IMPACT OF NON-OIL EXPORTS

ON THE INDONESIAN ECONOMY:

AN ECONOMETRIC ANALYSIS

By

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TO PAPA AND MAMA

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ABSTRACT

Prior to 1986, oil was the major export of Indonesia. In large measure, it supported the economic development of the country. During the oil price booms of 1974 and 1979, oil exports increased considerably from U.S. $1.6 billion in 1973 to almost U.S. $20.7 billion in 1981. This favourable trend, however, was halted after the oil price dropped in 1982. Following this, oil exports gradually decrease to U.S. $8.3 billion in 1986. The Indonesian government responded this situation rapidly by introducing a series of policy measures including, devaluation, privatization, and deregulation to promote non-oil exports especially manufactured exports.

Due to these new government policy initiatives substantial progress has been made in many sectors of the economy. Indeed, since 1987, non-oil exports have become major export names for Indonesia. In 1991, the ratio of non-oil exports to gross domestic product was 15.6%, compared to only 5.3% in 1981.

In view of the above, the objective of this thesis is to analyze the impact of non-oil exports on the Indonesian economy within the context of a medium sized macroeconometric model. Based on the simulation results, this study also draws some conclusions which will be useful for the policy makers and researchers in Indonesia.

ACKNOWLEDGEMENTS

CHAPTER 1

INTRODUCTION

Promoting non-oil exports has been a primary concern in Indonesia since late 1982 because oil exports are no longer the backbone of economic growth for the country. Before 1982, especially during the two oil price booms of 1973 and 1979, oil exports were the engines of growth of the Indonesian economy. The ratio of oil export revenue to total export revenue was 75.8% in 1975 and this ratio reached a peak of 82.4% in 1982.[1] However, shortly after a recession in 1982, the price of oil declined, resulting in a decrease in the production of oil. Consequently, government revenues from oil dropped. The Indonesian Government responded to this situation quickly, reducing the dependency on oil and increasing non-oil exports. Some measures were introduced to liberalize the market and to encourage non-oil exports. These include deregulation packages and frequent devaluations in the exchange rate.

The Indonesian government also promoted non-oil exports as a means for creating new areas of employment and increasing value added exports. In recent years the value added from the oil and mining sectors has expanded less rapidly than that of other sectors of the Indonesian economy. The declining share of oil and mining in the Gross Domestic Product (GDP) was due not only to the lower prices of oil but also the

Indonesia, as a member of the Organization of Petroleum Exporting Countries (OPEC), produced an average of over one and a half million barrels per day of petroleum during 1991. Without further oil discoveries and with the current depletion rates, combined with a rapidly increasing domestic demand for oil, it has been suggested that Indonesia would become a net importer of oil by the next century.[2] It should also be noted that Indonesia is the world's largest exporter of Liquefied Natural Gas (LNG). Although the prospects for oil discoveries are good, and there are 60 known basins of which only 30 basins have been explored and 14 basins are still being developed, efforts have nevertheless been taken by the Indonesian government to encourage non-oil exports.

The Indonesian government invited both domestic and foreign investments which were labour intensive and export oriented. To encourage exports, investment has been liberalized since 1967. Consequently, foreign investment increased rapidly. During the period 1967 to 1991, there was approximately U.S. $50 billion in foreign investment in Indonesia. In that period more than 66% was allocated to the manufacturing sector while the agricultural sector accounted for over 15%. The focus of foreign investment has changed from agriculture to the manufacturing sector. A change in the structure of the Indonesian economy occurred not only in the investment sector but also in some of the other sectors, particularly the export sector.

Rapid changes in the Indonesian economy have been recorded since the late

predominant driving force for future growth and development of the Indonesian economy. In reference to this situation, some pertinent questions arise as to whether the policy to reduce oil exports can be compensated by expanding non-oil exports, not only for the present but also in the future; and secondly, whether such a policy can positively affect the economic growth of Indonesia. These are the two main questions to be dealt with in this thesis.

The purpose of this study is thus to investigate the impact of the government's policy of promoting non-oil exports on the Indonesian economy. In this context, a medium sized 44 equation macroeconometric model was constructed with particular focus on the export sector of Indonesian economy. The econometric policy simulations constructed in this thesis were designed with a view to address some key issues, namely; whether changing the relative price of non-oil tradeable commodities, devaluation of exchange rates and increased income levels of the main trading partners of Indonesia will bring about a favourable impact on non-oil exports and on the growth of economic development of the country. It is hoped that this study can contribute some suggestions or ideas to decision makers. In the following, the organisation of the remaining chapters are presented.

Chapter 2 provides an economic perspective of Indonesia. This chapter includes various summaries of Indonesian economic characteristics, its economic history, and

of the Indonesian economy.

A number of studies have been under taken on the subject of the determinants of export demand in developing economies. Some of these studies complement each other, while others do not. Chapter 3, therefore, reviews the literature on export demand with an objective to find some consensus on this topic.

Having discussed the economic situation in Indonesia and reviewed several studies, either on Indonesia or other developing countries, a medium sized macroeconometric model was constructed. In Chapter 4 the complete specification of the model is presented and also a flow chart of the entire model. The flow chart is useful in showing the linkages between different sectors of the economy.

Chapter 5 contains estimated results and policy simulations relevant to the objective of this thesis. In this chapter we use some indicators to investigate the quality of the simulation set. The results of some shock scenarios imposed on the economy are also presented in this chapter by using tables. These tables also demonstrate selected endogenous variables that are affected by the shock scenarios.

Chapter 6 contains the conclusion and its implications. The conclusion consists of a summary of this study and findings from the thesis. The implications consists of comments and suggestions and the hope that it may be useful as a guideline to help some policy makers to evaluate and create policy in the future.

base line solutions are presented in Appendix C, while Appendix D presents the impacts

of (policy) shock simulation on selected endogenous variables.

FOOTNOTES

1. Source: Central Bureau of Statistics, *Statistik Indonesia*, various issues.

2. This estimate has been reported by the government of Indonesia (unpublished) and also in the *Petroleum Report*, issued by the United States in Jakarta (June 1990).

ECONOMIC PERSPECTIVE OF INDONESIA

2.1 Introduction

Since the late 1960s, the Indonesian economy has experienced significant growth in most sectors of the economy. This high economic growth has been maintained even at a time of recession in the rest of the world. When exports of oil decreased in Indonesia following a reduction of oil prices in the world in the early 1980s, the government promoted an alternative policy to reduce dependency on oil and increase non-oil exports. This policy was supported by initiating deregulation and reforms in domestic economic policies. Since 1982, the government has pursued vigorous adjustment programs aimed at improving competitiveness, increasing economic efficiency, and diversifying the pattern of industrial production.

Economic reforms in 1983, introduced by the Soeharto Government, were instrumental in promoting economic growth and in generating rapid increases in non-oil exports, especially manufacturing exports. Non-oil exports have continued to increase, and since 1987, they have constituted a higher percentage of total exports than that of oil exports. The focus of this thesis is to analyze the economic impact of a change in policy to reduce dependency on oil and at the same time to enhance non-oil exports. Recent data indicates that exports of manufactured commodities have increased, especially after

months by the easing of restrictions on foreign investment. Indeed, this policy encouraged non-oil exports, and it appears that political stabilization and deregulation have helped many sectors of the Indonesian economy.

In view of the above considerations, the purpose of this chapter is to critically review the economic performance of the Indonesian economy, particularly the international trade sector. In addition, the political economy of Indonesia is also examined in order to provide a background on policies which support the economic stabilization of Indonesia. In section 2 we discuss the economic characteristics of Indonesia. Section 3 examines the Indonesian political and economic situation, while, in section 4, we discuss the recent economic progress in the Soeharto era. Section 5 reviews Indonesia's competitiveness in international trade, and finally, in section 6 we discuss Indonesia's garment, textile and plywood industries and their progress, followed by a summary of this chapter in section 7.

2.2 Indonesian Economic Characteristic

Indonesia is an archipelago republic, which covers much of the old world tropics between 96^0 and 141^0 east latitude and 4^0 north to 11^0 south latitude. It has over 13,600 islands, of which only 3,000 are inhabited. These islands lie along the equator and are spread over an area nearly as large as the United States of America, with 60 to 70 percent of that

Ocean, and between two continents, Asia and Australia. The border of this country on the north is limited by Malaysia, Singapore and the Philippines, on the east by Papua New Guinea, on the south by Australia and on the west by the Indian Ocean.

At the end of 1991, the population in Indonesia was about 187.7 million, with a population growth rate of about 1.8 percent per annum. Data from the Central Bureau of Statistics of Indonesia shows that the annual population growth rate has decreased from 2.3 percent in the period 1971-1980 to 2.1 percent during 1980-1985 and finally 1.8 percent in 1985-1991. The decreasing growth rate has been attributed to the successful promotion of the Indonesian government's population control policy through family planning programs. It is interesting to note that the labour force participation rate, at the same time, increased from 53% in 1985 to 57% in 1987 and 59% in 1991.

In the 1960s, the Indonesian economy grew very slowly. From 1960 to 1968, the real Gross Domestic Product (GDP) had grown only 2.6 % at constant 1973 prices. With a population growth rate of 2.1 per cent per year, the GDP per capita had experienced a period of practically no growth. Soon after the takeover of the government by the "New Order" in 1969, the government implemented the five-year development program during which the Indonesian economy grew significantly. From 1970 to 1990, the GDP per capita more than doubled. Table 2.1 shows that the growth of real GDP per capita in current prices increased from about Rp. 28,000 or U.S. $77 in 1970 to about Rp.

TABLE 2.1
PROFILE OF GDP PER CAPITA AT CONSTANT
AND CURRENT PRICES AND POPULATION

Years	GDP per capita			Population[b] (000,000)
	Constant price[a]	Current price		
	in thousand rupiah	in thousand rupiah	in U.S. $	
1970	299	28	77	119.47
1975	388	93	224	135.67
1980	522	308	491	147.49
1985	588	590	531	164.63
1986	610	709	475	168.35
1987	625	724	440	172.01
1988	647	794	471	175.59
1989	683	928	524	179.14
1990	734	1,103	598	179.30
1991	745	1,210	621	187.76

a) 1985 price.
b) The end of the year.
Source: IMF (1991), *International Financial Statistics*, various issues.

Table 2.2 demonstrates the ratio of expenditure on individual components of GDP to total GDP in constant (1983) prices. During 1987 to 1991, the ratio of Indonesia's exports to GDP (in percentage) fluctuated. The figures in Table 2.2 show that, in 1987, the ratio was about 27.2%, decreasing in 1988 to 26%, and eventually, in 1991, increasing to 29.2%. The table also indicates that the ratio of imports to GDP is less than that of

TABLE 2.2

EXPENDITURES AS PERCENTAGE OF GROSS DOMESTIC PRODUCT AT 1983 PRICE

	1987	1988	1989	1990	1991
Private consumption	55.2	54.3	52.5	53.9	54.4
Government consumption	9.8	9.9	10.2	9.8	9.8
Increase in Stock	1.3	1.1	1.3	2.7	0.5
Gross fixed capital formation	30.2	25.2	26.6	28.3	27.3
Export of goods and services	27.2	26	26.7	26.4	29.2
Less:import of goods and services	(21.4)	(16.5)	(17.3)	(21.1)	(21.2)
Gross domestic product	100	100	100	100	100

Note : Numbers in parentheses indicate negative value.
Source : Various issues of Central Bureau of Statistics.

During 1991, as a member of the Organization of Petroleum Exporting Countries (OPEC), Indonesia produced around 1.55 million barrels per day (b/d) of crude oil and nearly 180,000 (b/d) of condensates. One of the major reasons why Indonesia whishes to reduced its dependency on oil exports and to encourage non-oil exports is to prevent the rapid depletion of oil resources. Without further oil discoveries, current depletion rates and rapidly increasing domestic demand may cause Indonesia to become a net importer of oil by the next century. However, the prospects of new oil discoveries are good. There are 60 known oil basins, of which 36 have already been explored and 14 are being developed.

decreased from 70.6% in 1981/82 to 57.1% in 1985/86 and eventually 36.0 % in 1991/92.

Conversely, the ratio of non-oil exports to non-oil imports increases from 28.6% in 1981/82 to 53.8% in 1985/86 and to 77.5% in 1991/92. The ratio of non-oil manufacturing exports to GDP also increases from 8.4% in 1981/82 to 15.5% in 1991/92.

TABLE 2.3

INDONESIA'S CHANGING ECONOMIC STRUCTURE
in percentage

Ratio of	1981/82	1985/86	1991/92[c]
Oil/LNG exports to total merchandise exports [a]	81.9	66.6	36.2
Non-oil exports to non-oil imports[a]	28.6	53.8	77.5
Oil/LNG revenues to total revenues	70.6	57.1	36.0
Private fixed investment to total fixed investment [b]	52.1	49.1	64.7
Non-oil manufacturing export to GDP [b]	8.4	11.5	15.5

[a] Goods only in current dollar.
[b] Calendar year basis in 1983 prices.
[c] Preliminary estimates.
LNG : Liquified Natural Gas.
Source: World Bank staff estimates.

From Table 2.3 we can see the changing economic structure in relation to the government policy to reduce dependency on oil exports. From this table we can see that the government policy reforms moved sharply towards a more outward-oriented growth strategy that spurred competition and expanded opportunity for growth, especially for non-

countries interested in occupying this territory. In 1510, the Portuguese arrived in Moluccas, a part of Indonesia, to find spices for the European market. Early in the seventeenth century the Dutch East India Company, the dominant company in the Indies, extended its activities beyond trading and acquired territorial possessions in many parts of Indonesia and the area became known as the Dutch East Indies. During World-War II (1942-1945), Japan occupied Indonesia for more than three years.

Indonesia declared its independence on August 17th, 1945. Its independence was proclaimed by Soekarno and Hatta, who became the first President and Vice President of the new nation, respectively. Indonesia was rebuilt after the damage inflicted by the Dutch occupation, World War II and the Japanese occupation. The new government set itself the task of unifying the diverse areas of politics, culture, religion and language. The period 1945-1950 is known as the period of National Revolution, as Indonesia attempted to gain independence while the Dutch tried to federalize the country and to suppress Indonesian sovereignty through military intervention. After four years of war and negotiation, Indonesia achieved formal recognition of her sovereignty.

Soon after Indonesia's declaration of independence (while Soekarno remained President with few powers and Sultan Syahrir became Prime Minister) the rapid increases in both rural and urban industrial production stagnated because investment was not maintained [see Pauw (1963) p.199]. The threat of overpopulation at that time became

persons.[1]   Although agriculture was their mainstay, not all villages   participated in cultivation.

In the agricultural sector, rice production rose 30% between 1950 and 1954, but during 1954 to 1957 its production declined slightly, becoming insufficient for the people. Since 1958 its production has slightly increased, and in 1961 the government promoted "rice self-sufficiency".   This particular campaign was unsuccessful, although rice production did rise in 1961 and 1962, reported at 8,350 and 9,200 thousand metric tons. This was not sufficient because the 2.2% growth in population was too high to meet the projected demand for rice.   Consequently, the government had to import about one million tons in both years.[2]

Rubber is the major export besides oil, but its value increased only during a certain period, that is between 1938 and 1951, when its production was increased from 303,000 metric tons to 793,000 metric tons.[3] This commodity became the main source of the country's export earnings and replaced the old staples of coffee and sugar. However, a few years after 1951, rubber export value decreased significantly. Some of the reasons why its production declined were that smallholdings were badly maintained, old trees, and the rate of replanting of estates was low. The government estates did not receive adequate funds to maintain the expensive replanting program. In addition, in the 1960s, many leaseholds were due to expire. The government had not been successful in

During the postwar decade, sugar production, which was the country's chief plantation commodity, declined and was only 3% of the total export. Furthermore, in 1961, to provide the normal domestic need of over 600,000 tons per annum, the government had to import sugar [see Glassburner (1971)]. Except for tin, other plantation commodities which were produced during Soekarno's period were generally lower than in the earlier years. In 1950, the plantation commodities, i.e., tin, copra, coffee, tobacco, palm oil and kernels, tea and sugar had been 30% of Indonesia's export earnings.

As for the oil sector, in 1941 there were seven oil refineries operating. A few years later, the Dutch government accelerated oil production, and three big refineries, the Stanvac and Shell refineries at Palembang and the Shell refinery in Balikpapan, were processing the bulk of Indonesia's oil. After independence in 1952, only one of the three big companies had gained benefit from oil production. The foreign oil refineries needed to continue operating the oil production, but the government and the oil companies could not come to an agreement. In 1962, the government signed agreements with three new American companies, where the ratio of division of profit became 60:40.[4] At that time Indonesia was accepted as a member of OPEC (Organization of the Petroleum Exporting Countries). Among the member countries, Indonesia is the oldest crude oil producer. The first oil was found in 1885, and the initial production was 2,000 barrels per day in 1893 [see Kubah (1974) p. 146].

inflation, price instability and government regulations restricted the inflow of investment into these industries.

During this period, President Soekarno announced a concept known as 'Guided Democracy'. One part of this concept is 'Guided Economy', but this concept could not help people avoid worsening poverty. This 'Guided Economy' was unworkable and it led to hyperinflation of more than 100% per year over the years between 1961 to 1964. Before 1960, the money supply increased at an average rate of 25% per annum, but it rose to 50% in 1961, and approximately doubled between 1962 and 1963. It also reached its highest level in 1964/65, when the money supply increase from Rp 675 million to Rp. 2,582 million, respectively, or more than 280%.[6] By 1965, the market interest rate was 10% per month or more, and prices rose 20% per month. In December 1965, the government implemented the "currency reform", a new rupiah was equal to 1000 old rupiahs.

During the last two years of Soekarno's government, the credit system depended on the Central Bank. This decision was advantageous to the political control system, making it easier for the government to draw money for budgetary expenditures, extra-budgetary expenditures and for funding political purposes. The critical political situation in the country and the unwise policy of Soekarno towards the Communist Party (PKI) forced the President to give his authority to General Soeharto.

communist country, attempted to change the political ideology of Indonesia from Pancasila (Five Basic Principles) to Communism. In March of 1965 General Soeharto rose as a supreme power with an objective to provide stability and solve the political and economic problem. In March 1968, Soeharto was elected by the People's Consultative Assembly-Provisional (MPR-S) as President.

2.4. Economic Development Under Soeharto

During Soeharto's rule, which was known as 'the New Order', the government implemented a five-year plan known as REPELITA to accelerate the development of various sectors of the Indonesian economy. Most of this development program was financed by foreign aid. Funds came from a wide range of sources, namely Japan, an informal group of major western nations, the World Bank, the International Monetary Fund and United Nations Development Program. The government established an Inter-Governmental Group for Indonesia (IGGI) to fund the country's recovery and development.

A few years after Soeharto became president, the economic trend showed progress in many sectors. The mining sector, including petroleum, increased its production, especially after the government established the National Oil and Natural Gas Mining Company (Pertamina) in 1968. In the years between 1968 and 1971, the export of crude

the backbone of government income. The agricultural sector which employed the majority of the labour force underwent improvement. Rice production increased from 13 million tons in 1971 to 18.5 million tons in 1981, implying an increase on an average of 0.5 million tons per annum.[8]

Approximately half of the labour force was employed in the small farm agricultural sector. They produced food crops for domestic consumption and exported goods such as rubber, tobacco, pepper and coffee. There were three kinds of production necessary to support the Indonesian economy: small farm agriculture, oil and gas, and mineral and export-oriented estate agriculture. The World Bank reported that, in the period 1970-1982, Indonesian agricultural production showed growth faster than the average of lower and middle income categories of countries. In that period the agricultural and food sub sector production showed a growth rate average of 3.68 % and 4.00 % each year.[9]

In retrospect, the government was highly successful in initiating the five-year development plan programmes and results show that in the first planned period the real GDP rose from Rp 28.2 billion in 1967 to Rp 139.9 billion in 1991 (in 1985 prices)[10], representing an annual growth rate of 15.8%. The share of government expenditure in GDP averaged about 14% and 22% per annum, respectively, in both nominal and constant values.[11]

The structure of Indonesian production moved from predominantly agriculture in

on the other, the ratio of industrial sector to GDP increased from 16.9% in 1987 to

21.3% in 1991.

TABLE 2.4
PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC PRODUCT
BY INDUSTRIAL ORIGIN

NO	SECTOR	1987	1988	1989	1990	1991
1	AGRICULTURE, LIVESTOCK, FORESTRY, FISHERY	23.5	24.1	23.4	21.4	19.5
2	MINING	13.8	12.1	13.0	12.9	13.6
3	INDUSTRY/MANUFACTURE	16.9	18.5	18.1	20.3	21.3
4	ELECTRIC, GAS & WATER SUPPLY	0.6	0.1	0.1	0.1	0.1
5	CONSTRUCTION	4.1	0.5	5.4	5.4	5.6
6	TRADE/HOTEL/RESTAURANT	16.8	17.1	17.3	17.2	16.6
7	TRANSPORT/COMMUNICATION/ OTHER SERVICES	38.1	27.6	22.7	22.7	23.3
	TOTAL GDP	100	100	100	100	100

Source : Central Bureau of Statistics, *Statistik Indonesia*, various issues.

Indonesia is well known for its abundance of oil and as a member of OPEC. Since

1973 the export of oil greatly determined government revenue. Since 1977 the export of

Liquified Natural Gas (LNG) has increased significantly. In addition, both of these

commodities are fully controlled by the government. In nominal terms, government tax

crude petroleum (oil) started to decline, from U.S. $34.5 in 1982 to U.S. $13.6 per barrel in 1986. The price then fluctuated, finally, settling at U.S. $19.3 per barrel in 1991. This large decline in oil export prices has influenced government revenues considerably in recent years. Total value of oil and gas exports dropped to U.S. $10.9 billion in 1991 from U.S. $18.39 billion in 1982.[12]

Generally, government revenue is composed of a domestic component and funds originating from foreign aid and loans. The revenue side in the government's balanced budget shows a counter balance with the expenditure side. Government expenditure has significantly contributed to increasing aggregate expenditure or aggregate demand in the economy. This led to an increase in income growth, but at the cost of high inflation and the pressure on interest rates. At the beginning of Soeharto's rule (1966), the rate of inflation was extremely high, being estimated at about 1,500%.[13] For the period 1970-1982, the average inflation rate was 19.9%, and the World Bank reported that Indonesian inflation exceeded the average rate of 13.9% for the middle income oil exporting countries over a 12 year period [see Glassburner (1985)].

Monetary measures were introduced to promote growth, and at the same time to control inflation. During the period 1967 to 1978, the government implemented a fixed exchange rate system, and since December 1978 a managed floating exchange rate system has been adopted. Under this exchange system, the domestic currency fluctuates in line

of payment policy. The inflow of foreign resources in the form of foreign aid, loans, and foreign direct investment, combined with price stabilization and exchange rate policies, were able to affect the supply of funds as well as demand in the economy.

In order to diversify and intensify exports on the one hand and to accelerate import substitution of manufacturing on the other, the government implemented a suitable balance of payment policies. These policies led to an increase in money supply through their impact on the monetary base and demand for domestic credit. The government was also able to control the rise in prices by using its large surplus of foreign exchange. During the period 1970-80 prices rose by only 14.8% per annum [see Bunge (1983)].

The participation of many prominent technocrats in designing the development program played an important role in the success of the government program concerning the Indonesian economy in many sectors. A series of five-year economic development programs were designed as follows: The first five-year plan or REPELITA I (1969-73) accentuated the development of basic agriculture; REPELITA II (1974-78) balanced agricultural production; REPELITA III (1979-83) introduced industries which were supported by the agricultural sector; REPELITA IV (1984-88) strengthened basic industry; REPELITA V (1989-93) holds defence and security industries; and REPELITA VI (1994-98) maintains balance and self-sustaining production in all sectors.

from Persia, Arabia, and Turkey to the Far East and from the Indian port and the Islamic states to the West. According to the cultural history of Indonesia, Indian trade reached the Indonesian archipelago in the twelfth century. This trade relationship existed even before the trade relationship between Indonesia and China. There were valuable high quality products in Indonesia to trade, such as spices, drugs, expensive kinds of wood, forest products, animal products, exotic birds, and other curiosities. These same products were brought to India and the Near East from many places. The trade relationship between India and Indonesia influenced the culture in Indonesia which is called Hindu-Indonesia History [see Van Leur (1981)]. At the beginning of the Christian era, ships from the Indian ports first reached southern China via the coast of Indonesia and Indo-china. At the time of Chin Shih Huang Ti, the empire expanded its territory to the southern part of China. At this time Indonesians and other foreigners from the west, i.e. India, carried part of the trade and shipping on South China [see Van Leur (1981), p.105].

In the early part of the fourth century, Arab and Persian traders travelled to East Asia. In the seventh century Arab traders set up moslem colonies at the intermediate stations on the long trade route in southeast Asia. A few centuries later, Islam, introduced by Arab traders, was adopted in some parts of Indonesia. In the fifteenth century, the dynasty of Malacca accepted Islam [see Van Leur (1981), p. 122] and turned it into a political instrument. In 1511 Malacca fell, soon after the Portuguese arrived in

forced to leave Indonesia by the Dutch Company after its arrival in 1596. The initial purpose of the Dutch Company was not different from that of Portuguese, that of exploiting spice trade for the purpose of selling it in Europe.

The Dutch came to power in Indonesia by struggling against the Portuguese and Indonesian people, and by establishing both a naval station and a naval base. During their occupation, the Dutch implemented a trade monopoly, i.e. forcing the people to sell the local commodities to the Dutch government. The commodities that were exported at that time besides spices included oil, textiles (yarn), palm oil and others. The Dutch, however, left Indonesia at the beginning of the World War II (1942).

After independence, the Indonesian government faced the crucial problem of politics and economy from both within and outside the country. During the period 1945-1966, the GDP growth was virtually zero or even negative. The total value of Indonesian export commodities decreased from U.S. $931 million in 1959 to U.S. $685 million in 1966.[14] During this period, the balance of payments fluctuated sharply from a surplus of U.S. $25 million in 1959 to a deficit of U.S. $521 million in 1961, and in 1965 the deficit was U.S. $248 million [see Glassburner (1985), p. 429]. The data in this period shows that the economic situation was worsening. The "New Order" program under Soeharto emerged in 1966 as a correction of the "Old Order".

The Indonesian foreign trade during Soeharto's rule showed considerable

1983 to U.S. \$14.805 billion in 1986. However, during the following five years (1987-1991), exports have continuously increased from U.S. \$17.136 billion in 1987 to U.S. \$29.142 billion in 1991.[15] The trend of total exports, consisting of oil and non-oil commodities, can be seen from Figure 2.1.

Figure 2.1
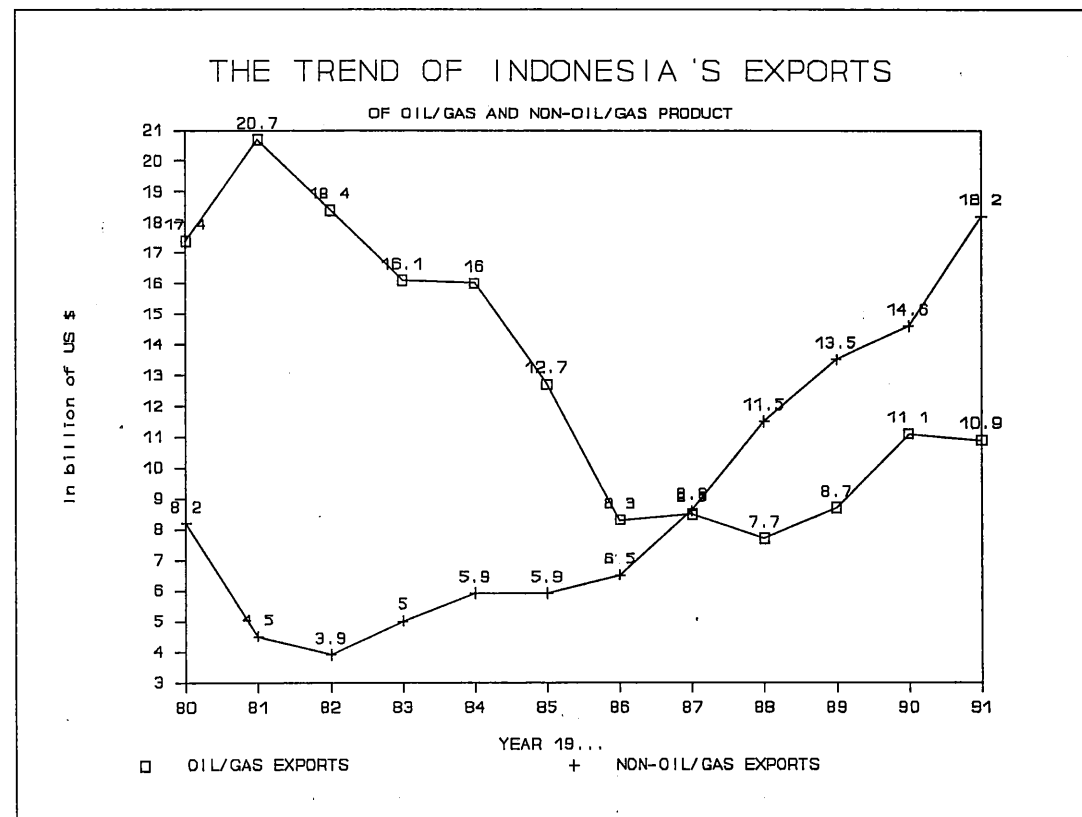
Source : Central Bureau Of Statistics, various issues.

In Table 2.5, we can see the share of petroleum (oil) and non-petroleum (non-oil) exports in the overall exports during the 1980-1991 period. In Figure 2.1, we can see that during

exports, and the highest share of oil and gas export in the overall export was recorded in

1982 at 82.40%, as shown in Table 2.5. Other than that, the share has of oil and gas has

continuously fallen from 76.33% in 1983 to 37.39% in 1991.

TABLE 2.5

THE TREND OF OIL/GAS AND NON-OIL/GAS EXPORT
FROM 1980 TO 1991.
in U.S. $ billions

Year	Total Export	Oil and gas		Non-oil and non-Gas	
		Value	%	Value	%
1980	23.590	17.781	74.24	6.169	25.76
1981	25.165	20.664	82.11	4.501	17.89
1982	22.328	18.399	82.40	3.929	16.60
1983	21.146	16.141	76.33	5.005	23.67
1984	21.888	16.018	73.18	5.870	26.82
1985	18.587	12.718	68.42	5.869	31.58
1986	14.805	8.277	55.91	6.528	44.09
1987	17.136	8.556	49.93	8.580	50.07
1988	19.219	7.682	39.97	11.537	60.03
1989	22.159	8.678	39.16.	13.480	60.83
1990	25.675	11.071	43.12	14.604	56.88
1991	29.142	10.895	37.39	18.247	62.61

Source : Central Bureau of Statistics, *Indikator Ekonomi*, various issues.

Since 1987 the percentage of non-oil exports has been greater than that of oil

exports. Data in Table 2.5 reveals that the government has successfully reduced

dependency on oil exports and accelerated the export of non-oil products.

rose from 16.6% in 1982 to 60.83% in 1988, and finally to 62.61% in 1991. In order to

see the distribution of non oil exports, Table 2.6 demonstrates the composition of non-

oil/gas export commodities. Much of the expansion of non-oil/gas exports came from the

export of industrial products which rose from U.S. $4.25 billion in 1985 to U.S. $15.07

billion in 1991 (see Table 2.6). The average increase in industrial products in the period

1985-1991 was 42.4% annually. Meanwhile, in the same period, the average increase in

agricultural products was 10.8% annually.

TABLE 2.6

THE COMPOSITION OF EXPORT OF NON-OIL/NON-GAS COMMODITIES
FROM 1985 TO 1991
in U.S. $ millions

YEAR	INDUSTRY	AGRICULTURE	MINING	OTHER	TOTAL
1985	4,251.4	1,383.3	202.4	31.7	5,868.8
1986	4,509.3	1,754.1	253.3	12.7	6,528.4
1987	6,666.4	1,665.7	240.6	6.8	8,579.5
1988	9,261.9	1,909.2	348.7	17.1	11,536.9
1989	11,028.1	1,943.1	503.0	5.8	13,479.5
1990	11,878.5	2,083.2	636.0	6.4	14,604.1
1991	15,067.5	2,281.9	889.0	8.8	18,247.2

Source : The Central Bureau of Statistics, *Indicator Ekonomi*, various issues.

According to the value of Indonesian exports by countries of destination (the first

six main trading partners) as shown in Table 2.7, Japan was the largest importer of

Indonesia's commodities during 1986-1991. Japan's imports from Indonesia increased

TABLE 2.7

INDONESIAN EXPORT BY COUNTRY OF DESTINATION
FIRST SIX COUNTRIES, 1986-1991
U.S. $ million

Country of Destination	1986	1987	1988	1989	1990	1991
Total	14,805 (100%)	17,136 (100%)	19,219 (100%)	22,159 (100%)	25,675 (100%)	29,832 (100%)
Japan	6,644 (44.8%)	7,393 (43.1%)	8,018 (41.7%	9,321 (42.1%)	10,923 (42.5%)	11,203 (37.6%)
USA	2,901 (19.5%)	3,349 (16%)	3,074 (15.8%)	3,497 (15.8%)	3,365 (13%)	3,509 (9.6%)
Singapore	1,238 (8.4%)	1,449 (8.5%)	1,653 (8.7%)	1,818 (8.2%)	1,902 (7.4%)	2,410 (7.9%)
South Korea	356 (2.4%)	673 (3.9%)	840 (4.4%)	921 (4.17%)	1,363 (5.3%)	1,447.7 (4.8%)
Netherlands	453 (3.1%)	493 (2.9%)	646 (3.4%)	681 (3.1%)	723 (2.8%)	745 (2.5%)
Taiwan	317 (2.1%)	474 (2.8%)	478 (2.5%)	576 (2.6%)	849 (3.3%)	1,056.9 (3.5%)

Note: In brackets are percentages of the export value in relation to the total exports in the recorded year.
Source : Central Bureau of Statistics, *Indikator Ekonomi*, various issues.

