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The Political Economy of Agricultural Pricing Policy

# Trade, Exchange Rate, and Agricultural Pricing Policies in Thailand

Ammar Siamwalla  
Suthad Setboonsarng



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Abstract

Thailand, which had a population of about 45 million in 1980, is still largely an agricultural country. In 1984, it is estimated, agricultural work was still the main source of earnings for more than 70 percent of the population. It was expansion of agricultural land, along with investment in infrastructure, that allowed Thailand's gross domestic product (GDP) to grow an average annual 7.2 percent between 1960 and 1973. GDP growth slipped to an average annual 6.2 percent for the 1974-85 period.

For much of the 25-year period covered by this report, government intervention in the prices of rice, maize, and natural rubber was extensive. In the cases of rice and natural rubber, both of them traditional Thai exports, intervention took the form of explicit export taxes. Intervention in the price of maize, on the other hand, took the form of restrictive quotas on maize exports to countries other than Japan and Taiwan, the principal buyers.

Unlike the other three commodities discussed here, sugar was a product that was imported by Thailand until 1960. For many years prior to that, government policy was to encourage growers of sugar cane and thus achieve self-sufficiency. This general policy of aiding growers continued even after Thailand became an exporter of sugar. One conclusion of this study is that the Thai sugar industry would have shrunk to about a quarter of its size during the study period if the government had refrained from intervention.

Intervention in the prices of rice and natural rubber had the effect of penalizing farm producers by reducing their output prices. There was, as a consequence, a shift of resources towards Thailand's small industrial sector.

In 1981, the Thai government lifted its quota restrictions on maize exports, effectively freeing trade in maize. Between then and 1985, the government also liberalized its trade by eliminating its intervention in the rice, sugar, and natural rubber markets. Unfortunately for export growers, however, the gradual elimination of government intervention was overshadowed by sharp declines in the world prices of Thailand's major agricultural exports.

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## LIST OF ABBREVIATIONS

BOI	Board of Investment
BOT	Bank of Thailand
CPI	Consumer Price Index
CPO	Crude Palm Oil
DFT	Department of Foreign Trade
DIT	Department of Internal Trade
EER	Equilibrium Exchange Rate (generic term)
EER1	Equilibrium Exchange Rate (adjusted for balance of payments deficit on current account)
EER2	Equilibrium Exchange Rate (adjusted for balance of payments deficit on current account)
FAF	Farmers' Aid Fund
FAO	Food and Agriculture Organization
f.o.b.	free on board
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
G-to-G	Government to Government
MOF	Marketing Organization for Farmers
n.a.	not available
NEDB	National Economic Development Board (name of NESDB before 1971)
NESDB	National Economic and Social Development Board
PPC	Policy Possibility Curve
PWO	Public Warehouse Organization
RBD	Refined, bleached and deodorized palm oil
RRF	Rubber Replanting Fund

SES	Socioeconomic Survey
SIAP	Sugar Industrial Aid Fund
TCST	Thai Cane and Sugar Trading Corporation
TDRI	Thailand Development Research Institute

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Ammar Siamwalla

Suthad Setboonsarng

## Chapter 1

### OVERVIEW OF THE THAI ECONOMY

This overview discusses Thailand's geographic characteristics and resources and outlines its economic performance and distribution of income. In the chapter, we also look briefly at the Thai agricultural sector and present a thumbnail sketch of post-World War II political developments.

#### Geographic Characteristics and Resources

Thailand's total land area of 51.3 million hectares can be divided into four main regions: North, Northeast, Central, and South. The northern region accounts for about a third of the land area of the country. The region is divided by mountain ranges running north and south, with numerous valleys between the ranges. The four major rivers of the region (the Ping, Wang, Yom, and Nan) merge to form the Chao Phraya River, which feeds the major rice-producing area of the Central Plains. The forests of the mountainous northern region once were a main source of wood products, such as teak. Production of forest goods has dwindled rapidly, however, as farm cultivation has expanded. The upper northern valleys are well irrigated and now grow rice, soybeans, tobacco, fruit, and vegetables. The lower valleys grow rice, maize, and soybeans.

The northern region, which accounts for another third of Thailand's land area, is a sandstone plateau that slopes from mountains in the southern and western portions of the region toward the Mekong River on the Thai-Laotian border. Because these mountains block the southwesterly monsoon rains, the area--particularly the southwest portion--has below-average rainfall. The problems of low rainfall are aggravated by sandy soils, and the Mekong River

irrigates only a small area. The major output of the region is mostly field crops--for example, cassava, maize, sorghum, and glutinous rice. Productivity is generally low because of the poor environment, and the region is the poorest in Thailand.

The Central region, accounting for about a fifth of the land area, lies on the Chao Phraya River delta and contains the major agricultural area of the country. It has the most favorable conditions for lowland crops because of the monsoon rains and river irrigation. The eastern part of this region consists of hilly and coastal areas. The regularity of rainfall in the Central region permits various kinds of agricultural production. The clay soils and flat terrain of the delta make it ideal for traditional rice agriculture. Other products from this region are fruit, livestock, and fish. The upland areas on the fringes supply sugarcane, maize, and cassava.

The southern part of Thailand is a peninsular strip, divided by a North-South mountain range that stretches from the Burmese border to the Malaysian border. An equatorial climate makes the region most suited to tree crops. Broadly speaking, its agricultural output is similar to Malaysia's, consisting of rubber, oil palm, coconut, and fish.

Climate. Thailand is a tropical monsoon country with three seasons: rainy, cool and hot.

The rainy season usually begins in mid-May, when the southwest monsoon brings moisture from the Indian Ocean. The monsoon rains usually end in mid-October. The eastern coast of the southern region has additional rainfall from the northwest monsoon from November to February.

Rainfall and its distribution are important to agricultural productivity. The South has the highest rainfall. The North, in contrast, has the lowest total rainfall, but the mountains there concentrate a

substantial amount of water in the valleys. That makes the region generally more suitable for cultivation than the Northeast, whose sandy soils do not retain the region's slightly higher rainfall.

The cool season lasts from mid-November to mid-February. During this time, the northeast monsoon carries winter winds from China that cool the entire country, except for the southern region.

The hot season usually starts in mid-February and lasts until mid-May. The country has the maximum exposure to the sun during this period, when the average temperature is about 33 to 38 degrees Celsius. For the southern part of Thailand, however, the average temperature is quite stable, at about 22 degrees Celsius throughout the year. Except for the South, both the cool and the hot seasons are very dry. Without irrigation, cultivation during this period is difficult.

Land. Of approximately 51 million hectares of land, a little more than 38 percent is farmland. The rest consists of forests (about 30 percent), national parks (about 5 percent), and unclassified areas (about 27 percent).

Climate, soil structure, and slope determine the potential use of land for cultivation. A World Bank study (1980) found that about 26 million hectares (or 52 percent of Thailand's total land area) are suitable for cultivation. Yet even as late as 1984, only about 20 million hectares were occupied by farm holdings. It must be pointed out, however, that the question of whether there is actually any surplus land remains controversial. Table 1.1 shows the actual land utilization in Thailand. Increases in farmland have been largely at the expense of forest land.

Human Resources. After rising sharply in the 1950s, Thailand's population growth rate fell steadily from more than 3 percent a year during the 1960s to 2.7 percent a year during the 1970s (Appendix Table A.1). The

decline has been accelerating since 1981 and at present is 2.06. It is anticipated that the rate will drop to about 1.6 percent a year by the end of the Sixth Five-Year Social and Economic Development Plan in 1991.

The share of the country's population living in urban areas increased from 12.5 percent in 1960 to 13.2 percent in 1970 and to 17 percent in 1980 (Appendix Table A.2). Compared with other countries at the same level of income, the rate of urbanization in Thailand is still low, but it is accelerating. The low rate of urbanization reflects a high share of the labor force in agriculture.

Population censuses indicate that the agricultural labor force constituted 82, 78, and 71 percent of the total labor force in 1960, 1970, and 1980 respectively (Table 1.2). These are high figures by international standards (Figure 1.1), but they probably exaggerate the role of agriculture somewhat because they fail to account for the highly seasonal character of Thai agriculture. Because the bulk of Thai agriculture is rainfed, and because major rainfalls are separated by a long dry spell, agriculture cannot provide year-round employment. The censuses provide only the major occupation of the respondents for a given year--that is, agricultural labor. But Thailand's labor force surveys, which are conducted in two rounds every year, give different picture (Table 1.3). They show that a large number of people (about 3 to 5 million) leave the labor force altogether during the dry season and that agriculture's share of those who stay also drops drastically. Thus, if we take a simple average of the labor force survey figures for the wet and dry seasons, we get a share of agriculture in the labor force in 1980 that is closer to 65 percent.

Notwithstanding seasonal shifts into and out of agriculture, the sector remains Thailand's most important source of employment. This role is

TABLE 1.1  
LAND UTILIZATION IN THAILAND

Unit : Million Hectares

Year	1950	1955	1960	1965	1970	1975	1980	1982
Forest Land	31.71	29.73	28.19	26.23	23.27	20.92	16.55	15.68
Farm Holding Land	8.27	9.03	10.00	12.76	15.04	17.95	19.04	19.77
Housing Area	-	-	-	-	-	0.45	0.40	0.41
Paddy Land	5.40	5.77	6.20	6.64	9.37	11.40	11.77	11.72
Field Crops	0.73	0.76	1.11	1.98	2.25	3.19	4.12	4.69
Tree Crops	0.77	0.83	0.93	1.54	1.46	1.67	1.78	1.90
Vegetables & Flowers	-	-	-	-	-	0.06	0.05	0.05
Pasture Land	-	-	-	-	-	0.06	0.05	0.05
Idle Land	0.85	0.85	0.84	0.79	0.66	0.73	0.49	0.62
Others	0.51	0.83	0.92	1.81	1.30	0.38	0.34	0.26
Unclassified	11.33	12.55	13.13	12.33	13.00	12.44	15.72	15.86
Total Land	51.31	51.31	51.31	51.31	51.31	51.31	51.31	51.31

Sources : 1950-1974 "Land Utilization of Thailand 1950/51-1977/78"  
Office of Agricultural Economics, Ministry of Agriculture & Co-operatives.  
1975-1982 "Agricultural Statistics of Thailand" Crop year 1983/84  
Office of Agricultural Economics, Ministry of Agriculture & Co-operatives.

TABLE 1.2  
AGRICULTURAL LABOR FORCE  
AND ARABLE LAND

	1960	1970	1980
1. Population, ages 15 and over (millions)	14.94	18.98	27.66
2. Economically active population, age 15 and over (millions)	12.68	15.01	21.84
3. Labor force in agriculture, age 15 and over (millions)	10.34	11.68	15.53
4. Share of agriculture in the labor force, age 15 and over (Percent)	81.55	77.81	71.11
5. Cultivated area (mn. hectares) a/	8.26	13.10	17.72
6. Cultivated area per agricultural worker (hectare/capita)	0.80	1.12	1.14

Notes : a/ Arable area refers to land under paddy cultivation, field crops, fruit tree and tree crops and vegetables and flowers.

Lines 1 to 3: National Statistical Office, 1960 Population Census, 1970 and 1980 Population and Housing Censuses.

Line 4: (Line3/Line2)\*100

Line 5: Center for Agricultural Statistics, Office of Agricultural Economics, Ministry of Agriculture and Cooperatives.

