.00	0.0001
20 November 1980	9.80	4.34	5.70	-0.40	6.54	1.28	3.78	-0.14	9.00	-1.18
21 January 1981	11.9	5.82	6.12	0.01	7.39	1.52	4.70	0.42	9.46	-0.73
5 February 1981	11.9	4.50	6.12	-0.51	7.39	1.14	4.70	-0.09	9.46	-0.88

<sup>1/</sup> Net Tax or subsidy is the sum of taxes and oil fund.

Table 5: Annual Average Retail Prices of Oil Products in Thailand, 1973-1981

Oil Product	Unit : Baht/litre (except LPG : Baht/kg.)								
	1973	1974	1975	1976	1977	1978	1979	1980	Jan.-Oct.1981
Premium Gasoline	2.262	3.518 (55.52)	3.620 (3.00)	3.620 (0)	4.095 (13.12)	4.853 (18.51)	6.575 (35.48)	9.637 (46.57)	9.742 (1.09)
Diesel Oil (H.S.D.)	1.068	2.208 (106.74)	2.330 (5.53)	2.330 (0)	2.575 (10.52)	2.640 (2.52)	3.845 (45.64)	6.508 (69.26)	7.319 (12.46)
L.P.G.	4.000	4.000 (0)	4.000 (0)	4.000 (0)	4.712 (17.80)	4.900 (3.99)	6.195 (26.43)	9.077 (46.52)	9.422 (3.80)
Fuel Oil	-	-	1.490 -	1.490 (0)	1.625 (9.06)	1.660 (2.15)	2.397 (44.40)	3.718 (55.11)	4.623 (24.34)
Kerosene	1.436	2.305 (60.5)	2.410 (4.55)	2.410 (0)	2.624 (8.88)	2.680 (2.13)	3.972 (48.21)	5.778 (45.47)	6.085 (5.31)

Note: Figures in parentheses are annual percentage changes.

Table 6: Annual Percentage Change of Oil Consumption, 1970-1981

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981 <sup>a/</sup>
Gasoline	48.87	34.08	-0.13	18.32	7.08	9.74	11.38	11.20	5.70	0.75	-0.75	-8.81
Diesel Oil	-1.12	18.39	5.05	13.59	-4.16	-2.97	17.08	11.12	5.27	12.34	-7.32	-3.71
L.P.G.	-31.72	1-.18	31.50	17.74	11.94	20.66	14.76	9.27	13.61	18.59	10.89	41.27
Kerosene	23.03	48.32	40.77	-2.22	15.33	-14.25	42.68	-3.19	-6.77	21.17	-11.42	16.52
Fuel Oil	16.36	28.26	26.17	14.99	-2.21	4.42	10.41	20.68	12.71	-0.12	0.84	22.76
Total	10.14	25.13	11.88	13.59	-0.04	2.37	14.10	13.79	7.85	5.75	-3.10	4.67 <sup>b/</sup>

<sup>a/</sup> Percentage change during January and May.

<sup>b/</sup> Total oil except LPG.

Table 7: The Structure of Retail Prices for Locally Refined and Imported Refined Products, September 16, 1981 - Present

Unit : Baht/litre

A. Locally Refined Products

Product	Ex-refinery price	Oil fund	Excise and municipal taxes	Marketing Margin	Retail price
Premium gasoline	6.4361	0.8918	4.0624	0.5097	11.90
Kerosene	6.6300	-1.3020	0.3956	0.3964	6.12
High speed diesel	6.3766	-0.3807	0.9927	0.4014	7.39
Fuel oil (600)	5.0230	-0.4204	0.0010	0.0964	4.70
LPG (baht/kg)	9.1725	-1.5392	0.0010	1.8266	9.46

B. Imported Refined Products

Product	Import price	Oil fund	Import, business and municipal taxes	Marketing Margin	Retail price
Premium gasoline	6.4361	1.1456	3.8086	0.5097	11.90
Kerosene	6.7738	-1.4823	0.4321	0.3964	6.12
High speed diesel	6.5281	-0.5453	1.0058	0.4014	7.39
Fuel oil (600)	5.1525	-0.5499	0.0010	0.0964	4.70
LPG (baht/kg)	10.4735	-2.8411	0.0010	1.8266	9.46

Table 8: Taxes and Oil Fund as Percentages of Ex-Refinery Prices for Locally Refined Products.

	Premium Gasoline			Kerosene			High Speed Diesel Oil			Fuel Oil 600"			LPG		
	Taxes	Oil Fund	Taxes+ Oil Fund	Taxes	Oil Fund	Taxes+ Oil Fund	Taxes	Oil Fund	Taxes+ Oil Fund	Taxes	Oil Fund	Taxes+ Oil Fund	Taxes	Oil Fund	Taxes+ Oil Fund
1 January 1973	139.33	-	139.33	61.45	-	61.45	30.24	-	30.24	n.a.	-	n.a.	120.40	-	120.40
4 July 1973	106.04	-	106.04	52.27	-	52.27	25.27	-	25.27	n.a.	-	n.a.	65.73	-	65.73
14 November 1973	108.97	-	108.97	39.09	-	39.09	19.40	-	19.40	n.a.	-	n.a.	65.73	-	65.73
17 December 1973	139.92	-	139.92	39.09	-	39.09	39.77	-	39.77	9.70	-	9.70	65.73	-	65.73
27 February 1974	91.39	-	91.39	27.03	-	27.03	25.35	-	25.35	4.98	-	4.98	65.73	-	65.73
10 December 1975	47.26	6.55	53.81	13.36	-6.56	6.80	16.41	-9.02	7.39	0.07	-7.37	-7.30	65.73	-	65.73
15 March 1977	60.34	-	60.34	15.72	-	15.72	15.93	-	15.93	0.06	-	0.06	5.87	-	5.87
9 March 1978	83.10	5.14	88.24	11.41	-	11.41	11.55	-	11.55	0.06	-5.27	-5.21	5.85	-	5.85
31 January 1979	77.09	20.09	97.18	10.94	7.78	18.72	11.18	12.22	23.40	0.06	5.10	5.16	8.35	-	8.35
13 July 1979	87.07	11.16	98.23	21.73	11.17	32.90	21.56	11.00	32.56	0.04	10.53	10.57	8.14	13.39	21.53
10 February 1980	90.43	8.56	98.99	24.25	9.21	33.46	23.61	24.77	48.38	0.03	9.01	9.04	7.56	13.12	20.68
20 March 1980	90.43	8.56	98.99	7.97	-	7.97	21.06	-9.87	30.93	0.03	-9.01	9.01	0.001	-	0.001
20 November 1980	73.53	5.21	78.74	6.86	-13.89	-7.03	18.23	-5.31	12.92	2.46	-6.14	-3.68	0.001	-14.15	-14.149
21 January 1981	73.06	31.78	104.84	6.93	-6.69	-0.24	18.18	9.78	27.96	0.02	9.93	9.95	0.001	-8.74	-8.739
5 February 1981	73.06	2.46	75.52	6.33	-14.69	-8.36	16.99	2.60	19.59	0.02	-1.81	-1.79	0.001	-10.32	-10.319