Even though government policies have been instrumental in accelerating the export

of many commodities, the complexity of port clearances, periodic quotas or bans on the

storage of export foods on consignment and reduce harbour fees (Bunge, 1983).

On the import side, the total import to Indonesia continuously increased from U.S. $6.69 billion in 1978 to a record high of U.S. $16.86 billion in 1983. During the following three years, imports to Indonesia fell from U.S. $16.35 billion in 1983 to U.S. $10.26 billion in 1985. However, since 1986, import values have been increasing from U.S. $10.72 billion in 1986 to U.S. $25.87 billion in 1991 (see Table 2.8).

TABLE 2.8

THE COMPOSITION OF INDONESIAN IMPORT
FROM 1985 TO 1991
in U.S. $ billion

YEAR	OIL AND GAS		NON-OIL AND GAS		TOTAL
	VALUE	% TOTAL	VALUE	% TOTAL	
1985	1.274	12.4	8.987	87.6	10.258
1986	1.086	10.1	9.632	89.9	10.718
1987	1.068	8.6	11.302	91.4	12.370
1988	0.909	6.9	12.339	93.1	13.248
1989	1.195	7.3	15.164	92.7	16.359
1990	1.921	8.8	19.916	91.2	21.837
1991	2.310	8.9	23.559	91.1	25.869

Source : Central Bureau of Statistics, Statistik Indonesia, various issues.

Most imports consist of non-oil/gas products, and the highest non-oil/gas import value was recorded in 1991 at U.S. $23.56 billion. Table 2.8 shows that starting in 1985,

Since 1982 the government has implemented the counter purchase policy. This policy states that the seller who exported commodities to Indonesia must buy comparable amounts of Indonesian products. Most of Indonesia's major trading partners followed this policy. The purpose of this policy was to manage the deteriorating balance of payment. It is important to note that more than 25% of imports in 1990 and 1991 were capital goods. These imports were provided to encourage production, which in turn would increase exports.

TABLE 2.9
INDONESIA'S OVERALL BALANCE OF TRADE
FROM 1985 TO 1991
(in million U.S. $)

YEAR	EXPORTS	IMPORTS	BALANCE	% CHANGE
1985	18,586.7	10,259.1	+8,327.6	+4.0
1986	14,850.0	10,718.4	+4,131.6	-50.9
1987	17,135.6	12,370.3	+4,980.3	+13.1
1988	19,218.5	13,248.5	+5,970.0	+25.3
1989	22,160.2	16,359.6	+5,800.6	-2.9
1990	25,675.2	21,837.0	+3,838.2	-33.8
1991	29,142.0	25,868.8	+3,273.2	-14.7

Source : Central Bureau of Statistics, *Indikator Ekonomi*, various issues.

Indonesia's overall balance of trade during the period 1979-1989 showed a surplus, with the highest surplus being recorded in 1980 at U.S. $13.12 billion, while the lowest

exports had experienced a declining trend, the trade balance always seemed to be in surplus.

2.6 Indonesia's Garments, Textiles and Plywood Exports in the World Markets

We have previously discussed the performance of exports of non-oil products. In this section, we discuss the composition of non-oil exports, especially manufactured exports. From Table 2.6 we find that the composition of non-oil/gas exports was dominated by the industrial sector, which steadily increased from U.S. $4.25 billion in 1985 to U.S. $15.07 billion in 1991. If we examine the composition of non-oil exports (manufactured goods and primary products) as shown in Table 2.10, we find that the export of garments and textiles was rapidly increasing. In 1985, garments and textiles comprised only 9.5% of total exports, but by 1991, its value increased to more than 22% of total exports. Similarly, the export value of plywood increased three and a half times during the period 1985 to 1991, from U.S. $0.8 billion to about U.S. $2.9 billion. Detailed figures of non-oil exports are presented in Table 2.10.

From Table 2.10 we can further see that, during 1985-1989, exports of garments and textiles ranked second next to plywood. However, in 1990, the situation was reversed with garments and textiles taking the lead. It is also shown that, during the period of 1985-1991, the export of garments and textiles increased from U.S. $0.56 billion in 1985

TABLE 2.10
THE FIRST FIVE NON-OIL/GAS EXPORT COMMODITY
FROM 1985 TO 1990
(Million US$)

Commodity	1985	1986	1987	1988	1989	1990	1991
Total	5,869	6,528	8,580	11,537	13,480	14,604	18,247
	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Garments&	559	979	1,028	1,428	2,032	2,917	4,075
textile	(9.5)	(14.9)	(11.9)	(12.4)	(15.1)	(20)	(22.3)
Plywood	824	1,002	1,759	2,074	2,351	2,726	2,871
	(14.1)	(15.4)	(20.5)	(18)	(17.5)	(18.7)	(15.7)
Rubber	683	670	906	1,168	962	851	960
	(11.6)	(10.3)	(10.6)	(10.1)	(7.1)	(5.6)	(5.3)
Shrimps	202	285	352	499	541	672	760
	(3.4)	(4.4)	(4.1)	(4.32)	(4.0)	(4.6)	(4.1)
Footwear	4	8	24	83	220	569	994
	(0.1)	(0.1)	(0.3)	(0.7)	(1.9)	(3.9)	(5.4)

Note : In brackets are percentages of the total value of non- oil/gas exports.
Source : Central Bureau of Statistics, *Statistik Indonesia*, various issues.

This improvement demonstrates the importance of Indonesian exports of garments

and textiles in the international trade despite the existence of a quota system which acts

as an obstacle to export growth. It has been argued that an increase in garments and

textile exports could have many positive multiplier effects on other sectors of the

economy. Particularly, these industries are labour intensive, consequently personal

around the globe by employing masses of the world's peoples. Together, textile and apparel production is the largest source of industrial employment in the world, providing jobs for more than 25 million persons.[16] These industries play a particularly vital role in employing masses of persons who have few other job alternatives-both in the developing countries and often in the developed countries as well.

Figure 2.2

THE WORLD MARKET SHARE OF TEXTILES IN 1986
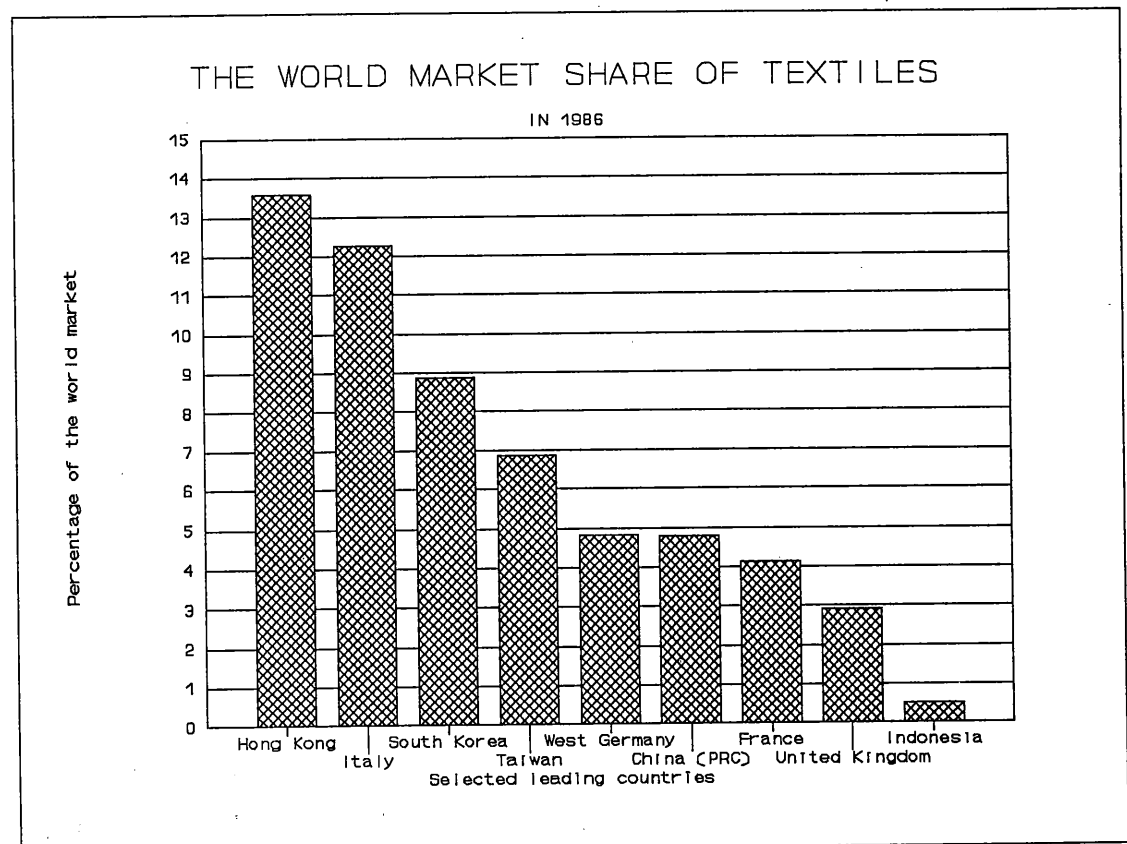
Source: GATT, International Trade 1989-1990, Vol.I, Geneva, 1990.

Due to the low price of labour in Indonesia, on the surface it may appear that Indonesian garments can compete against such other exporters in the world. However,

international market reached its highest value (see Figure 2.2). Hong Kong's market

share at that time was 13.58%, with Italy at 12.25%, South Korea at 8.87%, Taiwan at

6.88%, West Germany at 4.81%, France at 4.4%, United Kingdom at 2.91, and Indonesia

at only 0.49%. Compared to the main competitive countries, the market share of

Indonesia's textile exports in the world was very small. However, the prospects for

garments and textiles industries in the world are usually favourable even in a recession.

TABLE 2.11
LEADING IMPORTERS OF TEXTILES IN THE WORLD
FROM 1980 TO 1987

Countries	Value (billion$)	Growth Rate (average annual % change)			
		Dollar value		National currencies	
	1987	1980-1986	1987	1980-1986	1987
F. Rep. of Germany	8.0	-0.5	20.4	2.5	-0.3
Hongkong [a]	7.3	10.5	34.8	19.1	34.7
United States	6.5	14.8	11.5	14.8	11.5
United Kingdom	5.7	4.4	23.9	12.7	10.6
France	5.5	2.0	19.0	10.7	2.9
Italy	4.4	4.1	32.0	14.1	14.8
Japan	3.0	4.7	36.9	-0.3	16.8
Netherlands	2.8	1.0	17.9	4.5	-2.6

[a] Includes imports for re-export. Re-exports were $3.6 billion in 1987.
Source : GATT (1988).

The trend always improves following the growth of population. Consequently, the

importers of textiles, i.e., the Federal Republic of Germany, increased from -0.5% in the

period 1980-1986 to 20.4% per annum in 1987. Japan and Hong Kong have the highest

growth rates at 36.9% and 34.8% annually, respectively, in dollar values.

Figure 2.3
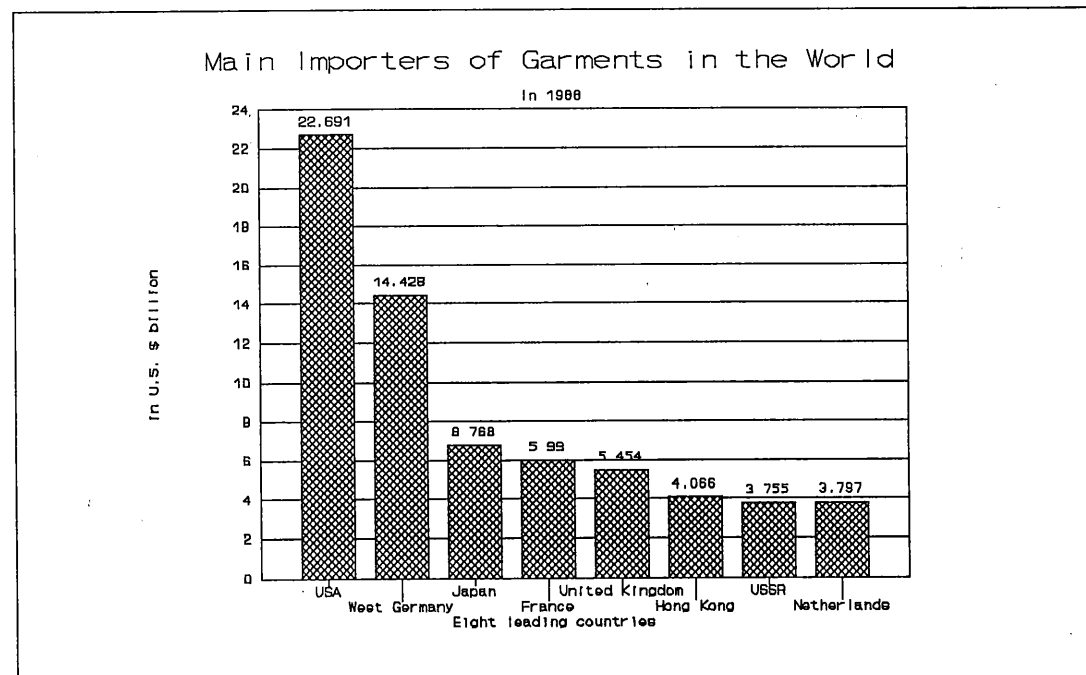
Source : UNCTAD, Handbook of International Trade Statistics 1990, Geneva, 1991.

On the other hand, comparing the main importers of garment products in the world

in 1988, we can see from Figure 2.3 that the United States was the largest importer of

garments at U.S. $22.7 billion, then followed by West Germany (U.S. $14.4 billion),

Japan (U.S. $6.7 billion), France (U.S. $6.0 billion), United Kingdom (U.S. $5.9 billion),

Hong Kong (U.S. $4.1 billion), and the Netherlands (U.S. $3.8 billion).

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the commodities are faced with problems of limited quotas, strict quality control, high

taxes, etc., in the international market. These restrictions put the Indonesian government

in a difficult position. We know that in 1986, the market share of Indonesian garments

was very low compared to other exporters in the world.

Figure 2.4

Market Share of Indonesian Garments

In the World Market in 1888

In percentage

| USA | West Germany | Netherlands | United Kingdom | Hong Kong | France | Japan |

Selected main trading partners
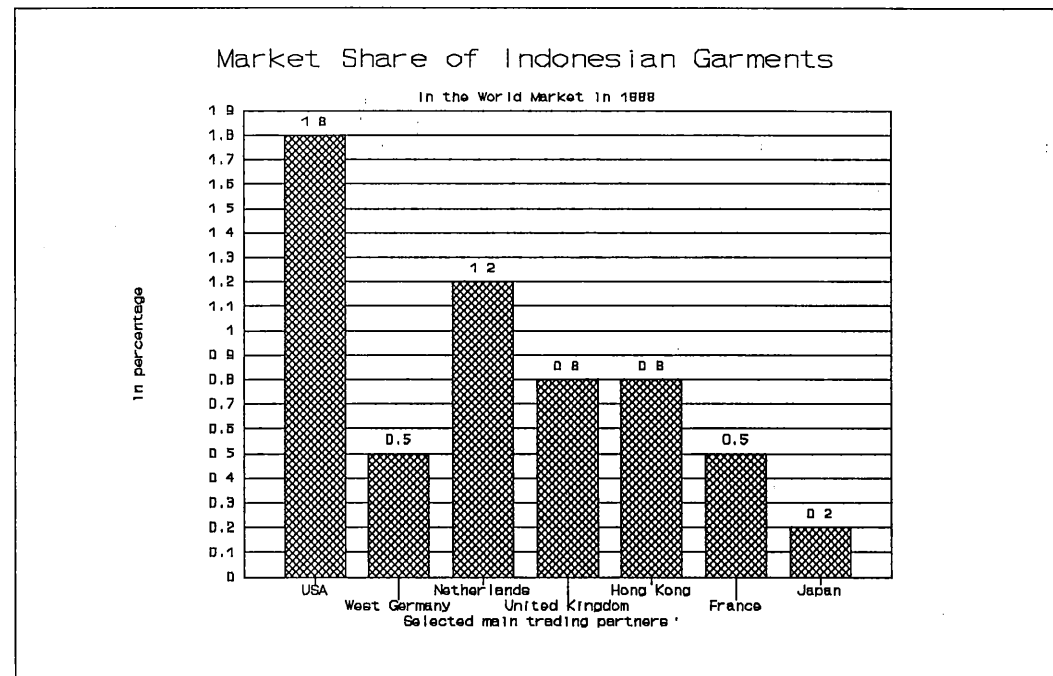
Source :   National Agency for Export Development and Central Bureau of Statistics, various issues.

If we are to examine the exports of Indonesian garment commodities, Figure 2.4

reveals the market share of Indonesian garments to leading importer countries in 1988.

The largest export of garments and textiles goes to the United States in the amount of

is the Netherlands (U.S. $46.1 million) with 1.2% of the market share, followed by the United Kingdom (U.S. $45.3 million) with 0.8% of the market share, Hong Kong (U.S. $33.9 million) with 0.8% of the market share, France (U.S. $29.7 million) with 0.5% of the market share, and Japan (US $11.6 million) with 0.2% of the market share.

Given the data on imported garments to the United States, we can see that the United States would be a good prospective market for Indonesian garments and textiles. Since 1988, the United States has the largest demand for commodities in the world. Meanwhile, since 1975, most of Indonesia's garments and textiles exports go to the United States. However, to penetrate the market, Indonesia faces some difficult problems at home and abroad.

In domestic terms, what is needed is modernization. With new technology, the quality of production can be increased and efficiency can also be improved. Training of the work force would have to swiftly follow modernization. This is not an easy task, as modern high technology is very expensive and it takes a long time to train the work force.

In foreign terms, the competition to penetrate the international market is fierce. Many exporting countries of garments and textiles are in this race. There are many problems which plague Indonesia's attempt to enter the world market. Protectionism was implemented in many countries following the recession and the uncertain economic situation in the world. Finally, the limitation of quotas poses a major problem. In terms

In its dealings with international trade, Indonesia actively participates in the General Agreement on Trade and Tariff (GATT) meetings. The rapid growth in Indonesia's non-oil and non-gas exports and the need to secure future market access for such products has increased Indonesia's interest in these negotiations. Indonesia sees a more liberal, transparent and predictable international trading system as a necessary means of achieving its own trade policy objectives. It attaches a high priority to settling trade disputes multilaterally. To keep good trade relationships with its trading partners, Indonesia is involved in agreements both multilaterally and bilaterally.

Indonesia is a member of several multilateral agreements, such as the United Nations, UNCTAD, the Asian Development Bank, the International Monetary Fund, the World Bank, the International Finance Corporation, etc. Indonesia participates in the international commodity agreements for natural rubber, coffee and tropical timber. It is also a member or signatory of various international agreements or organizations such as the Organization of Petroleum Exporting Countries (OPEC), the Association of Tin Producing Countries, the International Bauxite Association, the International Sugar Organization, the International Pepper Community, the Asian Pacific Coconut Community, the South East Asia Lumber Producers' Association, the International Tea Council, the Association of Natural Rubber Producing Countries, the International Rubber Research and Development Board, the International Rubber Study Group, and the Nickel

2.7 Summary

From the year 1970 to 1991, growth of the Indonesian economy has been undergoing some near boom conditions in most sectors. During the period 1970 to 1982, oil exports provided the major engine of growth for the entire Indonesian economy, following the two oil price booms in the years 1973 and 1979. However, in 1982, oil prices peaked, and revenues from this sector contracted, and prospects for economic growth deteriorated. Indonesia responded to this situation quickly and relatively forcefully with measures that included devaluation, significant reduction in government expenditures, and some policies that liberalized both internal markets and external trade. These policies were aimed not only at stimulating short-term stabilization, but also long-term structural change towards a more export-oriented, internationally competitive economy.

Some progress has been made following some packages of deregulation to stimulate economic growth. The structure of the economy has also changed. The value of exports increased from U.S. $14.8 billion in 1986 to U.S. $29.1 billion in 1991, while the ratio of exports of manufactured goods to total exports also increased from 20.4% in 1986 to 43.7% in 1991.[18]   Conversely, the ratio of exports of primary products to total exports in the same period (1986-1991) decreased from 20.3% in 1986 to 18.1% in 1991. Meanwhile investment, especially foreign investment, was also increasing to support non-oil exports. Since 1967, the Indonesian government has been liberalizing the investment

exports are continuously increasing. The prospect of manufactured exports is good due to the lower price of labour in Indonesia and the expansion of investment. It is important to note that during the fiscal year 1989-90, Indonesia was the world's 31st largest exporter and the 35th largest importer of merchandise.[19] Among the exported manufactured goods, garments and textiles have the potential for further expansion. However, the exported manufactured goods are very competitive in the world market, and they pose such restrictions as tariff and non-tariff barriers. Indonesia, as a member of GATT, has supported some efforts to limit export restrictions. Some efforts have been taken to encourage exports of manufactured goods.

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FOOTNOTES:

1. The 1961 census figured by Pelzer, *Physical and Human Resources Pattern*. Pp. 13-23.

2. Central Bureau of Statistics, *Statistical Pocket Book of Indonesia*, 1961, Jakarta, pp.53 and 116; and Economist Intelligence Unit, *Three Monthly Economic Review*, May 1963, p.4.

3. Central Bureau of Statistics, *Statistic Konjunktur*, 1963, Jakarta, Table C.8.

4. Cited from *Three Monthly Economic Review*, July 1963. Pp. 5-6.

5. Central Bureau of Statistics, *Statistics Konjunktur*, May-June 1961, Table 9A. Pp. 57-61.

6. Bank Indonesia, *Report of the Governor*, Jakarta, 1959-1960, p. 53; BNI Unit I (Bank Indonesia), *Weekly Return*, Jakarta, June 1966; BNI Unit I (Bank Indonesia), *Weekly Return*, Jakarta, January 1966.

7. International Monetary Fund, *International Financial Statistics Yearbook*, 1991.

8. Central Bureau of Statistics, *Indikator Ekonomi*, Monthly Bulletin of statistics, Jakarta, April 1982, p. 137.

9. World Bank, *World Development Report*, 1984 and *Nota Keuangan* (Presidential Report), 1983.

10. International Monetary Fund, *International Financial Statistics Yearbook*, 1991.

11. International Monetary Fund, *International Financial Statistics Yearbook*, 1991.

12. Central Bureau of Statistics, *Indikator Ekonomi*, June 1992.

13. Grenville, Stephen (1981), 'Monetary Policy and the Formal Financial Sector', in Booth and Mc Clay, *The Indonesian Economy During the Suharto Era*, Oxford University Press, Kuala Lumpur.

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17. Cited from Dickerson, Kitty G., 1991, *Textiles and Apparel in the International Economy*, Coller Macmillan, Toronto, Canada, p. 146.

18. Data source: Central Bureau of Statistics, *Indikator Ekonomi*, December 1992.

19. See: Trade Policy Review, *General Agreement on Tariffs and Trade*, Vol. I, August 1991.

CHAPTER 3

REVIEW OF RELATED LITERATURE

3.1 Introduction

In recent years, the study of the relationship between export and output growths of developing economies has attracted a great deal of attention from economists and policy makers alike [Serletis (1992)]. An empirical evaluation of this relationship is important because in many developing countries export promotion policy have been used as a device for development strategy [Jung (1985)]. Although based on in depth research of several industrial countries, strong support for export promotion has been found to be critical for economic growth. While the effectiveness of a government led intervention policy for developing economies is, at present, still a hotly debated topic [Lee (1988), Ram (1987)].

When economists examined the problem of international trade in certain developing countries, based on geographical and socio-economic considerations, the Indonesian trade issue was found to be particularly interesting. This is due to the fact that Indonesia is endowed with a large amount of natural and human resources and has recently shifted towards an outward-oriented development strategy. When those resources are combined with high technology, it will be possible for Indonesia to become a potentially significant industrial exporter in the world. Since oil is no longer the major export commodity in

resource-based products (Lee, 1988). Many economists, such as Oskooee (1991), Lee (1988), Ram (1987), Love (1986) and Wong (1986), have studied export growth in relation to output for Indonesia as well as other developing economies.

The purpose of this chapter is to present a critical review and evaluation of the empirical results of interaction between export and output growth in developing countries, especially in Indonesia. Furthermore, this chapter also describes the essence of outward-inward oriented development strategies and their roles in increasing in the growth for developing countries. Since an econometric model is constructed in this thesis as a tool for analysing the Indonesian economy, a discussion of other empirical models developed in this context is also given.

Section 3.2. discusses literature on the relationship between exports and the growth of developing countries, particularly Indonesia, while Section 3.3 reviews the policies of selected developing countries regarding trade, i.e., inward and outward looking strategies. Section 3.4 discusses the effect of export instability on economic growth in developing countries, particularly Indonesia. Finally, Section 3.5 describes a general macroeconometric model of Indonesia. A conclusion to this chapter is presented in Section 3.6.

3.2 Export Growth, GDP Growth and their Relationship

recently, Sheehey (1992) and Edwards (1992), have found a strong positive correlation between export and GDP growth.

Chow (1987) argued that in the new industrial countries (NICs),[1] setting a causal pattern between export growth and industrial development has important implications for development strategies. He states that:

> If there is a definite unidirectional causality from export expansion to the development of manufacturing industries (X → MFG), then it will lend credence to the export led growth strategy. Exports will not only promote the growth of national income, but also lead to structural transformation in the developing economies. If the causative is of the opposite direction (MFG → X), then it would imply that the development of manufacturing industries may be a prequisite for developing countries to expand their exports. If the causative process is bidirectional (X ←→ MFG), then export growth and the development of manufacturing industries have a reciprocal causal relationship. However, if there is no definite causality between export growth and the development of manufacturing industries, then alternative strategies rather than export promotion may be needed to structurally transform the developing countries. (p. 56)

According to Jung and Marshall (1985), there are many reasons for exports to cause growth in real GDP. Firstly, if the export growth reflects an increase in the demand for the output of the country, then this increase of exports will increase real GDP. Secondly, the increase in exports may lead to an expansion in productive intermediate import, thereby bringing about an increase in output. Thirdly, an increase in exports may increase efficiency, and consequently boost output.

In a causality test, we pay attention not only to the cause and effect issue, but also

an increase in consumer demand could increase real growth, and if this demand for goods is heavily concentrated in the exportable and non-tradable sectors, then it could lead to a decline in exports. On the other hand, when export increases, inward foreign direct investment might reduce domestic output due to various distortions. Thus, export growth might cause reduced output growth.

According to Kravis (1970), since exports are a component of aggregate output, it can be assumed that the correlation coefficient of these variables is positive. But based on the empirical results by Balassa (1978), Michaely (1977) and Tyler (1981), it is demonstrated that exports contribute to the GDP more than just a change in the volume of exports.

Recent studies in the areas of export growth provide considerable support in favour of a positive relationship between export and output growth. A summary of the empirical results of various studies on the relationship between export and output growth is reported in Table 3.1

From Table 3.1, we can see that most of the studies are based on cross-country data. Michaely (1977) illustrates that growth of export and economic growth are positively correlated. He uses time series data of 41 developing countries, including Indonesia, to show that the positive correlation between economic and export growth is exclusively strong among the more developed countries and the same positive correlation

TABLE 3.1

SOME STUDIES ON EXPORT AND GROWTH

Study	Data set	Econometric technique	Other variable	Result
Emery (1967)	Cross country(50) 1 time period (1953-63 avg)	OLS (GNP on exports)	Current account	EP
Maizels(1968)	Time series (1950-62) (9 countries)	OLS (GDP on exports)	none	EP
Voivodas(1973)	Cross-country(22) Time series(12) (1956-1967)	OLS (GDP on export share)	countries dummies	EP
Michaely(1977)	Cross country(41) 1 time series (1950-1973)	Spearman rank co-relation	none	EP
Balassa (1978)	Cross country(10) 2 time periods (1960-66, 1967-73)	OLS (GNP growth on export or real export growth)	labour force growth, domestic and foreign investment	EP
Williamson (1978)	Cross-country(22) Time-series (1960-74)	OLS (change in GDP on lagged export)	country dummies, direct investment, other foreign capital.	EP
Fajana(1979)	Time-series (20) (1954-74)	OLS (GDP growth on ex	trade balance current	EP

Tyler(1981)	Cross-country(55) 1 time period (1960-77)	OLS (GDP growth on export growth	labour force growth, investment growth	EP
Schenzler(1982)	Time-series(30) (1950-79) (3 countries)	OLS (GDP growth on export growth or export share)	share of investment, government spending, foreign aid and direct investment	EP
Feder(1983)	Cross-country(31) 1 time period (1964-73)	OLS (GDP growth on export growth & export change)	labour force growth, investment/output	EP
Chen (1990)	Time series(15) (1968-1982) Taiwan	OLS (GDP/output growth on export growth)	time	EP

Note:
1. In all cross-country studies the number of countries is given in parentheses. The number of time-series observations is given in parentheses as well.
2. OLS is ordinary least squares.
3. EP denotes a finding in favour of the export promotion hypothesis.

We now examine the empirical studies that investigate the relationship between economic and export growth in more detail. The study undertaken by Balassa (1978) used time series data for 11 developing countries with an industrial base. The period analyzed was from 1960 to 1973. He used an industrial base because he believed that:

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The results show that export growth favourably affects the rate of economic growth over and above the contributions of domestic and foreign capitals and labour. In addition, due to the expansion of exports, an increase in the balance of payments may increase the attractiveness of the country for foreign capital.

Meanwhile, the empirical result of Tyler's (1981) study is an extension of Balassa's (1978) work. Tyler used 55 middle-income developing countries. He ran regressions to estimate his models. The dependent variable is the income of developing countries which was divided into two groups, i.e., all OPEC middle-income countries and non-OPEC middle-income countries. On the right hand side of his model he had capital formation, labour force, total exports and manufacturing exports. The results indicated that export played an important role in contributing to economic growth. In his concluding remarks, Tyler (1981) noted that:

> ... countries which neglect their export sectors through discriminatory economic policies are likely to have settled for lower rates of economic growth as a result. While in our treatment it has been assumed that export performance reflects export related economic policies, a growing body of empirical literature supports this contention. Consequently, economic policies entailing appropriate price incentives for exports appear to take on a central importance in the economic growth of developing countries. (p. 129)

According to Jung and Marshal (1985), the sign of the effect of the causal variable can be checked by using a F test. This amounts to a test of whether a steady state change in

for Indonesia show that the causality test between export growth and output growth is statistically supported. The export growth of Indonesia causes output growth with positive sign at 5% level of significance. It also found supports for the export promotion hypothesis. Time series studies provide evidence in favour of export promotion for only four countries, namely, Indonesia, Egypt, Costa Rica, and Ecuador.

Other studies done by Rati (1987) introduce the output growth function which is derived from the general production function of the following type:

$$Y = f(L, K, X); \tag{3.1}$$

where Y is aggregate real output, L and K are the conventional labour and capital inputs, and X denotes the level of exports, which is introduced as additional input. One can get the equation :

$$\hat{Y} = a_1 + a_2\hat{L} + a_3\left(\frac{I}{Y}\right) + a_4\hat{X} \tag{3.2}$$

where $\hat{Y}$ is the growth rate of output, $\hat{L}$ is the growth rate of labor, $\frac{I}{Y}$ is the investment-output ratio, and $\hat{X}$ denotes the growth rate of exports.

$$\hat{Y}=b_1+b_2\hat{L}+b_3(\frac{I}{Y})+b_4[\frac{\delta}{(1+\delta)}+MPx]\hat{X}(\frac{X}{Y})$$

(3.3)

where $\hat{Y}$ and $\hat{L}$ are the growth rates of real output and labour, $\frac{I}{Y}$ is the investment output ratio, $\hat{X}$ is the growth of export, δ denotes the inter-sectoral relative factor productivity differential, MPx indicates the marginal externality effect of the export sector output on the rest of the economy, and $\frac{X}{Y}$ is the ratio of export to real output.

TABLE 3.2

SUMMARY OF TIME SERIES RESULTS: TABULATION OF NUMBERS OF COUNTRIES WITH REFERENCE TO SIGN AND SIGNIFICANT OF THE EXPORT VARIABLE COEFFICIENT

Characteristics	Model A			Model B		
	Sign F	Nonsign F	Total	Sign F	Nonsign F	Total
Full sample	61	27	88	62	26	88
1	37	1	38	36	1	37
2	15	20	35	19	21	40
3	0	0	0	1	0	1
4	9	6	15	6	4	10

Note: Model A is Equation 3.2, and Model B is Equation 3.3.
Sign F implies 10% significance and nonsign F implies no significance.
Characteristic 1 implies a positive and significant export variable coefficient.
Characteristic 2 implies a positive but not significant export variable coefficient.
Characteristic 3 implies a negative and significant export variable coefficient.
Characteristic 4 implies a negative but not significant export variable coefficient.

there are some negative coefficients, practically none of them are statistically significant at any reasonable level. In the sample used by Feder and Balassa, the proportion of the countries that have statistically significant positive coefficients for the export variable is broadly of the same order as in the full sample, but is considerably lower than in the middle-income sub-group [Feder (1982) and Balassa (1978, 1985)]. Table 3.2 shows the estimation results of two plausible growth models represented by Equation 3.2 (Model A) and Equation 3.3 (Model B) for 88 LDCs on the basis of time series data from 1960 - 1982.

The estimation result for developing countries indicates the fit of the model is good in most cases, and the role of export in growth seems predominantly positive. The result for Indonesia can be seen as follows:

Using the OLS estimation method on Equation 3.2, we find that

$$\hat{Y} = \underset{(0.33)}{1.774} \ \hat{P} + \underset{(1.6)}{0.315} \ (\frac{I}{Y}) + \underset{(3.53)}{0.261} \ \hat{X} \qquad (3.4)$$
$$F^a = 5.45 \qquad R^2 = 0.56$$

From Equation (3.3), we get:

$$\hat{Y} = \underset{(0.28)}{1.711} \ \hat{P} + \underset{(1.24)}{0.264} \ (\frac{I}{Y}) + \underset{(2.92)}{1.423} \ \hat{X}(\frac{x}{Y}) \qquad (3.5)$$
$$F^a = 4.16 \qquad R^2 = 0.49$$

section estimates. While supporting the conclusion that government size appears to have an important effect on growth, it also indicates that the size and significance of the export variable coefficient are not affected much by the inclusion or exclusion of the government size variable.