TABLE 1.3

TOTAL LABOR FORCE AND THE SHARE OF EMPLOYMENT BY MAJOR SECTORS

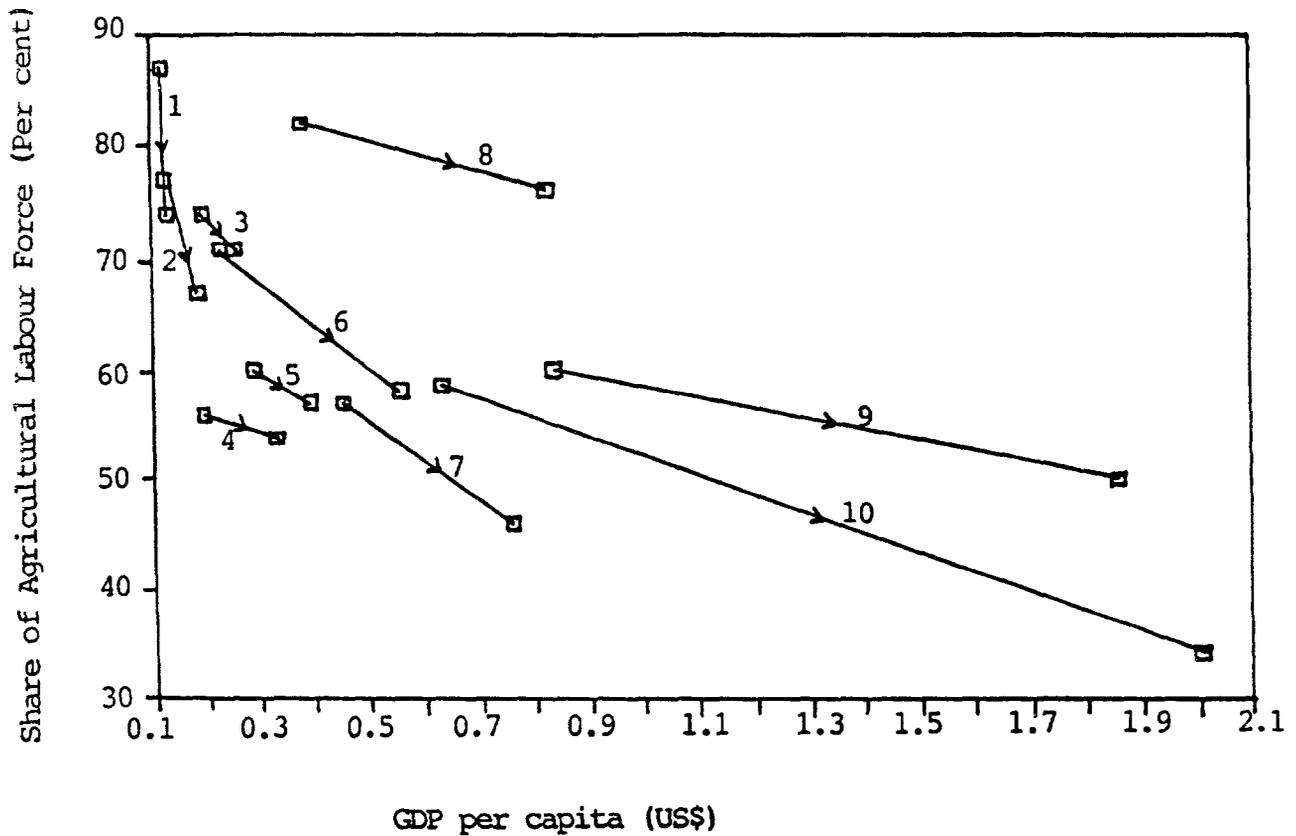
Year	Dry Season (January-March)				Wet Season (July-September)			
	Total Labor Force (million)	Agri %	Ind %	Services %	Total Labor Force (million)	Agri %	Ind %	Services %
1977	16.101	61.1	15.1	23.8	20.400	73.6	8.6	17.8
1978	16.820	63.0	13.4	23.6	21.807	73.8	8.6	17.6
1979	16.935	57.8	17.1	25.1	21.378	70.9	10.4	18.7
1980	NA <sup>a/</sup>	NA	NA	NA	22.680	71.0	10.2	18.8
1981	17.543	53.7	17.2	29.1	24.712	72.1	9.5	18.4
1982	18.616	52.6	17.8	29.6	25.369	68.7	10.6	20.7
1983	20.640	55.9	16.7	27.4	25.184	69.1	10.0	20.9
1984	22.321	60.0	14.9	25.1	25.999	69.7	10.6	19.6
1985	22.602	59.2	14.9	25.9				

a/ not available

Source: National Statistical Office, Labor Force Surveys, 1977-1985.

FIGURE 1.1

RELATIONSHIP BETWEEN THE SHARE OF AGRICULTURAL LABOUR FORCE AND GDP PER CAPITA, SELECTED ASIAN COUNTRIES, 1965 - 1983



- |               |                    |
|---------------|--------------------|
| 1. Bangladesh | 6. Indonesia       |
| 2. Burma      | 7. The Philippines |
| 3. India      | 8. Thailand        |
| 4. Sri Lanka  | 9. Malaysia        |
| 5. Pakistan   | 10. Korea          |

Initial Point: 1965      End Point: 1983

Source: The World Bank, World Development Report, 1985

maintained largely because of the expansion of cultivated area, which, in turn, is possible because of the availability of vast, unused land areas. The cultivated area per agricultural worker has actually increased over time (column 6 of Table 1.2).

The general level of education has been improving steadily over the past three decades. The government's aim of providing universal primary education (defined at first as the first four years of schooling but later as the first six years) is close to being achieved.<sup>1</sup> For every age group, the level of education has increased over time (Table A.3). The proportion of men of fifteen years and over who completed at least four years of primary education increased from 56.8 percent in 1960 to 83.6 percent in 1980. For women, the figures were 42.9 percent and 75.5 percent, respectively. For higher education, the growth has been even more dramatic. The proportion of men of fifteen years and over who have completed more than ten years of education rose from 1.9 percent in 1960 to more than 8.2 percent in 1980. Among women, the figures were 0.8 percent in 1960 and 6.6 percent in 1980.

#### Economic Performance and Distribution of Income

Macroeconomic Performance. The Thai economy grew steadily between 1951 and 1984. Real GNP growth was fairly rapid throughout the period under study (Table 1.4; for the absolute levels see Table A.4). Compared to other developing countries, Thailand has performed reasonably well during the vicissitudes of the world economy, although, for reasons explored in chapter 4, debt accumulated at an unhealthy pace at the end of the period.

---

1. The compulsory part of the education was first changed to seven years in 1966, but it was later reduced to six.

TABLE 1.4  
GROWTH RATES OF REAL GROSS DOMESTIC PRODUCT AND ITS COMPONENTS.

Period	GDP	Agriculture	Industry <sup>a/</sup>	Services <sup>b/</sup>
1951-58	3.9	1.9	5.4	5.6
1958-73	7.2	5.4	9.0	7.3
1973-84	6.4	3.9	8.2	6.9

Notes : The growth rates are obtained by fitting a log-linear least square trend.

a/ Includes mining, manufacturing, construction, electricity and water supply

b/ Includes transportation and communication, wholesale and retail trade, banking insurance and real estate, ownership of dwellings, public administration and defense services.

Source : National Accounts Division,  
National Economic and Social Development Board.

One factor that has allowed Thailand to maintain a healthy economy has been its ability to take advantage of its resource base, especially an abundant supply of land. The increase in agricultural production earned Thailand a sufficient income from exports to enable the economy to maintain a fixed nominal exchange rate (the baht/dollar exchange rate was maintained at Baht 20-21 per dollar from 1954 to 1981) and hence a relatively low level of inflation. Excluding the oil-shock years of 1973, 1974, 1980, and 1981, the rate of inflation (as measured by the consumer price index; CPI) in Thailand averaged about 3.3 percent a year for the past twenty years (Table A.5).

Policies promoting industrialization have stimulated the manufacturing sector, especially in the 1960s. (For further details, see chapter 4.) During the first three Development Plans (1961-66, 1967-71, and 1972-76), government expenditures emphasized improvement of the general infrastructure, which benefited both agriculture (e.g. through building of roads and irrigation facilities) and industry (e.g., through electrification). Investment incentives were given to selected import-substituting industries to induce an inflow of foreign capital. Both expenditures and incentives played a major role in transforming the economy during the past decades.

Table 1.5 shows a clear shift from an agricultural economy to a more industrial economy implicit in the differential growth rates displayed in Table 1.4.

From the growth rates of the three major sectors displayed in Table 1.4, it is evident that the rates in all sectors declined after the oil shock of 1973. In crude per capita terms, however, the fall was smaller, because population growth also slackened by 0.7 to 0.8 percent. Yet the deceleration in population growth cannot be a sufficient explanation for the fall in

TABLE 1.5  
SHARES OF MAJOR SECTORS IN GDP  
(PERCENT CURRENT MARKET PRICES)

Year	Agriculture	Industry <sup>a/</sup>	Services <sup>b/</sup>
1960	39.76	18.55	41.70
1965	34.85	22.67	42.47
1970	28.29	25.33	46.38
1975	31.48	24.81	43.71
1980	25.38	28.49	46.13
1984	19.51	29.22	51.27

Notes : a/ Includes mining, manufacturing, construction, electricity and water supply  
b/ Includes transportation and communication, wholesale and retail trade, banking insurance and real estate, ownership of dwellings, public administration and defence services.

Source : National Accounts Division,  
National Economic and Social Development Board.

production because the period after 1973 saw a peak in the growth of the labor force.

The reasons for the decline in the GDP growth rate are complex. Although they have not been fully studied, three reasons may be suggested. First, the import-substitution phase of industrialization ran out of steam, and the export-led phase was just beginning at the very end of the period. Second, the relative fall in international agricultural prices and the closing of the land frontier began to make themselves felt in the late 1970s, affecting the income of a large proportion of the Thai population and thereby depressing demand for manufactured goods. Finally, the poorer performance of the world economy was probably also a factor.

The very low share of agricultural product in GDP, combined with the very high share of the total population in the agricultural labor force (see Table 1.2), indicates a very large difference in productivity between the agricultural and nonagricultural sectors. As we have noted, the census figures on the size of the agricultural labor force are somewhat exaggerated. Yet, even when adjustments are made, the productivity differential remains high. Most rural households, even those that claim agriculture as their main occupation, have to supplement their income by work outside their farm.

Income Distribution. There is no question that steady economic growth has "trickled down" some benefits to the poor. The incidence of poverty (the proportion of population living below the poverty line) has steadily and substantially declined, from 57 percent in 1962-63 to 39 percent in 1968-69, to about 31 percent in 1975-76, and to 24 percent in 1981. The decline occurred in all regions and in both rural and urban areas (Meesook 1979; World Bank 1985).

A decline in poverty is compatible with an increase in income disparities, of course. There are three dimensions to the measure of income disparities: across region, urban versus rural, and within regions. Table 1.6 indicates the relative movements of average incomes in the various regions, classified by rural and urban areas. Note that the 1968-69 urban/rural dividing line is not comparable with those for other years and that the definition of "Bangkok" expanded substantially in 1975-76 and 1981 to include a much larger fringe area.

The data show that the ranking of relative rural incomes among the various regions did not change much, nor did their levels, except for the South, which had a substantial decline after 1962-63 (a peak year in rubber prices). Regarding relative urban incomes, no clear pattern emerges, except that Bangkok remained by far the richest urban area. The main point, however, is to note the very large urban/rural income differential, one that is diminishing only gradually.