Table 9: Oil Tax Revenue as Percentage of Total Tax Revenue

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981*
Oil Excise tax revenue	6.2	8.1	7.4	7.0	7.2	6.5	6.3	6.7	6.3	8.4	12.9	11.2
Oil import tax revenue	3.2	1.8	1.5	1.4	1.5	1.1	1.3	1.3	1.9	2.4	3.4	n.a.
Revenue from oil excise and import taxes	9.4	9.9	8.9	8.4	8.7	7.6	7.6	8.0	8.2	10.8	16.3	n.a.

\* Estimate

Source: Budget Bureau, Ministry of Finance.

Table 10: Marketing Margin of Oil Products

	Unit : baht/litre							
	April 1, 1971	Dec.17, 1973	Dec.18, 1974	March 15, 1977	Jan.31,1979 July 13,1979	July 14,1979 Feb.9,1980	Feb.10,1980- March 18,1980	March 19,1980 -Present
Premium Gasoline	0.5435	0.5487	0.4340	0.3986	0.3958	0.4489	0.5097	0.5097
Kerosene	0.1334	0.32	0.2635	0.2844	0.3229	0.3756	0.3951	0.3964
High speed diesel	0.2028	0.2929	0.2630	0.2842	0.2880	0.3357	0.4014	0.4014
Fuel oil (600)	-	-	0.0926	0.0777	0.0769	0.1006	0.0964	0.0964
LPG (baht/kg)	-	-	-	-	1.5865	1.7120	1.8266	1.8266

Number 87

Economic Dimensions of ASEAN's Energy Security

By

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ECONOMIC DIMENSIONS OF ASEAN'S ENERGY SECURITY

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## Economic Dimensions of ASEAN's Energy Security

### Introduction

The era of cheap energy has ended since the OPEC, acting as a very powerful cartel, started "taxing" the rest of the world by rapidly raising their oil prices in 1973/74. Yet oil is expected to continue its dominant role in the world's energy mix at least until the end of this century. The world is still in the process of adjusting itself to the energy problem which has brought economic hardship and instability to most developing countries.

This paper examines the economic effects of the oil crises on individual ASEAN countries and the adjustments and policy responses to the crises by ASEAN, as a group and as individual sovereign nations. Some scope for cooperation within the region to strengthen its energy security is briefly discussed.

### Oil Crises and Their Effects on ASEAN Economies

During the past eight years the world has witnessed two oil crises which were characterized by sharp price increases and sudden supply shortages of oil in 1973/74 and again in 1979. The nominal price of oil has risen by over ten times and its real price also has more than doubled. Events during the period should indicate the degree of ASEAN's vulnerability to the crises. Since oil plays a very important role in the international trade of the ASEAN countries all of which are rather open economies,

it should be expected that the effects of the crises on the ASEAN economies would vary according to the position of each country as a net oil exporter or importer.

Indonesia as a net oil exporter and an OPEC member clearly benefitted from the increases in oil prices in the world market. As table I shows, oil, the most important foreign exchange earner, has sharply increased its share in total export earnings after 1973 to around 60%, and this share is expected to remain high in the next decade. The economy grew at a satisfactory rate of almost 7% per year over the 1974-1980 period, with much less fluctuations than in the pre-1970 period. The balance of trade surplus, which occurred every year since 1970, rose by 700% in 1974 and by 60% in 1979 as a result of the big oil price increases in both years. The balance of payments and the foreign exchange reserves have also been favorably affected, with the reserves growing by 800% over the 1973-1980 period. As a result, Indonesia's foreign debt situation improved considerably. Its debt outstanding - GDP ratio was substantially reduced in 1974 and, though still high compared with those in other ASEAN countries, has remained rather stable. The debt service ratios, on the other hand, had a tendency to rise during the 1970's. But this is perhaps because of the debt burden resulting from massive government borrowings from abroad during the 1960's.

Despite these healthy signs, Indonesia did not seem to be insulated from the inflationary impact of oil price increases. The growth rate of consumer price index after 1973 reached a double-digit level every year except in 1978, and was particularly high in 1973, 1974 and 1979.

Though the government adopted the policy of generally low domestic prices of oil products,<sup>1</sup> with subsidies for some products (e.g. kerosene and fuel oil), increases in the money supply due to rapid expansions of the oil income in the international reserves seemed to be the main cause of high and persistent inflation. For instance, in 1979, a 38% increase in the money supply and a rupiah devaluation brought about an inflation rate of 22%. The highest rate of 40% was registered in 1974 when the money supply increased by 40% as a result of a large influx of oil income. It should be noted that the average inflation rate in Indonesia during the past eight years was the highest among the ASEAN countries.