Chow's study (1987) demonstrates that countries, such as Asian NICs, can expand their limited domestic markets by exporting their manufactured outputs to international markets because the growth of exports of manufactured goods and industrial development have proven to be complementary. It is important for other LDCs, especially for those chasing the Asian NICs, to consider both the supply side and the demand side effects of export promotion strategies.

The results of Oskooee's (1991) study provide some support for an export promotion development strategy, although the evidence is, at most, inconclusive in evaluating competing hypotheses. Some important East Asian NICs, such as Korea and Taiwan, known for their moderately strong export promotion policies, as well as some others, such as Thailand, known for their moderate export promotion policies, show positive causality from exports to growth. The results show five countries that exhibit positive causality from export growth to economic growth: Dominican Republic, Indonesia, Korea, Taiwan and Thailand. The three countries that exhibit negative causality from export growth to economic growth are El Salvator, Paraguay and Peru.

The issues regarding trade and the condition of the world economy regarding export expansion are important in order to boost economic growth in many developing countries, especially Indonesia.

According to Lee and Naya (1988), the reason East Asian countries succeeded in expanding exports and achieving high rates of economic growth was due to their adoption of an "outward-oriented development strategy" in the early 1960s. Lee and Naya argued that:

> "An outward-oriented development strategy implies a role of government in the economy that is particularistic to liberal ideology. It is limited to setting relative prices and is severely limited in the exercise of command and discretionary measures. Whether such is the role of government in East Asia is at present a hotly debated topic. Even if a more interventionist role of government is conceded, whether it has had any contributory effect on economic growth and export expansion is however, another matter. (p. 124).

Balassa (1980) has been criticized for being too general and vague for stating that the essence of an outward-oriented development strategy may be captured in the following four principles: (1) Preferential treatment of manufacturing activities, which warrant infant industry considerations, should be applied on a moderate scale; (2) Equal treatment should be given to exports and import substitutes in manufacturing; (3) Variations in incentive rates within manufacturing should be kept to a minimum; and (4) The system of incentives should be stable and automatic to minimize uncertainty.

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World Bank (1987: p. 82) specifies the four trade orientation categories as follows:

1. **Strongly Outward Oriented**: Trade controls are either nonexistent or very low in the sense that any disincentives to export resulting from import barriers are more or less counterbalanced by export incentives. There is little or no use of direct controls and licensing arrangements, and the exchange rate is maintained so that the effective exchange rate for importable and exportable are roughly equal.

2. **Moderately Outward Oriented**: The overall incentive structure is moderately biased toward production for domestic rather than export markets.

3. **Moderately Inward Oriented**: The overall incentive structure distinctly favours production for the domestic market and the exchange rate is clearly overvalued.

4. **Strongly Inward Oriented**: The overall incentive structure strongly favours production for the domestic market and the exchange rate is significantly overvalued.

Kavoussi (1985) investigated the relationship between trade policy and economic performance, using the growth of exports due to competitiveness and diversification as an index of export orientation of trade policy and the average annual growth rate of GNP which is utilized to measure economic performance (p.388).

Kavoussi used the world-market factor (rw) as an index of the impact of external earnings, and the growth of exports due to competitiveness and diversification (rcd) as an indicator of the effect of trade policy. He classified the market conditions into two based

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TABLE 3.3

SOURCES OF GROWTH OF EXPORT EARNING BY COUNTRIES CLASSIFIED ACCORDING TO EXTERNAL MARKET CONDITION AND TRADE POLICY

period	market trade condition	orientation	number of ob-serva-tion	mean and standard deviation[a] (percentage per annum)		
				rx	rw	rcd
1967-1973	Favourable[b]	outward[d]	22	11.4 (6.5)	7.9 (2.1)	3.3 (5.0)
		Inward[e]	27	2.9 (3.2)	8.0 (2.2)	-4.7 (3.1)
	Unfavourable	outward[d]	2	8.4 (4.0)	4.6 (0.1)	3.7 (3.7)
		Inward[e]	1	-3.6	0.4	3.7
1973-1977	Favourable	outward[d]	4	14.3 (4.2)	10.0 (4.7)	4.0 (1.6)
		Inward[e]	9	2.8 (6.9)	9.6 (3.8)	-6.3 (4.3)
	Unfavourable	outward[d]	24	5.9 (5.5)	-1.1 (3.9)	7.0 (4.7)
		Inward[e]	14	-4.9 (4.7)	-4.6 (3.9)	-3.4 (2.9)

Note:
r represents growth of total export earnings.
[a] Numbers in parentheses are the standard deviations.
[b] rw > 4.6   [d] rcd > 0 per-cent

orientation strategies are implied when rcd < 0 percent. The empirical results are presented in Table 3.3 [Kavoussi (1985), p. 387].

The justification of the relationship between trade and development, especially among the four trade oriented classifications and growth was investigated by Salvatore (1989). He constructed a model where the real income was a function of the growth of investment, real exports and real industrial production. The estimation of the model was based on the following equation [Salvatore (1989), p. 12)]:

$$\hat{Y}=a'+c'I+g'\hat{X}+h'\hat{R} \tag{3.6}$$

where : $\hat{Y}$ = the growth of real per capita income
I = gross fixed capital formation as a percentage of GDP
$\hat{X}$ = the growth in the value of real exports
$\hat{R}$ = the growth of the real industrial production

The positive relationship between growth in exports and real per capita income has been studied by many economist such as Balassa (1978), Michaely (1977), Salvatore (1983) etc.

According to Salvatore, the estimated coefficient of I in the Equation 3.6, i.e., c' can be either positive or negative. If c' is positive and significant for countries with a strong outward orientation but negative and significant for countries with a strong inward orientation, a strong inward trade orientation is associated with or leads to serious

it is statistically negative for the country with a strongly inward orientation, a strongly inward orientation characterized by import substitution leads to gross inefficiencies.

In his study, Salvatore provided some indications of the level of destruction that developing countries experienced from the changed economic condition and rising protectionism.

With given data from 41 developing countries, Salvatore (1989) estimated the parameters of the coefficients of Equation 3.6 using OLS and divided the group of countries into strongly outward oriented, moderately outward oriented, pooled outward oriented, moderately inward oriented, strongly inward oriented, and pooled inward oriented, for the time periods 1963-73 and 1973-85. Based on his studies conducted during the past two or three decades, Salvatore (1989) concluded : "... export growth which is positively correlated with the growth of real GDP must be qualified by the recent Singer's and Gray's (1988) finding that when external demand is weak, the advantages of outward orientation tend to vanish, especially for the poorer developing countries" (p.22).

3.4 Export Instability

The definition of instability is not always the same to all economists. In our study, instability is defined in terms of deviation from trend. James Love (1986) states that

There are always some deteriorating conditions of export from developing countries, when their export prices and earnings experience a large fluctuation resulting in earning instability. Causes and effects of earning instability have been investigated by many economists. According to Wong (1986) these issues and their possible impacts on the economic growth of less developed countries (LDCs) have been examined since the 1950s. Before we go into the effect of export earning instability, let us examine the causes of export instability.

According to Salvatore (1990), the instability of the price of primary exports for developing countries is caused by inelastic and unstable demand and supply:

> The demand for many primary exports of developing nations is price inelastic because individual households in developed nations spend only a small proportion of their income on such commodities as coffee, tea, cocoa and sugar. Consequently when the prices of these commodities change, households do not significantly change their purchases of these commodities, resulting in a price inelastic demand. On the other hand, demand for minerals is price inelastic because few substitutes are available. At the same time, the demand for primary exports of developing nations is unstable because of business cycle fluctuations in developing nations .... the supply of the primary exports of developing nations is price inelastic (i.e., the quantities supplied do not respond very much to changes in their prices) because of the internal rigidities and inflexibilities in resources uses in most developing nations.... Supplies are unstable or shifting because of weather conditions, pests, and so on." (p.323)

Stabilizing export commodity prices of developing countries is very important because the price stabilization may sustain increases of well-being to society, as consumers will

disturbances, and will lose if the price fluctuation arise from demand disturbances (Massell, 1969). Other economists, such as Hueth and Schmitz (1972), argued that in an open economy of a developing country under free trade, a country gains from price stabilization if instability is generated abroad and loses if it is generated internally. Export instability can also affect some other economic variables.

In his examination of the relationship between export instability and government expenditure, Reynolds (1963) proved that export instability does have an impact on government expenditure instability. Reynold's study was also supported by Lim (1983), who examined the effect on government expenditure instability of revenue instability and possible offsetting influences, including domestic and foreign borrowing, foreign grants, and foreign exchange reserves. In his study, Lim concluded that, while revenue instability was the single most important explanatory variable, other factors contributed to some dampening of the destabilizing effects of revenue fluctuation. This is the reason why many developing countries, either individually or jointly, have tried to stabilize primary commodity prices, while operating market power through export restrictions. Wong (1990) in his study, found that when only foreign demand disturbances occur, an export quota has the property of stabilizing the price directly. Wong suggests that " the best policy choice for exporting countries is the export tax without domestic price stabilization since the latter lowers national welfare."(p.187). To implement this policy,

It is impossible for economists to examine export instability without having a precise indicator of the existence of export instability. N.V. Lam (1980) formulated an indicator for the existence of export instability, i.e. an instability index. He determined the instability index by using the standard error of estimate normalized by mean. The standard error of estimate was calculated by taking the deviation of the value of merchandise exports from their trend values, and trend values were obtained by a simple linear regression of export values against time [Lam (1980), p. 104-5)]. The formulation of a country's exports with constant rate of exports can be described as follow:

$$X_t = X_1 \, (\, 1 + x)^{t-1} \, , \quad t = 1,2, \dots , n,$$

where X_t is the country's exports, X_1 is the initial value of the series and x is the annual growth rate. Both Lam's export instability index (Ix) and the elasticity index of growth (Ex) can be used to illustrate that there are increasing functions of growth rate (x) and of the sample size (n) (Glezakos, 1973).

As it is important to use the instability index, Glezakos (1973) maintains the following reasons for choosing this particular instability index, namely: (1) that "there exists convincing evidence that the selection of any one of the available instability indicators would not affect comparative results for a cross-sectional study within the same

The instability index is very useful for economists to analyze the instability problem. Tan (1983) states that:

> *.... export instability is most likely to be associated with rising rates of expansion in trade earnings... Thus the instability index as calculated by Lam contains a positive bias in that countries with higher rates of growth of export will be higher instability indexes. (p. 220).*

By using the instability index from Lam (1980), Tan (1983) investigated the correlation between export instability and export expansion and found that it is the result of a systematic bias. In his study, Tan (1983) examined 15 Western Pacific Countries (WPCs) including Indonesia and 9 developed countries for the years 1961-1974 and 1961-1972. The results show that due to a bias in the calculation of the instability index, resulting from fitting a linear trend to non-linear data, the positive rank correlation coefficients between export instability and export expansion reported by Lam are a statistical mirage. During the period 1961-1972, the correction for the bias indicates that there is neither a significant rank correlation between export instability and export expansion nor a significant correlation between export instability and domestic income. Meanwhile, in the period 1961-1974, there is a positive correlation between export instability and export expansion or domestic income expansion.

With regard to the empirical results of the export instability problem in relation to government expenditure, Love (1989) examined 15 developing countries. Eleven of the

capital expenditure than in recurrent expenditure.

Murray (1978) analyzed the export instability experienced by many developing countries. The sample covered 50 less developing countries (LDCs), one of which was Indonesia. Murray states that there are many factors that are relevant to the determination of the level of export instability, i.e. fluctuation in national income and production of exportable goods, changes in world market conditions, instability of market shares, and commodity and geographic concentrations. According to his results, export instability originates mainly from foreign sources. Furthermore, some countries tend to encounter greater instability because of greater variations in the shares of their main commodities in the world and in the share of their exports in major foreign markets. For countries with comparatively low proportions of exports going to developed countries and countries with high food ratios in exports, geographic concentration is also an important factor. On the other hand, in the case of exports of a country to countries which have unstable economies, or export of specialized commodities with unstable world to other countries which have unstable economies, it does not appear that export instability is higher. Domestic supply fluctuation explains only a small part of international differences in export instability, and then only among countries with very high food ratio in export. For these countries, domestic demand fluctuations contribute significantly to export instability, but instability of market shares does not seem to be an important factor.

price increases, in 1974 and in 1979. Unfortunately, not many of the econometric models have focused on the international trade sector of Indonesia. J.M. Dowling Jr. (1983), for example, constructed an econometric model which aimed at exploring the various short-run relationships between the balance of payments and economic growth, employment and inflation. Meanwhile, Slangor and Odano (1983) constructed a macroeconometric model to evaluate the impact of oil price increases and devaluation on the Indonesian economy. The current macroeconometric model of Indonesia, constructed by I.J. Azis (1990), forecasted the Indonesian economic performance from 1991 to 1997.

Most of the existing macroeconometric models, such as those by Dowling Jr. (1983) and I.J. Azis (1989), were constructed with aggregate income being determined from the demand side with supply being forthcoming. Dowling Jr. maintains that constructing a macroeconometric model from supply and merging it with demand will generally create an econometric problem for developing countries in Asia, due to the lack of data.

Models for developing countries in Asia have been successfully constructed by some institutions, such as the Institute of Developing Economies Tokyo, Japan in 1983 and 1985, and the Economic and Social Commission for Asia and Pacific (ASPAC) in 1985. Models have also been constructed by both domestic and foreign economists, such as Ichimura (1985) and Kinoshita (1985).

endogenous variables. In his model, merchandise imports and exports are determined by behavioural equations.   His model consists of 25 equations, out of which 15 are behavioral equations. The estimation period runs from 1968 to 1981, and the simulation period was from 1977 to 1981. To examine the quality of the model, the mean absolute percentage errors were calculated.

Policy simulation as conducted by Dowling consisted of three scenarios, i.e., where interest rates were raised by 4 to 5 points, government spending was decreased by Rp. 1 billion (1960 prices), and where the currency was devalued by 5%. The simulation set is treated only for *ex-post* forecast. The result of the first scenario shows that an increase in interest rate, from 15 to 20 per cent over the 1977-1981 period has very little effect on the real sector.[2] It also has little effect on the narrow money supply and prices. Real 2GDP, money supply and the components of income decline slightly. Coefficients of interest rates that appear in both the consumption and investment functions are also small.

Another result shows that the impact of reducing government spending by Rp. 1 billion will lead to a decrease in the Gross National Product (multiplier 1.63 by end of period) and its components. Meanwhile, a devaluation of five percent will increase consumer prices and the GDP deflator by approximately five and seven percents, respectively. The conclusion of this study is that non-oil exports which are exogenous have not been adjusted upward as a result of the devaluation.

one of the reasons government policy encourages non-oil exports is due to the dropping oil price after the oil price boom in the 1970s. The model is a widely used demand determined model which consists of 70 equations, of which 24 are behavioural equations. In his model, exports are classified into oil/gas and non-oil/non-gas exports. Oil production, oil exports, gas exports and the price of gas are considered to be exogenous variables. Non-oil and non-gas exports, which include primary products, are influenced by imports of industrial countries and their relative price.[3] There are three dynamic simulations conducted in their study; first, no devaluation was adopted, but only oil price increases; second, devaluation was adopted without increasing oil prices, with no adjustment in government expenditure as a response to reducing oil prices, so that government loans increased to finance the deficit; third, devaluation was adopted without increasing oil prices (as in the second simulation) but government adjusted its government revenue in response to reducing oil prices.

Simulation I shows that devaluation raised consumption, investment and GDP growth. It also improved the current account balance. It is proved that devaluation improves government budgetary outcome, and without devaluation the government budget will undergo a substantial budget deficit. In simulation II, the result shows that the government deficit would have been substantial, and if this deficit is financed by borrowing from the Central Bank, there would a large reduction in external reserves.

over investment growth (investment multiplier) became higher.

The other econometric model for Indonesia constructed by the Central Bureau of Statistics in "Econometric Link System for Asean" is also interesting. This model is an annual model of the Indonesian economy in the 1970s with aggregate supply determined in which GDP is defined as an aggregate of the value added in 19 production sectors. However, the expenditure side is also investigated in detail as most of its demand oriented model. The focus of the model is to investigate the consequences of alternative fertility reduction and urbanization of several significant economic variables in Indonesia's planned economy. The model consists of 26 identities and 41 behavioural equations which are estimated by using Ordinary Least Square (OLS). The observations of this model ranged between 10 to 22 ending in 1981. To measure the sensitivity of this model, alternative "shock" is applied to 1975 figures of several endogenous variables. The simulation scenarios are applied by a 20% increase in several exogenous variables, i.e., export of oil and gas, government foreign revenue, rice land and import deflator.

The result of first simulation with 20% increase in export of oil and gas will increase the total GDP by about 3.4% in the first year and this increase continues till the end of observation period. The impact of this scenario on private consumption (PC) shows that PC increase by 3.5% in the first year, but this figure decreases up to the final year of observation. Meanwhile, the impact of this scenario on investment and total

The result of the second simulation with a 20% increase in government revenue will increase the GDP by about 0.1% and this figure fluctuates in the following year through 1981. Meanwhile, the impact of this scenario on total investment and total imports decrease these variables by 1.9% and 1.7%, respectively.

Last, but not least, the macroeconometric model constructed by I.J. Azis (1989) should also be reviewed. This model is constructed for simulating alternative external trade scenarios of the Indonesian economy. There are 48 equations, of which 24 are behavioural. The model consists of four blocks. Compared to other blocks, the trade block has the largest number of behavioural equations. There are 12 behavioural equations out of which 10 are export functions and two are import functions. These export and import functions are classified based on the one-digit Standardization of International Trade classification (SITC): primary goods are from SITC 0 to 4 except 3, oil and gas is SITC 3, and manufacturing goods are from SITC 5 to 8 plus 9. Export function is determined based on the commodity classification of manufacturing goods, oil, and primary goods to the main trading partners. Meanwhile, import equations are divided into manufacturing and primary goods import functions. Some of the estimation periods started from 1970 to 1988, and others are from 1975 to 1988. To examine the quality of the simulation model, Azis used six indicators, i.e., the correlation coefficient (CC), the root mean square error (RMSE), the mean absolute error (MAE), the mean error (ME),

way. There are five policy simulations conducted in this model.

Among the five simulation scenarios, two are interesting to review: first, an appreciation of the yen against the U.S. dollar of twenty percent; second, an increase in Japan's imports by 10%, a decrease in the U.S. import by 10% and an increase in EEC imports by 10% (separate and combined scenarios). According to Azis, historically the first scenario will depreciate the rupiah-U.S. dollar rate by 10.5%. The result of the first scenario shows that manufactured exports to Japan would increase 40% (the result is measured in percentage deviation from baseline solution), while manufactured exports to the U.S., ASEAN, the EEC, plus the rest of the world, increased at lower rate, i.e., 14%, 12.8% and 8.6%, respectively. Total manufactured exports would increase by 16.6% and non-oil and non-gas export will increase by 11.7%.

The result of the second scenario shows that the combination scenario (10% increase in total imports of Japan, 10% decrease in total import of the U.S., and 10% increase in total imports of EEC) would generate increases in total exports by an average of 2.23% annually. The percentage deviation from baseline solution of manufactured exports would increase from 1.64% in the first year to 2.17% in the third year, and finally decrease to 0.72% in the last simulation year. Exports of oil increased from 2.57% in the first year to 3.6% in the last simulation year. Meanwhile, exports of primary goods increased by an average of 0.87% annually.

Indonesia, the causality test between export growth and output growth is significant, and statistically positive from export growth to economic growth. The increase of the export growth of Indonesia increases output growth. It has been proved by some economists that the relationship between exports and economic growth supports export promotion development strategies.

Most developing countries, including Indonesia, support outward-orientation strategies rather than inward-oriented strategies. Strong inward orientations are identified with high levels of inefficiencies if the estimated coefficient of investment is positive and significant for countries with a strong outward orientation, but negative and significant for countries with a strong inward orientation.

It was found that export instability does have an impact on government expenditure instability. The relationship between export instability, government expenditure, and revenue instability shows that government revenue instability creates the possibility for developing countries to lessen domestic and foreign borrowing, foreign grants, and foreign exchange reserves.

Revenue instability is the single most important explanatory variable, although the other factors contributed to some dampening of the destabilizing effects of revenue fluctuation. Therefore, in the case of developing countries, especially Indonesia, stabilizing primary commodities prices is more important. Thus, commodity prices are

from the aggregate demand curve, as for developing countries, constructing the model

from supply side will create econometric problems (Dowling, 1983).

FOOTNOTES

1. Here, we define NICs as countries with approximately 20-25 percent of their output accounted for by manufacturing [Sheila Page (1989)].

2. This result is quite similar to the result done by Slangor and Hindromarsono in their supply determined model (1985).

3. This is quite similar to the model of this thesis (see Chapter 4). In this model manufactured export is like a function of income of destination country and price of commodity of local relative to the destination country.

4. This thesis will also adopt these indicators (except coefficient correlation), and their formula can be seen in Chapter 4.

CHAPTER 4

STRUCTURE OF THE MODEL

4.1 Introduction

Prior to 1980, there were few macroeconometric models on the Indonesian economy. During the 1960s, some models were constructed with only a limited number of equations as they focused on specific subjects. Towards the end of the 1970s and the beginning of the 1980s, more detailed models were developed for forecasting the growth of the Indonesian economy, for example, a model by Ezaki (1982) which was designed for a comparison with models of other countries. During this period, some models were combined with population variables, because many economists realized that overpopulation posed a serious problem in Indonesia and it was a primary concern for the Indonesian economy [for example, econometric models by Central Bureau of Statistics (1985) and Kinoshita (1985)]. In recent years, however, models have been constructed to solve more specific problems, such as monetary, external debt, external trade and the oil price shock [e.g., see Slangor (1983), Haas (1989), and Azis (1990)].

The macroeconometric model constructed in this study focuses on the export sector of the economy. In particular, we analyze in detail the impact of non-oil exports, especially exports of manufactured goods, on the Indonesian economy. This model is developed from the aggregate demand side, where the components of the gross domestic

In this chapter, we discuss the structural specification of the macroeconometric model for Indonesia. We also review some economic aspects of Indonesia, and in Section 4.2, we briefly discuss the structure of the Indonesian economy which specifically determines our entire model. As well, some limitations and features of this model are presented in Section 4.3. In Section 4.4, we discuss the theoretical specification and the flow-chart of the model. The flow-chart is important and useful as it schematically displays the linkages of the structure model between the endogenous and exogenous variables, and the relationship among them. After we have constructed the model, we determine simulation time horizons, as presented in Section 4.5. To determine the validity of the model, some indicators are set. The definition of these indicators is presented in Section 4.5 as well. Finally, in Section 4.6, we summarize our discussion of this chapter.

4.2 Economic Structural and Government Policies Affecting the Model

Indonesia has experienced rapidly increasing economic growth since the late 1960s. From the late 1960s until 1982, the export of oil continually increased and became the backbone of economic growth. Like other oil producing countries, Indonesia also enjoyed two oil booms, one in 1973 and another in 1979. When the price of oil declined in early 1980s, total exports of Indonesia decreased. This occurred because at that time, total exports were dominated by oil exports. The ratio of oil exports to total exports decrease from

and the devaluation of the exchange rate, expanding non-oil exports, particularly manufactured goods, were seriously promoted by the government.

The market-oriented deregulation packages have been successful, and these policies have benefited both the foreign and domestic private sectors. However, the private sector had some advantages following the changes in the structure of economy. More than 70% of both domestic and foreign investment approved during 1988 to 1991 have been directed to export-oriented projects, especially exports of manufactured goods [see Parker (1991)]. The export of manufactured goods gradually increased. It should be noted that in 1982, the ratio of manufactured exports to total exports was 5.6%, compared to 20% in 1986, and further increased to 43% in 1991.[1] The two largest commodities in manufactured exports were garments and textiles and plywood. In 1991 garment and textile exports represented 12.8% of total manufactured exports, and plywood exports accounted for 10.4% of total exports.

Although the total exports of Indonesia have indeed been increasing since 1975, total imports have also been increasing. These imports include capital goods, which will support domestic production in the future. Expanding exports, especially in labour intensive manufactured goods, is regarded as a prerequisite for attaining key government objectives, such as the creation of employment in order to absorb the rapidly growing labour force. Current manufactures in Indonesia are mainly labour intensive consumer

Even though it has been recorded that Indonesia is the world's largest exporter of liquified natural gas (LNG), Indonesia should no longer expect oil exports to remain the backbone of economic growth. The reason for this is that the price of oil fluctuates, and furthermore, Indonesia should reduce the rapid depletion of oil reserves. Consequently, the economic structure has changed rapidly due to the introduction of some broadly based adjustment programs to restructure the economic growth and promote export growth.

Macroeconomic and sectoral reforms and policy changes which were implemented through the 1980s were some of the reasons which permitted Indonesia to undergo rapid growth.[3] Under managed floating exchange rates, the government allowed large currency devaluations in 1983 and 1986, and slower depreciation thereafter. These measures encouraged labour intensive rather than capital intensive import-substituting activities. Besides trade deregulation, these measures helped to encourage the establishment of labour intensive, small scale manufacturing enterprises, which increased the efficiency of production and gave an incentive to produce in the export market. With deregulation and a broader use of market incentives, the industrial sector has become more diversified. The development of many new product lines has created job opportunities, as has recent growth in labour intensive export industries. As a result of deregulation, the Central Bank increasingly relied on reserve money targets rather than

Referring to budget policy, the government revenue consists of routine and loan revenues. Government revenue from loans can actually be broken down into loans from foreign and domestic sources. In fact, Inter-Governmental Group on Indonesia (IGGI) was established to provide loans for the balance of payment financing. Government routine revenue, on the other hand, can be broken down into revenues from oil and from non-oil sources. The government routine revenue from oil always fluctuates, because it depends on the price of oil and the production of oil, while government revenue from non-oil sources depends on Indonesia's income or Gross Domestic Product (GDP). Government revenue from non-oil sources consists of taxes (income tax, excise tax, export tax, land and building tax, and other taxes), import duties, non-tax revenues, other oil revenues, and aid programs. If we link government revenue and government expenditure, government expenditure is usually adjusted according to government revenues. Whether the government increases or decreases its budget depends to some extent on government revenue, because the government has been implementing a balanced budget policy since the early 1970s. Therefore, government revenue influences government expenditure.

4.3 Model Specification

There are 44 equations in the model, of which 22 are behavioural and 22 are identities.

blocks, namely *Aggregate Demand Block, Expenditure Block, International Trade Block, Fiscal Block,* and *Monetary and Price Block.* Although the complete model is presented later in Table 4.1, a discussion on the specification of each block is now presented.

Aggregate Demand Block

The aggregate Demand Block consists of six equations of which two are behavioural and four identities. Income identity or gross domestic product in real price (GDPRR) contains five endogenous variables and one exogenous variable. The endogenous variables are private consumption (PCRR), government consumption (GCRR), private investment (PIRR), exports (XTRR), and imports (IMTRR). The exogenous variable is government investment (GIRR).

Gross domestic income in real terms (GDYRR) is determined from gross domestic product (GDP) and the terms of trade. However, the terms of trade are determined by multiplying GDPRR by the ratio of export to import deflator. Export and import deflators have the same base year, i.e., 1983 price year.

The behavioural equation for private consumption (PCRR) is based on the standard economic theory on consumption where PCRR is influenced by gross domestic income (GDYRR), the interest rate (R), and private consumption in the previous year (PCRR-1). The coefficient of the interest rate is expected to be negative, reflecting the

Expenditure Block

In the expenditure block, there are four equations, one behavioural and three identities. The behavioural equation is the real private investment (PIRR). Real private investment is determined by real GDP and lagged value of real investment (PIRR). It should be noted that the interest rate variable does not appear in the investment demand function. This is based on the premise and empirical studies elsewhere [see Azis (1989)] that due to the government controlled interest rate policy, there is little variation in interest rates in Indonesia and thus it is not an important factor for determining investment. Government investment in real rupiah is obtained by dividing the government investment in current rupiah with its deflator, i.e., investment deflator (IDEF).

International Trade Block

In total there are 19 equations in the international trade block. This block consists of 9 behavioural equations for export supply and only one import demand equation. Total exports can be classified into three kinds of export commodities. They are the export of oil, manufactured goods, and primary products. These total exports are measured in current U.S. dollars. This total export (in U.S. dollars), theoretically, should be the same as total export in current rupiah after it is divided by the export deflator and adjusted for the exchange rate. However, in practice this is not always the case. To adjust the

exports in a given year may be different from the average value of ER. Similarly, the exchange rate adjustment for imports (ERAI) is also examined for the same reason.

Exports of manufactured goods are divided into three classifications, i.e. exports of garments and textiles (XGTCD), exports of plywood (XPWCD), and exports of other manufactured goods (XMOTHECD). The export of garments and textiles is broken down into five different categories based on the export destination, e.g., export of garments and textiles to Japan (XGTJAPCD), The U.S. (XGTUSCD), Singapore (XGTSNGCD), the composite of Saudi Arabia and European countries (XGTSEUCD), and the rest of the world (XGTOTHCD). Similarly, the export of plywood (XPWCD) is also broken down into four different categories based on the country of destination, e.g., export of plywood to Japan (XPWJAPCD), the U.S. (XPWUSCD), Pacific countries (XPWPASCD), and the rest of world (XPWOTHCD). All the export supply variables are endogenous variables with the exception of export of garments and textiles to the rest of the world (XMOTHCD) and export of plywood to the rest of the world (XPWOTHCD). In this model, the relative price and the income of the destination country are the variables that affect the export supply function.

The import demand function, which represents total import in current dollars (IMTCD), is expected to be influenced by the exchange rate (ER), domestic income (GDPCD), and the export of manufactured goods (XMCD). Based on this relationship,

Fiscal Block

In the fiscal block, there are two behavioral equations and four identities. Total government revenue (TGRCR) is divided into government routine revenue (GRRCR) and foreign government loans (LOANCR). GRRCR is divided into two types of revenue, i.e., government revenue from oil (GROCR) and from non-oil sources (GRNOCR). GROCR is influenced by the value of oil, while GRNOCR is influenced by both income (GDPCR) and GRNOCR in the previous year (GRNOCR-1).

Monetary and Price Block

There are seven behavioral equations and two identities in the monetary and price blocks. The deflator of gross domestic product (DEF) is derived from the money supply in current prices (M2C) divided by the money supply in constant prices (M2R). M2C and M2R is broad money supply in current and real value, respectively, which is determined from the sum of demand deposit, currency and quasi money. M2R is influenced by GDPRR and M2R in the previous year. M2C is modeled by reserve money and M2C in the previous year. Reserve money is influenced by total exports (XTCR) and credit from monetary authority (CREDIT). Reserve money is affected by total export in current rupiah (XTCR) and the interest rate (R).

In the monetary and price block, there are four price index behavioural equations, i.e., consumer price index (CPI), export deflator (XDEF), import deflator

influenced by WHPIXNOG and the price of oil (POIL). WHPIXNOG is influenced by

the exchange rate and the wholesale export price index of primary product.