Table 1.7 shows changes in income disparities within each region (Krongkaew 1985). We must issue some caveats regarding the problems posed by the upper tail of the distribution and concerning the definition of rural and urban areas for 1968-69, but we can note that the figures indicate a clear trend of increasing inequality in all regions, most strikingly in rural areas. The causes of this trend have been little studied, but possibilities are a decreasing access to new lands, which has caused the share of income from property (in which there is presumably greater inequality) to increase; a relatively slow rate of growth of wage income caused by rapid labor force growth; and a misguided industrial policy that provides different regions with unequal access to the benefits of public investment (e.g., to irrigation and roads).

TABLE 1.6  
RELATIVE INCOME PER CAPITA  
(Whole Kingdom Average = 100)

Region	1962/63			1968/69 <sup>c/</sup>		1975/76			1981		
	Rural <sup>a/</sup>	Urban <sup>b/</sup>	Rural ----- Urban (%)	Rural <sup>a/</sup>	Urban <sup>b/</sup>	Rural <sup>a/</sup>	Urban <sup>b/</sup>	Rural ----- Urban (%)	Rural <sup>a/</sup>	Urban <sup>b/</sup>	Rural ----- Urban (%)
North	66.3	135.7	48.9	73.9	232.6	72.90	136.4	53.4	78.4	141.1	55.5
Northeast	59.5	167.2	35.6	63.5	195.6	61.60	133.3	46.2	56.4	112.3	50.2
Central <sup>d/</sup>	106.9	171.6	62.3	114.3	197.1	108.75	162.7	66.8	102.4	137.2	74.7
South	105.8	180.9	58.5	76.5	189.8	80.41	156.2	51.5	81.3	147.9	55.0
Bangkok <sup>d/</sup>	-	227.1	-	-	227.0	-	172.5	-	-	204.9	-
Whole Kingdom Average	78.8	165.0	47.8	79.8	183.3	76.03	146.1	52.1	74.1	133.1	55.6

Notes : a/ Definition of "rural" includes sanitary districts for 1968/69 and excludes them for other years.  
b/ Definition of "urban" excludes sanitary districts for 1968/69 and includes them for other years.  
c/ Rural/urban income ratios not reported because 1968/69 data are non comparable (See notes a/ and b/)  
d/ Definition of Bangkok expanded in 1975/76 and 1981 to include three neighbouring provinces :  
Samut Prakarn, Nonthaburi and Pathum Thani. Definition of "Central" contracted correspondingly.

Sources : Neesook 1979: Table D.2 and World Bank 1985: Tables 3.2, 2.1 and A.1

TABLE 1.7

GINI COEFFICIENTS BY REGION AND AREA, 1962/63,  
1968/69, 1975/76, AND 1981

Region and Area	Gini Coefficients			
	1962/63	1968/69	1975/76	1981
North	0.359	0.370	0.422	0.456
Urban	0.460	0.440	0.453	0.462
Rural	0.308	0.345	0.368	0.422
Northeast	0.344	0.379	0.405	0.438
Urban	0.422	0.450	0.457	0.456
Rural	0.264	0.347	0.343	0.395
Central	0.391	0.401	0.399	0.430
Urban	0.384	0.399	0.425	0.445
Rural	0.375	0.392	0.376	0.418
South	0.402	0.401	0.449	0.456
Urban	0.360	0.450	0.465	0.443
Rural	0.370	0.325	0.402	0.426
Bangkok	n.a.	0.412	0.398	0.405
Whole Kingdom	0.414	0.429	0.451	0.473
Urban	0.405	0.429	0.435	0.447
Rural	0.361	0.381	0.395	0.437

Sources: Krongkaew (1985) based on estimates for 1962/63; 1968/69 from Meesook (1979) and Wattanavitukul (1978); and 1981 Socio-Economic Survey data tapes for the latter two sets of figures.

### The Agricultural Sector

The growth of the agricultural sector has been alluded to above. Because its share of GDP is relatively small and has been decreasing, agriculture's contribution to the economy as a whole has been belittled. Yet, agriculture provides the lion's share of employment, even during the dry season, and the agro-industrial sector, which depends on agricultural raw materials, has a substantial share in manufacturing value-added--approximately 40 percent.

Within the agricultural sector, food crops have been expanding somewhat faster than population (Table A.6). It is important to note that the line between "foodcrops" and "cash crops" is not sharply drawn in Thailand because most crops (food and nonfood) are exported. In 1985, for example, two-thirds of maize production, three-quarters of sugar production, 95 percent of cassava production, and half of mungbean production were exported. Even for rice, the staple cereal consumed in the country, the share exported is now about one-third. The major nontraded crops are coconuts, fruit, and vegetables, although even here, exports of the latter two items are rapidly increasing. Among livestock products, only the bovine sector is nontraded (although large numbers of cattle are smuggled into the country). Poultry, swine, and even eggs are now exported.

The major items in which Thailand is deficient and has to import are shown in Table 1.8 for 1985. These import figures are dwarfed by the volume of exports in that year--Baht 72,452 million, or five times the import level.

The outward orientation of the Thai agricultural sector exists despite the fact that smallholders predominate (Table 1.9). More remarkably, however, the size distribution of agricultural holdings has remained unchanged over the entire postwar period despite a rapid rate of growth in the

TABLE 1.8  
AGRICULTURAL IMPORTS INTO THAILAND, 1985.

Item	Value (Million Baht)
Dairy Products	2,193.47
Soybean Cakes	761.05
Raw Cotton and linters	4,749.97
Wheat and flour	798.61
Soybean oil	282.14
Tobacco leaf	1,408.86
Others	4,168.98
Total	14,363.08

Source : Agricultural Statistics of Thailand, Crop Year 1985/86  
Ministry of Agriculture & Co-operatives.

TABLE 1.9  
DISTRIBUTION OF LAND HOLDINGS  
BY SIZE OF HOLDING

Size Class (hectares)	Per Cent of Holdings			Per Cent of Land Area		
	1950	1963	1978	1950	1963	1978
0.00 - 0.30	0.95	-	1.60	0.02	-	0.02
0.30 - 0.99	13.88	15.16	14.30	2.27	2.48	2.27
1.00 - 2.39	28.17	30.60	27.43	11.74	13.01	11.38
2.40 - 4.79	29.53	28.65	28.97	26.37	26.57	25.71
4.80 - 9.59	21.59	19.95	21.41	37.01	35.70	36.34
9.60 and over	5.88	5.64	6.29	22.59	22.24	24.28

Note : In 1963, farms under 0.3 hectares were not enumerated in the census.

Sources : 1. Agricultural Census : 1950, Ministry of Agriculture, Thailand.  
2. Agricultural Census Report of Thailand : 1963 and 1978, National Statistical Office, Office of the Prime Minister, Thailand.

agricultural labor force. The explanation for the stable size of agricultural holdings may be the open land frontier.

The pattern of Thai agricultural expansion has had a significant effect on the relative role of rice in the economy, which has declined as new upland (i.e., nonpaddy) crops began to be cultivated in increasing amounts. The emergence of each of these new crops came in waves (see Figure 1.2). The first wave was the maize expansion of the late 1950s and early 1960s. The second wave, quickly aborted, was kenaf in the mid-1960s. The third wave was cassava and sugar, which took off at about the end of the 1960s and the early 1970s, with the sugar wave peaking somewhat earlier. These crops, of minor significance in 1960, are now established as important export commodities and are major sources of livelihood for millions of farmers.

#### The Postwar Political System: A Thumbnail Sketch

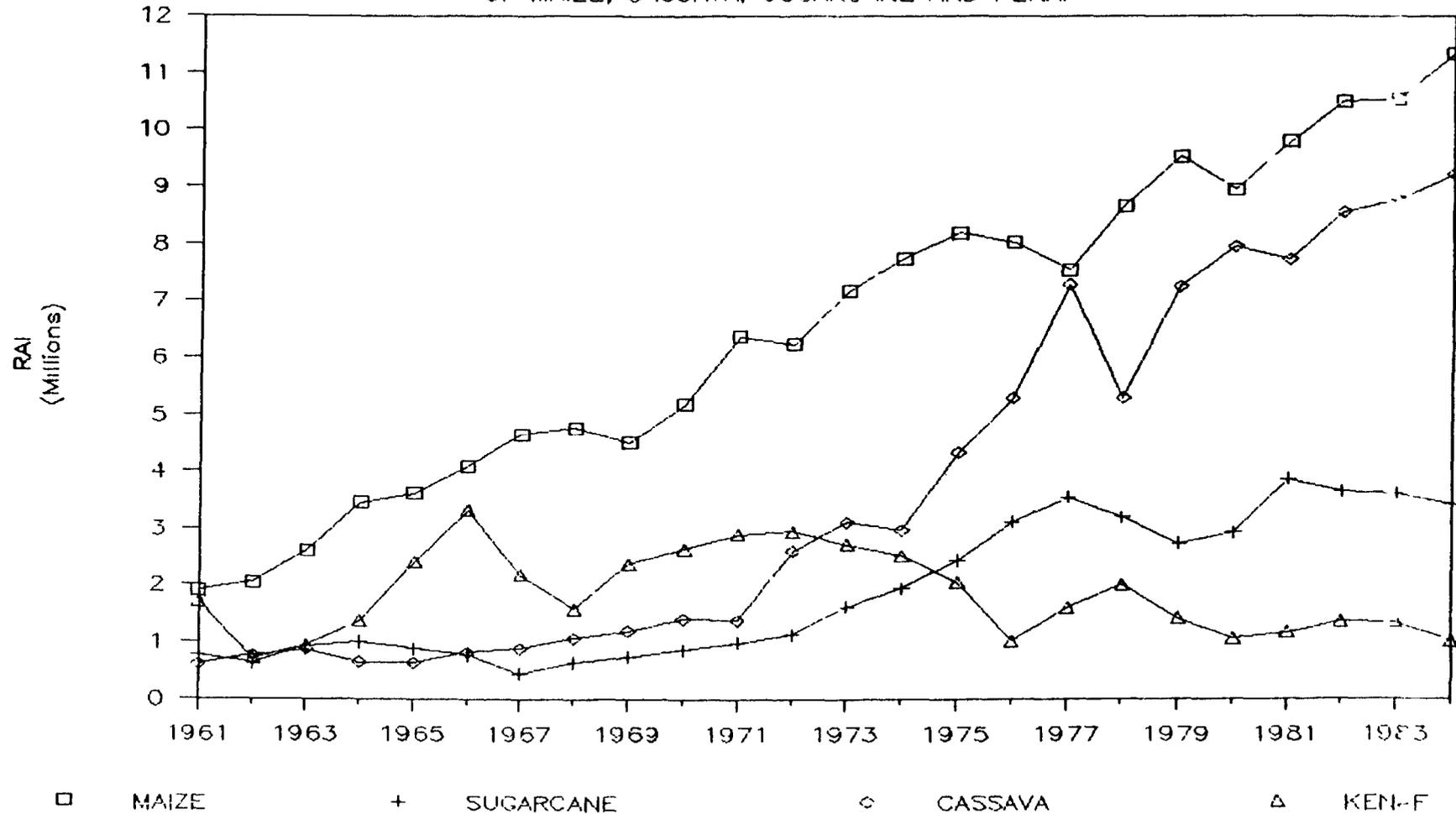
History. Thailand emerged from World War II with its physical infrastructure unscathed, at least compared to its neighbors, Burma and Malaya. Thailand expected to incur a heavy penalty for having sided with the Axis but ultimately managed not to be penalized. Political instability in the postwar period paved the way for a military coup d'etat in 1947. The major political figures of the next quarter-century all participated in that coup.