Malaysia has become a net oil exporter since 1976, and as the figures in table 2 show, started to reap the benefit of oil price increases from that year onwards. Being one of the leading export items, oil has consistently increased its share in total export value, and in 1980 began to be the most important export, surpassing such traditional exports like palm oil, rubber and tin. The balances of trade and payments, which have been in surplus in the late 10 years, improved visibly in 1976 when the payments balance jumped 500%, the trade balance increased by 110%, and 60% of more foreign exchange was added to the reserves. The levels of these surpluses still remained quite high after 1976, particularly in 1979. The Malaysian economy also improved its growth performance by expanding at the annual rate of 8.5% after 1976, compared with the rate of 7.5% achieved in the 1973-75 period. However, all debt indicators for Malaysia

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<sup>1</sup> It was reported that until recently the domestic oil prices in Indonesia was less than 40% of the world prices. See the World Bank, World Development Report, 1980, p. 15.

has risen in the 1970's - a phenomenon which is unexpected and inexplicable. As far as inflation is concerned, Malaysia has had a good record. Its CPI growth rate reached double-digit levels only in 1973 and 1974, while it remained relatively low in other years, particularly in 1979 despite significant oil price increases.

Singapore, as the world's important oil refining center with no indigenous energy sources of its own, is an importer of crude oil and an exporter of refined products. In the foreign trade of Singapore since 1974, oil has played a very significant role, being both the biggest import and export items. On balance, Singapore seemed to have suffered from oil price increases in 1974 when the economic growth rate dropped significantly, the trade deficit rose by over 70%, the payments surplus was cut by almost 30%, and the growth rate of CPI reached 22%. (See table 3) However, since 1976 Singapore has been able to achieve quite high economic growth rates exceeding 8% per year, though these are still lower than in the pre-1974 period. The trade balance, though still rather high, increased only moderately. Being able to attract more investment from abroad, Singapore has boosted its payments surplus and international reserves in the last 4-5 years. As in the case of Malaysia, Singapore could keep its inflation rate at a relatively low level of 4% in 1979. Therefore, the Singaporean economy seemed to have adjusted rapidly and successfully to external disturbances. This is possible through a drive to expand and diversify exports and to attract more oil surplus

fund.<sup>2</sup> The fact that Singapore is an important entrepot and refining center in the region should facilitate the necessary adjustment in the economy.

Philippines and Thailand are in a similar position of net oil importer and most of their energy requirements are met by imported oil. For both, oil has become the biggest import item since 1974, and its share in total import value increased from about 10% before 1974 to 25% - 30% in recent years. (See tables 4 and 5.) Massive oil price increases in the past have drastically reduced their import capacity. In 1980, for instance, Thailand had to spend 44% of its export earnings to buy oil from abroad. The increases in 1974 and 1979 brought about large increases in import values, trade deficits and inflation rates in the two countries. Since 1974, their balance of payments deficits occurred more frequently than in the previous period. Nevertheless, their foreign exchange reserves expanded gradually every year, except a slight decline in 1975. This was all possible due to substantial borrowings from international money markets. It should be noted that in recent years the governments of the two countries were forced by sluggish world trade and higher prices of their imported oil to support their balance of payments by borrowing more from private capital markets and paying higher interest rates than in such official capital markets as the World Bank, the

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<sup>2</sup> Singapore was cited as a good example of a developing country which could cope best with the oil crisis by a temporary slowdown in growth and a rapid expansion in export. See World Bank, ibid, p. 4.

International Monetary Fund, and the Asian Development Bank.<sup>3</sup> In contrast to the period before 1973, all foreign debt indicators of the two countries increased consistently after the first oil crisis, although those for Thailand are still the lowest in ASEAN. By increasing its foreign debts very rapidly, Philippines has become one of the heavy borrowers in the international capital market. In 1980, for example, the Philippines government's external debts jumped 25% .

Despite these adverse effects of the oil crises on the two economies, their economic growth performance has not been seriously affected. Since 1974 both economies have been able to maintain the average growth rates of 6% - 7% per annum, which are comparable with the rest of ASEAN and are relatively high among oil-importing developing countries. This is due to their ability to borrow from abroad to finance such high growth rates. In addition, the "commodity boom" in 1974, partly precipitated by the oil crises, also pushed up prices of their major agricultural exports, e.g. rubber, tin, sugar and rice. This boom plus the fact that they have been able to boost their industrial exports helped to cushion the adverse impact of the oil crisis on their economies.

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<sup>3</sup> It was found that the foreign debt outstanding in the government sector for ASEAN as a group coming from private capital markets increased from 28% of total debt outstanding in 1974 to 41% in 1978. See Pranee Tinakorn, "Survey of Foreign Debts in the Government Sector of ASEAN", a paper presented at a workshop on Foreign Debts in Thailand at the Faculty of Economics, Thammasat University, April 3, 1980.

Energy security is defined by Deese<sup>4</sup> as "a condition on their economies in which a nation perceives a high probability that it will have adequate energy supplies.....at affordable prices". If the degree of energy security can be gauged from the abovementioned indicators, our analysis has shown that during the last eight years the degree tends to vary among the 5 ASEAN countries depending on whether they are net exporters or importers of oil. Philippines, Thailand, and to a less extent, Singapore, have clearly suffered from the oil crisis. Their positions with regard to international trade and payments, and foreign debts have worsened, while they managed to maintain high economic growth rates. Indonesia and Malaysia, on the other hand, have greatly improved their balances in international trade and payments. But no country seemed to be able to insulate its economy from the inflationary impact of high oil prices in the world market, except Malaysia and Singapore in 1979.

#### ASEAN Adjustment to the Oil Crises

An interesting issue to be investigated is on the ways in which ASEAN, as a group and as individual countries, has coped with the oil crisis. For an oil-exporting country like Indonesia and Malaysia, disruptions of oil supply are not really its problem. The only decision its government has to make is whether and how the country will make the best use of its oil and other energy

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<sup>4</sup> David A. Deese, "Energy ; Economics Politics, and Security", in International Security 4 (3), Winter 1978/1980, p. 140.



resources, given the fact that oil prices, both nominal and real, have increased very substantially. On the other hand an oil-importing country has to deal with both the problem of energy supply which has been very uncertain and the problem of higher energy prices.

For Philippines, Thailand and Singapore, all of which have to rely on imported oil for their energy use, adjustments and responses can be examined on the consumption side and the supply side, in the short run and in the long run.<sup>5</sup>

On the demand side, when oil is getting more expensive, the rational response is to reduce oil consumption, or at least to reduce its growth rate, and switch to other cheaper energy resources. Having been dependent on oil for energy for quite some time, it is rather difficult in the short run for oil-importing countries to choose such a response. Changes in the consumption pattern of energy, either in transportation or industry or power generation, will take some years, for these involve substantial investment; and it will be very costly to achieve in the short run, say 2 - 3 years.