TABLE 4.1.
SPECIFICATION OF MACROECONOMIC
MODEL FOR INDONESIA

A.   AGGREGATE DEMAND BLOCK

Gross Domestic Product in Real Price (rupiah)
1. $GDPRR = PCRR + GCRR + PIRR + GIRR + XTRR - IMTRR$

Private Consumption in Real Price (rupiah)
2. $PCRR = f(PCRRR_{-1}, GDYRR, R)$

Government Consumption in Real Price (rupiah)
3. $GCRR = f(GCRR_{-1}, GRREAL)$

Gross Domestic Product in Current Price (U.S. dollar)
4. $GDPCD = (GDPCR/ER)*1000$

Gross Domestic Product in Current Price (rupiah)
5. $GDPCR = (GDPRR * DEF)/100$

Gross Domestic Income in Real Price (rupiah)
6. $GDYRR = GDPRR + \{(XDEF/MDEF) - 1\} * XTRR$

B.   EXPENDITURE BLOCK

Private Investment in Real Price (rupiah)
7. $PIRR = f(GDPRR, PIRR_{-1})$

Investment in Current Price (U.S. dollar)

10.   ICUD   =   (PIRR + GIRR)*IDEF*1000/(100 * ER)

C.   INTERNATIONAL TRADE BLOCK

Export of Oil in Current Price (U.S. dollar)

11.   XOILCD   =   f(POIL, PRODOIL)

Export of Primary Product in Current Price (U.S. dollar)

12.   XPRCD   =   f(ER, UVPX)

Export of Garments and Textiles to Japan in Current Price (U.S. dollar)

13.   XGTJAPCD =   f{(PIGTJAP/PIGTIND), GDPJAPCD, GTJAPCD$_{-1}$}

Export of Garments and Textiles to the U.S. in Current Price (U.S. dollar)

14.   XGTUSCD =   f{(PIGTUS/PIGTIND), GDPUSCD, ER}

Export of Garments and Textiles to Singapore in Current Price (U.S. dollar)

15.   XGTSNGCD=   f{(PIGTSNG/PIGTIND), GDPSNGCD, XGTSNGCD$_{-1}$}

Export of Garments and Textiles to Saudi Arabia and European Countries in Current Price (U.S. dollar)

16.   XGTSEUCD= f{(PIGTSA/PIGTIND), GDPSEUCD, PICD$_{-1}$}

Export of Plywood to Japan in Current Price (U.S. dollar)

17.   XPWJAPCD=   f{(PIPWJAP/PIPWIND), GDPJAPCD, XPWJAPCD$_{-1}$}

Export of Plywood to the U.S. in Current Price (U.S. dollar)

19.   XPWUSCD =   f{(PIPWUS/PIPWIND), GDPUSCD}

Export of Plywood to Pacific Countries in Current Price (U.S. dollar)

20.   XPWPASCD=   f{(PIPWPAS/PIPWIND), GDPPASCD, PICD$_{-1}$}

Total Import in Current Price (U.S. dollar)

21.   IMTCD   =   f(ER, XMCD, GDPCD)

Total Export in Real Price (U.S. dollar)

24.   XTRD   =   (XTCD/XDEF) * 100

Total Export in Current Price (U.S. dollar)

25.   XTCD   =   XOILCD + XMCD + XPRCD

Export of Manufacture Product in Current Price (U.S. dollar)

26.   XMCD   =   XGTCD + XPWCD + XMOTHECD

Export of Garments and Textiles in Current Price (U.S. dollar)

27.   XGTCD   =   XGTJAPCD + XGTUSACD + XGTSNGCD + XGTSEUCD + XGTOTHCD

Export of Plywood in Current Price (U.S. dollar)

28.   XPWCD   =   XPWJAPCD + XPWUSCD + XPWPASCD + XPWOTHECD

Total Import in Real Price (rupiah)

29.   IMTRR   =   (IMTRD * ER * ERAI)/1000

Total Import in Real Price (U.S. dollar)

30.   IMTRD   =   (IMTCD/MDEF) * 100

D.   **<u>FISCAL BLOCK</u>**

Government Routine Revenue from Non-Oil/Gas in Current Price (rupiah)

31.   GRNOCR = $f(\text{GDPCR}, \text{GRNOCR}_{-1})$

Government Routine Revenue from Oil in Current Price (rupiah)

32.   GROCR   =   f(VALOIL)

Total Government Routine Revenue in Current Price (rupiah)

33.   GRRCR   =   GRNOCR + GROCR

Total Government Revenue in Current Price (rupiah)

34.   TGRCR   =   GRRCR + LOANCR

E. MONETARY AND PRICE BLOCK

Broad Money Supply in Real Price (rupiah)

36. $M2R = f(GDPRR, M2R_{-1}, R)$

Broad Money Supply in Current Price (rupiah)

37. $M2C = f(RM, M2C_{-1})$

Consumer Price indices (1983=100)

38. $CPI = f(GDPCR, CPI_{-1})$

Export Deflator (1983=100)

39. $XDEF = f(WHPIXNOG, POIL)$

Wholesale Price Indices of Non-oil/gas Export (1983=100)

40. $WHPIXNOG = f(ER, WHPIPR)$

Import Deflator (1983=100)

41. $MDEF = f(ER, WIEUV)$

Reserve Money (rupiah)

42. $RM = f(XTCR, CREDIT)$

Gross Domestic Product Deflator (1983=100)

43. $DEF = (M2C/M2R) * 100$

Inflation

44. $INFL = (CPI-CPI_{-1})/(CPI_{-1})$

DEFINITION:
ENDOGENOUS VARIABLES:

CPI   Consumer Price Index

DEF   GDP Deflator

GCRR   Government Consumption at Constant Prices (rupiah)

GIRR	Government Investment at Constant Prices (rupiah)
GRNOCR	Government Revenue from Non-oil at Current Prices (rupiah)
GROCR	Government Revenue from Oil at Current Prices (rupiah)
GRRCR	Government Routine Revenue at Current Prices (rupiah)
GRREAL	Government Routine Revenue at Constant Prices (rupiah)
ICUD	Total Investment at Current Prices (U.S. dollar)
IMTCD	Total Import at Current Prices (U.S. dollar)
IMTCR	Total Import at Current Prices (rupiah)
IMTRD	Total Import at Constant Prices (U.S. dollar)
IMTRR	Total Import at Constant Prices (rupiah)
INFL	Inflation Rate
MDEF	Import Deflator
M2C	Broad Money supply at Current Prices (rupiah)
M2R	Broad Money Supply at Constant Prices (rupiah)
PCRR	Private Consumption at Constant Prices (rupiah)
PICD	Private Investment at Current Prices (U.S. dollar)
PIRR	Private Investment at Constant Prices (rupiah)
RM	Reserve Money at Current Prices (rupiah)
TGRCR	Total Government Revenue at Current Prices (rupiah)
XDEF	Export Deflator
XGTCD	Export of Garments and Textiles at Current Prices (U.S. dollar)
XGTJAPCD	Export of Garments and Textiles to Japan at Current Prices (U.S. dollar)
XGTSEUCD	Export of Garment and Textile to Saudi Arabia and European Countries at Current Prices (U.S. dollar)
XGTSNGCD	Export of Garments and Textiles to Singapore

XPRCD	Export of Primary product in Current Prices (U.S. dollar)
XPWCD	Export of Plywood in Current Prices (U.S. dollar)
XPWJAPCD	Export of Plywood to Japan in Current Prices (U.S. dollar)
XPWUSCD	Export of Plywood to the U.S. in Current Prices (U.S. dollar)
XPWPASCD	Export of Plywood to Pacific in Current Price (U.S. dollar)
XTCD	Total Export at Current Prices (U.S. dollar)
XTCR	Total Export at Current Prices (rupiah)
XTRD	Total Export at Constant Prices (dollar)
XTRR	Total Export at Constant Prices (rupiah)
WHPIXNOG	Wholesale Price Indices of Non-oil/gas Export

EXOGENOUS VARIABLE:

Policy variable

ER	Exchange Rate (nominal)
GICR	Government Investment at Current Prices
GDPJAPCD	Gross Domestic Product of Japan (U.S. dollar)
GDPUSCD	Gross Domestic Product of the U.S. (U.S. dollar)
GDPPASCD	Gross Domestic Product of Pacific (U.S. dollar)
GDPSNGCD	Gross Domestic Product of Singapore (U.S. dollar)
GDPSEUCD	Gross Domestic Product of Saudi Arabia and European Countries (U.S. dollar)
LOAN	Foreign Government Loan at Current Prices
PIGTJAP	Japan's Price Indices of Garments and Textiles
PIGTSEU	Saudi Arabia's and European Countries' Price Indices of Garments and Textiles

POIL   Price of Oil

Non-Policy Variables

CREDIT   Credit Authority

ERAI   Exchange Rate Adjustment for Import

ERAX   Exchange Rate Adjustment for Export

IDEF   Investment Deflator

PIGTIND   Indonesia's Price Indices of Garments and Textiles

PIPWIND   Indonesia's Price Indices of Plywood

PRODOIL   Oil Production

R   Interest Rate (deposit rate)

UVPX   Unit Value Price of Export

VALOIL   Value of Oil Production

WHPIPR   Wholesale Price Indices Exports of Primary Product

WIEUV   World Indices of Export Unit Value

XGTOTHCD   Export of Garments and Textiles to Other Countries
                at Current Prices (U.S. dollar)

XMOTHECD   Export of Manufactured Goods to Other Countries
                at Current Prices (U.S. dollar)

XPWOTHCD   Export of Plywood to Other Countries at Current Prices (U.S. dollar)

Note :   European Countries : United Kingdom, the Netherlands, and R. Fed. of
                Germany.
                Pacific Country   : China, South Korea, Hong Kong and Taiwan.

4.4 Linkages in the Model

Identifying the specific links between different sub-models are important since it enables one to see the direction of simultaneity and causal effects in the macroeconomic model. Figure 4.1, presents the schematic diagram of the model along with the direction of intra-block linkages of six major kinds [links within block are not shown in this figure].

The important major linkages are indicated by links 1,2,3, and 4. These major linkages, shown as two way arrows from one block to other, indicate an interdependent relationship between the aggregate demand block and the expenditure block. Similarly, there is an interdependent relationship between the aggregate demand block and the international trade block.

Figure 4.1

Schematic Diagram of Linkages in the Model
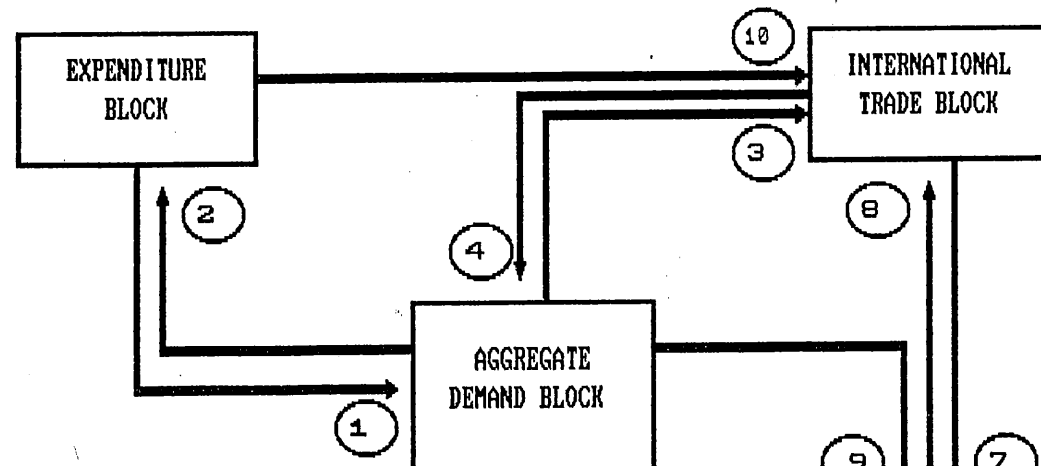
Link 1 arises because investment is a component of GDP, so that when investment increases, GDP will also increase: while link 2 arises because, theoretically, GDP affects investment and this relationship is known as an accelerator of investment.

As shown by link 3, the international trade block affecting aggregate demand is due to export and import variables as components of GDP. Increases in exports will increase GDP, while in contrast an increase in imports will decrease GDP. On the other hand, link 4 shows that the aggregate demand block affects the international trade block, because GDP affects imports.

The other two way relationship, link 5 and link 6, is between fiscal and aggregate demand block. Link 5 arises because national income or GDP affects the Indonesian government revenue from non-oil sectors. Meanwhile, link 6 shows that total government revenue affects government consumption in the Indonesian economy.

The two way relationship between the international trade block and the monetary and price block is also shown in link 7 and link 8. Link 7 shows that exports affect reserve money: and when income increases due to an increase in exports, reserve money will also increase. On the other hand, link 8 shows that price and the production of oil affect the value of oil exports. Historically, Indonesian oil exports drastically rose during the two oil price booms, and it dropped when the price fell. The production of oil also decreased following the oil price decline.

national the income of the country increases, money supply also increases. In practise, this is shown in the (Indonesian) economy i.e., when GDP changes (increase), money supply will also change (increase). In addition, when GDP changes, CPI will also change. So, in this case, GDP affects both money supply and CPI.

Finally, link 10 shows that private investment affects Indonesian export, especially manufactured exports. This is due to the government policy which concentrates more of the investment strategy towards the industrial sector that can boost exports; therefore, changing private investment affects manufactured exports.

Table 4.2

Type of Variables and Equations

Block	Number of Variables			Type of Behavioural Equations	
	Behavioural	Identity	Total	Simultaneous	Recursive
Aggregate Demand	2	4	6	-	2
Expenditure	1	3	4	1	-
International Trade	10	9	19	-	10
Fiscal	2	3	5	2	-
Monetary and Price	7	3	10	5	2
Total	22	22	44	8	14

From the five blocks in the model, Table 4.2 shows that in the aggregate demand block, there are no simultaneous and two recursive equations, while the

equations. In the monetary and price block, we can find there are five simultaneous and two recursive equations.

4.5 Simulation Set

The time horizon period of the model constructed is presented in Figure 4.2. Estimation period of the model covers the period from 1975 to 1991. However, the simulation forecast, which is as known the *ex post* forecast, lasts from 1985 to 1991. In the period of the *ex post* forecast, the quality of the simulated model is examined. The result of this test is important, as it establishes the reliability of the model and acts as a criteria for the validity of the simulation forecasts of the endogenous variables. The closer the simulated values are to the actual data, the greater the forecasting accuracy obtained.

FIGURE 4.2

TIME HORIZON SIMULATION OF MACROECONOMETRIC MODEL OF INDONESIA

1973	1985	1991	1995

-----------------------------Estimation Period------------------------------

-----*Ex-post* Forecast-----

---*Ex-ante* Forecast---

There are several indicators that can be used to evaluate the performance of the simulation forecast, namely, RMSE (Root Mean Square Error), ME (Mean Error), MAE

This test is applied by observing and judging how well a simulation forecast captures the turning point from the plot of actual time series of endogenous variable. Given Y^s_t as the simulated value, Y^a_t as the actual value and T as the number of periods in simulation, we can then define the above statistical test as:

$$RMSE = \sqrt{\left(\frac{1}{T}\sum_{t=1}^{T}\left(Y^s_t - Y^a_t\right)^2\right)}$$

$$RPE = \sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(\frac{Y^s_t - Y^a_t}{Y^a_t}\right)^2}$$

$$MAE = \frac{1}{T}\sum_{t=1}^{T}\left[\left(Y^s_t - Y^a_t\right)\right]$$

$$ME = \frac{1}{T}\sum_{t=1}^{T}\left(Y^s_t - Y^a_t\right)$$

$$THEIL = \frac{\sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(Y^s_t - Y^a_t\right)^2}}{\sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(Y^s_t\right)^2} + \sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(T^a_t\right)^2}}$$

RPE is also used for the same purpose, but its result is given in percentage terms. MAE is used in the absolute value, so that it can avoid the problem with positive and negative errors cancelling. On the other hand, ME can not avoid the positive and negative cancel errors cancelling. So, it is possible that ME is close to 0, while RMSE is otherwise, in this case RMSE would be a better indicator to evaluate the quality of a simulation model.

While the RMSE can evaluate the quality of the model to be able to forecast well, Theil provides an evaluation for a simulation model in historical simulation and ex-post forecast. The numerator of the Theil's formula is nothing but RMSE, so that with the denominator such that the value of Theil (U) will be any value between 0 and 1. If the value of U is equal to 0, we can find that actual and simulated value is the same along the time observation (t). On the other hand, if U is equal to 1, the simulated value of a model is bad, because it indicates that the simulated value is always 0 when the actual value is not 0.

One of the other statistical evaluations is RCAP, which is defined by regressing the actual value of endogenous variables on its predicted value. The predicted value is observed by regressing the behavioral equation. As with the identity equation, the predicted value is obtained from the sum of predicted values which have already been observed. This criterion shows that the better the variable in the model, the closer to one the coefficient of the predicted value.

perfect. However, when some turning points are almost captured, or they are not captured totally, the predicted value is called "almost perfect" or "not perfect", respectively. Therefore, there are three possibilities, perfect, almost perfect and not perfect.

4.6 Summary

The macroeconometric model constructed in this thesis contains 44 equations, of which 22 are behavioural. This model is developed from the demand side showing government investment as an exogenous variables. What makes this model unique is that there are nine behavioural equations of exports and only one behavioural equation of imports. This indicates that this model is focused on the export sector of the economy which is relevant to the objective of the study. The behaviour of exports, especially manufactured exports such as garments and textiles, can be examined through the entire model.

The model is up to date, based on most recent available data till 1991. Meanwhile, standard statistical tests, namely, the Root Percentage Error (RPE), Root Mean Square Percentage Error (RMSE), Mean Error (ME), Mean Absolute Error (MAE), Regression Coefficient of Actual on Predicted value (RCAP) and Turning Point (TP), are applied to evaluate the validity of the macroeconometric model.

The flow chart of the variables in the system explains the causal links among the variables. Furthermore, it reveals the dynamic relationship between endogenous and

FOOTNOTES

1. The value of manufactured exports are found by calculation based on Standardization of International Trade Classification (SITC) from number 5 to 9.

2. See "Trade Policy Review of Indonesia." *GATT*. Geneva. August 1991. Vol. 1. p. 22.

3. See "*Indonesia, Growth, Infrastructure and Human Resources*." World Bank. May 1992.

ESTIMATION RESULTS AND POLICY SIMULATION

5.1 Introduction

The purpose of this chapter is to present and discuss the estimated regression results of the macroeconometric model for Indonesia as constructed in Chapter 4. As indicated earlier, some of the equations in the model are simultaneous in nature, while others are block recursive equations. Dummy variables are used in some cases to capture the turning point. These variables are introduced to reflect the changing patterns of certain variables in a given period(s) due to unforseen events. The estimation period of this model is from 1975 to 1991. Even though some data is available from 1973, an estimation period starting from 1975 has been chosen because prior to this period the volume of export of some commodities, especially garments and textiles, is not significant.

The unique aspect of this model is that, in the international block, there are nine export supply equations but only one import demand[1]. This reflects the fact that in the recent years, there has been a greater focus on exports as a tool for encouraging economic growth in Indonesia.

Econometric policy simulation has been used as a guideline for decision making, that is, to evaluate the economic situation in the past (*ex-post* forecast), and to analyze

from 1992 to 1995. A good prediction in economic cycles enables the policy makers to plan their futures with a greater degree of accuracy, however, no one can guarantee that the outcome of plans will meet the desired expectations. To make a scientific and more precise forecast, assumptions are made which are based on available historical data. In addition, key statistical are used to measure the quality of the model.

Section 5.2 presents the estimated regression results, while in Section 5.3, a discussion and the relevance these results to the Indonesian economy is given. In Section 5.4, the simulation results and the indicators used to determine the quality of the simulation model are examined. Furthermore, the evaluation of policy simulation in *ex-post* forecast, under a given shock scenarios is presented in section 5.5. Based on some assumptions and forecasting methods, certain exogenous variables are predicted in the period of *ex-ante* forecast (from 1992 to 1995). These assumptions, described in section 5.6, includes the results of some given scenarios which are examined, by using a percentage deviation from the baseline simulations. Finally, in section 5.6, the entire discussion is summarized.

5.2 Regression Estimates of the Model

Our model contains 75 variables, of which 44 variables are endogenous and other 31 are exogenous. Overall the model consists of five blocks, namely, the *Aggregate Demand Block*, the *Expenditure Block*, the *International Trade Block*, the *Fiscal Block*, and the

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(TSLS) and ordinary least square (OLS) methods.

It should however be noted that the instrument set used for TSLS estimation contains variables [e.g. price of oil (POIL), production of oil (PRODOIL), exchange rate (ER), loan, government investment (GICR), and investment deflator (IDEF)], some of which are common and have been used for all other simultaneous equations. These common exogenous variables in the instrument set are chosen because they are considered to be important in explaining all the endogenous variables in the system. The detail definition and data source of each variable are presented in Appendix A, while the actual data set is given in Appendix B. In Table 5.1 the figures in parenthesis for each equation represent the t-values. The sign with one, two and three asterisks indicate one per cent, five percent, and ten per cent level of significance, respectively. R^2 represents the coefficient of determination, while DW indicates the Durbin Watson value. SE is standard error and F indicates the value of the ratio of any two independent estimated variances. The software that has been used to run regression is TSP version 7.0. The estimated regression results of the macroeconometric model are reported in Table 5.1 while the discussion of these results are presented in the next section.

5.3 Discussion of Estimated Results

5.3.1 Aggregate demand block

in 1991 when the average population was about 187.76 million, for every one per cent increase in the interest rate, private consumption per individual decreased by Rp. 1,395 (in 1983 price). On the other hand, every one billion rupiah increase in gross domestic income results in an increase of 0.28 billion rupiah in total private consumption. It should be noted that after tax marginal propensity (MPC) to consume cannot be estimated in this model due to lack of appropriate disposable income data for Indonesia.

In Equation 2, we can observe that government consumption is significantly determined by government revenue in real prices and the lag of its variable. Here we see that for every billion rupiah increase in total government revenue (in real price) goes to accommodate Rp. 0.137 billion toward government consumption. The rest of the government revenue of course goes to pay loans and to provide government savings.

5.3.2 Expenditure block

The expenditure block has one behavioral equation (private investment equation) and three identities. Private investment is determined by the gross domestic product in real price (GDPRR) and the lag of its variable. We set the gross domestic product in the private investment equation to capture the accelerator effect, which is almost 25% of the gross domestic product. The dummy variable (D90) in the model aims to capture the tight monetary policy implemented by the government in 1990 that brought about an increase in interest rates.

Table 5.1

Estimated Regression Results

A. AGGREGATE DEMAND BLOCK:

1. Private consumption

$$PCRR = 2444.6942 + 0.2821 \ GDYRR - 261.897 \ R + 0.6025 \ PCRR(-1)$$
$$\qquad\qquad (2.328)^* \qquad\quad (4.242)^* \qquad (-2.817)^* \qquad\quad (5.180)^*$$

R2= 0.9933   F = 637.1055
DW= 1.4493   SE= 1420.092
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF R PCRR(-1)}
PERIOD OF ESTIMATION: 1975-1991

2. Government consumption

$$GCRR = 553.12 + 0.1368 \ GRREAL + 0.683 \ GCRR(-1)$$
$$\qquad\quad (2.624)^{**} \qquad (2.519)^{**} \qquad\quad (5.688)^*$$

R2= 0.9903   F = 715.7678
DW= 2.4143   SE= 259.9881
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF GCRR(-1)}
PERIOD OF ESTIMATION: 1975-1991

B. EXPENDITURE BLOCK:

3. Private investment

$$PIRR = -8749.299 + 0.2474 \ GDPRR - 1074.9131 \ D90$$
$$\qquad\quad (-6.095)^* \qquad (13.1622)^* \qquad (-1.645)^{***}$$

R2= 0.9503   F = 113.634
DW= 1.3734   SE=1611.571
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF D90}

C. INTERNATIONAL TRADE BLOCK:

4. Export of oil

$$XOILCD = -9612.2095 + 586.4089 \ POIL + 15.864 \ PRODOIL$$
$$ (-3.4571)^* (19.8108)^* (3.2137)^*$$

$R2 = 0.9657 F = 196.8367$

$DW = 2.4405 SE = 933.6377$

OLS-PERIOD OF ESTIMATION: 1975-1991

5. Export of primary product

$$XPRCD = 181.1874 + 14353.53 \ UVPX + 1.6722 \ ER$$
$$ (0.4521)^{***} (6.4658)^* (8.2818)^*$$

$R2 = 0.86 F = 45.7279$

$DW = 1.723 SE = 443.2174$

OLS-PERIOD OF ESTIMATION: 1975-1991

6. Export of garments & textiles to Japan

$$XGTJAPCD = -60.929 + 21.324 \ (PIGTJA/PIGTIND) + 0.000031 \ GDPJAPCD$$
$$ (-1.664)^* (1.171)^{**} (2.341)^{**}$$

$$+ 0.9603 \ XGTJAPCD(-1) - 19.43 \ D89$$
$$ (4.639)^* (-1.415)^{***}$$

$R2 = 0.956 F = 59.901$

$DW = 2.795 SE = 14.757$

OLS-PERIOD OF ESTIMATION: 1975-1991

7. Export of garment & textiles to the USA

$$XGTUSCD = -1932.3780 + 820.9784 \ (PIGTUS/PIGTIND) + 0.000264 \ GDPUSCD$$
$$ (-5.0247)^* (4.4673)^* (3.594)^{**}$$

$$+ 0.393 \ ER - 186.82 \ D91$$
$$ (3.9417)^* (-3.4436)^*$$

8. Export of garment and textiles to Singapore

XGTSNGCD= -1051.198 +469.2259 (PIGTSNG/PIGTIND) + 0.0376 GDPSNGCD
           (-7.1242)*   (6.0082)*   (10.148)*

+ 0.03765 XGTSNGCD(-1) + 156.087 D86
       (10.148)*   (2.472)*

R2= 0.936   F = 63.391
DW= 1.733   SE= 54.761
OLS-PERIOD OF ESTIMATION: 1975-1991

9. Export of garment & textiles to Saudi Arabia and Europe

XGTSEUCD= -1662.8195+ 802.7038 (PIGTSEU/PIGTIND)+ 0.0002829 GDPSEUCD
            (-4.4421)*   (3.2894)*   (4.556)*

+ 0.0516 PICD(-1)
     (3.6069)*

R2= 0.9119   F = 44.881
DW= 1.2031   SE= 98.583
OLS-PERIOD OF ESTIMATION: 1975-1991

10. Export of plywood to Japan

XPWJAPCD= -280.475 + 30.443 (PIPWJAP/PIPWIND) + 0.000227 GDPJAPCD
           (-3.381)*   (1.582)***   (4.822)*

+0.469 XPWJAPCD(-1) + 278.69 D89
   (4.051)*   (4.294)*

R2= 0.9809   F = 141.941
DW= 3.2739   SE= 58.985
OLS-PERIOD OF ESTIMATION: 1975-1991

$$R2= 0.9177 \quad\quad F = 33.445$$
$$DW= 1.5638 \quad\quad SE= 54.018$$

OLS-PERIOD OF ESTIMATION: 1975-1991

12. Export of plywood to Pacific countries

$$XPWPASCD= -898.204 + 182.653 \ (PIPWPAS/PIPWIND) + 0.00168 \ GDPPASCD$$
$$\quad\quad\quad\quad (-6.224)^* \quad\quad (3.476)^* \quad\quad\quad\quad\quad\quad (4.8559)^*$$

$$+ \ 0.02149 \ PICD(-1)$$
$$(1.7263)^{***}$$

$$R2= 0.9562 \quad\quad F = 94.5082$$
$$DW= 1.5301 \quad\quad SE= 85.4509$$

OLS-PERIOD OF ESTIMATION: 1975-1991

13. Import total

$$IMTCD= -283.917 - 4.855 \ ER + 1.019 \ XMCD + 0.190 \ GDPCD$$
$$(-0.1659)^{***} \ (-2.4923)^* \ (3.5579)^* \quad\quad (7.0878)^*$$

$$R2= 0.9404 \quad\quad F =66.2502$$
$$DW= 1.5296 \quad\quad SE=1568.05$$

TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF }
PERIOD OF ESTIMATION: 1973-1991

D. FISCAL BLOCK:

14. Government revenue from non-oil sector

$$GRNOCR = -128.723 + 0.0331 \ GDPCR + 0.7166 \ GRNOCR(-1) + 2135.47 \ D89$$
$$\quad\quad (-0.3099)^{***} \quad\quad (2.153)^* \quad\quad (3.880)^* \quad\quad\quad (2.583)^*$$

$$R2= 0.9925 \quad\quad F =531.589$$

15. Government revenue from oil sector

GROCR= -783.611 + 0.7581 VALOIL - 1821.1255 D86
          (-1.865)***   (21.716)*   (-2.0532)**

R2= 0.9754   F = 277.904
DW= 2.2359   SE= 760.430
OLS-PERIOD OF ESTIMATION: 1975-1991

E. MONETARY AND PRICE BLOCK

16. Money supply in riel price

M2R= -4148.2022 + 0.1327 GDPRR + 0.743 M2R(-1) + 6905.428 D91
        (-0.8879)**   (1.3012)*   (6.7811)*   (2.1202)*

R2= 0.991   F =478.243
DW= 2.579   SE=1533.661
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF M2R(-1) D91}
PERIOD OF ESTIMATION: 1973-1991

17. Money supply in nominal

M2C= -1416.454 + 0.950 RM + 0.991 M2C(-1) + 7665.306 D88
        (-0.7939)*** (1.70819)*   (9.0326)*   . (2.3179)*

R2= 0.9912   F = 488.7898
DW= 2.2451   SE=3052.991
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF M2C(-1) D88}
PERIOD OF ESTIMATION: 1973-1991

18. Consumer price index

CPI= 9.2168 + 0.000089 GDPCR + 0.9105 CPI(-1)
        (3.717)*   (2.1105)*   (14.0447)*

19. Export deflator

XDEF= -32.702 + 0.911 WHPIXNOG + 1.261 POIL
     (-5.8309)*   (29.9072)*   (5.94088)*

R2= 0.9856   F =479.6785
DW= 1.419   SE=6.7191
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF}
PERIOD OF ESTIMATION : 1975-1991

20. Wholesale price index non-oil and gas export

WHPIXNOG= 3.341 + 0.0217 ER + 0.750 WHPIPR
     (4.1967)* (6.0085)*   (21.2669)*

R2= 0.9993   F = 10319.86
DW= 1.7826   SE= 1.5387
OLS-PERIOD OF ESTIMATION: 1975-1991

21. Import deflator

MDEF= -38.1987 + 0.0872 ER + 0.5938 WIEUV
     (-1.9868)** (3.5347)*   (2.2374)**

R2= 0.95499   F = 169.7643
DW= 0.7879   SE= 14.6567
OLS-PERIOD OF ESTIMATION: 1973-1991

22. Reserve money

RM= 886.372 + 0.1609 XTCR + 0.259 CREDIT
     (2.694)*   (5.153)*   (2.1588)*

R2= 0.9614   F = 178.6056
DW= 1.4785   SE= 817.6056
TSLS INSTRUMENT: {POIL PRODOIL ER LOAN GICR IDEF CREDIT}

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5.3.3 International Trade block

In this block, the current prices in the U.S. dollar are used for both exports and imports. As pointed out earlier, exports are divided into three classifications of commodities, i.e, exports of primary products, exports of oil, and export of manufactured products. These three different classifications are distinguished by the standard international trade classification (SITC). The export of primary products is defined as the sum of SITC number 0 to number 4 except number 3, while the export of oil is defined as SITC number 3. Finally, a sum of SITC from number 5 to number 9 is classified as exports of manufactured commodities.[2]

Estimated Equation 4 indicates that price and production of oil significantly affect the value of oil exports. For every U.S. $1 increase in the price of oil per barrel, the value of oil export supply in Indonesia will increase by more than U.S. $0.586 billion. From this figure, we can calculate the supply price elasticity of oil (ε_{poil}) in 1991 due to the price increase.[3] We find that the price of oil in 1991 was U.S. $19.3 per barrel and the oil exports in the same period was U.S. $11.172 billion. Therefore, the value of supply price elasticity of oil is

$$\varepsilon_{poil} = (586.4)x\frac{(19.3)}{(11172)} = 1.013.$$

In Equation 5, the unit value export of primary products significantly affects the export of primary products. Meanwhile, exchange rate significantly, and positively, affects the export of primary products. For every rupiah per U.S. dollar increase in the exchange rate (i.e. depreciation of the rupiah), the export of primary product will increase by more than U.S. $1.6 million.

We now turn to the first two main exports of manufactured goods, XGTCD and XPWCD (as defined in Appendix A). These variables are endogenous variables, and as indicated earlier the export of these commodities are defined by the country of destination. In our model, the relative price and the income of the main trading partners affect the value of exports from Indonesia to the respective countries. The base year of the price indices of the commodities is defined as 100 in 1983. From our analysis it is found that most of the garment and textile exports of Indonesia go to Japan. In Equation 6, the price of those commodities in Japan, relative to Indonesia's price (relative price), significantly affects exports to Japan. If the prices of garment and textile in Japan relative to these prices in Indonesia increase by one percent, the export value of these commodities to Japan will also increase by more than U.S. $21.3 million. The total income of Japan marginally affects Japan's import of these commodities from Indonesia. This is due to the fact that the garments and textiles are not an expensive item of the consumer basket in Japan.

effect is quite sensitive, for every one percent increase in the price of garments and textiles in the U.S. relative to these prices in Indonesia, the export value of garments and textiles to the U.S. will increase by almost U.S. $820 million. Meanwhile, the export value can only increase by about U.S. $260 when the income of the U.S. increases by one million U.S. dollar. The exchange rate variable, through its explanatory variable, shows that for every rupiah per U.S. dollar increase in the exchange rate, export of these commodities to the U.S. will increase by almost U.S. $40,000.

The figure representing the effect of relative prices on garment and textile exports in Singapore is quite similar to that of Europe and Saudi Arabia. In Equation 8 and Equation 9, we see that for every one percent increase in the price of these commodities in Singapore, and in Europe and Saudi Arabia relative to these prices in Indonesia, exports of these commodities to Singapore will increase by approximately U.S. $469 million, while exports to Europe and Saudi Arabia will increase by more than U.S. $800 million. For every million U.S. dollar increase in income in those two countries, exports to Singapore will increase by almost U.S. $37,600, while exports to Saudi Arabia and European countries will increase by almost U.S. $280. Private investment at current prices significantly affects export of these products to Saudi Arabia and European countries.

Similarly, the export of plywood to the destination countries is modelled as a

the price of plywood in Japan, the U.S. and Pacific countries relative to the prices in

Indonesian, export of plywood to Japan, the U.S. and Pacific countries will also increase

by almost U.S. $30 million, U.S. $130 million and U.S. $182 million, respectively. For

every million U.S. dollar increase in the income of those countries, as seen in Equation

10, 11 and 12, export of plywood to those countries will also increase by almost U.S.

$220, U.S. $220 and U.S. $1600, respectively. In Equation 11, dummy variables (D87

and D88) are used to capture the change in export deregulation policy of 1987/88 in

Indonesia. Finally, private investment also acts as the explanatory variable in the

equation of the export of plywood to the Pacific countries. Notably, more money has

been invested in Indonesia to encourage exports, especially to Eastern Asia, including

China (after diplomatic relationships to China are normalized in 1989).

Now, we turn our attention to Equation 13, where the exchange rate has a

significantly negative influence on the import demand equation. The value of imports

will decline by more than U.S. $4.8 million when the currency increases by one rupiah

per U.S. dollar. Meanwhile, the export of manufactured goods is set as an explanatory

variable of this equation, because some imports are provided to produce manufactured

products that are supplied as export commodities. Increasing manufactured exports by

one million US dollar will necessarily increase the total imports by U.S. $1.019 million.

In addition, an increase of one million U.S. dollar of national income (GDP) will cause

available in statistical data, and total exports or imports in rupiah, calculated from exports in US dollars, multiplied by the exchange rate. The reason for this deviation is due to the fact that the exchange rate is calculated on the basis of an average value every year, while transactions for this variable use different rates structure.

Exports of other manufactured (XMOTHECD) and exports of garment and textiles to other countries (XGTOTHCD), and exports of plywood to other countries (XPWOTHCD) are determined residually. To determine the amount of these variables in 1991, we must take into account that exports of other manufactured goods which (XMOTHECD) make up approximately 53% of total exports of manufactured goods. In the same year, the export of garments and textiles to other countries (XGTOTHCD) is about 30.8% of total exports of garments and textiles and the export of plywood to other countries (XPWOTHECD) makes up approximately 22.8% of the total export of plywood in 1991.

5.3.4 Fiscal Block

In the fiscal block, there are two behavioral equations and three identities (see Equation 14 and 15). It is found that for every one billion rupiah increase in GDP, Government revenue from non-oil products (GRNOCR) will increases by about Rp.0.033 billion. The reason for including a dummy variable (D89) in Equation 14 is to capture the success of

Government revenue from oil will increase by almost Rp. 0.75 billion for every increase in Rp 1 billion of value of oil. The reason for including dummy variable (D86) in Equation 15 is to reflect the shift structure of government revenues from pre-dominantly oil (prior to 1986) to pre-dominantly non-oil after 1986 and also to capture oil price declines in 1986.