The dominant political figure of the 1947-57 period was Field Marshal Phibun Songkram, a wartime political leader who adroitly overcame his past as a staunch supporter of Japan and became an architect of the pro-American stance that has characterized Thai foreign policy ever since. Domestic economic policies during this period were notable for their nationalism and animus against ethnic Chinese. Yet this thrust was mainly rhetorical, and, in fact, the government created a number of public monopolies which were then

FIGURE 1.2

## GROWTH OF CULTIVATED AREAS

OF MAIZE, CASSAVA, SUGARCANE AND KENAF



Source: Office of Agricultural Economics, Ministry of Agriculture & Co-operatives

surreptitiously "sublet" to a few favored Chinese families who used them to accumulate great wealth (Skinner 1958; Golay et al. 1969). This wealth remained in Chinese hands and became the foundation for large Thai-Chinese conglomerates that became prominent in the 1970s.

Economic mismanagement worsened the adjustment problems of the post-Korean War period, and some of the enterprises whose loans were guaranteed by the government became bankrupt. As these bankruptcies became public knowledge, confidence in the regime faltered. Other instances of corruption and finally of election-rigging led to the overthrow of the Phibun government by Field Marshal Sarit Thanarat in September 1957.

The next period of Thai political development was 1957-73. Even before the fall of the Phibun government, bureaucrats were moving to direct Thailand's economic policies away from the economic nationalism that characterized the early 1950s. By 1955 the country's multiple exchange rates were being unified, and more transparent export taxes were replacing the system of licensing and quotas that had characterized the rice trade since World War II.

Policy changes were spurred by a year-long (July 1957 to June 1958) World Bank mission that prepared an extensive report "to help the Government plan its contribution to the economic and social development of the country during the next several years, and to advise on the forms of organization which are likely to be most effective in fostering these developments" (World Bank 1959). The World Bank report rejected the haphazard intervention of the early 1950s and the economic nationalism that appeared to be the main rationale for it. Instead, it proposed that the government foster long-term development by building up its infrastructure, particularly in transport and irrigation. It also recommended policies to promote investment through a

Board of Investment that would have the power to grant tax and duty concessions to domestic and foreign firms investing in favored sectors.

The Sarit government followed these recommendations, particularly the last, and thus abandoned the nationalistic policies that had prevailed since 1947. Sarit's prime ministership (1958-63) is remembered for its decisiveness and for launching a sustained development effort, notwithstanding the fact that at the time of his death in 1963, Sarit had personal assets of at least \$140 million. On Sarit's death, another field marshal, Thanon Kittikhachorn, took over and continued basically the same economic policies--although without Sarit's elan.

During the Sarit-Thanom era, Thailand's economy performed very well, with GDP growth doubling to 7.2 percent per year (see Table 1.4). The contributing factors appear to have been better macroeconomic management, expanded infrastructural facilities (benefitting agriculture in particular) and an influx of Vietnam War money from the United States.

The Sarit-Thanom era finally faltered in 1973. Phenomenally successful when the world economy was booming and stable, the Sarit-Thanom regimes appeared plodding and lacking in sophistication in the relatively unpredictable world economic environment after 1971. The educated, whose numbers had increased as a result of the very development policies pushed forward by the Sarit-Thanom regimes, questioned many of the moves made by the government--moves that earlier would have been taken for granted. More important, the armed forces were beginning to chafe under the excessive greed of the ruling group (Girling 1981). Above all, the monarchy reemerged from the political shadows to which it had consigned itself after a 1932 coup broke its absolutist power. In many disputes between a rising student movement and the regime, the monarchy signaled its support for the students. Finally, in

October 1973, the Thanom government was dismissed by the King after a massive public demonstration led by students.

The Thanom government fell in the same week that the Yom Kippur war and Arab oil embargo ushered in a new era in the world economy. In Thailand, partly as a result of the recurrent economic crises and partly as a result of military disunity, a more competitive political regime took shape.<sup>2</sup> An extremely liberal (by Thai standards) democracy (1973-76) gave way briefly to an ultraconservative dictatorship (1976-77) that, in turn, was replaced by an order that reflected the political standoff between elected civilian politicians, on the one hand, and military and allied technocrats, on the other. This last political system has survived for more than a decade--a long time in Thai politics--largely because, in major political crises, the final arbiter has been a monarchy that has not hesitated to maintain a balance of power between contending factions, as long as these factions stay moderately conservative.

Despite an appearance of extreme instability (seventeen coups or attempted coups and thirteen constitutions in fifty-three years), Thai political regimes have shown a remarkably consistent ideological orientation. Their ideology may be characterized as moderately conservative--"conservative" in the sense of being disinclined to undertake radical changes in the existing social and economic order, and "moderate" in the sense of accepting gradual changes, even where they may lead cumulatively to a shift in the balance of political power in the long run. During the thirty-seven years (1947-84) discussed here, using a generous estimate, there have been only about five

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2. The military leadership in 1973 was part of the group that participated in the coup of 1947. Those that rose to power after 1973 belong to a generation that lack the bond provided by participation in that event.

years (1947-51 and 1976-77) when there was a departure from this norm of moderate conservatism.<sup>3</sup>

The Role of the Bureaucracy. The bureaucracy, including both civilian and military wings, has long dominated the Thai political system. Riggs (1966) has labeled Thailand a "bureaucratic polity" and has argued that the dominance of the bureaucracy has made it accountable to no one. The locus of political struggle in such a system, then, is not between the competing interest groups in society at large (labor, farmers' associations, etc.) but between bureaucratic cliques. Thus, as Riggs has put it,

"Political struggles began to take place on two levels: an open but largely epiphenomenal facade of parliamentary and constitutional processes; a hidden but substantive core of intra-bureaucratic rivalry" (1966: 148).

Riggs' analysis was based on an absence of popular pressures and described the situation of the mid-1960s, when interest groups and the mass media were weak. They were, in fact, organized by the bureaucrats and politicians themselves. Major business interests, mostly in the hands of the Chinese, could not be effectively organized without some protection from the bureaucrats. This meant that their role in policymaking was as clients of competing patronage groups headed by bureaucrats.

The picture of bureaucratic dominance has to be modified considerably when discussing Thai politics after 1973. As we have noted, the groups that became active during the post-1973 period emerged as a consequence of the development of the economy during the 1960s. They blossomed between 1973 and

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3. This does not mean that all actors in the political arena are of similar mold. The Communist Party of Thailand, in particular, was founded in 1942 and took up arms in 1965. For a time (particularly between 1973 and 1980) it was a significant force, able to dominate large tracts of territories in the Northeast and the South. Since 1980, however, it has declined and has ceased to be a major concern for the government.

1975 and survived or reemerged after the repression of 1975-78. The business interests were never suppressed and began to make their voices heard, no longer as cowed clients of military leaders but as independent entities pressing for reform of taxes and regulations.

It has been claimed that the regime that emerged after 1978 was "a reversion to the bureaucratic polity" (Girling 1981: 219). This is perhaps true if one looks at macropolitical trends, but if one looks at specific issues connected with particular commodities, as we do in chapters 2 and 3, the notion of Thailand as a bureaucratic polity cannot be accepted unquestioningly.

The Role of the Chinese. The Chinese and their assimilated descendants have traditionally dominated the Thai economy. Among other things, they dominate the network that moves commodities from the farm to export markets.<sup>4</sup>

The position of this important ethnic group in Thai society and politics and its evolution in the last three decades bears some examination. We touched earlier on the anti-Chinese thrust of economic policies in the early 1950s. That was the last time the Chinese problem was a major political issue in Thailand. Over time, the antagonism that had prevailed subsided but the relation that had grown up between the wealthy Chinese and the Thai bureaucracy continued for the next twenty years. That is, seemingly arbitrary actions taken by the government during the postwar period led Chinese businessmen to reach an accommodation with Thai bureaucrats and politicians that continued through the 1960s. That is, wealthy and influential Chinese

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4. The dominance of the Chinese in commodity trade was the case not only in Thailand but throughout Southeast Asia. Members of trading houses in different countries were sometimes related.

acquired monopolistic or promotional privileges from, and shared their proceeds with, powerful Thais.

The picture drawn here is mostly of the Chinese in Bangkok and pertains to the 1950s. Little systematic work has been done on the provincial Chinese. However, impressions gleaned from casual conversations suggest that, parallel to the deals their Bangkok counter-parts were making with national political figures, provincial Chinese were making their own arrangements with local officials.

After 1958, the relationship between Thai and indigenous Chinese changed as a result of several events: the turn toward a less interventionist mode of economic management; the gradual assimilation of the Chinese, particularly those of the newer generations, through a national schooling system (and discouragement of Chinese schools); and the closing off of mainland China. Occasional undercurrents of hostility have surfaced--for example, when the role of middlemen in agricultural commodities is discussed. But, this has not resulted in any action against them. On the contrary, both Bangkok-based and provincial businessmen of Chinese descent have been participating more and more in national politics and have even succeeded in guiding policies in directions that suit their interests (we discuss this in chapter 2).

TABLE 1.10  
PERCENTAGE SHARES OF FOUR SELECTED CROPS IN  
VALUE ADDED OF AGRICULTURAL CROPS  
(AT CURRENT PRICES)

Year	Paddy	Rubber	Maize and Sorghum	Sugarcane	Total
1960	43.92	10.67	2.45	2.48	59.52
1965	50.41	6.10	4.19	1.28	61.98
1970	35.37	6.68	6.56	3.23	51.84
1975	40.64	3.28	8.59	7.38	59.89
1980	34.77	6.36	5.76	8.75	55.64
1985(e)	29.61	7.32	6.65	12.05	55.63

Note : (e) Signifies preliminary estimates.

Source : National Accounts Division, NESDB.

Chapter 2

HISTORY, INSTRUMENTALITIES, AND OBJECTIVES OF  
GOVERNMENT INTERVENTION: RICE

This chapter gives a narrative history of government intervention in the rice sector. The next chapter treats intervention in the sugar, maize, and rubber sectors. We focus first on the instruments and then discuss the politics and objectives of intervention. Of course, a statement of economic objectives usually precedes a discussion of instruments. But here, we are reconstructing from the evidence at hand an account of policies and objectives. That is, from the firm data we have at hand we subjectively infer the objectives. The reader may judge whether the inferences are valid.

The Rice Export Tax Regime

At the end of World War II, the Thai rice trade was subjected to massive intervention by the government. The government intervened to facilitate Thailand's payment to the Allies of an indemnity of 1.5 million tons of rice. That indemnity was never paid, but the government used the situation to set in motion a series of measures that have become the basis of rice policies ever since.

First, the government nationalized the rice export trade and set up a Rice Office to handle all rice trade. After the dislocations of the immediate postwar period had passed, the government allowed private exports to resume but maintained the facade of the Rice Office's monopoly. Thus, private exporters could initiate and conclude sales with foreign buyers but then would have to arrange to ship the rice under license from the Rice Office. A quota rent, called by traders the "premium," emerged in such transactions in the

form of certain payments from rice traders either to the Rice Office itself or to officials within the Rice Office. In 1950, these payments became slightly more regularized as required accompaniments to an application for an export license. Later, in 1952, the rates were regularly set and announced by the Ministry of Commerce. Legal authority to impose this "premium" was not obtained until 1975, however (Inthachat 1960).

In addition to the rice export premium, the government imposed an even larger implicit export tax on rice because it paid rice exporters Baht 35 to the pound sterling for foreign exchange compared to Baht 55-60 to the pound sterling in the free market.

The combined proceeds from the premium (collected by the Ministry of Commerce) and the implicit export tax (received by the Bank of Thailand) were a very substantial component of government revenue--roughly one quarter--in most of the period between 1949 and 1953 (Siamwalla 1975a). Consequently, reforms to remove or reduce the export tax burden portended severe fiscal strain. By 1955, the total tax burden on rice was roughly 58 percent of the domestic wholesale price or 33 percent of the FOB price. Reforms were made in 1955, but they maintained the level of this burden and only merged the implicit tax with the "premium." The reforms thus made this part of the tax regime more transparent.