However, events in the past show that sudden increases in world oil prices were always accompanied by serious supply shortages of oil in the world market, caused by the Arab oil embargo in 1973/74 and the Iranian political crisis in 1979/80. These events

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<sup>5</sup> Deese categorized the policy responses to the oil crisis into the following: 1) demand reduction and restructuring; 2) arrangements such as stockpiles and sharing plans for emergency conditions; 3) development of alternative domestic supplies; 4) development and diversification of sources of external supply; and 5) diplomatic, industrial and military measures. See Deese, ibid, pp. 144-5.

exogenously restricted oil import and oil consumption in some oil-importing ASEAN countries. As a result, their oil consumption was reduced and their total energy consumption grew at very low rates. As shown in table 6, the consumption of oil products in Thailand, over 98% of which was imported, was cut back by over 2% in 1974 and 1980; and total energy consumption growth dropped to only 1.85% in 1974, compared with the average growth rate of 15% per year during the 1970-1973 period. These reductions were directly related to the oil supply disruptions caused by external factors, and had little to do with domestic adjustment measures.

On the domestic scene, the governments, particularly in the oil-importing countries, have tried to use both energy pricing and quantitative restriction measures to discourage the use of oil. Energy pricing policies which set domestic oil prices in order to reflect the higher cost of imported oil are very difficult to implement. There is an understandable reluctance to impose hardship on low and middle income population by raising energy prices; and subsidies are given for oil products consumed mainly by the poorer section of the economy. In Thailand, the pricing of oil products has become such a sensitive political issue because of its significant impact on cost of living that one government was brought down in 1980 after it sharply raised the local prices of oil products and electricity. In setting energy pricing, the government is caught in a situation where it has to trade off among different policy objectives, e.g., a trade-off between an equitable burden distribution of higher cost of living on various groups and the saving (earning) of foreign exchange spent on (derived from) imported

(exported) oil.<sup>6</sup>

The pricing of different oil products directly affects the pattern of oil consumption since, to some extent, substitution among different oil products is technically possible, e.g. a substitution between gasoline and LPG in passenger cars, and kerosene can be mixed with diesel oil in transport use. Table 7 displays the domestic price structures of oil products in the ASEAN countries, effective in 1980-81. Indonesia and Malaysia, the only two ASEAN oil-exporting countries, sell their oil products in their domestic markets at the average prices below those in the other three oil-importing countries. Indonesia and Malaysia also subsidize the use of kerosene, diesel and fuel oil (only Indonesia), Thailand gives subsidy for kerosene, fuel oil and LPG, and Singapore and Philippines have no oil subsidy. The retail prices of all oil products in Philippines are the highest among the ASEAN countries. In general, gasoline is more heavily taxed than other products, as it is regarded as a "less essential" product mostly consumed by the well-to-do. Kerosene, which is mainly consumed by the rural poor, is subsidized in three countries. The low and subsidized price of LPG in Thailand has induced more use of it, particularly in substituting gasoline in taxis and some private cars. No information can be obtained for other ASEAN countries

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<sup>6</sup> The author discussed this and other trade-offs in energy pricing in Thailand and proposed an optimization approach to the problem in the case of Thailand in "Energy Situation in 1980-81: Reaching a Dark End?", a paper presented at an annual symposium at the Faculty of Economics, Thammasat University, 17-18 February 1981.

to enable us to analyse the effects of these price structure on their oil consumption patterns. But the data in table 7 should indicate the fact that a gap in oil product prices among the ASEAN countries depends very much on their oil resource endowment.

Some quantitative restrictions measures have been adopted by the oil-importing ASEAN countries to reduce the use of oil and electricity. In Thailand, these measures include limits on the operating time of gas stations, television station and entertainment establishments, limits on the use of neon signs, and a reduction of highway speed limit for passenger cars from 100 kph to 90 kph. To encourage the use of fuel saving cars, the annual car tax is now based on the size of car engine instead of the car weight, and the new tax rates have been made progressive. Singapore introduced a law on commercial buildings with an aim of conserving electricity used in lighting and air-conditioning. Some incentives were given in the form of accelerated depreciation allowances for tax purposes to induce energy-saving modifications of existing buildings.

Other government and private measures will be introduced in some ASEAN countries to offer incentives and information for more effecient use of energy in production, especially in manufacturing industrics which usually are the biggest users of electricity.

There is an evidence which indicates that, except for Indonesia and Singapore, other ASEAN countries have been relying relatively less on energy to fuel economic growth.

A study by Siddayao<sup>7</sup> shows that the elasticities of energy consumption with respect to GDP declined after 1973 in the cases of Philippines, Thailand and Malaysia, though their magnitudes were still slightly greater than one (except in Malaysia). (See table 8) The elasticity for Indonesia, on the other hand, increased from less than one before 1973 to 4 during the 1973-1978 period. Evidently Indonesia was moving towards a more energy-intensive type of economic growth, aided by its vast oil, gas and other energy endowments. Singapore's elasticity remained constant at 1.20 for both periods.

There have already been some signs that consumption of some oil products in Thailand was reduced as their prices were raised this year, even though oil import supply was not restricted. The oil sales figures in table 9 indicate that less gasoline and diesel oil was consumed in the first five months of 1981, compared with the same period of 1980. The 9% reduction in gasoline consumption can be attributed to the rather steep increases in its price early 1981, coupled with some measures aimed mainly at the use of passenger cars. A drop in diesel oil use was probably due to a shift from trucks to boats and barges for cargo transport. Kerosene, fuel oil and LPG, all of which are subsidized by the government, registered significant gains in consumption. However, the overall consumption of liquid oil products increased by 5% - a rather low growth rate compared with those in the past normal years.

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<sup>7</sup> See Corazon Siddayao, "Oil Prices, the External Debt and Economic Growth", a paper presented at Input-Output Research Association Conference on Industrial International Trade, in Singapore, 13-16 April 1981, pp. 14-15, and table 2.