5.3.5 Monetary and Price Block

Monetary and Price block has seven behavioral equations (from Equation 16 to Equation 22) and two identities. Gross domestic product in constant price (GDPRR) significantly affects money supply in constant price (M2R). Meanwhile, reserve money (RM) also significantly affects money supply in constant price (M2C). M2R will increase by more than 7% for every unit increase in GDPRR and M2C will increase about 95% for every unit increase RM. The reserve money equation (see Equation 22) is significantly affected by total exports (XTCR) and credit from monetary authority (CREDIT). On the one hand, RM will increase by almost Rp. 160 million, if total export (XTCR) increases by one billion rupiah. On the other hand, RM will increase by almost Rp. 250 million if CREDIT increases by one billion rupiah.

Equation 18 indicates that consumption price indices (CPI) are significantly affected by gross domestic product in current price (GDPCR). The figure shows that CPI,

regression results, the next section is devoted to the presentation of simulation results.

5.4 Policy Simulation

The *ex-post* forecast period spans over from 1985 to 1991.   To test the reliability of the model we conducted some standard statistical tests for forecasting.   These are root percentage error (RPE), Theil equality coefficient (TIC), mean square error (ME), mean absolute error (MAE) and root mean square error (RMS).   The definition of these indicators has already been given in Chapter 4. The results of these quality test indicators are presented in Table 5.2.

In Table 5.2, it is found that most of the RCAP value of endogenous variables are close to one. The lowest value is for variable IMTRD (0.76754) while GRREAL has the highest value of 1.02078. The RCAP indicator suggests that the better the quality of the model, the closer to one the value of RCAP should be. Meanwhile, TIC values vary from 0.0049 to 0.1031. The highest value is for INFL and the lowest value is WHPIXNOG.

Turning point (TP) indicator demonstrates the capability of simulation forecast to reflect the important actual events occurred in endogenous variables. The notation P indicates that the simulation set perfectly captures every turning point, while O indicates that it almost captures every turning point, or it can merely capture several turning point in one session. The notation I indicates that the simulation set cannot capture every

imperfect (I) fit.   Based on the summary test results in Table 5.1 we can conclude the

estimated model in this thesis should have a reasonably good forecasting power.

TABLE 5.2

SUMMARY TEST RESULTS OF STATISTICAL INDICATORS

	RMS	MAE	RCAP	RPE	TIC	TP
AGGREGATE DEMAND BLOCK						
GDPRR	2481.2	344.6	1.00938	0.0517	0.0226	I
GDPCD	1905.9	1458.0	0.86730	0.0219	0.0104	P
GDPCR	2748.4	2114.9	0.98656	0.0219	0.0095	P
GDYRR	2680.4	3981.3	0.99378	0.0551	0.0247	I
PCRR	2270.6	2060.9	1.00103	0.0405	0.0194	A
GCRR	617.2	522.4	1.00040	0.0689	0.0304	P
EXPENDITURE BLOCK						
PIRR	2107.7	1737.3	0.94317	0.1949	0.0630	A
ICUD	2129.2	1684.5	0.91702	0.1057	0.0447	I
INTERNATIONAL TRADE BLOCK						
XTRR	2626.4	1943.6	0.78001	0.1093	0.0507	I
XTCD	1131.9	850.5	0.96552	0.0637	0.0263	P
XTCR	1743.8	1287.0	0.97587	0.0637	0.0476	P
XTRD	1761.1	1317.6	0.85606	0.1093	0.0522	P
XPRCD	360.9	299.1	1.00000	0.0931	0.0423	P
XOILCD	1042.2	770.9	1.00000	0.1021	0.0448	P
XMCD	141.4	127.3	1.00311	0.0388	0.0104	P
XGTCD	96.6	80.0	0.99781	0.0908	0.0255	P
XPWCD	111.5	85.2	1.02103	0.0794	0.0285	P
XGTJAPCD	14.8	11.8	1.00000	0.3664	0.0732	P
XGTUSCD	68.7	46.3	1.00000	0.1587	0.0739	P
XGTSNGCD	21.5	17.4	1.00000	0.3590	0.0359	P

IMTRR	2808.7	2339.5	0.90078	0.1385	0.0688	A

FISCAL BLOCK

GRNOCR	1038.3	822.5	0.99999	0.1423	0.0366	P
GROCR	793.9	593.2	1.00000	0.0609	0.0352	A
TGRCR	1211.1	1003.2	1.00446	0.0509	0.0189	P
GRRCR	1211.3	1003.4	1.00516	0.0643	0.0240	P
GRREAL	1723.1	1335.3	1.02078	0.0943	0.0394	A

PRICE AND MONETARY BLOCK

M2C	2460.89	1851.19	0.99849	0.0507	0.0233	P
M2R	1753.80	1408.95	1.00101	0.0637	0.0265	P
RM	1382.92	984.23	0.97359	0.1561	0.0749	A
DEF	4.48	3.23	0.90835	0.0394	0.0163	P
XDEF	6.93	5.23	0.99839	0.0597	0.0263	P
MDEF	18.27	15.09	1.00000	0.1433	0.0556	A
INFL	0.02	0.015	0.88189	0.2778	0.1031	I
CPI	2.08	1.73	0.99993	0.0175	0.0075	P
WHPIXNOG	1.49	1.19	1.00000	0.0107	0.0049	P

Note:
RMS = Root Mean Square Error
MAE = Mean Absolute Error
RCAP= Regression Coefficient Actual on Predicted value
RPE = Root Mean Percentage Error
TIC = Theil Inequality Coefficient
TP = Turning Point
P = The simulated value perfectly capture every turning point of the actual series
A = The simulated value almost capture every turning point of the actual series
I = The simulated value imperfectly capture every turning point of the actual series

5.4.1 *Ex-post* forecast

In this thesis, the period of *ex-post* forecast is from 1985 to 1991. In the period of *ex-post* forecast, alternative policies were proposed, and subsequently the impact of changing exogenous policies on key endogenous macroeconomic variables were evaluated. The alternative policies, which are termed scenarios, are constructed in relation to the condition of the Indonesian economy. In the *ex-post* period, the construction of baseline solutions are based on the estimation of historical data.

A list of possible scenarios is presented in Table 5.3. The detailed numerical results of each scenarios have been relegated to Appendix C, however in Table 5.3 the code number of tables containing the results for each scenario (in appendix) is given in the last column.

It should be noted that the impact of a given exogenous policy shock on each endogenous variable can be measured in the same units as the original endogenous variable, however, for convenience sake, in this thesis we have measured the impact as a percentage deviation from base line solutions (PD) which is calculated as follows:

$$PD = \frac{impactline - baseline}{baseline} x100\%$$

TABLE 5.3.
THE LIST OF SCENARIO AND TABLE CODE NUMBER

No.	Variable	Value of Shock	Table Code Number
Exchange Rate Policy Shock			
1.	Exchange rate (ER)	(+) 10%	D1
2.	Exchange rate (ER)	(+) 20%	D2
Export Price Policy Shock			
3.	Garment and textile prices of Japan relative to Indonesia's (PIGTJA/PIGTIND)	(+) 20%	D3
4.	Garment and textile prices of the U.S. relative to Indonesia's price (PIGTUS/PIGTIND)	(+) 20%	D4
5.	Garment and textile prices of Singapore relative to Indonesia's price (PIGTSN/PIGTIND)	(+) 20%	D5
6.	Garment and textile prices of Saudi Arabia and European countries relative to Indonesia's price (PIGTSE/PIGTIND)	(+) 20%	D6
7.	Plywood price of Japan relative to Indonesia's price (PIPWJA/PIPWIND)	(+) 20%	D7
8.	Plywood price of the U.S. relative to Indonesia's price (PIPWUS/PIPWIND)	(+) 20%	D8
9.	Plywood price of Pacific countries relative to Indonesia's price (PIPWPA/PIPWIND)	(+) 20%	D9
World Income Shock			
10.	Income of the main trading partners (the rest of the world)[4]	(+) 20%	D10
Government Investment Policy Shock			
11.	Government investment (GICR)	(+) 10%	D11
12.	Government investment (GICR)	(+) 20%	D12
Government Loan Policy Shock			
13.	Government loan (LOAN)	(+) 10%	D13
14.	Government loan (LOAN)	(+) 20%	D14
Oil Price Policy Shock			
15.	Price of oil (POIL)	(-) 10%	D15
16.	Price of oil (POIL)	(-) 20%	D16

Oil Production Policy Shock

<u>Note:</u> 1. The positive sign (+) indicates increasing shock by the given number.
2. The negative sign (-) indicates decreasing shock by the given number.

The result of the scenarios on the selected endogenous variables are reported in the appendix from code number D1 to D18, and the combination scenario can be seen in Table 5.4. The endogenous variables reported in the table are important ones, in that they are relevant to, and depend upon, the given scenarios. The formula of percentage deviation from baseline solutions, as mentioned above, is used in these tables to measure the impact of the scenario on the endogenous variables. If the impact has a negative sign, it indicates that the value of the given variable decreases relative to the base line value. Conversely, if the given variable has a positive sign it implies improvement.

Exchange Rate Policy Shock

From Tables D1 and Table D2 (in Appendix B), we can observe the impact of an increase in the exchange rate (ER) or depreciation in the rupiah by both 10% and 20%, respectively. It appears that a policy of devaluation may have a positive impact on the GDP in nominal (GDPCR) as well as in real terms (GDPRR). During 1985, devaluating ER by 10% may increase GDPCR by +11.3% and decrease GDPRR by (-) 2.82%. By 1991, however, this devaluation policy may increase GDPCR by 8.11% and GDPRR by 8.48%. Furthermore, in 1985, devaluating ER by 20% increased both GDPCR and GDPRR by 11% and 16.1% respectively, and in 1991, these numbers become 16.9% and

(XTCD) while total imports in current price IMTCD decreases. These percentage numbers indicate the sensitivities of international trade due to the depreciation of the rupiah. The depreciation of the rupiah will decrease the price of domestic goods in terms of foreign price. Consequently, on the one hand, the international demand for domestic products increases, thus exports increase. On the other hand, an increase in the price of foreign goods brings about a decrease in imports.

Tables D1 and D2 also reveal that the results of the above scenarios illustrate an increase in government revenue from oil and non-oil products. However, the revenue from oil products is almost double that of the revenue from non-oil products. Again, this discrepancy reflects the sensitivities of oil exports that increase government revenues from oil.

Export Price Policy Shock

In turning our attention to Tables D3 to D9, we see the impact of the price of the main export commodities (especially garments and textiles and plywood) upon the key macroeconomic variables. From these seven tables, we can see that in real terms the components of GDP, except exports and imports, have negative signs. GDP in current prices, however, has a positive sign. The scenario of an increase in garment and textile prices of the main trading partner by 20% may increase the garment and textile exports, thus it may increase exports of manufactured goods as well. That increase will contribute

increase in the garment and textile prices of Japan may result in an increase in Indonesia's garment and textile exports to Japan by almost 32% in 1985, and this value declined year by year to 7.5% in 1991. Similarly, total garment and textile exports may also increase by 0.5% in 1985 and 0.43% in 1991. Furthermore, manufactured exports may increase by 0.13% in 1985 and 0.12% in 1991. At the same, the time total exports may also increase by 0.02% in 1985 and 0.05% in 1991. Because the ratio of garment and textile export to total GDP is very small, the above scenarios affect on GDPCR accounts for a very small percentage, i.e., 0.01% in 1991.

World Income Shock

The other interesting scenario is a 20% increase in income of Indonesia's main trading partners. Indonesia's main trading partners in this study are Japan, the US and Singapore. Table D10 indicates that this scenario may increase Indonesia's garment and textile exports to the three countries, as well as Indonesia's plywood exports to Japan and the U.S. Understandably, when the income of the main trading partner increases, the demand for importable goods increases, including the demand for the import of garments and textiles, and plywood from Indonesia. The result of this scenario shows that during 1985, Indonesian exports of garments and textiles to Japan, the US and Singapore increase by 81%, 80% and 85%, respectively. During the *ex-post* simulation period, these percentage values decline. Finally, in 1991, the percentage value becomes 53%, 53% and 47%,

Finally in 1991, the values become 46% and 29%, respectively. Meanwhile, the impact of the scenario upon the components of GDP, in real value (GDPRR), have negative signs except export and import variables. Its response to GDPRR shows that GDPRR may decrease by (-) 1.04% in 1985, and this negative impact gradually increases to (-) 2.81% in 1991. GDP in nominal value (GDPCR), however, has a positive impact. In 1985 its impact on GDPCR is almost 0%. In 1991 its impact is (+) 1.1%.

Government Investment Policy Shock

Let us turn our attention to the other scenarios which contains a 10% and 20% increase in government investment. Table D11 and D12 demonstrate the responses of these scenarios. From these tables, we find that all of the selected endogenous variables, including the components of GDP in both real and nominal value, have positive impacts. In 1985 the impact of 10% and 20% increases in GICR upon GDPRR is 1.59% and 3.18% respectively. These numbers gradually increase year by year. In 1991, the numbers are 4.88% and 9.79%, respectively. The previous impacts are parallel to GDPCR. In 1985, their impact on GDPCR is 0.77 and 1.54%, respectively, and the numbers increase from year to year. Finally, in 1991, the numbers become 1.30% and 2.51%, respectively.

Government Loan Policy Shock

(GCRR) increased by 0.57% and 1.14%, respectively. These numbers gradually increase from year to year. Finally, in 1991, these numbers are almost doubled, i.e., by 2.18% and 4.38%, respectively. Interestingly enough, the contribution of these scenarios to GDPCR is small. Tables D13 and D14 show that in 1985, GDPCR increases by only 0.05% and 0.11%, respectively. Even though they gradually increase, in 1991 the numbers are only 0.24% and 0.48%, respectively.

Oil Price Policy Shock

Before we turn our attention to the scenario regarding the oil prices, our attention must be drawn to the fact that oil prices fluctuate from time to time. During the *ex-post* period (1985-1991), based on the annual average value, the lowest oil price is U.S. $13.6 per barrel in 1986, with the highest almost doubled in 1990, that is, U.S. $23.1 per barrel during the Gulf war. Our scenario entails a reduction in the oil price by 10% and 20%. The responses are shown in Table D15 and D16. When oil prices are allowed to decline by either 10% or 20%, the percentage of reduction in oil exports turned out to be greater than the percentage of shock implemented in the scenario. Oil exports decreased by (-) 11.31% and (-) 22.62% in 1985, respectively. These numbers fluctuate from year to year and in 1991, the numbers become (-) 10.36% and (-) 20.73% respectively. Furthermore, the responses of government revenue show that in 1985, the government revenues from oil (GROCR) decreases by (-) 10.72 and (-) 21.45% respectively. These numbers

Oil Production Policy Shock

Similar to the previous scenario, the scenario regarding reduction in oil production also has negative impacts on the Indonesian economy. Table D17 and D18 demonstrate the response of the scenarios, which are 10% and 20% decreases in the production of oil. Interestingly, the scenario of reducing the oil price has a stronger impact on exports than that of reducing oil production. In 1985, the responses of 10% and 20% reductions in oil production to exports in current value are only (-) 5.19% and (-) 10.38% respectively (compared to the previous scenario, (-) 11.31% and (-) 22.62% in the same year). Nevertheless, the negative responses of these scenarios to the GDPRR in 1985 are (-) 1.51% and (-) 3.01% respectively. These negative numbers gradually increase from year to year up to 1991, when their numbers become (-) 4.42% and (-) 8.78%, respectively. In addition, the Tables D17 and D18 also show that in 1985, government revenue from oil (GROCR) decreases by 10.72% and 21.45%. These numbers fluctuate from time to time until 1991, when the numbers become 10.5% and 20.99%.

Combined Policy Shock

The last, most noteworthy, scenario is the combination scenario. This scenario consists of all of the above scenarios that we have previously discussed, except scenarios numbered 1, 11, 13, 14, 15 and 17 (see Table 5.3). The response of this scenario is presented in Table 5.4. Interestingly, Table 5.4 shows that GDP in real value (GDPRR)

TABLE 5.4

THE IMPACT OF THE COMBINATION SCENARIO*) ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)						
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	5.83	7.01	8.32	12.70	13.45	13.50	14.81
GDPCR	2.85	2.10	2.08	3.85	5.06	5.39	6.75
PCRR	0.82	2.70	4.41	7.01	8.92	9.85	11.27
GCRR	-2.66	-2.69	-2.61	-1.73	-0.71	-0.47	0.19
PIRR	9.69	11.69	12.60	20.34	17.84	17.34	20.87
XTRR	2.97	3.27	5.67	8.90	9.85	9.56	11.08
XTCD	-16.39	-12.54	-10.49	-7.41	-6.88	-7.90	-5.91
XPRCD	-0.15	-0.15	-0.15	-0.12	-0.12	-0.15	-0.13
XMCD	40.26	34.61	30.84	21.26	19.11	15.86	13.23
XOILCD	-33.00	-49.88	-43.01	-46.57	-41.64	-35.54	-37.60
XGTCD	108.63	72.75	73.93	52.41	51.06	34.25	30.34
XPWCD	33.41	32.64	33.02	22.72	22.08	20.06	19.28
XGTJAPCD	93.93	91.89	74.52	62.22	66.53	68.70	60.22
XGTUSCD	96.81	91.68	90.98	93.86	81.54	74.65	95.09
XGTSNGCD	87.20	88.39	81.81	76.53	71.83	63.06	52.61
XGTSEUCD	49.52	24.02	27.28	12.56	32.97	9.60	6.48
XPWJAPCD	87.53	52.68	42.23	36.34	24.94	29.09	30.18
XPWUSCD	90.15	78.14	149.79	83.00	70.77	64.17	60.95
XPWPASCD	11.04	2.89	3.52	1.70	3.26	1.79	1.21

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TGRCR	-11.55	-7.89	-8.49	-7.24	-6.12	-7.18	-5.57
GRRCR	-14.20	-9.91	-11.48	-9.11	-8.21	-9.18	-6.99
GRREAL	-8.99	-3.46	-2.90	0.67	1.38	-0.04	1.57
IMTRR	-14.43	-17.46	-21.83	-14.07	-11.20	-9.20	-7.02

Note: The combination scenario includes:
1. Increase in exchange rate (ER) by 20%
2. Increase in garment and textile prices of Japan relative to Indonesia's by 20%
3. Increase in garment and textile prices of US relative to Indonesia's by 20%
4. Increase in garment and textile prices of Singapore relative to Indonesia's by 20%
5. Increase in garment and textile prices of S. Arabia and european countries relative to Indonesia's by 20%
6. Increase in plywood price of Japan relative to Indonesia's price by 20%.
7. Increase in plywood price of US relative to Indonesia's price by 20%.
8. Increase in plywood price of Pacific countries relative to Indonesia's price by 20%.
9. Increase in income of Japan by 20%.
10. Increase in income of the US by 20%.
11. Increase in income of Singapore by 20%.
12. Decrease in production of oil (PRODOIL) by 20%
13. Decrease in price of oil (POIL) by 20%

Similarly, GDPCR increases by 2.85% in 1985. In 1991, its number becomes 6.75%.

More specifically, the column under 1991 in Table 5.4, shows that government revenue

from oil (GROCR) and oil exports (XOILCD) decreases by (-) 24.35% and (-) 37.6%,

respectively. These reductions occurred because oil price and oil production decrease at

the same time by 20%.

Due to the contribution of depreciation of the rupiah to the scenario, imports

(IMTCD) may decrease by (-) 10.7% but manufactured exports (XMCD) may increase

by 13.23%. Of course, the export of garments and textiles and plywood to the main

trading partner increase, because the exchange rate is depreciated, and at the same time

income of the main trading partners increased by 20%. It is also to be observed that

Government Revenue from Non-oil (GRNOCR) increases by more than 4% in 1991.

Because the revenue from oil increases much more than that from non-oil, total

government revenue (TGRCR) decreased. In 1991, the response of the scenario to

TGRCR is (-) 5.57% (see Table 5.4).

5.4.2 *Ex-ante* forecast

The period of *ex-ante* forecast is 1992-1995. In this period, all of the exogenous

variables are initially forecasted. Forecasting can be useful to measure for determining

sensitivity and for policy analysis [Pyndick (1981), p.360]. From this forecast, one can

examine the effects of policies that cause changes in exogenous variables or specific

assumptions for such other exogenous variables, such as interest rate (R), price of oil (POIL), and credit from monetary authority. These variables are set with assumptions of special cases rather than those based on the trend. Table 5.5 shows the key assumptions made in *ex-ante* forecast.

It is noteworthy that one cannot apply trends for the price of oil (POIL) and interest rates for their forecasting. The reason for this is that the oil price (POIL) fluctuates and it is very often affected by non-economic reasons. Meanwhile, interest rates are affected by other variables not in the system. Therefore, we make the assumption that the price of oil has the same value or rate with their average and interest rates are predicted by using ARIMA model. ARIMA forecast is atheoretical projection, but it is still objective.

Based on the assumption mentioned above, we can set the baseline solution starting from 1992 to 1995. All of the baseline solution in *ex-ante* forecast is under the assumption that the parameters of behavioral equations are always constant. It is also under the assumption that in the future, *ex-ante* period, all of exogenous variables are predicted to be what we have forecast in Table 5.5.

Some policy scenarios are taken to measure the response of interesting variables to the given shock scenario using the assumption mentioned above. Accordingly, the scenarios that are taken are interesting and important issues. Compared with the scenario for *ex-post* forecast, in *ex-ante* forecast we treat some given shock variables with more

TABLE 5.5.

ASSUMPTION OF FORECASTING OF THE EXOGENOUS VARIABLES BY USING TREND (GROWTH) OF THEIR HISTORICAL DATA

No.	Variables	% (GROWTH)
1.	Exchange rate period average (ER)	8.6
2.	Government Investment (GICR)	10.9
3.	Gross domestic product of Japan (GDPJAPCD)	12.3
4.	Gross domestic product of USA (GDPUSCD)	6.2
5.	Gross domestic product of Pacific (GDPPASCD	11.9
6.	Gross domestic product of Saudi Arabia and European countries (GDPSEUCD)	12.6
7.	Gross domestic product of Singapore (GDPSNGCD)	14.7
8.	Investment deflator (IDEF)	7.57
9.	Correction of Exchange rate (ERAX)	1.17
10.	Exchange Rate adjustment for imports (ERAI)	-4.86
11.	Government Loan (LOAN)	5.3
12.	Production of oil (PRODOIL)	3.08
13.	Garments & textiles price indices of Japan relative to Indonesia (PIGTJA/PIGTIND)	-10.3
14.	Garments & textiles price indices of Saudi Arabia and European countries relative to Indonesia (PIGTSE/PIGTIND)	-7.4
15.	Garments & textiles price indices of Singapore relative to Indonesia (PIGTSN/PIGTIND)	-10.4
16.	Garment & textiles price indices of the USA relative to Indonesia (PIGTUS/PIGTIND)	-8.6
17.	Plywood price indices of Japan relative to Indonesia (PIPWJA/PIPWIND)	-4.0
18.	Plywood price indices of Pacific countries relative to Indonesia (PIPWPA/PIPWIND)	-7.8
19.	Plywood price indices of the USA relative to Indonesia (PIPWUS/PIPWIND)	-8.6
20.	Price export primary product (PIXPR)	
22.	Unit value price of export (UVPX)	13.6
23.	World indexes export unit value (WIEUV)	7.0
24.	Exports of garment/textile to other countries (XGTOTHCD)	33.5
27.	Exports of manufacture to other countries (XMOHTECD)	37.4

The indicators to measure the impact of the scenario on the selected endogenous variables are presented by using percentage deviation from baseline solutions. This percentage deviation is the same as the one which we have already used in the *ex-post* forecast. The result of the above scenarios are presented in the tables from code number D19 to D37 and Table 5.7 (the list and the code number can be seen in Table 5.6).

The series of the impacts of above scenarios on the selected endogenous variables are presented as follows:

Exchange Rate Policy Shock

Table D19 and D20 show that shock of exchange rate (ER) by 10% and 20% may increase GDPRR by 7% and 14%, respectively, in 1992. In 1995, these figures increase by almost 13% and 26%, respectively. On one hand, it is also found that due to these scenarios, in 1992 total exports (XTRR) increase by 9% and 18%, respectively, and these figures are almost the same, respectively, in the following year during this period. On the other hand, total import (IMTRR) decrease by 3.5% and 7.5%, respectively, in 1992, and finally these figure became 0.5% and 1.8%, respectively, in 1995.

Price Shock

The price shock scenarios do not have significant impacts on endogenous variables in the macro model. This is because the trend of relative price decline, in other words, the trend of manufactured exports of Indonesia, is steeper than that of the Indonesia's main trading

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TABLE 5.6
THE LIST OF SCENARIOS AND TABLE CODE NUMBERS

No.	Variable	Value of Shock	Table Code Number
Exchange Rate Policy Shock			
1.	Exchange rate (ER)	(+) 10%	D19
2.	Exchange rate (ER)	(+) 20%	D20
Export Price Shock			
3.	Garment and textile prices of Japan relative to Indonesia's (PIGTJA/PIGTIND)	(+) 20%	D21
4.	Garment and textile prices of US relative to Indonesia's (PIGTUS/PIGTIND)	(+) 20%	D22
5.	Garment and textile prices of Singapore relative to Indonesia's (PIGTSN/PIGTIND)	(+) 20%	D23
6.	Garment and textile prices of Saudi Arabia and european countries relative to Indonesia's (PIGTSE/PIGTIND)	(+) 20%	D24
7.	Plywood price of Japan relative to Indonesia's price (PIPWJA/PIGTIND)	(+) 20%	D25
8.	Plywood price of US relative to Indonesia's price (PIPWUS/PIGTIND)	(+) 20%	D26
9.	Plywood price of Pacific countries relative to Indonesia's price (PIPWPA/PIGTIND)	(+) 20%	D27
World Income Shock			
10.	Income of the main trading partners (the rest of the world)	(+) 20%	D28
Government Investment Policy Shock			
11.	Government investment (GICR)	(+) 10%	D29
12.	Government investment (GICR)	(+) 20%	D30
Government Loan Policy Shock			
13.	Government loan (LOAN)	(+) 10%	D31
14.	Government loan (LOAN)	(+) 20%	D32
Oil Price Policy Shock			
15.	Price of oil (POIL)	(-) 10%	D33
16.	Price of oil (POIL)	(-) 20%	D34

Oil Production Policy Shock

Note: 1. The positive sign (+) indicates increasing (policy) shock variables.
2. The negative sign (-) indicates decreasing (policy) shock variables.

World Income Shock

Income shock scenario shows that increase income of the main trading partners by 20% significantly affects manufactured exports of Indonesia. Theoretically, an increase in income of the main trading partners will increase demand for importable goods, including those from Indonesia. Table D28 shows that during this period, even though exports are affected, national incomes or GDPs are not significantly altered.

Government Investment Policy Shock

It is shown from Tables D29 and D30 that shock government investment does not significantly affect Indonesian exports, but it significantly affects national income (GDPRR). The tables show that 10% and 20% increases in government investment will increase GDPRR by 3% and 6%, respectively, in 1995.

Loan Policy Shock

Loan policy shock scenarios do not significantly affect national income (GDPRR). Tables D31 and D32 show that as a response to 10% and 20% increases in government loans, GDPRRs do not significantly increase. Meanwhile, government revenues (GRREAL) increase by almost 2% and 4% yearly during this period.

and D34 shows that the impact of these scenarios on Indonesian exports gradually decrease. This indicates that in the future (1995), decreases in oil prices still significantly affect total exports (XTCD and XTRR).

Oil Production Policy Shock

As presented in Tables D35 and D36, in oil production policy shock scenario, 10% and 20% decreases in oil production will decrease GDPRR by 2.7% and 5.4%, respectively, in 1995. Similar to the previous scenario, the impact of these scenario on total export (XTCD and XTRR) gradually decrease. It is also found that in 1995, due to decrease in the production of oil, total exports significantly decrease.

Combined Scenario

The impacts of the combination scenario upon the Indonesian economy are demonstrated in Table 5.7. It is important to note that even though POIL decreases by 20% while PRODOIL also decreases by 20%, both GDPRR and GDPCR have positive impacts and their figures increase at an annual rate. As a response to the scenario, GDPRR increases by 14% in 1995, compared to only 8% in 1992. Meanwhile, in 1992, GDPCR increases by 6.8% and in 1995 it becomes 9.6%. It is also shown that, on the one hand, in the exception of oil exports (XOILCD), most export variables increase, while on the other,

TABLE 5.7

THE IMPACT OF THE COMBINATION SCENARIO ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	8.15	10.05	12.21	14.34
GDPCD	-10.94	-10.34	-9.53	-8.64
GDPCR	6.86	7.58	8.56	9.62
PCRR	2.06	4.02	6.00	7.96
GCRR	-1.57	-2.03	-1.79	-1.07
PIRR	11.18	13.58	16.08	18.39
XTRR	11.57	12.65	13.93	14.98
XTCD	-5.42	-4.39	-3.14	-2.14
XPRCD	-0.13	-0.13	-0.13	-0.13
XMCD	9.67	7.98	6.97	6.08
XOILCD	-37.14	-36.69	-36.25	-35.82
XGTCD	23.23	18.64	16.63	14.92
XPWCD	14.32	14.37	13.89	13.60
XGTJAPCD	11.40	17.59	20.93	22.69
XGTUSCD	65.68	60.12	54.85	50.70
XGTSNGCD	44.81	39.34	35.41	32.47
XPWJAPCD	17.29	23.22	24.66	24.57
XPWUSCD	45.05	42.36	40.05	38.04
IMTCD	-9.77	-8.36	-6.76	-5.35

XTCR	13.49	14.72	16.22	17.43
TGRCR	-6.64	-5.65	-4.70	-3.60
GRRCR	-8.32	-7.00	-5.73	-4.33
IMTRR	-6.07	-4.40	-2.63	-1.02
INFL	9.72	9.15	8.98	8.92

Note: The combination scenario includes:
1. Increase in exchange rate (ER) by 20%
2. Increase in garment and textile prices of Japan relative to Indonesia's by 20%
3. Increase in garment and textile prices of US relative to Indonesia's by 20%
4. Increase in garment and textile prices of Singapore relative to Indonesia's by 20%
5. Increase in garment and textile prices of S. Arabia and european countries relative to Indonesia's by 20%
6. Increase in plywood price of Japan relative to Indonesia's price by 20%.
7. Increase in plywood price of US relative to Indonesia's price by 20%.
8. Increase in plywood price of Pacific countries relative to Indonesia's price by 20%.
9. Increase in income of Japan by 20%.
10. Increase in income of the US by 20%.
11. Increase in income of Singapore by 20%.
12. Decrease in production of oil (PRODOIL) by 20%
13. Decrease in price of oil (POIL) by 20%

5.5 Summary

The macroeconometric model constructed in this thesis consists of 22 behavioral equations and 22 identities. This model is based on the demand side of the national income. Expenditure of gross national product is shown as a core of identity. This national identity is presented in constant prices. All constant price variables are calculated where index prices in 1983 equal 100.

Due to the lack of information about the national income of Indonesia, the estimation of the marginal propensity of consumption (MPC) can not be observed. However, gross domestic income (GDYRR) is defined by adding Gross Domestic Product in real price (GDPRR) and the terms of trade. The terms of trade itself is defined by multiplying the real price of export (XTRR) and the ratio of the export deflator (XDEF) to the import deflator (MDEF). The model shows that GDYRR and nominal interest rate significantly affect private consumption.

Exchange rates (ER) significantly affect some export equations and import equations. Exports can be broken down by type of specific commodity, i.e., garments and textiles, and plywood, and by countries of destination. The exports of the specific commodities to the main trading partners are significantly affected by both the price of the relevant commodity, relative to Indonesia's price, and the income of the relevant destination countries. Meanwhile, it can be significantly proven that the import of capital goods

significantly affected by the value of oil production (VALOIL). Money supply (M2C) at current price is significantly influenced by reserve money (RM). This RM is significantly affected by exports at current price (XTCR) and credit from the monetary authority (CREDIT). Generally speaking, all of the explanatory variables on the right hand side of price equations significantly influence their dependent variables.

Let us turn our attention to forecast simulation. Quality testing of the simulation set shows that the root percentage error (RPE) of most endogenous variables is less than 10 % and the Theil inequality coefficient (TIC) is less than 5%. Having the quality of the simulation set, we can set such scenarios to observe the impact of the given shock on the endogenous variables. These scenarios are relevant to the objective of this thesis and, recently, the engrossing topic of the Indonesian economy. The analysis of the impact of given shock creates a very interesting discussion. In the case of *ex-post* forecast, the impact of the given shock scenario would be an important contribution to either the Indonesian government or policy makers.

To observe the impacts of such scenarios upon the endogenous variables in the system, we measure the percentage deviation of the impacts from baseline solutions. In the *ex-post* forecast, the result demonstrates that the exchange rate, relative price and income of the main trading partners, i.e., Japan, the US, and Singapore, may play an important role in encouraging exports. The change of the exogenous variables affects the

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equal, results in a decrease in the gross domestic product (GDP), as well as a degeneration in all of the economic variables in the system. Applying the scenario which reduces the production of oil to a certain level will create the same economic response as the scenario for reducing oil prices. Reducing oil production may decrease the economic growth. For example, reducing oil production by 20% may decrease the GDPRR by (-) 1.5% in 1985, and this negative impact gradually increases until it reached (-) 4.4% in 1991. Meanwhile, it can also be observed that increasing government foreign loans by 20% may bring about a very small contribution to the GDP (gross national products) both in constant and current prices; i.e., an increase, in 1991, by 1.59% and 0.48% respectively.

Oddly enough, the combination scenario makes for the most interesting discussion in this thesis. This scenario combines a 20% decrease in the oil price and the production of oil, and a 20% increase in the relative price, national incomes of the main trading partners, government foreign loans and government investment. The result demonstrates that in 1985, gross domestic product in constant and current price may increase by 5.8% and 2.9%, respectively. These figures more than double in 1991, i.e., by 14.8% and 6.8%, respectively. It is interesting observe the responses to this scenario, such as a decrease in total government revenue (TGRCR) by (-) 11.5% in 1985. This negative impact decreases to (-) 5.6% in 1991. This is because the revenue from oil (GROCR)

The responses of this scenario to the international trade block have significant impact.