Beginning in 1952, the Ministry of Finance levied an ad valorem export duty of 5 percent on rice. Furthermore, between 1962 and 1982, exporters were required to sell to the government at below market prices a certain proportion (which varied over time) of rice for every ton exported. Eventually, this rice was supposed to become part of government reserves for a consumption subsidy program (this program is discussed in the next section).

Throughout the entire postwar period, rice exports have had to be licensed. Except for very brief periods when the world rice market was soft, the government gave licenses on the basis of past performance, and quotas tended to be binding. The Commerce Ministry occasionally has tacked on some other measures that have allowed exporters to earn extra quotas. Because quotas were often binding, some quota rents were acquired by exporters.

Another measure often used by the Ministry of Commerce was to impose a minimum selling price requirement on exporters. Attempts to cartelize the trade were often promoted by the authorities on grounds of maximizing the price of rice to foreigners. Usher (1967) described an early version of such an export cartel. Several versions followed. As finally refined in the late 1970s, the cartel worked as follows. Any exporter having a sizable export prospect could, after negotiations with the Ministry, compete for the order. After winning the order, the original exporter had to share it with all other exporters, who would ship 80 percent of the total. The sweetener for the original exporter was a discount on the rice reserve requirement. By forcing the original exporter to share the order with others, the government created an inherent self-check that the price agreed on with the foreign buyer met the minimum level set by the Ministry. Then the remaining exporters would have to be paid the price quoted by the original exporter.

#### The Consumption Subsidy Program: The Rice Reserve Requirement

The requirement for exporters to sell certain quantities of rice to the government at below-market prices before they were permitted to ship their rice had a curious origin. It was first conceived of as a move to facilitate exports rather than to subsidize consumption. A Rice Reserve Committee, chaired by the Minister of Commerce, was formed in 1960 to produce rice for the government's own exports--that is, government-to-government (G-to-G) trade

as a hedging activity. The rice was purchased in the open market (Piriyavithayopas 1980). The rice reserve was first used as a consumption subsidy and as an export tax device in 1962 after considerable amounts of rice had been shipped and the FOB price of 5 percent rice (the major grade of rice consumed) began to edge upward from Baht 3.12 to Baht 3.64 per kilogram. The rice was then resold to selected outlets by the Public Warehouse Organization (PWO), a public agency charged with maintaining rice reserves to meet the needs of the G-to-G trade and of the city of Bangkok. There are no extant data on the price at which this rice was resold.

Between 1966 and 1968, as the world rice market became tight, the government reintroduced the cheap rice program. The amount of subsidy was approximately 10 percent, as the free-market price was at about Baht 2.33 to Baht 2.53 per kilogram and the price for government rice about Baht 2.13. At this differential, meeting the demand on government rice appeared manageable.

Because of an extremely rapid price increase in 1973-74, the government's commitment to provide cheap rice for Bangkok residents was subjected to a severe test. In June 1973, the government's rice was to be sold at Baht 2.40 per kilogram whereas free market price was 25 to 30 percent higher, at Baht 3.0 to Baht 3.33. As the market price climbed further the government raised its release price, but not by the same extent, so that the gap continued to widen. In response, the government increased the rice reserve obligations of exporters.

The government's administration of rice sales was rigorous in some respects but very loose in others. Buyers had to show identity cards and housing registration in the district in which they were buying rice. This automatically ruled out many poor people who did not have their papers in order, or who, as recent migrants, had not registered a change in residence.

The amount of rice allowed each buyer per transaction was limited, but not the number of transactions per buyer per week. Nor was there any way the government could gauge the supplies that each rice shop required. Allegations that a considerable amount of cheap rice was diverted back to the free market naturally arose (see the section on the legal and administrative framework of rice policy below).

As the crisis in the world rice market subsided, and with it the pressure on domestic prices, the demand on the system lessened. The government eliminated the rice reserve requirement in early 1976, only to reinstate it ten months later. To prevent any leakage in the system, a new and distinctive grade of rice, Ocha rice, was introduced in 1979 (Ocha is a Thai word for "delicious"). This rice was a mixture of 80 percent nonglutinous rice (15 percent broken) and 20 percent long-grained glutinous rice (10 percent broken). The introduction of a new and strange type of rice served two functions. First, it differentiated the product from what was generally available in the market. Second, the inclusion of glutinous rice absorbed a rising surplus of this kind of rice.<sup>5</sup> Another development was a gradual decline in the amount of rice allocated to Bangkok outlets (Table 2.1).

As the cheap rice program became increasingly diffuse, its political support also began to decline. Even the Ministry of Commerce, the program operator, realized the wastefulness of the program and began to demand cash payments from exporters in lieu of compulsory delivery of rice to the ministry, thus reducing the program to an explicit export taxation device.

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5. Glutinous rice is grown and consumed as a staple mostly in the North and Northeast. It is mostly a subsistence crop. Although grown extensively (2/3 of production), a very small proportion is marketed and still less exported.

TABLE 2.1  
CHEAP RICE DISTRIBUTED THROUGH  
PUBLIC WAREHOUSE ORGANIZATION

'000 Tons

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	Bangkok	Province	Total	%Bangkok
1972 (Nov - Dec only)	5.2	1.3	6.5	80.3
1973 (Jan - Mar only)	14.2	1.6	15.9	89.6
1974	517.1	229.0	746.1	69.3
1975	521.1	233.9	755.1	69.0
1976	228.7	70.7	299.4	76.4
1977	176.2	40.3	216.5	81.4
1978	295.4	144.5	439.9	67.1
1979	348.3	176.6	525.0	66.3
1980	328.0	228.7	556.7	58.9
1981	166.5	409.5	576.0	28.9
1982	41.7	50.0	91.7	45.5

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Source: Rice Division, Public Warehouse Organization, quoted from Piriyawithayopas (1980), Table 2.4 (1972-1977); Siriyodhin (1983), Table 2.5 (1978-1980); and Department of Internal Trade (1981-1982).

This was done in February 1981. Shortly after, in May 1982, the entire program was killed.

The consumption subsidy program was always a partial one. It affected a relatively small proportion of the rice marketed in Thailand. Its impact in Bangkok was quite substantial, however--theoretically, it represented the bulk of rice consumed within the city. But this assumes no leakage, and the extent of leakage is hard to estimate. Roughly, we may calculate, Bangkok's population consumed 400,000 tons of rice yearly. The amount of rice released through this program (see Table 2.1) therefore should have been enough to affect the private channels of distribution seriously. Interviews with rice wholesalers and retailers indicate, however, that they were not affected severely. In fact, when the cheap rice program was eliminated, there was no noticeable expansion in that part of the trade. This suggests that, toward the end of its life, the program had a small market impact.

Support for the consumption subsidy probably came from retail outlets more than from consumers. This supposition is bolstered by the fact that even if retailers honestly sold the public rice to consumers instead of diverting it to the free market, the profit margins allowed by the government were comfortable. The greater revenue gained by diverting rice to the open market, of course, was an additional incentive for retailers and for bureaucrats, who no doubt shared the profits of such transactions.

The demise of the program took place quietly, when a high-level decision was made to increase the release price gradually when free market rice prices increased and then not to allow it to decline when the latter declined. Thus, the program was not so much "killed" as allowed to die a natural death.

Although the publicly visible part of the government rice program was the consumption subsidy, by far the more important role of this program was as an additional tax on exports, since the Commerce Ministry obtained the rice through forced purchase from rice exporters at below market prices. The export tax equivalent of this measure is as follows:

$$\text{ETE} = \text{RRR} (\text{DP} - \text{RRP})$$

where:

ETE is the export tax equivalent in baht per ton

RRR is the rice reserve ratio (i.e., the proportion of rice to be sold to the Commerce Ministry for each ton exported)

DP is the domestic price in the free market

RRP is the buying price set by the Commerce Ministry.

Calculations of the value of ETE are given in the section on quantitative estimates of direct price effects below.

The rice reserve requirement might be regarded as a price-stabilizing factor for two reasons. First, it created a stock of rice to buffer against sudden surges in demand. Second, the implicit export tax was collected in a way that made it function as a sort of variable levy. As the domestic market price climbed upward, the equivalent export tax rate increased. This, in turn, stabilized the domestic market, even though it destabilized the overseas market.

In the short run, however, the rice reserve requirement tended to destabilize even the domestic market. First, the government agency charged with holding the reserve, the PWO, lacked sufficient storage facilities in

Bangkok. Consequently, when an exporter obtained his export license, he was not asked to deliver the rice for the reserve right away. He owed the government that rice. It was only later, when the government needed the rice, that he was called upon to deliver. Meanwhile, the exporter might actually hold the stock of rice or decide to go short. If the market was stable, there was no problem. However, with rapidly increasing prices in the free market, there would be an additional force acting on it. Thus, as the offtake from public distribution accelerated as a consequence of the price increase, the government would also call upon exporters to deliver the reserve rice. This would reduce the stocks in the hands of the exporters, accelerating the upward movement in price. This was the actual scenario in the first quarter of 1974 (Siamwalla 1975a).

#### The Price Support Program (1975-83)

Some sort of rice support program has been in effect since 1965, but because the declared support price was below the market price in the earlier year, the program played no significant role. The program also was not very effective even when the market price began to drop below the support price between 1969 and 1972. This was because the money available was never sufficient to buy more than 200,000 tons yearly. The average annual production of paddy rice between 1969 and 1972 was 13.4 million tons. About half was marketed. Also, during this period, the premium was reduced but never eliminated (Siamwalla 1975).

The problems that plagued the program in those four years (inadequate personnel, inadequate money, refusal to acknowledge the connection between low rice prices and the export tax) have continued to nag the programs implemented since 1975. The only difference is that the problems and the failures were on a magnified scale.

The first point to observe about Thailand's price support programs for rice since 1975 is their lack of continuity in method and organization with the earlier programs. In addition, the magnitude of the operation varied markedly with the political regime (Table 2.2). Typically, procurement volume would be large only when parliamentary democracy was the operating mode of government and when the Social Action Party was in charge of economic policy.

Despite the lack of continuity and the year-to-year variations, there was enough of a resemblance in the general mode of operation of price supports for us to give a broad description of the programs. Typically, there would be pressure on the government to embark on a support program a few months before (or almost at) harvest time of the wet-season crop (December-January). If the government was serious about implementing the program, it would decide at that time on the support price, the method of support, and the funding.

If the Minister of Agriculture was the advocate and chosen implementer of the program, he would make the Marketing Organization for Farmers (MOF) responsible for the support program.<sup>6</sup> If, on the other hand, the Minister of Commerce was to be responsible, he would choose the Public Warehouse Organization (PWO).<sup>7</sup> In one year (1980-81) both ministers wanted to be involved, because they belonged to different parties, each of which wanted to gain favor with the electorate. Therefore, both MOF and PWO were involved, with the former put in charge of supporting milled rice prices and the latter in charge of paddy prices.

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6. The MOF is an agency set up on the same day the Farmers' Aid Fund Act of 1974 was enacted. Although technically a public enterprise, it is affiliated with the Ministry of Agriculture and Cooperatives and is very much its creature.

7. The PWO is an older agency than MOF. In rice procurement, it plays the same role vis-a-vis the Ministry of Commerce as the MOF does vis-a-vis the Ministry of Agriculture.