On the supply side, short-run options for oil-importing countries with no significant energy resources of their own are :

- a) to increase their stockpiling reserves of oil,
- b) to diversify sources of oil supply, and
- c) to arrange and assure oil supplies from reliable sources.

Thailand and Philippines have been diversifying their sources of oil import since 1974, and one of the countries while they turn to is China. For instance, the oil supply from China to Thailand has been increasing such that in 1979 China was Thailand's fourth largest supplier of oil, supplying nearly 8% of total oil import in that year. Most of Thailand's imported oil still comes from the Middle East, and Thailand has succeeded in making a medium-term, government-to-government contract with Saudi Arabia to supply 65,000 barrels a day of its oil to Thailand. Under a general agreement in 1976 among the ASEAN countries on some form of cooperation in food and energy, Thailand and Philippines have been provided with crude and fuel oil from Indonesia and Malaysia to overcome shortages caused by the Iranian crisis since 1979. In 1980, for example, oil imported from Indonesia to Thailand was doubled in volume, though as a percentage of total oil import the Indonesia oil was only around 1%. Singapore also increased the volume of crude oil processed for Indonesia and Malaysia in 1980, thus reducing Singapore's excess refining capacity.

In the long run, due to uncertainties in the oil supply from OPEC, likely reductions in OPEC's oil production to conserve their exhaustible resource, and an upward trend of the real price of oil, the supply of energy for oil-importing countries will have

to rely more on indigenous energy sources. Since 1974, all ASEAN countries, except Singapore, have stepped up their oil and gas exploration activities. Indonesia now has reserves of about 9.5 billion barrels of oil and about 24 trillion cubic feet of gas and it will be able to continue exporting its oil and gas in the next decade and beyond. (See Table 10.) The oil and gas reserves for Malaysia are reported to be 1.8 billion barrels and 30 trillion cubic feet respectively.<sup>8</sup> With an expected decline in oil production towards the end of this decade and rising domestic demand, Malaysia will become a net oil importer in 1980. Philippines' oil reserve estimates have been fluctuating widely due to the recent unexpected decline of production from the Nido oilfield and a potentially good prospect for more production from other oilfields this year.<sup>9</sup> Although no firm predictions can be made for the next ten years, ASCOPE (ASEAN Council on Petroleum) data indicate that oil production in the Philippines would be about 19 thousand barrels a day in 1985, which is still a small fraction of its future needs.

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<sup>8</sup> Indonesia's and Malaysia's reserve figures are from the ASCOPE report cited above.

<sup>9</sup> See Richard Cowper, "Nido dashes Manila's high oil hopes", in Petroleum News, May 1981, pp. 15, and Emilea Tagaza, "Tara-1 discovery revives Manila's oil hopes", in Petroleum News, July 1981, pp. 8-9.

Thailand has so far discovered a gas reserve of about 14 trillion cubic feet<sup>10</sup> in the Gulf and production is expected to increase from 200 million cubic feet per day in 1982 to 1,000 in 1990. Most of the gas will replace fuel oil in generating electricity, and by 1990 gas will constitute 20% of total energy requirement in the country.

Besides oil and gas, all ASEAN countries, except Singapore, plan to use other energy resources which they can develop locally. Indonesia's third five-year plan envisages more use of coal, hydropower, geothermal energy, and nuclear power (in the far future) in electricity generation.<sup>11</sup> Malaysia plans to reduce the share of oil in its energy consumption by relying more on hydropower and imported coal mainly in power generation.<sup>12</sup> Philippines will introduce coal, geothermal energy, nuclear, and more hydro-power into its energy mix.<sup>13</sup> Gasohol produced from sugar cane has already been used at a small scale in transportation. Thailand's energy plan aims at burning lignite and imported coal and exploiting more hydro energy in its power plants. As shown in table 11, every ASEAN country, except Singapore, is expected to

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<sup>10</sup> See David Deese "The Oil-Importing Developing Countries" in David A. Deese and Joseph S. Nye eds. Energy and Security a Report of Harvard's Energy and Security Research Project. Cambridge, Ma.: Ballinger, 1981, p.229-260

<sup>11</sup> See Bernd Knoll, "Repelita III diversifies Indonesia's power sources", in Petroleum News, August 1980, pp. 22-23.

<sup>12</sup> See "Malaysia Supplement 1981" in Petroleum News, August 1981, pp. 27-34.

<sup>13</sup> See Emilia Tagaza, "Philippines rethinks its power program", in Petroleum News, August 1980, pp. 18-19.



reduce its dependence on oil-for energy needs in 1990. Philippines and Thailand, in particular, will drastically reduce their oil dependence from over 80% of their total energy use in 1980 to about half of the total in 1990. Over 80% of total energy consumption in Indonesia and Malaysia will still be based on oil in 1990. Singapore, with no indigenous energy resources, is expected to rely only on oil for its energy in the next decade. ASEAN as a group will reduce its oil share in total energy requirements from 86% in 1980 to 70% in 1990. This reduction may imply that any oil crisis in the future will create relatively less adverse impacts on the ASEAN region. However, it should be noted that, according to the forecast in table 10, oil to be imported by the oil-deficit ASEAN countries will increase from 631,000 barrels per day in 1980 to 725,000 barrels per day in 1990, mainly because Malaysia will not be self-sufficient in oil in that year. And though Indonesia will be able to increase its oil export in 1990, net oil export from the region will decline from 733,000 barrels per day in 1980 to 657,000 barrels per day in 1990.

#### ASEAN's Energy Cooperation<sup>14</sup>

Though the normal conflict of interest between producers and consumers prevents the ASEAN countries from having any common stand

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<sup>14</sup> See discussion on energy cooperation in R.C. Wanigatunga, "Exploitation of ASEAN Mineral Resources", Saw Swee-Hock (ed), ASEAN Economies in Transition, Singapore University Press, 1980, pp. 127-129, and the ASCOPE report cited above, pp. 13-14.

vis-avis the rest of the world on the oil issue, there is still room for intra-regional cooperation on energy. This cooperation can be achieved mainly in the form of the sharing of energy resources among the members to overcome temporary supply-demand imbalance problems. At present oil shortages in the oil-deficit members have been partly alleviated by relief supplies from the oil-surplus members. But the terms of these supplies would still have to be negotiated on a case-by-case basis. What the members (mainly the oil-deficit members) would like is, through ASCOPE, to establish an ASEAN petroleum security reserve to protect a member's economy from the risk of sudden and serious oil supply disruptions. This security reserve scheme is to have a built-in mechanism whereby some threshold levels of supply shortages can trigger the rights of drawing oil from the reserve. Details on the size of the reserve, the types of oil products, the location of the reserve, financial arrangements, replenishment measures, etc., will have to be worked out in the future. It can be observed here that while an agreement on the ASEAN rice security reserve was already concluded last year, the concept of the ASEAN oil security reserve which is perhaps more urgently needed was seriously discussed only this year. This may reflect the difficulties and the complex nature of the energy problem, and differences in the attitudes of the members themselves.