As a response to the combination scenario, the export of both garments & textiles, and plywood to the major destination countries have remarkably positive impacts. Consequently, total exports of garments & textiles (XGTCD) and plywood (XPWCD) significantly increase. Export in real price (XTRR), on the one hand, has a positive impact and this positive impact increases gradually. On the other hand, import in the real price (IMTRR) has a negative impact. This negative impact gradually decreases from year to year.

Let us turn our attention to the *ex-ante* forecast of this model. The period of the *ex-ante* forecast is 1992-1995. In this period, all of the exogenous variables in the system are forecasted. Some assumptions are implemented to determine the forecast value of the exogenous variables. Information on the economic situation of Indonesia is taken into account to make the assumptions applicable and relevant. Most of the forecasting is defined by assuming that the growth of such variables, starting from 1983 to 1991, is the same as that of the *ex-ante* period.

Based on the established exogenous variables, simulation forecasts in the ex-ante period are constructed. Alternative policies can be implemented to observe the behaviour of simulation forecasts as a response to the changes in such exogenous variables. These alternative policies, which are known as policy scenarios, are relevant to the economic

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The results of the scenarios for *ex-ante* forecast show that exchange rates, investment, and income of the main trading partners may play an important role in encouraging economic growth in the future. The scenario of a 20% increase in the exchange rate, for example, may increase the gross domestic product in both the real price (GDPRR) and the nominal price (GDPCR). The responses show that in 1992, GDPRR and GDPCR increase by 14.2% and 11.9%, respectively. These numbers increase gradually until 1995, where the numbers become 25.6% and 14.6%. Meanwhile, it is important to notice that the responses to the increase in the prices of the main manufactured goods in major destination countries, relative to Indonesia's, are no longer significant. During the first year of *ex-ante* period, the responses of exports of such commodities to the main trading partners are very small. In addition to this, the numbers decrease from year to year.

Similar to the scenario regarding reduction in oil prices and oil production, in the *ex-post* forecast, the same scenarios that are applied to the *ex-ante* forecast have negative impacts upon the Indonesian economy. The figure in the Table D34 shows that as a response to the 20% decrease in oil prices, in 1992, the GDPRR and GDPCR may decrease by (-) 2.5% and (-) 2.4%, respectively. These negative numbers increase gradually until 1995, when the numbers become (-) 4.4% and (-) 3.1%. Meanwhile, as a response to a 20% decrease in oil production, in 1992, GDPRR and GDPCR may

and government revenue from oil.

The noteworthy scenario is the combination scenario which combines with 12 existing scenarios. The composition of this scenario is the same as the combination scenario imposed in the *ex-post* forecast but the results, of course, are different. As a response to the combination scenario in the *ex-ante* forecast, in 1992, GDPRR and GDPCR increase by 8.1% and 6.9%, respectively. These numbers increase at an annual rate. In 1995, these numbers become 14.3% and 9.6%. The components of GDPRR have positive impacts, except for government consumption (GCRR) and imports (IMTRR). From this scenario, we can see that decreases in oil prices and oil production will result a decrease in government revenue. Consequently, government consumption will also decrease. In addition, IMTRR has negative impacts because the depreciation of the rupiah will reduce imports.

Nevertheless, as a response to the combination scenario, exports of manufactured goods may increase. This occurs because exports of garments & textiles and plywood to the main destination countries also increase. Conversely, oil exports significantly decrease. In addition, the exports of primary products slightly decrease. These negative impacts may compensate for the positive impact of exports of manufactured goods. Consequently, total exports have negative impacts.

From the last scenario, one can generally conclude that a devaluating or depreciating

main trading partners, relative to Indonesia's, only slightly affect Indonesia's exports.

Similarly, foreign government loans (LOAN) also affect Indonesia on a small scale

FOOTNOTES

1. It should be noted that all export and import data in a given equation are measured in the current price in U.S. dollars, because exports and imports are measured in U.S. dollar in current prices. However, the constant value of all variables in the model has the same base year, i.e., the 1983 price year.

2. This classification is also used by Azis (1989), Ichimura (1985) and Naqvi (1993).

3. Price elasticity of supply (εp) is defined as :
    εp = (percentage change in quantity supply)/(percentage change in price)

    or

    $$\epsilon_{poil} = \frac{dQ}{dP} X \frac{P}{Q}$$

    where: P = price
    Q = quantity supplied
    dQ = percentage change in quantity supply
    dP = percentage change in price

4. The Indonesia's main trading partners are the first three main trading partners, i.e., Japan, the U.S. and Singapore.

CHAPTER 6

CONCLUSION AND IMPLICATION

6.1. Conclusion

Many sectors within the Indonesian economy have progressed significantly since the late 1960s. Five year development programs initiated by the government (known as the "new order") provided the impetus for this economic change. Beginning in 1982, the price of oil gradually declined. Consequently, government revenues from oil decreased. Indonesia's oil price fell from U.S. $34 per barrel in 1982 to U.S. $15 per barrel in 1988. Indonesia responded quickly, realizing that oil exports were no longer to be the engine of growth in the economy. Some efforts were made to support exports with measures such as devaluation, significant reductions in government expenditures, and a series of deregulation that liberalized both internal and external trade (Thorbecke, 1991, p.23). However, to encourage non-oil exports, such as manufactured and primary products, the rupiah was allowed to depreciate sharply in 1983 (the rupiah dropped in value by 27.8%[1]). The government policies did, indeed, lead to some changes in the Indonesian economy.

Since 1984, the government has under taken specific policy initiatives which led to a significant structural transformation and diversification of the Indonesian economy. This lead to the development of the manufacturing sector and, at the same

Oil exports have fluctuated, being dependent on the price of oil and the production of oil. Among non-oil exports, industrial and manufactured exports were dominant.

Recent changes in economic structures support the viewpoint that non-oil exports are important to the Indonesian economy, because it not only creates additional jobs but also increases income level. Among the manufactured commodities, garments and textiles were the main exports, followed by plywood. It has been demonstrated that Indonesian commodities can compete in the world market, not only in terms of quality but also in terms of price. One advantage for investors in the industrial sector is that labour costs in Indonesia are very low, compared with other developing countries in the region.

The objective of this thesis was to empirically measure the impact of non-oil exports on the Indonesian economy in the context of a medium sized macroeconometric model. Existing econometric models on Indonesia developed by Kinoshita (1985), Azis (1989), IMF (1989) and Ichimura (1985) were taken into consideration in constructing the macroeconometric model of Indonesia in this thesis.

The estimation period of the macroeconometric model spans 1975 to 1991. The *ex-post* forecast starts from 1985 to the end of 1991, while the *ex-ante* forecast begins from 1992 to the end of 1995. Estimated regression results of the model were mostly statistically significant and the *ex-post* forecasting performance based on the summary indicators (*e.g.,* RPE, MAE, ME, RMSE, THEIL and RCAP), in general, seems to be

There are 18 scenarios and one combination scenario[2] applied in both *ex-post* and *ex-ante* forecast and the results produce important suggestions. In *ex-post* forecast, it is found that changing the prices of manufactured goods, such as garments and textiles, and plywood in the main trading partners relative to that in Indonesia significantly affects exports of manufactured goods to the relevant main trading partners. Similarly, income of the main trading partners[3] also significantly affects Indonesia's export of manufactured goods to the relevant countries. An interesting result arises in combination scenarios. One scenario shows that declining oil price and oil production may not significantly affect total exports as long as, at the same time, depreciation of the rupiah is allowed, and there is an increase in income and manufactured prices of the main trading partners relative to Indonesia's price.

In the *ex-ante* forecast, the scenarios suggest that changing the prices of manufactured goods of the main trading partners relative to domestic prices no longer significantly affects total exports. This is because the trend of the relative prices of both garments and textiles, and plywood is declining, or negative. In other words, the trend of prices of manufactured goods in Indonesia is steeper than that in the main trading partners, so that the ratio of the price in the main trading partners to the domestic price is very small during the *ex-ante* period. However, as a response to such scenario, the incomes of the main trading partners significantly affects the manufactured exports to the

the manufactured goods of the main trading partners relative to the domestic prices, and depreciation of the rupiah. It is also found that foreign government loans slightly affect the economic growth. Government investment, however, significantly contributes to the economic growth.

6.2. Implication

From this study, we learn that the government policy for reducing the dependency on oil exports (increase in non-oil exports and decrease in oil exports) may not lessen the Indonesian economic growth as long as non-oil exports, i.e., manufactured exports, can strongly compensate for the reduction of oil exports.

Due to the fact that non-oil manufactured exports can support the growth of the economy in Indonesia in the near future, it is suggested that the government should not only encourage non-oil exports but also control the depletion of scares oil resources. In addition, it is found that supply price elasticity of oil is elastic, in other words, the fluctuation in the price of oil can lead to drastic changes in oil export revenue.

It is also important to notice that the trend of the prices of major manufactured commodities in Indonesia is continuously higher than that of the main trading partners. It has been proven, through policy simulation, that when the scenario involving a 20% increase in the relative price of either garments and textiles or plywood of the main

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commodities to ensure the price of Indonesian manufactured commodities can be competitive in the markets of destination countries, especially the main trading partners.

Government should also focus on its exchange rate policies to stimulate the non-oil export. In addition, allocating the government budget more to the government investment may lead to strong growth and economic development of the Indonesian economy.

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FOOTNOTES

1. Bank of Indonesia, *Annual Report 1982/1983*, p. 161.

2. Combination Scenario consists of 20% decrease in oil price and oil production; 20% increase income of the main trading partners; 20% increase in manufactured prices of the main trading partners relative to Indonesia's price; 20% depreciation of the rupiah.

3. The main trading partners are the first three major exports by destination country, i.e., Japan, USA, and Singapore.

BIBLIOGRAPHY

Azis, I.J. (1990): "*Econometric Model for Policy Simulation and Forecasting*," Unpublished, Ministry of Education and Culture-University of Indonesia, Budget calender 1990/1991.

Azis, I.J. and E. Ekawati (1990): "A Simulation Study of Changing External Trade Situations: Econometric Model for Indonesia," A Study for " Asean Econometric Link Model," *Asia Pacific Development Center (APDC)*.

Balasa, B. (1978): "Export and Economic Growth: Further Evidence," *Journal of Development Economics,* 5, 181-9.

_____ (1980): *The Process of Industrial Development and Alternative Development Strategies,* Princeton University Press.

_____ (1985): "Export, Policy Choices and Economic Growth in Developing Countries After the 1973 Oil Shock," *Journal of Development Economics*, 18, 23-25.

Bunge, F. M. (1983): *Indonesia, a Country Study.* American University, Washington D.C., 138.

Calvo, G. (1989): "Incredible Reforms," in G. Calvo, R. Finlay, P. Kaori and J.de Marcelo (Eds.), *Debt Stabilization and Development*, Basil Blackwell, Oxford.

Central Bureau of Statistics. (1985): "A Macroeconometric Model of Indonesia," In *Econometric Link System for ASEAN: Final Report,* I, Institute of Developing Economies, Tokyo.

Chen, T.J. and D.P. Tang. (1990): "Export Performance and Productivity Growth: The Cans of Taiwan," *Economic Development and Cultural Change*, 38, 577-85.

Chow, P. (1987): "Causality Between Export Growth and Industrial Development," *Journal of Development Economics,* 26, 55-63

Darrat, A. (1986): "Trade and Development : The Asian Experience," *Cato Journal*, 6,

149

Dowling, Jr. J.M. (1983): *Adjustments to External Shocks and Analysis of External Debt: Short-term Adjustment in Korea, Indonesia and the Philippines*, Econometric Link System for Asean, Vol.1.

Edward, S. (1992): "Trade Orientation, Distortions and Growth in Developing Countries" *Journal of Developing Economics*, 39, 31-57.

Emery, R. (1967): "The Relation of Exports and Economic Growth," *Kyklos*, 2, 470-86.

Eshafani, H. S. (1991): "Export, Imports, and Economic Growth in Semi Industrialized Countries," *Journal of Development Economics*, 35, 93-116.

Ezaki, M. (1982): *An Econometric Model of Indonesia with Particular Reference to the Monetary Sector: 1970-1980*, in *Macroeconomic Modelling in the ESCAP Region*, Economic and Social Commission for Asia and the Pacific, Bangkok, Thailand.

Fajana, O. (1979): "Trade and Growth: The Nigerian Experience," *World Development*, 7, 73-78.

Feder, G. (1983): "On Exports and Economic Growth," *Journal of Development Economics*, 12, 59-73.

Glassburner, B. (1971): *The economy of Indonesia*, Cornell University Press, New York.

_____ (1985): "Macroeconomic and Agriculture Sector," *Bulletin of Indonesian Economy Studies*, XXI, 51-73..

Glezekos, C. (1973): "Export Instability and Economic Growth: a Statistical Verification," *Economic Development and Cultural Change*, 21, 670-8.

Haas, R.D. (1989): "INDOMOD : A Simulation Model of the Indonesian Economy," *International Monetary Fund*, IMF Working Paper.

Heller P.S. and R.C. Porter. (1978): "Export and Growth: An Empirical Reinvestigation," *Journal of Development Economics*, 5, 191-3.

Hirschman, A.O. (1964): "The Paternity of an Index," *American Economic Review*, 60,

150

Hueth, D and A. Schmitz. (1972): "International Trade in Intermediate and Final Goods: Some Implications of Destabilized Prices," *Quarterly Journal of Economics*, 86, 351-65.

Ichimura, S. and M. Ezaki (Eds.). (1985): "Indonesia Model," in *Econometric Models of Asian Link*, Springerverlag, Tokyo, 141-66.

International Monetary Fund, International Financial Statistics Yearbook, Various issues.

Jung, W.S. and P.J. Marshall. (1985): "Export and Growth and Causality in Developing Countries," *Journal of Development Economics*, 18, 1-12.

Kavousi, R. M. (1984): "Export Expansion and Economic Growth: Further Experience Evidence," *Journal of Development Economics*, 14, 241-50.

_____. (1985): "International Trade and Economic Development: The Recent Experience of Developing Countries," *The journal of developing areas*, 19, 379-92.

Keren, P.B. and Voivadis, C.S. (1972): "Export Instability and Economic Growth," *Kyklos*, 25, 791-804.

Kinoshita, S. (1985): *On the Construction of Econometric Model of Growth for the Asean Economies*, in *Econometric Link System for ASEAN*: Final Report Vol.I, Institute Development Economies, Tokyo.

Kletzer, K. M. (1991): "Trade Policy under Endogenous Credibility," *Journal of Development Economics*, 36, 213-28.

Kravis, I. B. (1970): "Trade as a Handmaiden of Growth: Similarities Between The Nineteenth and Twentieth Centuries," *Economic Journal*, 80, 850-72.

Kubah, A. A. (1974): *Opec Past and Present*, Erwin Metten, Vienna.

Lam, N.V. (1980): "Export Instability, Expansion and Market Concentration: A Methodological Interpretation," *Journal of Developing Economics*, 7, 99-115.

Lawson, C.W. (1974): "The Decline in World Export Instability," *Oxford Bulletin of*

Lewis, W.A. (1980): "Slowing Down of the Engine of Growth," *American Economic Review*, 80, 555-64.

Lim, D. (1983): "Instability of Government Revenue and Expenditure in Less Developed Countries," *World Development Report*, 5, 447-50.

Love, J. (1986): "Commodity Concentration and Export Earning Instability," *Journal of Development Economics*, 24, 239-48.

_____ (1989): "Export Instability and Recurrent and Development Expenditure in a Sample of Developing Countries," *Journal of Developing Areas*, 24, 19-26.

Massell, B.F. (1969): "Price Stabilization and Welfare," *Quarterly Journal of Economics*, 83, 284-98.

Michaely, M. (1977): "Export and Growth: An Empirical Investigation," *Journal of Development Economics*, 4, 49-53.

Michalopoulous, C. and K. Jay. (1973): "Growth of Export and Income in the Developing world; A Neoclassical View," *AID discussion paper,* 28, Washington D.C.

Maizels, A. (1967): *Exports and Economic Growth of Developing Countries,* Cambridge University Press, Cambridge.

Murray, D. (1978): "Export Earning Instability: Price, Quantity, Supply, Demand?," *Economic Development and Cultural Change*, 27, 61-73.

Naqvi, S.N.H., et al. (1993): *The Macroeconomic Framework for the Eighth Five-Year Plan*, Pakistan Institute of Development Economics, Islamabad, Pakistan.

Oskooee, M. B., et al. (1991): "Export Growth and Causality in LDCs a Re-Examination." *Journal of Development Economics*, 36, 405-15.

Page, S. (1989): "The Role of Trade in the New NICs," *Journal of Development Studies*, 3, 39-60.

Parker, S. (1991): "Survey of Recent Development," *Bulletin of Indonesian Economic*

Rati, R. (1987): "Export and Economic Growth in Developing Countries: Evidence from Time Series and Cross Section Data," *Economic Development and Cultural Change*, 36, 51-72.

Reynolds,C.W. (1963): "Domestic Consequences of Export Instability." *American Economic Review*, 53, 93-102.

Riegel, J. (1984): "Trade as Engine of Growth in Developing Countries, Revised," *Economic Journal*, 94, 56-73.

Salvator, D. (1983): "Simultaneous Equations Model of Trade and Development with Dynamic Policy Simulations," *Kyklos*, 36, 66-90.

_____ and T. Hatcher. (1989): "Inward Oriented and Outward Oriented Trade Strategies, *The Journal of Development Studies*, 27, 7-25.

_____ (1990): *International Economic*, Third Edition, Macmillan Publishing company, Canada.

Schenzler, C. (1982): *An Empirical Investigation of the Relationship Between Growth of Gross National Product and Exports in Chile, India and South Korea*, unpublished master's thesis.

Serletis, A, (1992): "Export Growth and Canadian Economic Development," *Journal of Development Economics*, 38, 133-45.

Sheehey, E. (1990): "Exports and Growth: A Flawed Framework," *Journal of Development Studies*, 28, 730-34.

Sims, C.A. (1980): "Macroeconomic and Reality," *Econometrica*, 48, 1-48.

Slangor and Odano. (1983): "The Impact of Oil Price Increase and Devaluation on Indonesian Economy" *Econometric Link system for Asean*, Final Report, I, 359-383.

Tan, G. (1983): "Export Instability, Export Growth and GDP Growth," *Journal of Development Economics*, 12, 219-27.

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Williamson, R. (1978): "The Role of Exports and Foreign Capital in Latin American Economic Growth," *Southern Economic Journal*, 45, 410-20.

Wong, C. M. (1990): "Welfare Implications of Commodity Price Stabilization Under Export Restrictions," *Journal of Development Economics*, 32, 93-112.

APPENDIX A

APPENDIX A

DEFINITION AND DATA SOURCES OF MACROECONOMETRIC MODEL

VARIABLE		UNIT	SOURCE

ENDOGENOUS

CPI	Consumer Price Index	1983=100	4(G)
DEF	GDP Deflator	1983=100	1(G)
GCRR	Government Consumption (RR)	Rp. BILL	1
GDPCD	Gross Domestic Product (CD)	U.S $ MILL	1
GDPCR	Gross Domestic Product (CR)	Rp. BILL	1
GDPRR	Gross Domestic Product (RR)	Rp. BILL	1
GDYRR	Gross Domestic Income (RR)	Rp. BILL	1(G)
GIRR	Government Investment (RR)	Rp. BILL	3
GRREAL	Government Routine Revenue (RR)	Rp. BILL	1
GRNOCR	Government Non-oil Revenue (CR)	Rp. BILL	1
GROCR	Government Revenue from Oil (CR)	Rp. BILL	1
GRRCR	Government Routine Revenue (CR)	Rp. BILL	1
ICUD	Total Investment (CD)	Rp. BILL	1
IMTCD	Total Import (CD)	U.S $ MILL	1
IMTCR	Total Import (CR)	Rp. BILL	1
IMTRD	Total Import (RD)	Rp. BILL	1(G)
IMTRR	Total Import (RR)	Rp. BILL	1

M2C	Broad Money Supply (CR)	Rp. BILL	5
M2R	Broad Money Supply (RR)	Rp. BILL	5
PCRR	Private Consumption (RR)	Rp. BILL	1
PICD	Private Investment (CD)	U.S. $ MILL	3
PIRR	Private Investment (RR)	Rp. BILL	3
RM	Reserve Money (CR)	Rp. BILL	4
TGRCR	Total Government Revenue (CR)	Rp. BILL	4
XDEF	Export Deflator	1983=100	1(G)
XGTCD	Export of Garments and Textiles (CD)	U.S. $ MILL	1
XGTJAPCD	Export of Garments and Textiles to Japan (CD)	U.S. $ MILL	1
XGTSEUCD	Export of Garments and Textiles to Saudi Arabia and European Countries[1] (CD)	U.S. $ MILL	1
XGTSNGCD	Export of Garments and Textile to Singapore(CD)	U.S. $ MILL	1
XGTUSCD	Export of Garments and Textile to USA (CD)	U.S. $ MILL	1
XMCD	Export of Manufactured Goods (CD)	U.S. $ MILL	1
XOILCD	Export of Oil (CD)	U.S. $ MILL	1
XPRCD	Export of Primary Product (CD)	U.S. $ MILL	1
XPWCD	Export of Plywood (CD)	U.S. $ MILL	1
XPWJAPCD	Export of Plywood to Japan (CD)	U.S. $ MILL	1
XPWUSCD	Export of Plywood to USA (CD)	U.S. $ MILL	1
XPWPASCD	Export of Plywood to Pacific[2] (CD)	U.S. $ MILL	1
XTRR	Total Exports (RR)	Rp. BILL	1
XTCD	Total Exports (CD)	U.S. $ MILL	1
XTCR	Total Exports (CR)	Rp. BILL	1

EXOGENOUS

CREDIT	Credit Authority	Rp. BILL	4
ER	Exchange Rate (annual average)	Rp/US$	4
ERAI	Exchange Rate Adjustment for Import	-	G
ERAX	Exchange Rate Adjustment for Export	-	G
IDEF	Investment Deflator	1983=100	1(G)
GDPJAPCD	Gross Domestic Product of Japan (CD)	U.S. $ MILL	4
GDPUSCD	Gross Domestic Product of USA (CD)	U.S. $ MILL	4
GDPPASCD	Gross Domestic Product of Pacific (CD)	U.S. $ MILL	4,7,8
GDPSEUCD	Gross Domestic Product of Saudi Arabia and European Countries (CD)	U.S. $ MILL	4,9
GDPSNGCD	Gross Domestic Product of Singapore(CD)	U.S. $ MILL	4,11
GICR	Government Investment (CR)	Rp. BILL	3
LOAN	Government Loan (CR)	Rp. BILL	5
PIGTIND	Garment and Textile Price Indices of Indonesia	1983=100	1
PIGTJA	Garment and Textile Price Indices of Japan	1983=100	10
PIGTSEU	Garment and Textile Price Indices of Saudi Arabia and European Countries	1983=100	7,10
PIGTSNG	Garment and Textile Price Indices of Singapore	1983=100	11
PIGTUS	Garment and Textile Price Indices of USA	1983=100	10
PIPWIND	Plywood Price Indices of Indonesia	1983=100	1
PIPWJA	Plywood Price Indices of Japan	1983=100	10
PIPWPAS	Plywood Price Indices of Pacific countries	1983=100	8,12,13,14

UVPX	Unit Value Price of Export	-	3
VALOIL	Value of Oil Production	U.S. $ MILL	1,15(G)
WHPIPR	Wholesale Price Index Export Primary Product	1983=100	1
WIEUV	World Indexes of Export Unit Values	1983=100	4
XGTOTHCD	Exports of Garment and Textile to Other Countries (CD)	U.S. $ MILL	1
XMOTHECD	Exports of Manufacture to Other Countries (CD)	U.S. $ MILL	1
XPWOTHCD	Exports of Plywood to Other Exporter Countries (CD)	U.S. $ MILL	1
D86	Dummy variable, 1 in 1986, otherwise=0		
D88	Dummy variable, 1 in 1988, otherwise=0		
D89	Dummy variable, 1 in 1989, otherwise=0		
D8991	Dummy variable, 1 in 1989, 1990 and 1991, otherwise=0		
D90	Dummy variable, 1 in 1990, otherwise=0		
D91	Dummy variable, 1 in 1991, otherwise=0		

Note:
(CD) = Current dollar (US$)
(CR) = Current rupiah (Rp)
(RR) = Real rupiah (Rp) at 1983 price
(RD) = Real dollar (US$) at 1983 price
MILL = million
BILL = billion
(G) = Generated

1) European countries covers United Kingdom, Netherlands and R. Fed. Germany.
2) Pasific countries covers People Republic of China, South Korea, Hong Kong and
    Republic of China (Taiwan).

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7. Asia Pacific Publication
8. Statistics of Republic of China
9. West Asia Publication
10. OECD Publication
11. Statistics of Singapore
12. Statistic of Hong Kong
13. Statistic of People's Republic of China
14. Statistics of Korea
15. Bulletin of OPEC

APPENDIX B

APPENDIX B

DATA USED FOR MACROECONOMETRIC MODEL

YEAR	CPI	CREDIT	DEF	ER	ERAI	ERAX
1973	-	204	18.0	415	1.18	1.02
1974	31.0	302	26.6	415	1.45	0.99
1975	36.9	548	29.9	415	1.42	0.98
1976	44.2	652	34.2	415	1.50	1.02
1977	49.1	648	38.6	415	1.49	1.00
1978	53.1	860	42.9	442	1.60	0.97
1979	61.7	1152	56.8	623	1.68	0.99
1980	72.8	1636	73.4	627	1.48	0.92
1981	81.7	2596	80.8	632	1.65	0.94
1982	89.5	3890	87.2	661	1.41	0.90
1983	100.0	4264	100.0	909	1.32	1.03
1984	110.5	7045	108.2	1026	1.39	1.02
1985	115.7	7039	114.0	1111	1.74	1.04
1986	122.6	7747	114.0	1283	1.53	1.05
1987	133.8	8100	132.1	1644	1.37	1.06
1988	144.6	11711	142.1	1686	1.40	1.07
1989	153.9	12936	155.6	1770	1.33	1.08
1990	165.4	11144	171.1	1843	1.27	1.10
1991	180.7	11692	185.1	1954	1.20	1.09

YEAR	GCRR	GDPCD	GDPCR	GDPEURCD	GDPJAPCD	GDPPASCD
1973	3288	16273	6753	903000	412076	-
1974	2944	25802	10708	1002600	457542	161713
1975	3837	30464	12643	1105970	498834	180190
1976	4118	37269	15467	1153440	560958	184480
1977	4796	45863	19033	1308840	690637	215850
1978	5640	51456	22746	1606180	970747	273430
1979	6177	51400	32025	1904350	1009226	334100
1980	6841	72482	45446	2100500	1057546	377130
1981	7536	85518	54027	1787560	1168454	376660
1982	8156	90158	59633	1675360	1086068	376750
1983	8077	85369	77623	1628402	1186093	401230
1984	8353	87612	89885	1537390	1264516	422700
1985	8991	87339	96997	1578730	1342202	424600
1986	9241	80061	102683	2148340	1985164	448260
1987	9226	75930	124817	2661230	2406561	520158
1988	9024	84200	142105	2957720	2897073	668007

YEAR	GDPRR	GDPSEUCD	GDPSNGCD	GDPUSCD	GDYRR
1973	37450	904507	4152	1343100	26569
1974	40309	1006126	5147	1452400	31768
1975	42315	1110775	5639	1580900	33167
1976	45229	1159248	5929	1761700	34485
1977	49253	1316069	6574	1965100	38263
1978	53049	1613843	7840	2219200	41962
1979	56367	1912737	9437	2464400	50179
1980	61937	2113335	11710	2684400	60515
1981	66846	1805168	13880	3000500	65903
1982	68348	1691065	15260	3114900	67366
1983	77623	1641450	17380	3355900	77623
1984	83037	1549773	18770	3724800	82929
1985	85082	1590101	17690	3974200	86333
1986	90081	2158379	17750	4205400	86555
1987	94518	2671546	20230	4497200	90465
1988	99981	2968399	24530	4840200	92320
1989	107437	2977540	29140	5244000	99320
1990	115110	3673164	35120	5513800	109753
1991	122705	3852928	39980	5672600	113669

YEAR	GICR	GIRR	GNPRR	GRNOCR	GROCR	GRRCR
1973	423	1854	36089	-	-	-
1974	711	3162	39561	-	-	-
1975	1127	3169	40451	927	1143	2071
1976	1827	4371	43818	1180	1508	2688
1977	2197	5104	47499	1582	1942	3524
1978	2345	5135	51028	1752	2162	3914
1979	3244	5167	53755	2299	3603	5902
1980	6497	8695	59196	3038	6419	9457
1981	6703	8185	64465	3482	8311	11794
1982	7588	8982	66104	4158	8310	12469
1983	7951	7951	74396	4601	8906	13507
1984	9851	8951	79088	5321	10357	15678
1985	9539	8366	81113	7684	10905	18589
1986	9740	8419	86278	10126	7617	17743

YEAR	GRREAL	ICUD	IDEF	IMTCD	IMTRD	IMTRR
1973	-	2911	22.8	2729	9631	4696
1974	-	3418	22.5	3842	10287	6208
1975	8063	6197	35.6	4769	11757	6931
1976	9869	7723	41.8	5673	13034	8093
1977	11074	9220	43.1	6230	13627	8453
1978	10989	10566	45.7	6690	13435	9522
1979	13229	10760	62.8	7202	11115	11659
1980	14550	15128	74.7	10834	14426	13421
1981	16786	18288	81.9	13272	16398	17053
1982	16535	20361	84.5	16859	19838	18453
1983	15970	21411	100.0	16352	16352	19626
1984	17614	19627	110.1	13882	12697	18151
1985	19989	20140	114.0	10259	9884	19109
1986	18814	19322	115.7	10718	10142	19906
1987	19856	18846	137.1	12370	8982	20299
1988	19443	21832	146.0	13249	7015	16504
1989	23886	25796	159.8	16360	7935	18723
1990	26261	30189	170.0	21837	9880	23050
1991	27632	31246	182.1	25869	11142	26196

YEAR	INFL	LOAN	M2C	M2R	MDEF	PCRR
1973	-	-	994	5512	28.3	17896
1974	-	-	1454	5473	37.3	20568
1975	0.19	339	2022	6768	40.6	21886
1976	0.20	687	2651	7752	43.5	22473
1977	0.11	755	3133	8108	45.7	23161
1978	0.08	798	3822	8914	49.8	25630
1979	0.16	1614	5159	9080	64.8	30123
1980	0.18	1219	7707	10504	75.1	35961
1981	0.12	1773	9705	12008	80.9	42869
1982	0.10	1958	11074	12692	85.0	46019
1983	0.12	2463	14670	14670	100.0	49857
1984	0.10	3389	17937	16571	109.3	53394
1985	0.05	4200	23177	20330	103.8	56089
1986	0.06	3703	27615	24226	105.7	56863

YEAR	PICD	PIGIRR	PIGTIND	PIGTJA	PIGTSA
1973	1892	5295	-	-	-
1974	1705	6312	-	-	-
1975	3482	7233	43.6	80.4	62.6
1976	3320	7667	48.7	88.7	64.2
1977	3925	8887	49.8	88.3	64.4
1978	5260	10226	51.5	89.7	63.6
1979	5553	10678	63.5	94.1	73.2
1980	4765	12694	77.1	98.9	87.4
1981	7678	14108	86.7	100.0	96.9
1982	8889	15941	92.2	101.8	101.1
1983	12667	19468	100.0	100.0	100.0
1984	10025	18297	109.6	102.3	96.9
1985	11551	19616	119.2	101.1	77.2
1986	11728	21422	129.8	93.6	62.0
1987	12762	22597	152.8	93.1	66.5
1988	16345	25201	181.3	93.4	62.4
1989	17790	28568	192.1	96.2	66.2
1990	20740	32732	205.6	96.0	74.3
1991	20545	33537	228.5	98.2	73.5

YEAR	PIGTSEU	PIGTSN	PIGTUS	PIPWIND	PIPWJA	PIPWPA
1973	-	-	-	-	-	-
1974	-	-	-	-	-	-
1975	59.6	77.8	71.4	20.8	75.8	49.7
1976	63.5	80.8	74.3	19.9	80.3	53.8
1977	66.9	82.9	75.2	22.4	82.6	55.3
1978	69.3	87.2	78.1	24.5	82.6	62.8
1979	79.6	99.6	82.3	53.2	101.4	69.9
1980	89.0	106.2	89.6	74.0	113.6	87.0
1981	95.5	107.8	97.4	74.7	102.2	91.3
1982	99.5	103.3	99.8	75.7	103.0	95.0
1983	100.0	100.0	100.0	100.0	100.0	100.0
1984	101.9	97.1	105.4	105.0	98.8	105.6
1985	100.3	91.1	102.7	107.0	98.9	109.4

YEAR	PIPWUS	PIRD	PIRR	POIL	PRODOIL	R
1973	-	10.0	3441	-	-	-
1974	-	9.6	3150	-	-	-
1975	57.9	12.1	4064	12.8	477	12.0
1976	53.2	10.4	3296	13.2	550	12.0
1977	55.2	12.0	3784	13.6	615	9.0
1978	58.5	14.6	5091	13.7	597	6.0
1979	98.3	11.1	5511	18.4	580	6.0
1980	94.3	9.1	3999	29.5	577	6.0
1981	96.0	12.3	5923	35.0	585	6.0
1982	93.1	13.7	6959	34.5	488	6.0
1983	100.0	12.7	11517	29.5	490	6.0
1984	99.9	9.1	9345	29.5	517	16.0
1985	99.1	10.1	11250	28.5	484	18.0
1986	100.0	10.1	13003	13.6	507	15.4
1987	104.7	9.3	15302	17.7	479	16.8
1988	110.3	11.2	18867	15.6	485	17.7
1989	117.9	11.1	19702	17.6	514	18.6
1990	120.8	12.2	22487	23.1	530	17.3
1991	122.8	11.3	22052	19.3	581	23.3