TABLE 2.2  
FUNDS ALLOCATED FOR PRICE SUPPORT PROGRAMS  
1974/75 - 1982/83

Season	MOF				PWO			
	Source	Revolving Fund (mn.B)	Used (mn.B)	Tonnage Procured (1,000 tons)	Source	Revolving Fund (mn.B)	Used (mn.B)	Tonnage Procured (1,000 tons)
Wet 1974/75	FAF	200	216	249	-	-	-	-
Dry 1975	FAF	305	430		-	-	-	-
Wet 1975/76	FAF	0	84	37	-	-	-	-
Dry 1976	FAF	0	2		-	-	-	-
Wet 1976/77	FAF	30	26	15	n.a.	n.a.	36.44	30.8
Dry 1977	FAF	0	0		-	-	-	
Wet 1977/78	FAF	0	2	4	-	-	-	-
Dry 1978	FAF	0	8		-	-	-	-
Wet 1978/79	FAF	900	375	178	-	-	-	-
Dry 1979	FAF	400	22		-	-	-	-
Wet 1979/80	FAF	1,230	3,304	1,146	-	-	-	-
Dry 1980	-	-	-		-	-	-	-
Wet 1980/81	-	-	-	-	<sup>1</sup> Banks	5,000	-	1158.1 (white rice)
Dry 1981	-	-	-	-	-	-	-	-
Wet 1981/82	FAF	750	606	180	<sup>2</sup> Banks	6,000	-	104.3 (white rice)
Dry 1982	-	-	-		-	-	-	-
Wet 1982/83	<sup>3</sup> FAF & BOT	2,400	1,600	510	-	-	-	-
Dry 1983	-	-	-		-	-	-	-
Wet 1983/84	FAF	400	-	-	-	-	-	-

Sources For MOF, upto 1979, from MOF, quoted in Thanapornpun (1980), Table 19 and 20  
For PWO, 1980-1981, from BOT  
For FAF, 1982-1983, from DIT, Ministry of Commerce

Note 1. 1/4 from BOT, others from BAAC 500 mn.B, Krungthai 530 mn.B and FAF 85 mn.B  
2. 1/4 from BOT, 3/4 from 16 commercial banks  
3. 1,900 mn.B from FAF and 500 mn.B from BOT

The source of funds for this operation was generally the Farmers' Aid Fund, which allocated the revolving funds for each operation. An alternative source, particularly when the Commerce Ministry or PWO was involved, was profits from the G-to-G trade. One exception may be noted: the PWO obtained funds for its program in 1980-81 by selling notes to commercial banks. These funds were sometimes rolled over a few times, because the government did not hold stocks but would release the rice back into the market very soon after procuring it, in most cases.

The main problem with the support programs was that they were never support programs in the classic sense that the government purchased rice and withdrew it from the market so that the price would rise.<sup>8</sup> Because of the government's preoccupation with spreading the program as widely as possible, the money obtained for the program was turned over many times. This implies that the government moved the rice into the market as quickly as it was purchased. To the extent that withdrawals took place they were to fill G-to-G orders, but then the government could just as effectively fill the orders with purchases from the free market without needing to engage in the whole panoply of support operations at the farm level.

The main task of the programs was to enable the government to purchase rice at prices higher than market levels. Because the rice was to be resold at market prices, and because rice used to fill G-to-G orders could be obtained more cheaply from the market, the programs created substantial economic rents for sellers lucky enough to sell to the government.

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8. Some officials justify the government programs by claiming that the temporary storage engaged in by the government would raise prices in the immediate postharvest period. However, inasmuch as the procurement program is publicly known, millers and traders would include it in their information set when making decisions to buy and sell. Consequently, the (temporary) public stock would merely replace private stocks.

If carefully administered, the program could have ensured that the recipients of this rent would have been farmers. As it was, however, neither the MOF nor the PWO were up to the task. Both organizations were small (MOF having about 400-500 employees, and PWO about 800-900 employees). Consequently, they were unprepared for the administrative burden required for this task, at least in those years when the amount to be procured was more than 100,000 tons.

Typically, in these years, another instrument chosen to carry out the program was the ricemills. They alone had the skills and the storage capacity to act as government agents. It is therefore not surprising that they were the ones to skim off much of the economic rent generated by the program. In a careful study of the distribution of the benefit and burden of the 1983 rice market intervention by the MOF, Pinthong (1984) estimated that of the economic rent thus generated, the distribution was 54 percent for millers and exporters, 27 percent for government officials and political parties, 6 percent for farm leaders, and 13 percent for farmers.

The last major price support program for rice came to an end in the mid-1980s because the politicians overreached themselves. Instead of being content with premium revenues that were placed in the Farmers' Aid Fund (as had been done up to that point), they had the PWO borrow approximately Baht 4.5 billion (about U.S. \$200 million) from the commercial banks in 1981-82 to finance the support program. When the short-term notes fell due three years later, the PWO could not pay, and the Cabinet finally understood the true cost of the program. Repayment was then rescheduled over the next ten years, with the money coming from the seemingly limitless Farmers' Aid Fund. The 1984 program, and those of succeeding years, have been much more modest in scale and have become, in effect, a way of buying off farmers' protests. The

administration of the program passed to the Ministry of Interior, which was allocated a revolving fund of Baht 200 million (about U.S. \$8 million). Because it is the main local administrative arm of the government, the Interior Ministry is better able to detect early signs of trouble in the provinces. When flare-ups of discontent occur, Interior Ministry officials douse the flames by buying off local leaders (usually rice millers) who stand to gain the most from government intervention.

Quantitative Estimates of the Direct Price Effects of Various Government Measures

Of the various measures discussed above, only those administered at the border affected the marginal prices received by producers and paid by consumers. Measures administered in the domestic market either did not affect marginal prices at all or generally had such a small impact that they can be safely ignored.

We estimate the effects on prices of four measures: (i) the export premium, (ii) the export duty, (iii) the rice reserve requirement, and (iv) export quotas.

The Ministry of Commerce has published data on export premium rates that go back to 1955. The export duty is levied at an ad valorem rate based on an assessed price, which is announced monthly and published in the Royal Gazette.

Data on the rice reserve requirement are somewhat more complicated. Calculation of the export tax equivalent (ETE) is based on Equation 1 above. Data for RRR and RRP and the required grades of rice are presented in Tables A.7 and A.8. As can be seen, different grades of rice are required at various times as reserve. Further, the grades of rice to be exported also require different proportions of reserve. Calculations therefore were made for each

grade of rice exported. Calculation for the period after October 1981 was simplified by the fact that cash payments were required in lieu of rice.

Since quota policies are constantly shifting and seldom explicit, we adopted the following procedure to estimate the quota rent. We calculated the gross exporters' margin for the entire period 1960-84 by subtracting the Bangkok wholesale price of rice and the three types of taxes discussed above from the FOB price. We then split the data into two periods--before 1972, and after 1973--to reflect the major price movements that took place in 1973, picking the years when the margin was the minimum for each of the two periods. (They were 1969 and 1983. We know, in fact, that 1983 was the year of most liberal licensing of the post-1973 period.) We then assume that the quota rent for these years reflected actual costs, including exporters' normal profits. Deducting this margin from the gross margin yields a quota rent series.

Table 2.3 presents the series for the four kinds of border measures on rice exports. To avoid detailed grade-by-grade analysis, we aggregated all data related to rice prices into "paddy" and assumed that the standard ton of paddy consists of 450 kilograms of white rice 5 percent, 150 kilograms of broken rice A1 extra, 30 kilograms of broken rice C1 extra, and 30 kilograms of broken rice C3. This is the modal milling outturn of Thai paddy.

The variability in the export tax rate (column 9 of Table 2.3) is quite substantial, particularly after 1966, with a broad, downward trend.<sup>9</sup> Both the variability and the trend become more explicable if one looks at real domestic and border prices. Figure 2.1 shows a remarkably stable real

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9. In all that follows, all border taxes are shown as negative amounts and all subsidies as positive.

TABLE 2.3  
EXPORT TAX EQUIVALENTS OF VARIOUS  
INTERVENTION MEASURES ON RICE  
(NOMINAL)

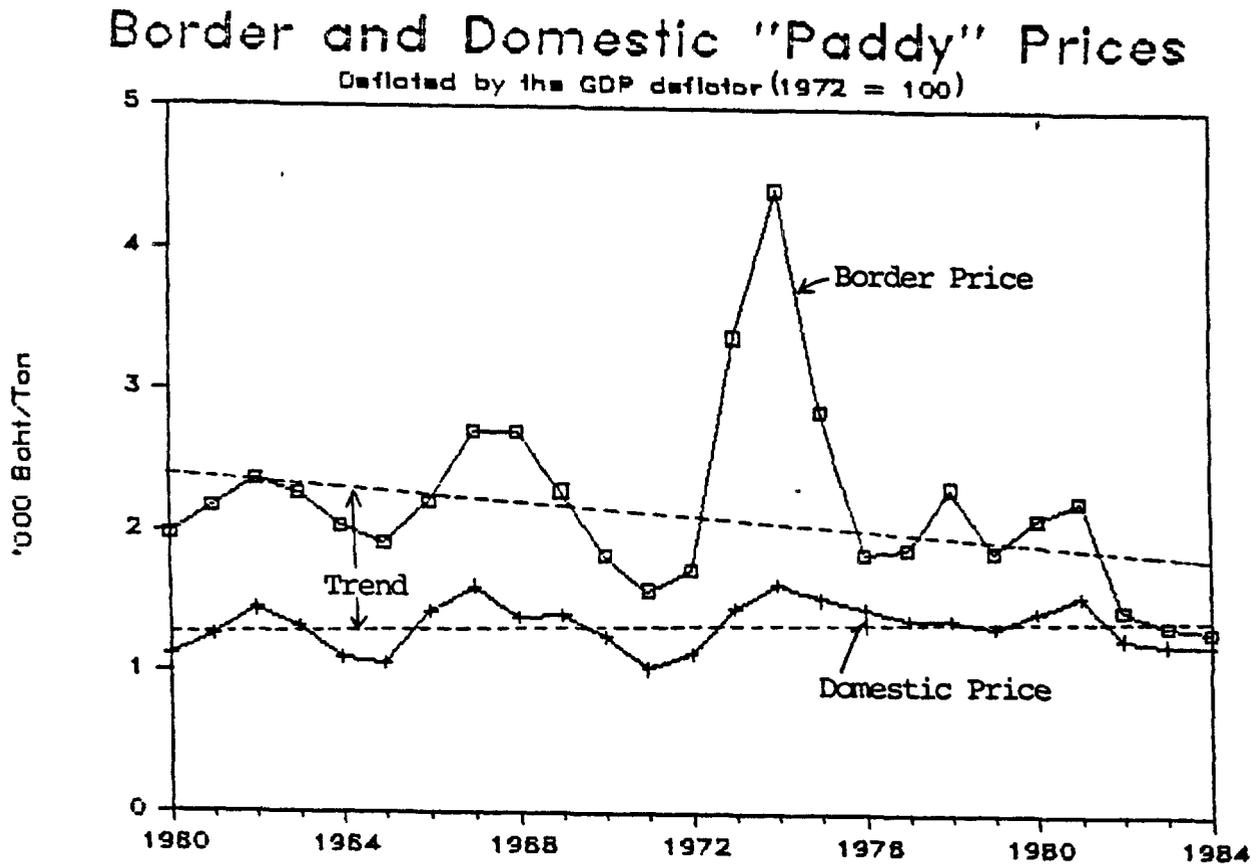
<sup>a</sup>  
(Baht/Ton of "paddy," nominal)