Sharing of energy resources in ASEAN can be achieved by linking electricity grids of some member countries and optimizing the use of refining capacity in the region. These possible schemes, which are still being discussed in ASCOPE will ensure a better use of resources and reduce the risk of temporary energy imbalances.

To reduce wasteful competition and excess capacity, the member countries should also explore the possibility of locating some important energy-related and energy-intensive industries in places which possess economic comparative advantages in terms of energy cost efficiency. For instance, almost all ASEAN countries plan to build a petrochemical complex of their own, and some have already invested in it. With a limited market in the region and an uncertain prospect for export to the rest of the world, a petrochemical industry established in each member country is likely to face the problems of excess capacity, scale diseconomies, wasteful protection, and inefficiencies. Joint decisions and some kinds of agreement on this and other energy-related industries are economically (and politically?) feasible and will ensure better energy utilization in the region.

In the areas of oil and gas exploration, the development of alternative energy sources, energy conservation, and oil shipping, there are opportunities for the member countries to share their knowledge and information, and in some cases, pool their resources. For instance, by coordinating their efforts in negotiations with multinational oil companies, oil-and gas-producing member countries can insist on and succeed in enlarging their share of production, as illustrated in the cases of Indonesia and Malaysia. Thailand, the only ASEAN country which adopted a concessionaire system in oil and gas exploration, can learn from the experiences of Indonesia, Malaysia and Philippines in using productionsharing systems.

However, even if these regional cooperative efforts will be made in ASEAN, the scope of actions is still limited and the derived benefit is likely to be marginal. Unlike the European Economic Community (EEC), the main objective of ASEAN is rather to promote "close cooperation" than to move towards "integration". Intra-ASEAN cooperation in the field of energy involves, in most cases, some economic assistance given by energy-fortunate member countries to energy-poor ones. Without a final goal of economic and political integration, a reluctance to forgo some degree of economic sovereignty tends to reduce the impact of their cooperation. Moreover, the move away from oil and the greater reliance on indigenous energy resources in most ASEAN countries will reduce the role of oil supply from foreign sources in and outside ASEAN. It is only in the areas of mutual benefit where we can expect productive cooperation in strengthening ASEAN's energy security.

Table 1: Economic Indicators, 1970 - 1980

## INDONESIA

Indicators	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Growth rate of real GDP (%)	7.5	n.a.	9.4	11.3	7.6	5.0	7.0	7.5	7.0	5.0	7.0
2. Debt Outstanding/GDP (%)	26.7	36.9	38.6	31.8	25.5	27.8	27.4	26.0	27.6	n.a.	n.a.
Debt Service/Export Earnings (%)	6.5	7.2	7.2	7.1	4.3	3.3	11.5	12.1	11.9	n.a.	n.a.
Debt Service/GDP (%)	.84	1.0	1.2	1.3	1.2	1.9	2.7	2.9	3.0	n.a.	n.a.
3. Total Exports (\$ million)	1,108	1,234	1,778	3,211	7,426	7,103	8,546	10,853	11,703	15,600	21,365
Total Imports (\$ million)	1,002	1,103	1,562	2,729	3,842	4,770	5,673	6,230	6,681	7,200	12,384
Balance of Trade (\$ million)	106	131	216	482	3,584	2,333	2,873	4,623	5,022	8,400	8,981
Balance of Payments	n.a.	-85	391	325	690	-983	736	1,001	n.a.	1,600	2,336
4. International Reserves (\$ million)	160	187	576	807	1,492	586	1,499	2,516	2,636	4,100	6,480
5. Petroleum Crude and Products											
- Exports (\$ million)	446	478	913	1,609	5,211	5,311	6,004	7,298	7,400	8,900	13,200
(%) of total exports	(40.3)	(38.7)	(51.4)	(50.1)	(70.2)	(74.8)	(70.2)	(67.2)	(63.2)	(57.1)	(61.8)
- Imports (\$ million)	15	20	30	44	183	254	438	732	n.a.	n.a.	n.a.
- Net exports (\$ million)	431	458	883	1,565	5,028	5,057	5,566	6,566	n.a.	n.a.	n.a.
6. Growth Rate of Consumer Price Index (%)	12.2	4.4	6.4	31.0	40.6	19.1	19.8	11.0	8.1	22	16.0

Sources: The 1970-1978 data are obtained and calculated from Asian Development Bank, Key Indicators of the Developing Member Countries of ADE April 1979, and Pranee Tinakorn, "Survey of Foreign Debts in the Government Sector of ASEAN", a paper presented at a workshop on Foreign Debts in Thailand at the Faculty of Economics, Thammasat University, April 3, 1980. The 1979-1980 data are extracted from Bank of Thailand, Annual Economic Report, 1979, 1980.