YEAR	RM	TGRCR	UVPX	VALOIL	WHPIXPR
1973	542	-	-	-	-
1974	850	-	-	-	-
1975	1132	2409	0.099	2533	26.2
1976	1380	3375	0.116	3015	32.3
1977	1720	4279	0.143	3459	37.9
1978	1885	4712	0.146	3614	42.6
1979	2478	7516	0.207	6636	55.9
1980	3375	10676	0.231	10673	68.7
1981	3920	13567	0.193	12932	79.2
1982	4107	14427	0.097	11149	87.9
1983	5138	15970	0.096	13170	100.0
1984	5701	19066	0.116	15663	113.0
1985	6721	22789	0.047	15328	118.0

YEAR	WHPIXNOG	WIEUV	XDEF	XGTCD	XGTJAPCD	XGTOTHCD
1973	-	41.6	8.7	-	-	-
1974	-	58.7	18.2	-	-	-
1975	31.7	64.0	17.8	4	1	1
1976	35.9	64.8	19.0	7	1	2
1977	40.1	70.6	21.6	8	2	2
1978	44.2	77.5	23.6	21	3	3
1979	56.1	91.9	45.7	118	10	28
1980	70.4	110.0	69.7	144	9	47
1981	77.3	109.4	77.0	132	7	36
1982	83.6	105.2	80.0	160	10	30
1983	100.0	100.0	100.0	278	22	75
1984	111.0	97.4	108.8	496	23	128
1985	117.0	95.7	110.5	579	20	210
1986	127.0	104.5	89.1	829	24	292
1987	151.0	115.0	116.0	1065	52	306
1988	162.0	121.2	133.3	1477	103	492
1989	174.0	122.6	147.9	2009	95	549
1990	185.0	135.0	180.0	2888	148	867
1991	199.0	146.6	173.7	3732	204	1153

YEAR	XGTSEUCD	XGTSNCD	XGTUSCD	XMCD	XMOTHECD	XOILCD
1973	-	-	-	164	-	1609
1974	-	-	-	449	-	5198
1975	1	2	1	172	167	5311
1976	2	2	1	186	176	6004
1977	2	1	1	398	374	7379
1978	6	2	7	507	464	7986
1979	28	45	6	872	715	10166
1980	37	43	9	960	748	17785
1981	26	21	41	1176	849	20669
1982	34	24	63	1259	782	18408
1983	52	26	103	2054	1038	16153
1984	70	38	236	2494	1203	16045
1985	69	42	239	2580	1060	12757
1986	91	106	316	3014	1059	8310

YEAR	XPRCD	XPWCD	XPWJAPCD	XPWOTHCD	XPWPASCD	XPWUSCD
1973	1438	-	-	-	-	-
1974	1738	-	-	-	-	-
1975	1620	0.36	0.02	0.32	0.01	0.01
1976	2356	2.85	0.01	2.71	0.01	0.12
1977	3076	16.02	0.78	14.34	0.41	0.48
1978	3150	21.83	2.79	14.79	0.76	3.49
1979	4553	39.40	3.88	20.78	10.09	4.65
1980	5205	68.49	8.64	12.34	38.13	9.38
1981	3320	194.66	11.13	118.48	47.37	17.67
1982	2662	316.14	19.41	166.54	74.73	55.46
1983	2939	737.67	47.93	427.81	94.31	167.62
1984	3349	795.44	51.41	364.70	190.32	189.00
1985	3249	941.27	93.32	355.69	224.97	267.29
1986	3481	1126.61	162.85	316.70	268.02	379.03
1987	3972	1900.68	515.41	409.79	570.63	404.85
1988	5270	2256.87	567.56	655.80	705.69	327.81
1989	5446	2413.96	936.47	392.99	764.76	319.74
1990	4570	2790.95	860.89	614.94	931.57	383.56
1991	5248	3034.03	938.35	692.62	1090.85	312.21

YEAR	XTCD	XTCR	XTRD	XTRR
1973	3211	1356	37095	15666
1974	7385	3045	40493	16693
1975	7103	2897	39936	16290
1976	8547	3621	44992	19064
1977	10853	4513	50168	20861
1978	11643	4974	49334	21075
1979	15590	9629	34080	21048
1980	23950	13849	34349	19862
1981	25165	14928	32682	19387
1982	22328	13345	27916	16685
1983	21146	19847	21146	19847
1984	21888	22999	20123	21145
1985	18587	21534	16827	19495
1986	14805	20010	16618	22460

APPENDIX C

APPENDIX C
GRAPHS OF ACTUAL AND SIMULATED MACROECONOMIC VARIABLES

GDPRR

GCRR

PCRR

PIRR

XTRR

IMTRR

Appendix C (countinued)

GDPCD

XTCD

XMCD

XOILCD

XPRCD

XGTCD

Appendix C (countinued)

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Appendix C (countinued)

XPWUSCD

XPWPASCD

IMTCD

XTCR

M2R

M2C
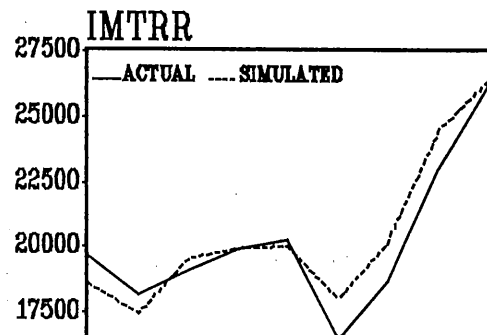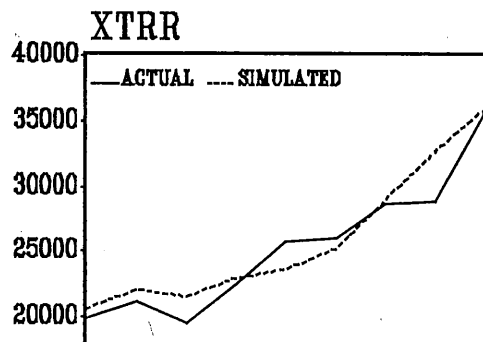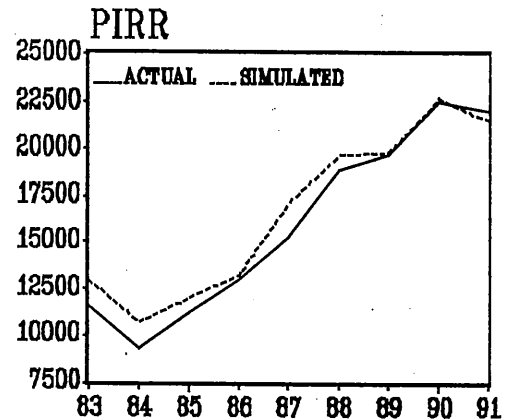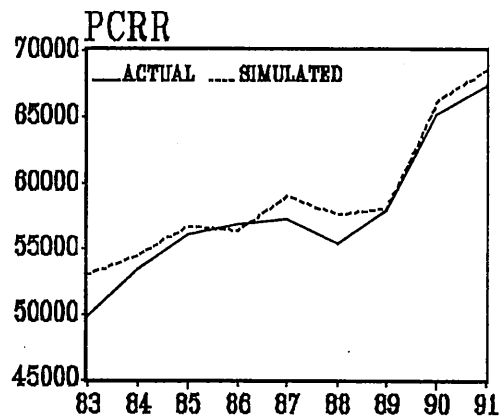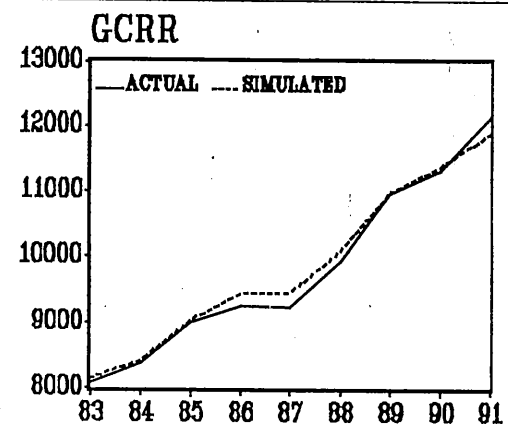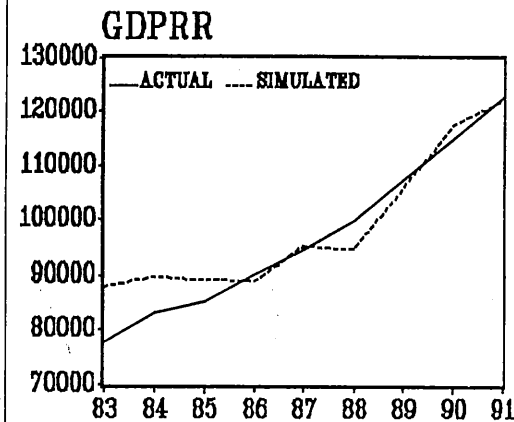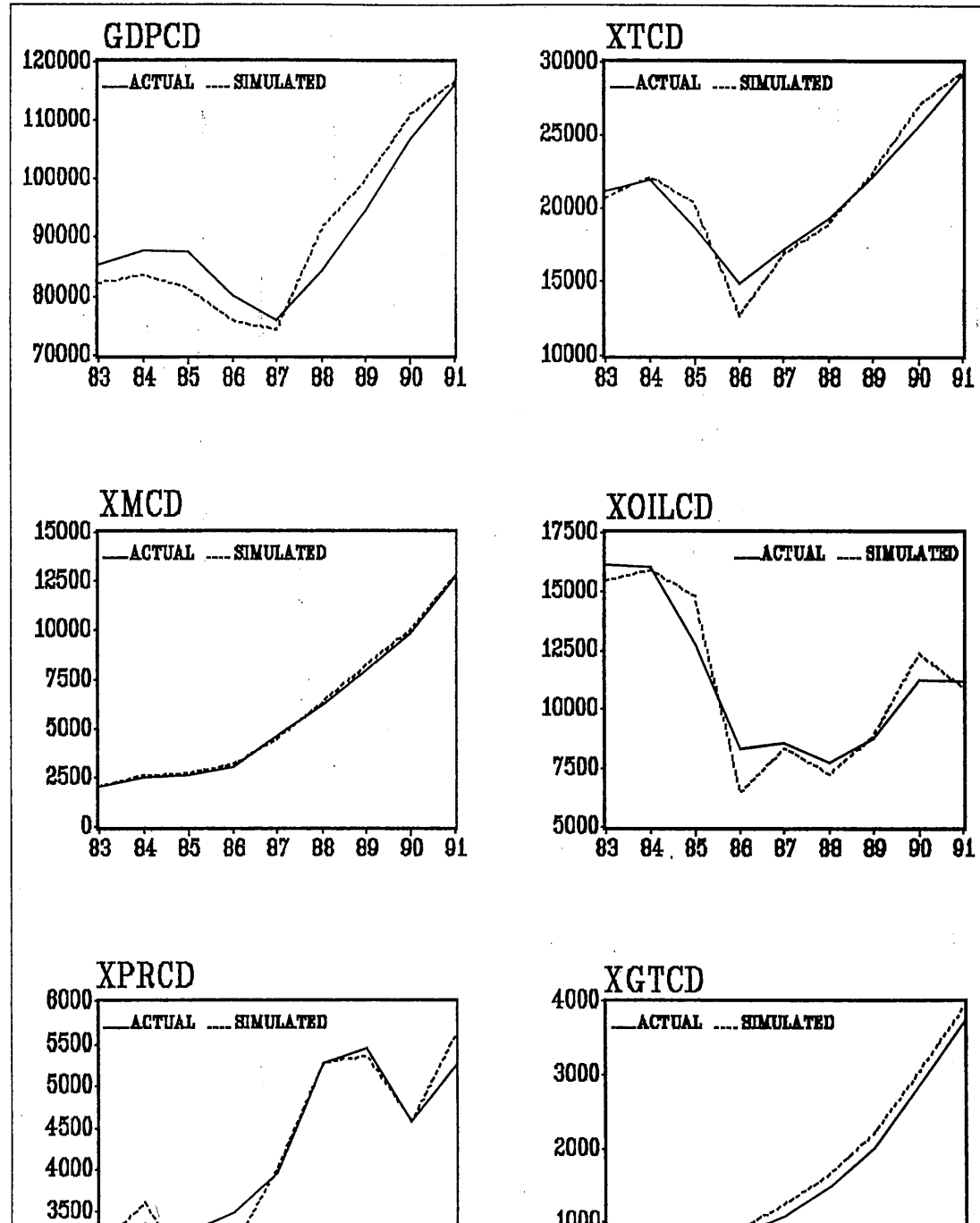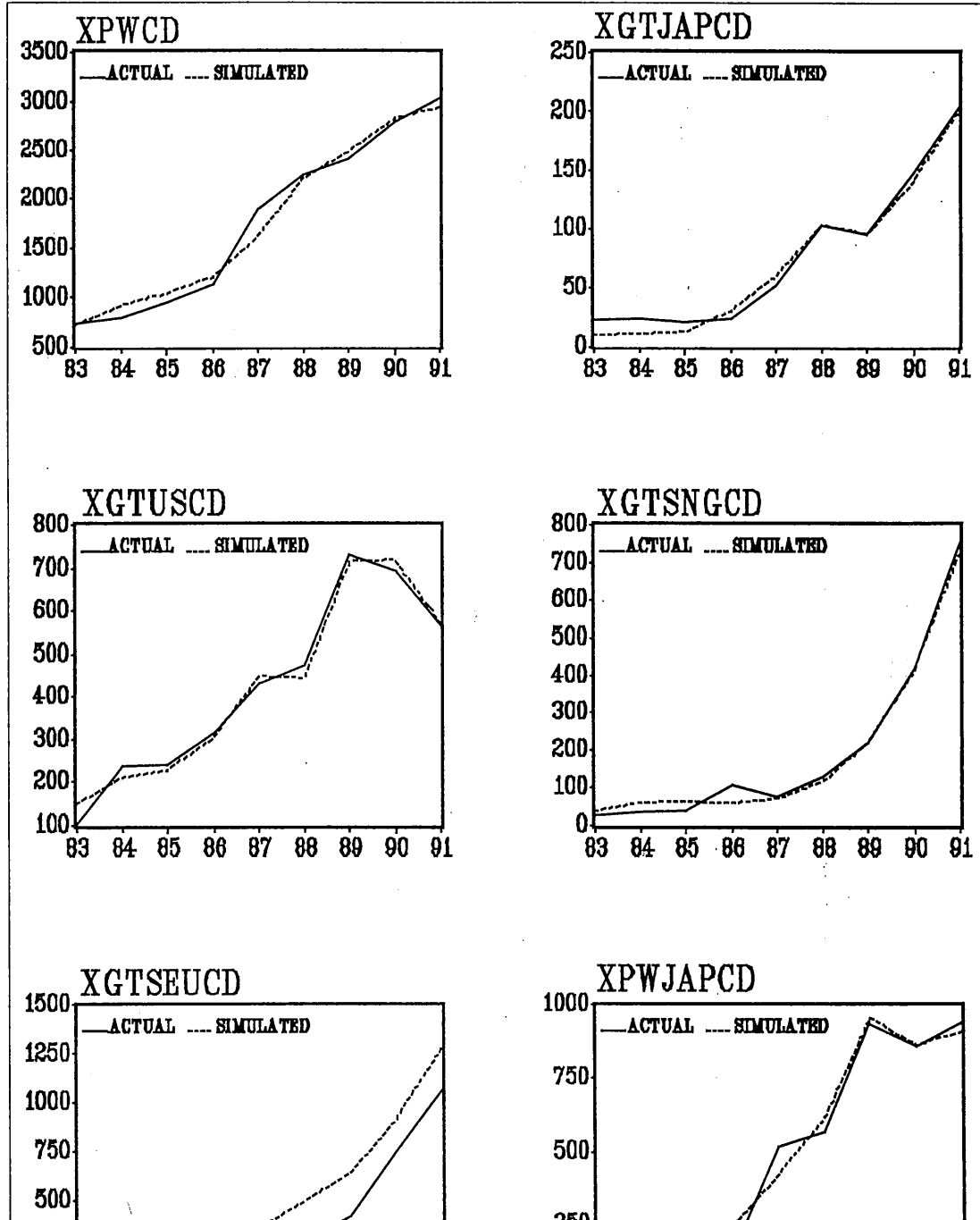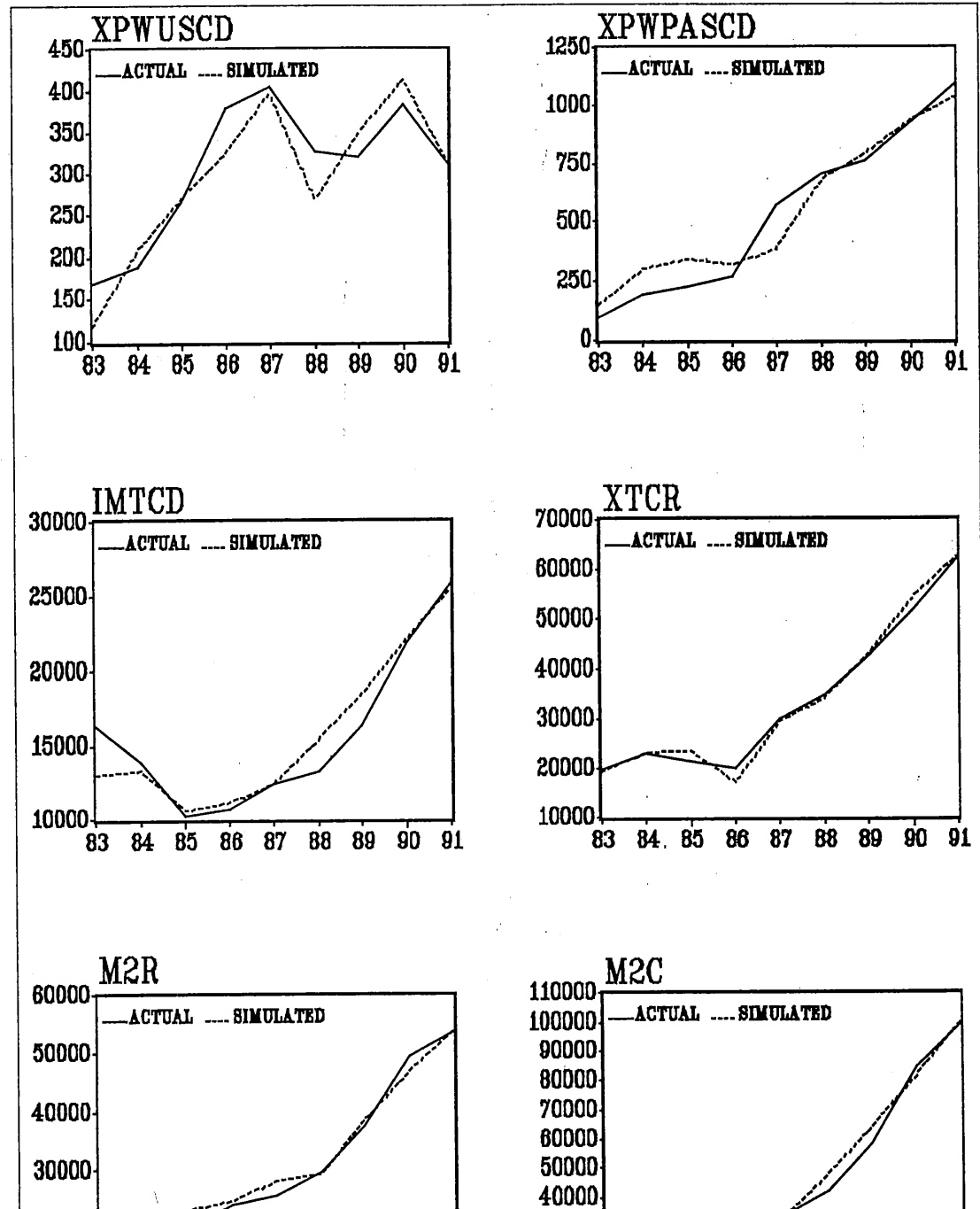
APPENDIX D

TABLE D1

THE IMPACT OF A 10% INCREASE IN EXCHANGE RATE ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	-2.82	-1.90	0.72	2.79	4.98	6.73	8.48
GDPCR	11.31	9.25	8.88	8.62	7.84	7.75	8.11
PCRR	-5.37	-4.66	-3.03	-1.38	0.77	2.91	5.01
GCRR	-12.45	-10.57	-7.67	-5.42	-2.66	0.04	2.07
PIRR	-4.69	-3.16	1.09	4.46	6.60	8.65	11.94
XTRR	7.01	8.68	8.97	9.06	9.20	9.16	9.18
XTCD	-0.76	1.29	1.66	1.60	1.61	1.40	1.46
XGTJAPCD	37.19	26.21	19.36	10.87	8.69	7.07	4.97
XGTUSCD	16.69	15.09	13.87	13.18	11.08	10.24	13.61
IMTCD	-5.67	-7.01	-9.66	-6.76	-6.57	-5.81	-4.99
GRNOCR	-7.05	-0.97	3.00	5.39	5.61	5.76	6.02
GROCR	10.72	11.32	10.80	10.88	10.69	11.79	10.50
M2R	-15.51	-11.68	-7.31	-4.03	-0.46	1.96	3.82
M2C	-3.23	-1.66	0.21	1.42	2.24	2.92	3.46
CPI	4.74	4.70	4.72	4.79	4.82	4.87	4.99
TGRCR	2.79	3.23	5.06	6.13	5.71	6.46	6.19
IMTRR	-4.27	-5.62	-8.27	-5.14	-5.03	-4.01	-3.05

TABLE D2

THE IMPACT OF A 20% INCREASE IN EXCHANGE RATE ON SELECTED ENDOGENOUS VARIABLE (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	16.08	20.17	24.13	32.93	34.90	36.64	39.86
GDPCR	11.08	10.06	10.02	10.96	13.31	14.82	16.88
PCRR	5.70	11.22	16.79	23.62	28.94	32.58	37.02
GCRR	4.97	8.29	12.91	16.87	20.41	23.62	25.81
PIRR	26.74	33.64	36.56	52.69	46.27	47.06	56.15
XTRR	18.14	19.81	19.76	19.74	19.95	19.66	19.67
XTCD	2.42	4.89	5.02	4.72	4.67	4.09	4.15
XMCD	3.09	4.76	5.54	4.32	4.90	4.27	3.94
XGTCD	11.98	13.70	18.25	14.66	16.92	11.74	11.35
XPWCD	0.00	1.36	2.06	1.83	2.88	2.87	3.18
XGTUSCD	33.39	30.18	27.74	26.35	22.15	20.48	27.21
IMTCD	-16.87	-20.22	-25.30	-17.27	-13.07	-10.24	-7.79
GRNOCR	4.39	6.61	8.07	9.37	9.62	10.39	11.55
GROCR	21.45	22.64	21.60	21.76	21.38	23.58	20.99
M2R	8.16	15.20	21.83	29.68	29.46	30.11	31.50
M2C	3.49	5.48	7.98	8.24	8.69	9.30	9.86
CPI	0.79	1.40	2.02	2.76	3.68	4.69	5.82
TGRCR	11.76	10.50	10.91	11.63	10.72	12.39	12.15
IMTRR	-14.56	-17.86	-23.10	-14.52	-10.41	-7.05	-4.27

TABLE D3

	THE IMPACT OF A 20% INCREASE IN GARMENT & TEXTILE PRICES OF JAPAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)						
END. VAR.	1985	1986	1987	1988	1989	1990	1991
GDPRR	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.03
GDPCR	0.00	0.00	0.01	0.01	0.01	0.01	0.01
PCRR	0.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03
GCRR	0.00	0.00	-0.01	-0.01	-0.02	-0.02	-0.02
PIRR	-0.01	-0.02	-0.02	-0.03	-0.03	-0.03	-0.04
XTRR	0.02	0.05	0.05	0.06	0.05	0.05	0.05
XTCD	0.02	0.05	0.05	0.06	0.05	0.05	0.05
XMCD	0.13	0.20	0.21	0.17	0.15	0.14	0.12
XGTCD	0.50	0.63	0.81	0.67	0.65	0.46	0.43
XGTJAPCD	32.95	21.31	14.51	10.24	9.88	9.39	7.50
IMTCD	0.03	0.06	0.10	0.08	0.08	0.07	0.07
GRNOCR	0.00	0.00	0.01	0.01	0.01	0.01	0.01
XTCR	0.02	0.05	0.05	0.06	0.05	0.05	0.05
TGRCR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GRRCR	0.00	0.00	0.00	0.00	0.00	0.00	0.01
IMTRR	0.03	0.06	0.10	0.08	0.08	0.07	0.07

TABLE D4

THE IMPACT OF A 20% INCREASE IN GARMENT & TEXTILE PRICES OF THE U.S. ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)							
END. VAR.	1985	1986	1987	1988	1989	1990	1991
GDPRR	-0.23	-0.26	-0.28	-0.39	-0.44	-0.42	-0.43
GDPCR	-0.01	0.13	0.23	0.19	0.14	0.13	0.11
PCRR	-0.11	-0.20	-0.27	-0.36	-0.44	-0.46	-0.49
GCRR	-0.07	-0.13	-0.22	-0.28	-0.34	-0.37	-0.39
PIRR	-0.39	-0.43	-0.42	-0.63	-0.58	-0.54	-0.60
XTRR	0.70	0.99	0.66	0.50	0.41	0.31	0.26
XTCD	0.70	0.99	0.66	0.50	0.41	0.31	0.26
XMCD	5.00	3.85	2.66	1.48	1.13	0.83	0.60
XGTCD	19.42	12.47	10.14	6.01	4.90	2.92	2.23
XGTUSCD	54.10	38.99	24.21	19.64	15.26	12.97	14.77
IMTCD	1.12	1.31	1.43	0.83	0.65	0.51	0.40
GRNOCR	0.00	0.05	0.12	0.15	0.13	0.12	0.10
XTCR	0.70	0.99	0.66	0.50	0.41	0.31	0.26
TGRCR	0.00	0.02	0.05	0.07	0.05	0.05	0.05
GRRCR	0.00	0.03	0.06	0.09	0.07	0.07	0.06
IMTRR	1.12	1.31	1.43	0.83	0.59	0.51	0.40

TABLE D5

THE IMPACT OF A 20% INCREASE IN GARMENT AND TEXTILE PRICES OF SINGAPORE ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVITION FROM BASELINE SOLUTION)							
END. VAR.	1985	1986	1987	1988	1989	1990	1991
GDPRR	-0.12	-0.13	-0.14	-0.20	-0.23	-0.22	-0.22
GDPCR	0.01	0.07	0.12	0.10	0.06	0.07	0.05
PCRR	-0.05	-0.10	-0.14	-0.19	-0.23	-0.24	-0.26
GCRR	-0.03	-0.07	-0.12	-0.14	-0.17	-0.19	-0.20
PIRR	-0.20	-0.22	-0.22	-0.33	-0.31	-0.28	-0.31
XTRR	0.35	0.51	0.36	0.27	0.21	0.15	0.12
XTCD	0.35	0.51	0.36	0.27	0.21	0.15	0.12
XMCD	2.53	1.97	1.46	0.79	0.58	0.39	0.27
XGTCD	9.84	6.38	5.55	3.19	2.52	1.37	1.01
XGTSNGCD	54.86	46.66	41.15	39.00	16.86	8.89	5.91
IMTCD	0.57	0.67	0.78	0.44	0.32	0.24	0.18
GRNOCR	0.00	0.02	0.06	0.08	0.06	0.06	0.05
XTCR	0.35	0.51	0.36	0.27	0.21	0.15	0.12
TGRCR	0.00	0.01	0.02	0.04	0.03	0.03	0.02
GRRCR	0.00	0.01	0.03	0.05	0.03	0.03	0.03
IMTRR	0.57	0.67	0.77	0.44	0.31	0.24	0.18

TABLE D6

THE IMPACT OF A 20% INCREASE IN GARMENT & TEXTILE PRICES OF SAUDI ARABIA AND EUROPEAN COUNTRIES ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)							
END. VAR.	1985	1986	1987	1988	1989	1990	1991
GDPRR	-0.22	-0.24	-0.27	-0.37	-0.41	-0.40	-0.40
GDPCR	-0.01	0.13	0.22	0.18	0.13	0.12	0.10
PCRR	-0.10	-0.19	-0.26	-0.34	-0.41	-0.44	-0.46
GCRR	-0.06	-0.13	-0.21	-0.26	-0.32	-0.35	-0.37
PIRR	-0.37	-0.40	-0.40	-0.60	-0.55	-0.51	-0.57
XTRR	0.66	0.93	0.62	0.46	0.38	0.30	0.26
XTCD	0.66	0.93	0.62	0.46	0.38	0.30	0.26
XMCD	4.78	3.61	2.51	1.35	1.05	0.79	0.60
XGTCD	18.55	11.71	9.56	5.47	4.55	2.79	2.24
XGTSEUCD	49.52	46.17	44.28	24.32	30.81	11.18	8.48
IMTCD	1.07	1.23	1.35	0.77	0.60	0.48	0.40
GRNOCR	0.00	0.05	0.12	0.14	0.12	0.11	0.10
XTCR	0.66	0.93	0.62	0.46	0.38	0.30	0.26
TGRCR	0.00	0.02	0.04	0.07	0.04	0.05	0.05
GRRCR	0.00	0.03	0.06	0.08	0.06	0.06	0.06
IMTRR	1.07	1.24	1.35	0.76	0.55	0.48	0.40

TABLE D7

THE IMPACT OF A 20% INCREASE IN PLYWOOD PRICE OF JAPAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELIN SOLUTIONS)							
END. VAR.	1985	1986	1987	1986	1989	1990	1991
GDPRR	-0.01	-0.01	-0.02	-0.03	-0.03	-0.03	-0.03
GDPCR	0.00	0.01	0.02	0.02	0.01	0.01	0.01
PCRR	0.00	-0.01	-0.02	-0.03	-0.03	-0.03	-0.04
GCRR	0.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03
PIRR	-0.02	-0.02	-0.03	-0.04	-0.04	-0.04	-0.05
XTRR	0.03	0.08	0.08	0.07	0.04	0.03	0.02
XTCD	0.03	0.08	0.08	0.07	0.04	0.03	0.02
XMCD	0.20	0.31	0.31	0.20	0.12	0.08	0.06
XPWCD	0.54	0.86	0.91	0.57	0.39	0.29	0.23
XPWJAPCD	7.38	4.22	3.02	2.15	1.06	1.00	0.84
IMTCD	0.04	0.10	0.15	0.10	0.07	0.05	0.04
GRNOCR	0.00	0.00	0.01	0.01	0.01	0.01	0.01
XTCR	0.03	0.08	0.08	0.07	0.04	0.03	0.02
TGRCR	0.00	0.00	0.00	0.01	0.00	0.00	0.00
GRRCR	0.00	0.00	0.00	0.01	0.01	0.01	0.01
IMTRR	0.04	0.10	0.15	0.10	0.07	0.05	0.04

TABLE D8

THE IMPACT OF A 20% INCREASE IN PLYWOOD PRICE OF THE U.S. ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)							
END. VAR.	1985	1986	1987	1988	1989	1990	1991
GDPRR	-0.05	-0.06	-0.07	-0.10	-0.10	-0.10	-0.10
GDPCR	0.00	0.03	0.06	0.05	0.04	0.03	0.03
PCRR	-0.02	-0.05	-0.06	-0.09	-0.10	-0.11	-0.12
GCRR	-0.02	-0.03	-0.05	-0.07	-0.08	-0.09	-0.09
PIRR	-0.09	-0.10	-0.10	-0.15	-0.13	-0.13	-0.14
XTRR	0.16	0.23	0.18	0.15	0.10	0.08	0.07
XTCD	0.16	0.23	0.18	0.15	0.10	0.08	0.07
XMCD	1.13	0.91	0.71	0.44	0.29	0.21	0.16
XPWCD	3.07	2.54	2.12	1.26	0.93	0.76	0.68
XPWUSCD	11.84	9.47	16.64	8.42	5.66	4.61	4.14
IMTCD	0.25	0.31	0.37	0.24	0.17	0.13	0.11
GRNOCR	0.00	0.01	0.03	0.04	0.03	0.03	0.03
XTCR	0.16	0.23	0.18	0.15	0.10	0.08	0.07
TGRCR	0.00	0.01	0.01	0.02	0.01	0.01	0.01
GRRCR	0.00	0.01	0.01	0.02	0.02	0.02	0.02
IMTRR	0.25	0.31	0.37	0.24	0.17	0.13	0.11

TABLE D9

THE IMPACT OF A 20% INCREASE IN PLYWOOD PRICE OF PACIFIC COUNTRIES ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)							
END. VAR.	1985	1986	1987	1988	1989	1990	1991
GDPRR	-0.06	-0.07	-0.07	-0.11	-0.11	-0.11	-0.11
GDPCR	0.00	0.04	0.06	0.05	0.04	0.03	0.03
PCRR	-0.03	-0.05	-0.07	-0.10	-0.11	-0.12	-0.13
GCRR	-0.02	-0.03	-0.06	-0.07	-0.09	-0.10	-0.10
PIRR	-0.10	-0.11	-0.11	-0.17	-0.14	-0.14	-0.16
XTRR	0.18	0.26	0.18	0.15	0.11	0.08	0.07
XTCD	0.18	0.26	0.18	0.15	0.11	0.08	0.07
XMCD	1.32	1.01	0.74	0.46	0.29	0.22	0.16
XPWCD	3.59	2.81	2.21	1.31	0.95	0.80	0.69
XPWPASCD	11.04	10.72	8.04	4.42	3.09	2.49	2.11
IMTCD	0.30	0.34	0.39	0.25	0.17	0.14	0.11
GRNOCR	0.00	0.01	0.03	0.04	0.04	0.03	0.03
XTCR	0.18	0.26	0.18	0.15	0.11	0.08	0.07
TGRCR	0.00	0.01	0.01	0.02	0.02	0.01	0.01
GRRCR	0.00	0.01	0.02	0.02	0.02	0.02	0.02
IMTRR	0.30	0.34	0.39	0.25	0.17	0.14	0.11