Year	Export Premium	Export Duty	Reserve Rice	Quota Rent	Total Tax	Domestic Price	Border Price	Border Price adj. for export price effect	Tax as Proportion of Border Price	Tax as Proportion of adj. Border Price
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1960	502.88	74.94	0.00	65.81	643.62	848.06	1,491.68	1,268.28	0.4315	0.3313
1961	509.72	74.94	0.00	135.69	720.35	983.12	1,703.47	1,477.70	0.4229	0.3347
1962	540.42	74.94	25.12	80.29	720.76	1,133.94	1,854.70	1,588.03	0.3886	0.2859
1963	550.50	74.94	0.00	109.32	734.76	1,020.22	1,754.98	1,499.32	0.4187	0.3195
1964	550.50	79.45	0.00	109.51	739.46	884.57	1,624.03	1,407.22	0.4553	0.3714
1965	550.50	76.97	0.00	89.45	716.92	897.81	1,614.73	1,402.98	0.4440	0.3601
1966	550.50	91.88	14.78	42.77	699.93	1,291.95	1,991.88	1,755.59	0.3514	0.2641
1967	759.88	114.56	29.36	86.85	990.65	1,461.41	2,452.06	2,056.02	0.4040	0.2892
1968	953.00	124.86	3.51	116.70	1,198.07	1,252.76	2,450.83	1,945.02	0.4888	0.3559
1969	706.96	110.27	0.00	0.00	817.23	1,301.70	2,118.93	1,754.57	0.3857	0.2581
1970	527.31	88.22	0.00	0.00	615.53	1,133.86	1,609.93	1,387.63	0.3210	0.1829
1971	356.25	75.51	0.00	85.10	516.86	952.00	1,468.86	1,283.53	0.3519	0.2583
1972	337.50	77.93	4.90	173.45	593.78	1,145.30	1,739.08	1,565.02	0.3414	0.2682
1973	530.00	115.69	825.15	827.45	2,298.29	1,770.84	4,069.13	2,973.42	0.5648	0.4044
1974	2,410.36	197.40	606.57	781.03	3,995.36	2,342.87	6,338.23	4,466.65	0.6304	0.4755
1975	883.95	162.15	576.95	331.69	1,954.74	2,261.75	4,216.49	3,314.46	0.4636	0.3176
1976	368.63	148.50	21.08	62.76	601.02	2,233.20	2,834.22	2,651.06	0.2121	0.1576
1977	357.63	153.99	118.64	200.26	830.51	2,313.96	3,144.47	2,966.13	0.2641	0.2199
1978	510.00	207.83	493.10	481.96	1,692.88	2,509.05	4,201.93	3,669.58	0.4029	0.3163
1979	510.00	178.85	311.50	94.21	1,094.57	2,675.09	3,769.65	3,515.94	0.2904	0.2392
1980	482.50	241.98	527.13	273.67	1,525.27	3,403.93	4,929.20	4,606.77	0.3094	0.2611
1981	347.52	297.68	877.31	219.37	1,741.87	3,951.39	5,693.25	5,320.29	0.3060	0.2573
1982	201.00	222.03	87.31	15.13	525.47	3,303.78	3,829.25	3,735.20	0.1372	0.1155
1983	176.71	178.03	0.00	0.00	354.75	3,303.52	3,658.26	3,592.79	0.0970	0.0803
1984	100.50	103.58	0.00	52.97	257.05	3,309.02	3,566.07	3,524.39	0.0721	0.0611

Notes : <sup>a</sup> One ton of "paddy" is defined as 450 Kgs. of white rice 5%, plus 150 Kgs. of broken rice A1 extra, plus 30 kgs. of broken rice C1 extra, plus 30 kgs. of broken rice C3

Sources : (1) Thailand, Ministry of Commerce, Department of Foreign Trade.  
(2) Thailand, Ministry of Commerce for rates of duties  
Royal Thai Gazette, various issues, for assessed price.  
(3) From Appendix Tables A.1 and A.2, See text.  
(4) See text.  
(5) = (1)+(2)+(3)+(4)  
(6) Thailand, Ministry of Commerce, Department of Internal Trade.  
(7) Board of Trade of Thailand.  
The exporters' margins are assumed to be the same as in 1969 for the period 1960-1972 and as in 1983 for 1973-1984.  
(8) = See text.  
(9) = ((6)-(7))/(7)  
(10) = ((6)-(8))/(8)

FIGURE 2.1



domestic price of rice, but the real border price shows a downward trend of about 1.1 percent per year, despite sharp fluctuations. The changes in the tax rate then can be explained as a device to stabilize domestic prices, compensating for the variability in the real border price.

Except for the export duty, which was fixed at 5 percent for the entire period (except 1984), there are considerable variations in the use made of the various export restriction measures chosen by the government. These shifts were very much determined by the political exigencies of the moment, and in particular by how much opportunity the alignments within the Cabinet afforded the Ministry of Commerce, the key actor in rice policy (see the section on bureaucratic politics below). The export tax rate in column 9 of Table 2.3 cannot be considered a measure of the direct effect of intervention, however. Thailand has always been a major exporter of rice in the world market. The small-country assumption is therefore not applicable, and a significant part of the burden of the combined export taxes was borne by foreign buyers. The final effect on domestic prices was thus much less.

Put another way, if all the taxes were reduced to zero, domestic prices would not rise fully to the border price, as shown in column 7, and the border price would itself fall somewhat, owing to the elimination of the tax on foreigners. Column 8, therefore, gives the border price as it would have been if Thailand had not collected any taxes. The formula used to adjust the

border price, derived from the conventional incidence analysis.<sup>10</sup>

$$BP' = DP \cdot [1 - (|EFD| / (|EFD| + EFS)) (1 - DP/BP)]^{-1}$$

where;

BP' is the adjusted border price after removal of taxes

BP is the border price without adjustment (column 7 of Table 2.3).

DP is the domestic price (column 6 of Table 2.3)

EFD is the elasticity of the foreign demand for Thai rice

EFS is the elasticity of the supply of Thai rice to foreign markets.

EFD is here assumed to be -4.0 as estimated by Wong (1978). EFS in turn, is calculated from the following formula:

$$EFS = EDS (P/X) - EDD (C/X)$$

where:

EDS is elasticity of domestic supply

EDD is the elasticity of domestic demand (algebraic value)

P is the level of production

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$$10. \text{ Incidence on Domestic Price} = \frac{|EFD|}{|EFD| + EFS} * \text{Tax Rate}$$

$$\frac{BP' - DP}{BP'} = \frac{|EFD|}{|EFD| + EFS} \frac{BP - DP}{BP}$$

$$\frac{1-DP}{BP'} = \frac{|EFD|}{|EFD| + EFS} \left( \frac{1-DP}{BP} \right)$$

$$\frac{DP}{BP'} = 1 - \left( \frac{|EFD|}{|EFD| + EFS} \right) \left( \frac{1-DP}{BP} \right)$$

$$BP' = \frac{DP}{1 - (|EFD| / (|EFD| + EFS)) (1 - DP/BP)}$$

C is the level of consumption

X is the level of exports.

The values used for EDS and EDD are the same as in chapter 4, where a fuller discussion of the sources is given.

The resultant BP' is shown in column 8 of Table 2.3, and the implied tax rate using BP' is shown in column 10. The figures in this column are necessarily smaller in absolute value than those in column 9.

#### The Legal and Administrative Framework

A major question underlies rice policy in Thailand. Why has so much government attention and public policy discussion focused on public procurement and distribution policies when their effect on rice prices has been minimal? Another question is implied by the rice export tax system, which has exerted a powerful impact on prices but has not been much discussed. Even more puzzling is the rationale for a rice policy that simultaneously involved an export tax and supports for domestic prices. To solve these puzzles, we must first look at the legal and administrative framework of rice policy. (For further details, see Siamwalla and Wongtrangan 1985.)

The authority of the government prior to 1974 to levy an export premium can be traced back to national law in a roundabout way. The Import and Export Act of 1939 gave broad powers to the Ministry of Commerce to control both domestic and foreign rice trade. This law, together with the Rice Trade Act of 1946, was used by the ministry to require the licensing of exports by private firms. The government could then levy a fee as a condition for issuing the export license. The direct application of quantitative restrictions was also possible.

Two consequences followed from this legal framework. First, final authority for changing the premium rates rested mostly within the Commerce Ministry. To the ministry, this freedom of maneuver in the use of the premium as a stabilizing device was of considerable value.

The second, and less well known, consequence was that the Commerce Ministry could vary the rate on a shipment-by-shipment basis. There never has been any suggestion that the ministry or its officials abused this authority for private gain in applying the premium measure to private exporters. We have suggested, however, that before 1974, some discounts on the premium were given for specific transactions involving all exporters.

There was also special treatment for G-to-G trade. Foreign purchasers of Thai rice are predominantly public agencies. Although many are content to deal with private Thai exporters, some insist on buying from the Thai government. And at various times the Thai government itself has insisted on expanding its share of the trade. The Department of Foreign Trade (DFT) of the Commerce Ministry is the Thai government's rice trader.<sup>11</sup>

In G-to-G trade, the government arranges the foreign part of the contract. The task of procuring the rice and loading it on ships is usually farmed out to private exporters.<sup>12</sup> The essential feature, however, is that the risk of losses arising from price movements between the time the contract is signed and the time rice is procured is borne by the Thai government.

The ability of the DFT to vary premium rates from shipment to shipment therefore was very useful. Interestingly, this combination of

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11. It took over this role from the Rice Office when the latter was abolished at the end of 1959 (Inthachat 1960).

12. This activity was previously engaged in by the Rice Allocation Office, an agency under the Commerce Ministry that was abolished at the end of 1953.

regulator and trader roles did not give rise to complaints from private exporters, who at times competed with DFT in foreign markets (as sellers) and domestic markets (as buyers), and at other times helped DFT fill its orders.

Another major implication of this flexibility has to do with financial administration. Normally, all premium revenues before 1974 were handed over to the Ministry of Finance, as were profits from G-to-G trade. The regulations concerning the use of the latter were somewhat more lax, however, than those concerning the former. In budget documents, the profits from G-to-G trade were put in the same category as profits from public enterprises. The consequences of this administrative sleight of hand was that the Ministry of Commerce had access to special funds; the formal budgetary process was bypassed.

The taint of deviousness surrounding the premium ended in 1974 with the passage of the Farmers' Aid Fund Act, which empowered the Ministry of Commerce to set and vary the premium rate.<sup>13</sup> The Ministry was explicitly given power to take a discount on the premium for G-to-G trade by Article 9 of the Act, although it was forbidden to give specific discounts to private transactions.

A major innovation--and one that gave the Act its name--was the use for revenue from the premium. No longer was it to be passed to the Ministry of Finance as general revenue. Rather, the revenue was to be placed into a Farmers' Aid Fund that would be administered by a Farmers' Aid Committee chaired by the Permanent Secretary of the Ministry of Agriculture and Cooperatives, and whose secretariat would reside in that Ministry.

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13. The Act extended the applicability of the premium concept to all agricultural commodities. Thus far, the premium has been collected only on rice and sugar. At one point, there was some discussion about applying it to cassava as well.

The Farmers' Aid Committee is authorized to spend money obtained from the export premium to provide price support. The framers of the Act probably envisaged that taxes collected in certain years would be used to finance price supports or export subsidies in other years. In fact, however, from 1974 until early 1986, there was always a premium on rice, and in many of those years there was also a price support program financed by the Farmers' Aid Fund. This included 1981, the year in which premium rates were set at a very high level--about 25 percent of the export price.<sup>14</sup>

We now turn to the rice reserve requirement imposed on exporters, which was the source of the cheap rice distributed by the government. Unlike the revenue from the premium, the rice reserve requirement remained under the control of the Ministry of Commerce until it was abolished in 1982. The way the Ministry implemented the program after 1975 indicates that its main interest was in using the requirement as an export management tool rather than as an subsidy for consumers.