Table 2: Economic Indicators, 1970 - 1980

MALAYSIA

Indicators	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Growth rate of real GDP (%)	n.a.	n.a.	n.a.	12.3	6.7	3.5	12.0	7.7	7.5	8.0	8.0
2. Debt Outstanding/GDP (%)	9.2	12.2	13.9	9.8	9.5	14.9	15.3	16.3	17.9	n.a.	n.a.
Debt Service/Export Earnings (%)	3.3	3.0	3.0	2.9	2.8	3.8	5.0	7.4	9.8	n.a.	n.a.
Debt Service/GDP (%)	1.3	1.2	1.0	1.2	1.3	1.6	2.5	3.5	4.7	n.a.	n.a.
3. Total Exports (Ringgit million)	5,163	5,017	4,854	7,372	10,195	9,231	13,443	14,971	16,850	24,024	28,140
Total Imports ( " )	4,288	4,416	4,543	5,934	9,891	8,531	9,722	11,178	13,822	17,058	23,420
Balance of Trade ( " )	875	601	311	1,438	304	700	3,721	3,793	3,028	6,966	4,720
Balance of Payment (\$ million)	18	40	32	118	188	71	808	307	625	1,876	459
4. International Researves (\$ million)	664	818	970	1,345	1,618	1,524	2,472	2,858	3,330	4,030	4,773
5. Petroleum Crude and Products (Ringgit million)											
- Exports	202(3.9)	390(7.8)	223(4.6)	269(3.6)	678(6.7)	861(9.3)	1,766(13.1)	2,011(13.4)	2,404(14.3)	4,127	6,846
(% of total exports)	(3.9)	(7.8)	(4.6)	(3.6)	(6.7)	(9.3)	(13.1)	(13.4)	(14.3)	(17.2)	(24.3)
- Imports	518	576	368	393	1,004	1,021	1,311	1,422	1,985	1,222	1,869
- Net export	-316	-186	-145	-124	-326	-160	455	589	419	2,905	4,977
6. Growth Rate of Consumer Price	1.9	1.6	3.2	10.5	17.4	4.5	2.6	4.7	4.9	6.0	7.0

Sources : See Table 1

Table 3: Economic Indicators, 1970 - 1980

## SINGAPORE

Indicators	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Growth rate of real GDP (%)	13.7	12.5	13.4	11.5	6.3	3.9	7.5	8.0	8.6	9.3	10.0
2. Debt Outstanding/GDP (%)	7.3	8.9	10.2	10.2	10.2	9.8	12.2	15.4	13.3	n.a.	n.a.
Debt Service/Export Earnings (%)	0.8	0.8	1.6	0.9	0.8	1.1	1.1	1.1	3.2	n.a.	n.a.
Debt Service/GDP (%)	.58	.64	1.1	.76	.91	.97	1.2	1.3	4.0	n.a.	n.a.
3. Total Exports (S \$ million)	4,756	5,371	6,149	8,907	14,155	12,758	16,266	20,090	22,986	31,000	n.a.
Total Imports (S \$ million)	7,534	8,664	9,538	12,513	20,405	19,270	22,405	22,522	29,601	38,300	n.a.
Balance of Trade (S \$ million)	-2,778	-3,293	-3,389	-3,606	-6,250	-6,512	-6,139	-5,432	-6,615	-7,300	-10,530
Balance of Payment (\$ million)	183	321	336	411	295	408	298	313	636	559	670
4. International Reserves(\$ million)	1,012	1,452	1,748	2,286	2,812	3,007	3,364	3,858	5,391	5,793	6,500
5. Petroleum Crude and Products (S \$ million)											
- Exports (Petroleum products) (% of total exports)	818 (17.2)	1,133 (21.1)	1,158 (18.8)	1,354 (15.2)	3,653 (25.8)	3,356 (26.3)	3,744 (23.0)	4,782 (23.8)	4,892 (21.3)	n.a.	n.a.
- Imports (Crude)	1,013	1,237	1,383	1,614	4,892	4,530	6,137	6,519	7,074	n.a.	n.a.
- Net Imports	195	104	225	260	1,239	1,174	2,393	1,737	2,182	n.a.	n.a.
6. Growth Rate of Consumer Price Index (%)	0.4	1.9	2.1	19.6	22.3	2.6	-1.9	3.2	4.8	4.0	8.5

Source: See Table 1.

Table 4: Economic Indicators, 1970-1980

## PHILIPPINES

Indicators	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Growth rate of real GDP (%)	4.6	4.9	4.8	8.7	5.3	6.6	7.5	6.2	5.8	6.0	4.7
2. Debt Outstanding/GDP (%)	9.2	9.2	10.7	8.4	7.5	8.8	12.1	14.3	17.5	n.a.	n.a.
Debt Service/Export Earnings (%)	9.3	8.4	13.1	11.5	6.8	10.0	9.5	10.1	19.0	n.a.	n.a.
Debt Service/GDP (%)	1.5	1.3	1.8	2.0	1.2	1.4	1.4	1.5	2.8	n.a.	n.a.
3. Total Exports (\$ million)	1,062	1,136	1,109	1,886	2,725	2,294	2,574	3,151	3,334	3,780	5,635
Total Imports ( " )	1,090	1,186	1,260	1,597	3,143	3,459	3,633	3,914	4,600	5,540	7,814
Balance of Trade ( " )	- 28	- 50	-124	290	-418	-1,165	-1,060	-764	-1,266	-1,760	-2,179
Balance of Payment ( " )	4	- 11	79	664	109	-521	-164	164	- 54	-639	-380
4. International Reserves(\$ million)	251	382	551	1,038	1,504	1,358	1,640	1,524	1,832	2,200	3,155
5. Petroleum Crude and Products (\$ million)											
- Imports	119	141	149	188	653	770	891	993	1,032	n.a.	n.a.
(% of total imports)	(10.9)	(11.9)	(11.8)	(11.8)	(20.8)	(22.3)	(24.5)	(25.4)	(22.4)	n.a.	n.a.
6. Growth Rate of Consumer Price Index (%)	23.6	15.1	10.3	14.0	33.5	8.1	6.2	7.9	7.6	19.0	17.8

Sources: See Table 1.