TABLE D10

THE IMPACT OF A 20% INCREASE IN INCOME OF THE MAIN TRADING PARTNERS ON SELECTED ENDOGENOUS VARAIBLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	-1.04	-1.24	-1.44	-2.24	-2.50	-2.65	-2.81
GDPCR	-0.05	0.63	1.30	1.17	1.07	1.08	1.10
PCRR	-0.48	-0.96	-1.42	-2.04	-2.54	-2.84	-3.19
GCRR	-0.29	-0.61	-1.14	-1.49	-1.91	-2.26	-2.54
PIRR	-1.72	-2.06	-2.19	-3.58	-3.32	-3.40	-3.96
XTRR	3.07	5.50	4.94	4.98	4.69	4.21	4.20
XTCD	3.07	5.50	4.94	4.98	4.69	4.21	4.20
XMCD	22.08	21.40	19.85	14.73	13.07	11.31	9.72
XGTCD	48.34	35.74	38.13	30.09	29.09	20.83	19.26
XPWCD	26.20	28.05	28.62	20.08	19.36	17.96	17.47
XGTJAPCD	80.98	70.58	60.01	51.98	56.65	59.31	52.72
XGTUSCD	80.32	66.52	51.02	50.87	44.12	41.20	53.10
XGTSNGCD	85.34	81.73	82.66	77.54	74.97	54.17	46.70
XPWJAPCD	80.14	48.46	39.20	34.19	23.87	28.09	29.34
XPWUSCD	78.31	68.68	133.15	74.58	65.12	59.56	56.81
IMTCD	4.96	7.16	10.10	7.52	6.95	6.27	5.92
GRNOCR	-0.02	0.23	0.66	0.88	0.84	0.84	0.85
XTCR	3.07	5.50	4.94	4.98	4.69	4.21	4.20
TGRCR	-0.01	0.11	0.25	0.40	0.36	0.39	0.41
IMTRR	4.96	7.17	10.06	7.49	6.87	6.29	5.92

TABLE D11

THE IMPACT OF A 10% INCREASE IN GOVERNMENT INVESTMENT ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE SOLUTIONS)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	1.59	2.38	2.66	3.37	3.87	4.26	4.88
GDPCR	0.77	0.71	0.28	0.25	0.73	0.95	1.30
PCRR	0.70	1.48	2.15	2.85	3.54	4.09	4.82
GCRR	0.27	0.62	1.16	1.57	2.00	2.39	2.75
PIRR	2.64	3.97	4.03	5.39	5.13	5.47	6.87
ICUD	5.49	6.33	5.83	6.78	6.62	6.88	7.95
XTRR	0.00	0.20	0.21	0.22	0.22	0.25	0.29
XTCD	0.00	0.20	0.21	0.22	0.22	0.25	0.29
XGTCD	0.00	1.81	2.23	1.85	1.88	1.60	1.69
XPWCD	0.00	0.64	0.72	0.54	0.57	0.67	0.77
XGTSEUCD	0.00	7.12	10.31	8.23	12.70	6.41	6.39
XPWPASCD	0.00	2.43	2.62	1.81	1.84	2.08	2.37
IMTCD	0.94	1.14	0.74	0.56	1.05	1.21	1.48
M2R	0.81	1.68	2.41	3.16	3.19	3.36	3.64
M2C	0.00	0.02	0.04	0.05	0.06	0.07	0.09
CPI	0.06	0.10	0.11	0.11	0.17	0.25	0.35
TGRCR	0.10	0.22	0.15	0.15	0.19	0.26	0.36
IMTRR	0.95	1.14	0.72	0.55	1.00	1.22	1.49

TABLE D12

THE IMPACT OF A 20% INCREASE IN GOVERNMENT INVESTMENT ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	3.18	4.77	5.32	6.75	7.74	8.55	9.79
GDPCR	1.54	1.39	0.55	0.49	1.41	1.85	2.51
PCRR	1.41	2.96	4.30	5.70	7.08	8.20	9.67
GCRR	0.54	1.25	2.33	3.15	4.02	4.80	5.52
PIRR	5.29	7.96	8.05	10.80	10.27	10.98	13.79
XTRR	0.00	0.41	0.42	0.44	0.45	0.49	0.57
XTCD	0.00	0.41	0.42	0.44	0.45	0.49	0.57
XMCD	0.00	1.60	1.68	1.31	1.25	1.33	1.33
XGTCD	0.00	3.62	4.46	3.70	3.77	3.20	3.39
XPWCD	0.00	1.28	1.45	1.07	1.14	1.35	1.55
XGTSEUCD	0.00	14.26	20.67	16.44	25.51	12.85	12.83
XPWPASCD	0.00	4.88	5.26	3.62	3.70	4.17	4.75
IMTCD	1.88	2.25	1.47	1.10	2.04	2.38	2.88
GRNOCR	0.61	0.92	0.78	0.67	0.85	1.10	1.45
XTCR	0.00	0.41	0.42	0.44	0.45	0.49	0.57
TGRCR	0.20	0.43	0.29	0.31	0.37	0.51	0.70
IMTRR	1.89	2.25	1.45	1.15	2.00	2.41	2.89

TABLE D13

THE IMPACT OF A 10% INCREASE IN LOAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	0.11	0.21	0.36	0.50	0.61	0.69	0.79
GDPCR	0.05	0.08	0.09	0.10	0.18	0.19	0.24
PCRR	0.05	0.12	0.25	0.38	0.52	0.63	0.76
GCRR	0.57	0.91	1.46	1.61	1.95	2.10	2.18
PIRR	0.18	0.36	0.54	0.81	0.81	0.88	1.12
XTRR	0.00	0.01	0.02	0.03	0.03	0.04	0.05
GRNOCR	0.02	0.04	0.06	0.08	0.11	0.12	0.15
M2R	0.05	0.14	0.27	0.41	0.45	0.50	0.56
M2C	0.00	0.00	0.00	0.01	0.01	0.01	0.01
TGRCR	1.87	2.06	2.63	2.09	2.59	2.23	2.11
IMTRR	0.06	0.11	0.16	0.15	0.19	0.23	0.27

TABLE D14

THE IMPACT OF A 20% INCREASE IN LOAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	0.21	0.43	0.73	1.02	1.21	1.37	1.59
GDPCR	0.11	0.15	0.19	0.20	0.33	0.38	0.48
PCRR	0.09	0.25	0.50	0.77	1.04	1.27	1.54
GCRR	1.14	1.82	2.93	3.23	3.92	4.22	4.38
PIRR	0.36	0.72	1.11	1.63	1.62	1.77	2.25
XTRR	0.00	0.03	0.04	0.06	0.07	0.08	0.09
XTCD	0.00	0.03	0.04	0.06	0.07	0.08	0.09
XMCD	0.00	0.11	0.15	0.18	0.19	0.21	0.21
XGTCD	0.00	0.24	0.40	0.51	0.57	0.50	0.54
XPWCD	0.00	0.09	0.13	0.15	0.17	0.21	0.25
IMTCD	0.13	0.23	0.33	0.31	0.44	0.46	0.53
GRNOCR	0.04	0.08	0.13	0.16	0.20	0.24	0.30
GROCR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
XTCR	0.00	0.03	0.04	0.06	0.07	0.08	0.09
TGRCR	3.73	4.12	5.26	4.17	5.18	4.46	4.22
IMTRR	0.13	0.23	0.30	0.31	0.39	0.46	0.55

TABLE D15

THE IMPACT OF A 10% DECREASE IN PRICE OF OIL ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	-2.02	-2.27	-2.96	-3.54	-3.73	-4.14	-4.31
GDPCR	-2.25	-2.19	-2.61	-2.25	-2.51	-2.92	-2.95
PCRR	-1.18	-1.72	-2.43	-3.11	-3.68	-4.22	-4.69
GCRR	-1.54	-2.12	-2.87	-3.38	-3.78	-4.28	-4.52
PIRR	-3.36	-3.78	-4.48	-5.66	-4.94	-5.31	-6.07
XTRR	-5.09	-4.89	-4.78	-3.69	-3.44	-3.58	-2.80
XTCD	-8.22	-6.52	-6.49	-5.10	-4.89	-5.27	-4.16
XOILCD	-11.31	-12.43	-12.41	-12.66	-11.64	-10.97	-10.36
IMTCD	-2.75	-3.10	-4.00	-2.84	-2.90	-3.08	-2.91
GRNOCR	-0.89	-1.40	-1.90	-2.07	-1.97	-2.09	-2.18
GROCR	-10.72	-11.32	-10.80	-10.88	-10.69	-11.79	-10.50
TGRCR	-5.44	-4.36	-4.66	-4.61	-4.12	-4.77	-4.35
IMTRR	-2.74	-3.09	-4.03	-2.85	-2.92	-3.05	-2.96

TABLE D16

THE IMPACT OF A 20% DECREASE IN PRICE OF OIL ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	85.00	86.00	87.00	88.00	89.00	90.00	91.00
GDPRR	-4.13	-4.59	-6.00	-7.15	-7.50	-8.33	-8.67
GDPCR	-4.52	-4.37	-5.21	-4.50	-5.01	-5.85	-5.92
PCRR	-2.37	-3.45	-4.88	-6.26	-7.39	-8.47	-9.41
GCRR	-3.11	-4.27	-5.79	-6.80	-7.58	-8.57	-9.04
PIRR	-6.86	-7.66	-9.09	-11.44	-9.95	-10.70	-12.21
XTRR	-10.53	-9.96	-9.74	-7.50	-7.00	-7.29	-5.68
XTCD	-16.44	-13.04	-12.98	-10.20	-9.78	-10.54	-8.32
XMCD	0.00	-2.07	-1.61	-1.48	-1.33	-1.29	-1.29
XOILCD	-22.62	-24.87	-24.82	-25.32	-23.28	-21.93	-20.73
XGTCD	0.00	-4.70	-4.30	-4.17	-3.99	-3.11	-3.29
XPWCD	0.00	-1.66	-1.39	-1.21	-1.21	-1.31	-1.51
IMTCD	-5.52	-6.21	-8.01	-5.69	-5.81	-6.18	-5.85
GRNOCR	-1.79	-2.80	-3.81	-4.14	-3.95	-4.19	-4.38
GROCR	-21.45	-22.64	-21.60	-21.76	-21.38	-23.58	-20.99
XTCR	-16.44	-13.04	-12.98	-10.20	-9.78	-10.54	-8.32
TGRCR	-10.89	-8.72	-9.32	-9.22	-8.23	-9.54	-8.70
IMTRR	-5.53	-6.19	-8.04	-5.74	-5.84	-6.12	-5.86

TABLE D17

THE IMPACT OF A 10% DECREASE IN PRODUCTION OF OIL ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE LINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	-1.51	-2.50	-2.87	-3.66	-3.83	-3.95	-4.42
GDPCR	-1.32	-1.91	-1.91	-1.82	-2.06	-2.18	-2.51
PCRR	-0.65	-1.36	-2.04	-2.79	-3.38	-3.77	-4.31
GCRR	-1.63	-2.26	-3.09	-3.61	-4.03	-4.54	-4.79
PIRR	-2.51	-4.17	-4.36	-5.85	-5.08	-5.08	-6.23
XTRR	-3.77	-6.49	-4.83	-4.31	-3.91	-3.37	-3.42
XTCD	-3.77	-6.49	-4.83	-4.31	-3.91	-3.37	-3.42
XOILCD	-5.19	-12.51	-9.10	-10.63	-9.18	-6.80	-8.44
IMTCD	-1.61	-2.67	-3.05	-2.35	-2.45	-2.39	-2.52
GRNOCR	-0.52	-1.06	-1.41	-1.60	-1.57	-1.62	-1.76
GROCR	-10.72	-11.32	-10.80	-10.88	-10.69	-11.79	-10.50
M2R	-0.77	-1.71	-2.54	-3.38	-3.30	-3.32	-3.48
M2C	-0.58	-1.12	-1.56	-1.54	-1.53	-1.54	-1.56
CPI	-0.09	-0.22	-0.34	-0.47	-0.60	-0.74	-0.90
TGRCR	-5.32	-4.20	-4.47	-4.39	-3.94	-4.55	-4.15
IMTRR	-1.61	-2.66	-3.05	-2.36	-2.49	-2.37	-2.57

TABLE D18

THE IMPACT OF A 20% DECREASE IN PRODUCTION OF OIL ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)							
YEAR	1985	1986	1987	1988	1989	1990	1991
GDPRR	-3.01	-5.01	-5.75	-7.30	-7.60	-7.85	-8.78
GDPCR	-2.65	-3.85	-3.81	-3.65	-4.12	-4.36	-5.05
PCRR	-1.29	-2.71	-4.09	-5.56	-6.72	-7.50	-8.56
GCRR	-3.25	-4.50	-6.15	-7.17	-7.99	-9.00	-9.48
PIRR	-5.01	-8.35	-8.70	-11.68	-10.08	-10.08	-12.37
XTRR	-7.54	-12.97	-9.66	-8.62	-7.83	-6.73	-6.84
XTCD	-7.54	-12.97	-9.66	-8.62	-7.83	-6.73	-6.84
XMCD	0.00	-1.51	-1.76	-1.41	-1.35	-1.31	-1.22
XOILCD	-10.38	-25.02	-18.19	-21.25	-18.37	-13.60	-16.88
XGTCD	0.00	-3.43	-4.68	-4.00	-4.06	-3.16	-3.11
XPWCD	0.00	-1.21	-1.52	-1.16	-1.23	-1.33	-1.42
IMTCD	-3.23	-5.37	-6.10	-4.70	-4.90	-4.77	-5.05
GRNOCR	-1.05	-2.13	-2.84	-3.20	-3.14	-3.24	-3.53
GROCR	-21.45	-22.64	-21.60	-21.76	-21.38	-23.58	-20.99
XTCR	-7.54	-12.97	-9.66	-8.62	-7.83	-6.73	-6.84
TGRCR	-10.64	-8.40	-8.95	-8.77	-7.88	-9.10	-8.28
IMTRR	-3.22	-5.34	-6.11	-4.67	-4.93	-4.74	-5.03

TABLE D19

END.VAR.	1992	1993	1994	1995
GDPRR	7.21	9.23	11.18	12.96
GDPCR	6.08	6.72	7.18	7.50
PCRR	2.64	5.07	7.36	9.47
GCRR	1.54	3.14	4.83	6.54
PIRR	9.95	12.47	14.71	16.59
XTRR	9.11	9.01	8.92	8.85
XTCD	1.33	1.19	1.10	1.01
XMCD	0.47	0.37	0.36	0.35
XGTCD	1.55	1.19	1.00	0.88
XPWCD	0.00	-0.01	0.21	0.37
XGTUSCD	10.42	9.83	9.32	8.86
IMTCD	-5.62	-4.47	-3.59	-2.89
M2C	1.26	2.46	3.62	4.73
CPI	0.73	1.49	2.26	3.01
XTCR	11.46	11.31	11.21	11.11
TGRCR	4.33	5.17	5.86	6.39
IMTRR	-3.58	-2.27	-1.31	-0.52

THE IMPACT OF 10% INCREASE IN EXCHANGE RATE ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE SOLUTIONS)

TABLE D20

THE IMPACT OF A 20% INCREASE IN EXCHANGE RATE ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	14.25	18.25	22.09	25.55
GDPCR	11.95	13.13	13.98	14.57
PCRR	5.20	10.03	14.58	18.76
GCRR	3.08	6.28	9.64	13.03
PIRR	19.66	24.66	29.08	32.76
XTRR	18.16	17.97	17.92	17.84
XTCD	2.71	2.46	2.40	2.28
XMCD	0.97	0.77	0.90	0.93
XGTCD	3.56	2.94	3.24	3.35
XPWCD	0.00	-0.03	0.36	0.66
XGTUSCD	19.04	17.78	16.72	15.77
IMTCD	-11.15	-9.12	-7.46	-6.13
M2C	2.50	4.86	7.16	9.33
CPI	1.43	2.90	4.38	5.81
XTCR	23.25	22.96	22.88	22.73
TGRCR	8.63	10.26	11.59	12.59
IMTRR	-7.50	-5.19	-3.36	-1.83

TABLE D21

THE IMPACT OF A 20% INCREASE IN GARMENT & TEXTILE PRICES OF JAPAN ON SELECTED ENDOGENOUS VARIAVBLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)				
END.VAR.	1992	1993	1994	1995
GDPRR	0.0001	0.0001	0.0001	0.0003
GDPCR	0.0006	0.0014	0.0024	0.0034
PCRR	-0.0001	-0.0003	-0.0004	-0.0005
GCRR	-0.0002	-0.0004	-0.0007	-0.0010
PIRR	0.0001	0.0001	0.0002	0.0003
XTRR	0.0049	0.0078	0.0092	0.0095
XTCD	0.0049	0.0078	0.0092	0.0095
XMCD	0.0099	0.0142	0.0151	0.0144
XGTCD	0.0363	0.0535	0.0592	0.0584
XGTJAPCD	0.6651	0.8959	0.9277	0.8713
IMTCD	0.0058	0.0091	0.0106	0.0109
GRNOCR	0.0002	0.0007	0.0013	0.0022
XTCR	0.0049	0.0078	0.0091	0.0095
TGRCR	0.0001	0.0003	0.0007	0.0011
IMTRR	0.0058	0.0091	0.0106	0.0109

TABLE D22

THE IMPACT OF A 20% INCREASE IN GARMENT & TEXTILE PRICES OF THE U.S. ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	-0.0030	-0.0032	-0.0086	-0.0137
GDPCR	0.0259	0.0395	0.0488	0.0543
PCRR	-0.0055	-0.0107	-0.0156	-0.0202
GCRR	-0.0052	-0.0126	-0.0201	-0.0266
PIRR	-0.0042	-0.0043	-0.0113	-0.0176
XTRR	0.2272	0.1787	0.1371	0.1042
XTCD	0.2272	0.1787	0.1371	0.1042
XMCD	0.4610	0.3248	0.2257	0.1575
XGTCD	1.6844	1.2213	0.8850	0.6430
XGTUSCD	9.0069	7.2307	5.7410	4.6222
IMTCD	0.2704	0.2118	0.1662	0.1298
GRNOCR	0.0088	0.0200	0.0312	0.0405
XTCR	0.2272	0.1787	0.1371	0.1042
TGRCR	0.0043	0.0098	0.0156	0.0211
IMTRR	0.2711	0.2118	· 0.1663	0.1298

TABLE D23

THE IMPACT OF A 20% INCREASE IN GARMENT & TEXTILE PRICES OF SINGAPORE ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	-0.0014	-0.0015	-0.0039	-0.0063
GDPCR	0.0116	0.0176	0.0215	0.0237
PCRR	-0.0025	-0.0048	-0.0070	-0.0091
GCRR	-0.0024	-0.0056	-0.0089	-0.0118
PIRR	-0.0019	-0.0020	-0.0052	-0.0081
XTRR	0.1018	0.0795	0.0598	0.0446
XTCD	0.1018	0.0795	0.0598	0.0446
XMCD	0.2066	0.1445	0.0984	0.0673
XGTCD	0.7548	0.5433	0.3859	0.2748
XGTSNGCD	4.0295	2.8503	2.0358	1.4757
IMTCD	0.1212	0.0943	0.0726	0.0558
GRNOCR	0.0040	0.0090	0.0138	0.0178
XTCR	0.1018	0.0795	0.0598	0.0445
TGRCR	0.0019	0.0043	0.0069	0.0093
IMTRR	0.1215	0.0942	0.0727	0.0557

TABLE D24

THE IMPACT OF A 20% INCREASE IN GARMENT AND TEXTILE PRICES OF SAUDI ARABIA & EUROPEAN COUNTRIES ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	-0.0035	-0.0036	-0.0096	-0.0154
GDPCR	0.0297	0.0455	0.0568	0.0637
PCRR	-0.0063	-0.0123	-0.0180	-0.0232
GCRR	-0.0060	-0.0145	-0.0231	-0.0308
PIRR	-0.0048	-0.0048	-0.0126	-0.0198
XTRR	0.2600	0.2072	0.1611	0.1241
XTCD	0.2600	0.2072	0.1611	0.1241
XMCD	0.5277	0.3767	0.2652	0.1876
XGTCD	1.9280	1.4162	1.0398	0.7655
XGTSEUCD	8.3579	6.4094	4.9418	3.8131
IMTCD	0.3095	0.2455	0.1950	0.1540
GRNOCR	0.0101	0.0231	0.0361	0.0471
XTCR	0.2600	0.2072	0.1611	0.1241
TGRCR	0.0050	0.0112	0.0181	0.0246
IMTRR	0.3104	0.2454	0.1950	0.1540

TABLE D25

THE IMPACT OF A 20% INCREASE IN PLYWOOD PRICES OF JAPAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	0.0002	0.0001	-0.0001	-0.0003
GDPCR	0.0012	0.0025	0.0035	0.0043
PCRR	-0.0002	-0.0005	-0.0008	-0.0010
GCRR	-0.0002	-0.0006	-0.0011	-0.0016
PIRR	0.0002	0.0001	-0.0001	-0.0004
XTRR	0.0103	0.0126	0.0118	0.0101
XTCD	0.0102	0.0126	0.0118	0.0101
XMCD	0.0208	0.0230	0.0195	0.0153
XPWCD	0.0901	0.1090	0.0989	0.0859
XPWJAPCD	0.3207	0.3734	0.3365	0.2798
IMTCD	0.0122	0.0147	0.0139	0.0120
GRNOCR	0.0004	0.0011	0.0020	0.0029
XTCR	0.0103	0.0126	0.0118	0.0101
TGRCR	0.0002	0.0006	0.0010	0.0015
GRRCR	0.0002	0.0007	0.0012	0.0018
IMTRR	0.0122	0.0147	0.0139	0.0120

TABLE D26

THE IMPACT OF A 20% INCREASE IN PLYWOOD PRICES OF THE U.S. ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END. VAR.	1992	1993	1994	1995
GDPRR	-0.0008	-0.0009	-0.0023	-0.0036
GDPCR	0.0068	0.0104	0.0129	0.0143
PCRR	-0.0014	-0.0028	-0.0041	-0.0053
GCRR	-0.0014	-0.0033	-0.0053	-0.0070
PIRR	-0.0011	-0.0012	-0.0030	-0.0047
XTRR	0.0599	0.0471	0.0361	0.0275
XTCD	0.0599	0.0471	0.0361	0.0275
XMCD	0.1216	0.0856	0.0595	0.0415
XPWCD	0.5256	0.4066	0.3025	0.2340
XPWUSCD	2.6568	2.1671	1.7752	1.4598
IMTCD	0.0713	0.0558	0.0438	0.0342
GRNOCR	0.0023	0.0053	0.0082	0.0107
XTCR	0.0599	0.0471	0.0361	0.0274
TGRCR	0.0011	0.0026	0.0041	0.0056
GRRCR	0.0014	0.0032	0.0050	0.0067
IMTRR	0.0715	0.0558	0.0438	0.0342

TABLE D27

THE IMPACT OF A 20% INCREASE IN PLYWOOD PRICES OF PACIFIC COUNTRIES ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	-0.0009	-0.0009	-0.0023	-0.0037
GDPCR	0.0071	0.0108	0.0135	0.0150
PCRR	-0.0015	-0.0029	-0.0042	-0.0055
GCRR	-0.0014	-0.0034	-0.0055	-0.0072
PIRR	-0.0011	-0.0012	-0.0030	-0.0047
XTRR	0.0619	0.0491	0.0380	0.0292
XTCD	0.0619	0.0491	0.0380	0.0292
XMCD	0.1257	0.0893	0.0626	0.0441
XPWCD	0.5434	0.4241	0.3184	0.2486
XPWPASCD	1.7669	1.3786	1.0822	0.8527
IMTCD	0.0737	0.0582	0.0460	0.0362
GRNOCR	0.0024	0.0055	0.0086	0.0112
XTCR	0.0619	0.0491	0.0380	0.0292
TGRCR	0.0012	0.0027	0.0043	0.0058
GRRCR	0.0014	0.0033	0.0052	0.0070
IMTRR	0.0739	0.0582	0.0461	0.0362

TABLE D28

THE IMPACT OF A 20% INCREASE IN INCOME OF THE MAIN TRADING PARTNERS ON SELECTED ENDOGENOUS VARIABLE (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	-0.02	-0.03	-0.06	-0.09
GDPCD	0.39	0.73	1.08	1.40
GDPCR	0.39	0.73	1.08	1.40
PCRR	-0.09	-0.19	-0.28	-0.34
GCRR	-0.08	-0.22	-0.37	-0.53
PIRR	0.03	-0.05	-0.08	-0.12
XTRR	3.55	3.67	3.58	3.42
XTCD	3.55	3.67	3.58	3.42
XMCD	7.22	6.67	5.90	5.18
XGTCD	15.26	13.87	12.59	11.46
XPWCD	13.15	14.20	13.67	13.31
XGTJAPCD	10.73	16.69	20.01	21.82
XGTUSCD	37.63	35.10	32.39	30.30
XGTSNGCD	40.78	36.49	33.38	30.99
XPWJAPCD	16.97	22.85	24.33	24.29
XPWUSCD	42.39	40.19	38.27	36.58
IMTCD	4.22	4.30	4.22	4.04
GRNOCR	0.13	0.35	0.63	0.94
XTCR	3.55	3.67	3.58	3.42
TGRCR	0.06	0.17	0.31	0.49
IMTRR	4.24	4.31	4.22	4.04

TABLE D29

THE IMPACT OF 10% INCREASE IN GOVERNMENT INVESTMENT ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE SOLUTIONS)				
END.VAR.	1992	1993	1994	1995
GDPRR	1.57	2.13	2.64	3.09
GDPCR	1.05	1.02	0.90	0.73
PCRR	0.79	1.59	2.21	2.84
GCRR	0.19	0.51	0.92	1.37
PIRR	2.16	2.87	3.47	3.95
XTRR	0.01	0.04	0.06	0.08
XTCD	0.01	0.03	0.06	0.07
IMTCD	0.81	0.75	0.61	0.487
GRNOCR	0.36	0.60	0.72	0.73
M2C	0.00	0.01	0.01	0.02
CPI	0.13	0.24	0.33	0.38
XTCR	0.00	0.04	0.06	0.087
TGRCR	0.17	0.29	0.36	0.38
IMTRR	0.81	0.75	0.62	0.48

TABLE D30

THE IMPACT OF A 20% INCREASE IN GOVERNMENT INVESTMENT ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)				
END.VAR.	1992	1993	1994	1995
GDPRR	3.14	4.28	5.31	6.24
GDPCR	2.10	2.04	1.81	1.50
PCRR	1.59	3.06	4.44	5.71
GCRR	0.38	1.02	1.84	2.77
PIRR	4.34	5.79	6.99	8.00
XTRR	0.05	0.17	0.21	0.24
XTCD	0.05	0.17	0.21	0.24
XMCD	0.00	0.32	0.36	0.36
XGTCD	0.00	0.86	1.00	1.06
XPWCD	0.00	0.45	0.54	0.61
XGTSEUCD	0.00	3.91	4.75	5.29
XPWPASCD	0.00	1.48	1.83	2.09
IMTCD	1.65	1.65	1.39	1.11
GRNOCR	0.71	1.20	1.44	1.47
XTCR	0.00	0.17	0.21	0.24
TGRCR	0.34	0.58	0.72	0.76
GRRCR	0.42	0.72	0.88	0.92
IMTRR	1.65	1.65	1.39	1.11

TABLE D31

THE IMPACT OF 10% INCREASE IN LOAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE SOLUTIONS)				
END.VAR.	1992	1993	1994	1995
GDPRR	0.10	0.18	0.25	0.32
GDPCR	0.06	0.10	0.10	0.09
PCRR	0.05	0.12	0.20	0.28
GCRR	0.58	0.95	1.19	1.34
PIRR	0.13	0.25	0.33	0.40
XTRR	0.00	0.00	0.01	0.01
XTCD	0.00	0.00	0.01	0.01
XMCD	0.00	0.01	0.01	0.01
IMTCD	0.05	0.07	0.07	0.06
M2C	0.00	0.00	0.00	0.00
CPI	0.01	0.02	0.03	0.04
XTCR	0.00	0.00	0.01	0.01
TGRCR	2.03	1.95	1.83	1.70
IMTRR	0.05	0.07	0.07	0.06

TABLE D32

THE IMPACT OF A 20% INCREASE IN GOVERNMENT LOAN ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	0.19	0.36	0.51	0.64
GDPCR	0.12	0.19	0.21	0.19
PCRR	0.09	0.23	0.39	0.55
GCRR	1.16	1.91	2.40	2.71
PIRR	0.26	0.49	0.67	0.82
XTRR	0.00	0.01	0.01	0.02
XTCD	0.00	0.01	0.01	0.02
XMCD	0.00	0.01	0.03	0.03
XGTCD	0.00	0.05	0.08	0.10
XPWCD	0.00	0.02	0.04	0.05
IMTCD	0.10	0.15	0.15	0.13
GRNOCR	0.04	0.09	0.14	0.16
XTCR	0.00	0.01	0.01	0.02
TGRCR	4.05	3.90	3.67	3.43
GRRCR	0.02	0.06	0.08	0.10
GRREAL	4.11	4.07	3.99	3.89
IMTRR	0.10	0.15	0.15	0.13

TABLE D33

THE IMPACT OF 10% DECREASE IN OIL PRICE ON SELECTED ENDOGEOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE SOLUTIONS)				
END.VAR.	1992	1993	1994	1995
GDPRR	-1.24	-1.62	-1.91	-2.12
GDPCR	-1.20	-1.43	-1.50	-1.46
PCRR	-0.73	-1.35	-1.87	-2.30
GCRR	-1.01	-1.76	-2.36	-2.84
PIRR	-1.71	-2.19	-2.52	-2.71
XTRR	-2.04	-1.66	-1.27	-0.94
XTCD	-3.31	-2.83	-2.36	-1.95
XMCD	0.00	-0.05	-0.07	-0.08
XOILCD	-10.10	-9.85	-9.59	-9.35
IMTCD	-0.93	-1.02	-0.97	-0.86
M2C	-0.36	-0.66	-0.88	-1.03
CPI	-0.14	-0.31	-0.47	-0.61
XTCR	-3.31	-2.83	-2.36	-1.95
TGRCR	-3.54	-3.71	-3.83	-3.84
GROCR	-10.46	-10.41	-10.37	-10.33
IMTRR	-0.92	-1.02	-0.97	-0.86

TABLE D34

THE IMPACT OF A 20% DECREASE IN OIL PRICE ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTIONS)				
END.VAR.	1992	1993	1994	1995
GDPRR	-2.51	-3.31	-3.93	-4.39
GDPCR	-2.43	-2.91	-3.10	-3.06
PCRR	-1.45	-2.70	-3.76	-4.63
GCRR	-2.03	-3.53	-4.73	-5.72
PIRR	-3.47	-4.47	-5.18	-5.63
XTRR	-4.27	-3.65	-2.92	-2.28
XTCD	-6.75	-5.95	-5.06	-4.26
XMCD	0.00	-0.26	-0.27	-0.27
XOILCD	-20.20	-19.69	-19.18	-18.69
IMTCD	-1.91	-2.23	-2.17	-1.96
GROCR	-20.91	-20.82	-20.73	-20.66
M2C	-0.72	-1.32	-1.80	-2.13
CPI	-0.29	-0.62	-0.95	-1.24
XTCR	-6.75	-5.95	-5.06	-4.26
TGRCR	-7.08	-7.44	-7.70	-7.76
IMTRR	-1.89	-2.23	-2.17	-1.96

TABLE D35

THE IMPACT OF 10% DECREASE IN OIL PRODUCTION ON SELECTED ENDOGEOUS VARIABLES (PERCENTAGE DEVIATION FROM BASE SOLUTIONS)				
END. VAR	1992	1993	1994	1995
GDPRR	-1.48	-1.94	-2.34	-2.67
GDPCR	-1.31	-1.49	-1.55	-1.51
PCRR	-0.66	-1.27	-1.84	-2.34
GCRR	-1.06	-1.86	-2.53	-3.10
PIRR	-2.04	-2.62	-3.07	-3.41
XTRR	-2.78	-2.46	-2.11	-1.80
XTCD	-2.78	-2.46	-2.11	-1.80
XMCD	0.00	-0.06	-0.09	-0.10
XOILCD	-8.47	-8.50	-8.53	-8.57
IMTCD	-1.01	-1.06	-1.00	-0.89
M2C	-0.30	-0.56	-0.77	-0.91
CPI	-0.16	-0.33	-0.49	-0.63
XTCR	-2.78	-2.46	-2.11	-1.80
TGRCR	-3.56	-3.73	-3.85	-3.86
GROCR	-10.46	-10.41	-10.37	-10.33
IMTRR	-1.00	-1.06	-1.00	-0.89

TABLE D36

THE IMPACT OF A 20% DECREASE IN OIL PRODUCTION ON SELECTED ENDOGENOUS VARIABLES (PERCENTAGE DEVIATION FROM BASELINE SOLUTION)				
END.VAR.	1992	1993	1994	1995
GDPRR	-2.95	-3.88	-4.69	-5.36
GDPCR	-2.61	-3.00	-3.15	-3.11
PCRR	-1.31	-2.54	-3.66	-4.66
GCRR	-2.11	-3.71	-5.05	-6.19
PIRR	-4.08	-5.24	-6.17	-6.88
XTRR	-5.66	-5.18	-4.55	-3.95
XTCD	-5.66	-5.18	-4.55	-3.95
XMCD	0.00	-0.30	-0.32	-0.32
XOILCD	-16.93	-17.00	-17.06	-17.13
IMTCD	-2.05	-2.32	-2.23	-2.02
GROCR	-20.91	-20.82	-20.73	-20.66
M2C	-0.61	-1.13	-1.57	-1.89
CPI	-0.31	-0.65	-0.98	-1.28
XTCR	-5.66	-5.18	-4.55	-3.95
TGRCR	-7.11	-7.47	-7.73	-7.79
GRREAL	-7.43	-8.31	-9.20	-9.93
IMTRR	-2.04	-2.32	-2.23	-2.02