Table 5: Economic Indicators, 1970-1980

## THAILAND

Indicators	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1. Growth rate of real GDP (%)	6.9	8.1	4.3	9.4	5.0	7.7	8.2	7.2	10.0	6.9	6.0
2. Debt Outstanding/GDP (%)	4.9	5.2	4.9	4.2	3.8	4.2	5.0	5.6	8.2	n.a.	n.a.
Debt Service/Export Earnings (%)	4.8	4.3	3.5	3.1	2.2	3.0	2.6	3.1	4.1	n.a.	n.a.
Debt Service/GDP (%)	.60	.58	.55	.52	.45	.52	.53	.64	.86	n.a.	n.a.
3. Total Exports (Baht million)	14,772	17,275	22,491	32,226	49,799	45,007	60,797	71,198	82,400	106,881	132,100
Total Imports ( " )	27,009	26,794	30,875	42,184	64,044	66,835	72,877	94,177	108,550	153,934	190,100
Balance of Trade ( " )	-12,237	-9,519	-8,384	-9,958	-14,245	-21,828	-12,080	-22,979	-26,150	-47,053	-58,000
Balance of Payment (\$ million)	-426.7	-30.3	175.4	41.8	393.2	-140.2	-4.1	-369.5	-653.8	-396.2	258.9
4. International Reserves (\$ million)	906	877	1,052	1,306	1,858	1,775	1,893	1,915	2,557	3,129	3,055
5. Petroleum Crude and Products (Baht million)											
- Import 2,329.	2,329	2,721	3,116	4,661	12,571	14,233	16,695	20,777	22,881	32,647	58,700
(% of total imports)	(8.6)	(10.2)	(10.1)	(11.0)	(19.6)	(21.3)	(22.9)	(22.1)	(21.0)	(21.2)	(30.9)
6. Growth Rate of Consumer Price Index (%)	0.3	2.1	3.9	11.8	23.3	4.1	4.9	8.4	9.7	9.9	20

Sources: See Table 1.

Table 6: Consumption of Total Energy and Oil Products in Thailand, 1970-1981

(Unit: oil equivalent barrel per day)

Year	Total Energy		Oil Products		
	Amount	Growth rate (%)	Amount	Percentage in total energy	Growth rate
1970	108,580	14.42	88,260	81.3	10.37
1971	132,590	22.11	110,415	83.3	25.10
1972	149,790	12.97	128,460	85.8	16.34
1973	169,175	12.94	145,240	85.9	13.06
1974	172,300	1.85	141,440	82.1	-2.62
1975	182,800	6.14	146,190	79.9	3.36
1976	208,580	14.05	165,080	79.1	12.92
1977	225,620	8.17	184,730	81.9	11.90
1978	238,640	5.77	198,800	83.3	7.62
1979	n.a.	n.a.	212,880	n.a.	7.08
1980	n.a.	n.a.	207,455	n.a.	-2.55
1981 <sup>a</sup>	n.a.	n.a.	214,845	n.a.	3.56

Source : National Energy Administration, Ministry of Science, Technology and Energy, Thailand.

Table 7: Retail Prices of Oil Products in ASEAN

(US \$/litre)	Premium Gasoline		Kerosene		Diesel oil		Fuel oil		LPG	
	Retail price	Tax (+) Subsidy (-)	Retail price	Tax (+) Subsidy (-)	Retail price	Tax (+) Subsidy (-)	Retail price	Tax (+) Subsidy (-)	Retail price	Tax (+) Subsidy (-)
Indonesia (May 1, 1980)	0.352	n.a.	0.06	-0.098	0.084	-0.081	0.072	-0.085	n.a.	n.a.
Malaysia, Peninsular (April 18, 1981)	0.49	0.11	0.21	-0.10	0.21	-0.80	n.a.	n.a.	0.37	0.11
Singapore (July, 1981)	0.49	0.17	0.37	0.05	0.325	0.03	n.a.	n.a.	0.37	0.02
Philippines (March 22, 1981)	0.66	0.20	0.39	0.02	0.39	0.04	0.26 <sup>a</sup>	0.01	0.37	0.02
Thailand (Feb. 5 1981)	0.59	0.27	0.30	-0.026	0.36	0.06	0.23	-0.004	0.25	-0.02

<sup>a/</sup> wholesale price

Source : Data submitted to the ASCOPE/Economic Committee. (ASEAN Council on Petroleum)

Table 8: Estimates of Energy Consumption Elasticities

With Respect to GDP for ASEAN Countries

	Period	Elasticity
Indonesia	1965 - 1972	0.75
	1973 - 1978	4.09
Malaysia	1965 - 1973	1.01
	1973 - 1978	0.51
Philippines	1965 - 1973	2.83
	1973 - 1978	1.03
Singapore	1965 - 1973	1.20
	1973 - 1978	1.20
Thailand	1965 - 1973	2.70
	1973 - 1978	1.05

Source : Siddayao, ibid, table 2.

Table 9 Consumption of Oil Products in Thailand

(January - May, 1980 and 1981)

Unit : million litres

	January - May		Percentage
	1980	1981	change
Regular benzene	434	405	-7
Super benzene	519	464	-11
Kerosene	115	134	17
High-speed diesel	1,741	1,682	-3
Low-speed diesel	40	33	-17
Fuel oil	1,459	1,791	23
LPG (million kg)	63	89	41
Total oil(excluding LPG)	4,308	4,509	5

Source : Department of Commercial Registration, Ministry of  
Commerce.

Table 10: Production, Consumption, and International Trade of  
oil in ASEAN, 1980 and 1990

Unit : thousand barrels per day

	1980			1990		
	Production	Consumption	Export(+) Import(-)	Production	Consumption	Export(+) Import(-)
Indonesia	1,570	362	1,208	2,298	840	1,458
Malaysia	275	152	123	250	317	-67
Philippines	10	211	-201	19 <sup>a/</sup>	188	-169
Singapore	-	184	-184	-	247	-247
Thailand	-	246	-246	-	318	-318
ASEAN	1,855	1,155	700	2,567	1,910	657

<sup>a/</sup> This figure assume that the oil production in the Philippines is the same as in 1985.

Source : Data submitted to the Economic Committee of ASCOPE

Table 11: Oil Consumption as a Percentage of Total

Energy Consumption in ASEAN, 1975, 1980 and 1990

	1975	1980	1990
Indonesia	84	80	80 <sup>a</sup> /
Malaysia	85	94	85
Philippines	93	87	56
Singapore	100	100	100
Thailand	92	82	50
ASEAN	n.a.	86	70

a/  
the author's assumed figure due to data nonavailability

Source : A Report on "The Supply/Demand Outlook for Petroleum in the Context of the total Energy Situation in the ASEAN Region in the Eighties", submitted to the 17<sup>th</sup> meeting of the ASCOPE Economic Committee in Malaysia, August 19 - 21, 1981.