This shift grew out of the searing experiences of the Ministry in 1973 and 1974. At that time, it sold the 5 percent and 10 percent varieties of rice. These were relatively high-quality products in relation to the entire spectrum of rice Thailand produces for consumption and export, but they were mediocre in terms of Thai urban consumption. That the rice sold in the government shops and in the open market was similar, of course, implies that the program was exposed to the kind of pressures to divert subsidized rice to the open market described above, and that indeed took place in 1973 and 1974.

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14. It is also possible that they envisaged a tax on one commodity and price supports for another. In fact, premium revenues obtained from rice and sugar were used to provide price supports for maize, coconut, and cotton, and even salt (Thanapornpun 1980). But the lion's share of the money used was to provide support for rice and sugar.

The entire effort of the Ministry after 1975, therefore, was to introduce different kinds of rice from those normally bought and sold in the market, culminating in ocha rice, the mixture of glutinous and nonglutinous rice that no Thai had ever consumed.

The system of distribution adopted by the Ministry can only spur skepticism about the consumer orientation of the program. Up to 1975, the Ministry required that exporters deliver the reserve rice to the Ministry. The rice was then supposed to be trucked to various retail outlets, where an attempt was supposed to be made to sell the rice at low prices to poor consumers. When the rice involved was of a quality acceptable to consumers, however, retailers actually ended up selling it at higher prices in the open market. When the rice was less acceptable to consumers, retailers diverted it to exporters who needed the rice to supply the ministry. Thus, the government ended up holding the lowest quality of rice.

This circular flow of rice was replaced sometimes by circular flow of paper. Rice did not need to leave the ministry's warehouse, provided an astute entrepreneur could arrange to have all papers signed by all officials. One provincial governor who was asked to participate (but refused) confirmed to one of the authors the existence of at least one such ring. As the quality of rice declined, there was less and less consumer demand, and stocks languished in the warehouses. Thus, in 1979, the Commerce Ministry decided to adopt the working methods of the rings, requiring exporters to buy from it the reserve rice that was to be delivered to it. In February 1981, even this paper transaction was dispensed with. The announcements merely required that exporters put up cash for the rice reserve requirement.

### The Bureaucratic Politics of Rice Policy

From about the mid-1960s, the need for fiscal revenue from the export tax, particularly from the premium, became increasingly marginal to the Finance Ministry. The last year in which premium receipts constituted as much as 10 percent of total government revenues was 1985 (Siamwalla 1974). Since then, rice policy has been subject to very little macroeconomic discipline. Neither the Commerce Ministry's rice policy nor its programs are scrutinized by the Finance Ministry or the Bureau of the Budget Office. If rice policy and programs had been reviewed, the Finance Ministry might have made a more careful evaluation of the rice measures' costs and benefits in comparison with other programs.

Although the ministry is charged with overseeing all aspects of the country's commerce (internal and external), its general functions tend to bias its policies in certain directions. It sees its role as practicing what might be called a microeconomic approach to inflation. This role flows from the Price Control and Antiprofitteering Act, which gives the ministry the power and, in the eyes of the public, the responsibility for keeping prices low. A bias toward keeping prices low follows naturally from this perception. This bias is reinforced by the fact that of all the prices the Ministry of Commerce is supposed to control, rice prices are the easiest to manipulate, particularly in a downward direction.

Closely related to the perception that the Commerce Ministry's role is to keep prices down is its belief that there are excess profits among traders and exporters, and premium and various export duties are intended to tax these profits. In a sense, some ministry policies on exports of rice ensure that it was technically correct in its view at least some of the time. If exports are to be subject to quantitative restrictions, then the incidence

of these taxes is entirely on the quota rent that the exporters would otherwise collect, provided that the taxes are not at such a high level that the quantitative restrictions cease to be binding. The real question is, why has the ministry felt impelled to regulate Thai rice exports?

The Commerce Ministry's perception that Thailand has a substantial monopoly power in international rice trade is of long duration and preceded Thailand's recent emergence as the world premier rice-exporting country (Table 2.4). Going hand in hand with this is the perception that if exporters are left to their own devices, they will undercut one another's selling prices, with consequent loss of revenue for the country. In this view, the premium ought to be retained to keep export prices high. Empirically, the ministry claims, every time the premium has been reduced, export prices have fallen: Post hoc, ergo propter hoc.<sup>15</sup> This points in the direction of a greater ministry role in managing export trade. Whereas the orthodox argument would be to retain the premium, the ministry has not been content with that. It has put up barriers to entry into the export trade and has attempted to cartelize the trade by fixing the market share of each exporter and setting minimum prices, all the while assuming that the cartel would earn its monopoly profits exclusively at the expense of foreign buyers. Over much of the period, however, cartelization measures other than the premium have had a relatively small impact on domestic rice prices. Thus, with few exceptions, the figures on quota rent in Table 2.3 show relatively low values. A scholar who made a detailed investigation into the modus operandi of Thai rice traders in the mid-1960s maintained that the cartel was a facade (Usher 1967).

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15. Contrast our own interpretation of the relation between export price and the tax rates, above.

TABLE 2.4

THAILAND'S MARKET SHARE AND  
RANK AMONG RICE EXPORTERS

Year	Market Share	Rank
1962	20.02	2
1963	19.31	2
1964	24.52	1
1965	22.98	1
1966	19.14	1
1967	19.06	3
1968	14.90	3
1969	13.65	3
1970	12.98	3
1971	18.43	1
1972	24.22	1
1973	10.13	3
1974	13.65	3
1975	12.74	3
1976	22.26	2
1977	27.49	1
1978	16.39	2
1979	22.53	1
1980	21.19	2
1981	23.30	1
1982	30.62	1
1983	31.03	1
1984	33.13	1
1985	36.75	1

Source : USDA.

One final, hidden motive that we believe may explain the Commerce Ministry's die-hard attitude toward the export tax is a consequence of the risk it takes as a G-to-G exporter. The existence of a gap between domestic and export prices opened up by the premium and rice reserve requirement<sup>16</sup> gave the Ministry a safety margin against losses that could arise from adverse movements in the domestic price.

One puzzling question remains: Why doesn't the Commerce Ministry nationalize the rice export trade? It is indeed strange that after the brief nationalization of the immediate postwar period this possibility was never again considered. Perhaps the corruption and dislocation that accompanied nationalization was so massive that the idea of a government export monopoly was discredited.

By and large, the preferred style of the ministry (and of Thai bureaucracy generally) has been to allow private traders to operate quite freely and even to enhance their earnings (e.g., through quota rents) with the ministry itself controlling a system of quasi-legal rewards and punishments to keep the traders in line. Allowing exporters to supply the rice needed by the Commerce Ministry to fill its G-to-G contracts is among these rewards. The Ministry farms out its orders to private exporters and gives them generous margins in return for the assurance that there will be no shirking on quality. The export licensing requirement serves as another means whereby the ministry can sometimes bring recalcitrant traders into line.

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16. The export duty did not count in this context, because the Ministry of Commerce had to pay the duty to the Finance Ministry, just like a private exporter. With the other two taxes, the Ministry of Commerce has the option not to pay, although the profits from the trade, if they occurred eventually had to be turned over to the Finance Ministry.

There was another, more complex expression of the symbiosis between the Commerce Ministry and the exporters. Traditionally, exporters hold a short position in the rice markets. That is, they tend to make sales commitments without having sufficient stocks. No concrete evidence exists, but the general impression is that exporters generally make far more money from speculation than from simple merchandising profits. What serves the interests of exporters in a short position is falling prices. Conversely, rising prices cost them money. Exporters therefore have a bias towards policies that cause prices to fall. Note that the exporters' fondness is not for low prices as such, but for falling prices. Measures that lead to such price movements--that is, those that increase existing barriers to exports--therefore find strong support among exporters. The increased barriers do not impose an additional burden on them, at least as far as most of their commitments are concerned. The premium is an accompaniment to the issuance of an export license. Therefore, the rate is locked in. The same rule applies to the rice reserve requirement. An export license is normally issued when an exporter receives a letter of credit from his foreign buyers.<sup>17</sup> If domestic prices are then forced downward by increased export taxation, an exporter in a short position can reap a substantial short-term gain.

Given the frequency with which the government adjusts its measures, exporters find it prudent to maintain close governmental ties, particularly with the Ministry of Commerce. At the very least, this ministry is the most important source of information concerning future price movements. Exporters on the inside track can obtain this information, and stand to gain very substantial rewards. On the other hand, bureaucrats in the ministry needed

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17. In later years the government allowed the actual payment to be made at the time of the shipment.

information from the traders, because most government measures were directed at the export point and because in its G-to-G business the government had to keep tabs on what was going on in the private trade. Given this mutual need for information, the only choice the Ministry faced was whether the consultations should be formal--with the Rice Exporters' Association--or informal--with a favored subset of exporters. Regardless of the choice, the result was that the decision-making process enabled export traders to have a disproportionate say in the formulation of policies.

Because of the importance of the premium to the budget in the early 1960s, the ministry was not in a position to play on this instrument a great deal. Consequently, there was very little variation in the premium rate (see Table 2.3), and foreign price movements were transmitted almost entirely to domestic prices. The period 1966-74 began with harvest failures on the Indian subcontinent, which boosted rice prices. These were followed by the slump in prices brought on by the Green Revolution. And then there was the 1973-74 crisis. It is not surprising, therefore, that changes in the premium rate came to be used more actively as a stabilizing mechanism from the mid-1960s.

Until 1974, changes in the policies pursued by the Ministry of Commerce were rationalized in terms of economics. Since 1974, however, a complex set of political pressures has also been at work. The passage of the Farmers' Aid Fund Act in 1974 provided resources to the Ministry of Agriculture and thereby allowed it to play a role in rice price policies, sometimes in competition with the Commerce Ministry. In addition, a more competitive political system emerged after 1973. Since 1977, all of Thailand's governments have consisted of shifting coalitions among the military, the technocrats, and elected politicians. The Commerce and, increasingly, Agriculture portfolio are seen as the preserves of elected

politicians. Finally, the share of rice in consumer expenditures has been steadily declining (Table 2.5), meaning that pressure from consumers has declined correspondingly.

As a result, elected politicians (both those who have become ministers of commerce as well as members of Parliament) have backed programs to lift producers' prices. The key desiderata of any such program are that it must be visible and must involve expenditure of funds, for only then can such funds be diverted for patronage. The main beneficiaries of such exercises have not been Thailand's rice farmers, who are poorly organized, but the rice mill owners. In many parts of rural Thailand, rice mill owners are members of local elites and in many instances are campaign organizers for members of Parliament. The opportunity to use a price support program for patronage has not been lost on politicians. That it has been used precisely in this fashion has been documented (Pinthong and Tinakorn 1984).

The rice mills are usually the storers of rice. In contrast to exporters, rice millers hold a long position and therefore are naturally inclined to favor rising prices. For the more politically influential millers, however, the natural bias against the introduction of an extractive policy or an increase in the rate of extraction was canceled out during 1975-82 by the fact that this same extractive policy provided the wherewithal to finance the price support program from which they could derive enormous profits.

Since the government must be perceived as expending resources to support prices--and given the central government's reluctance to draw resources from the central budget--the ready availability of money from the Farmers' Aid Fund, which is under the Agriculture Ministry's control, and from

TABLE 2.5

PERCENTAGE SHARE OF RICE IN CONSUMER EXPENDITURES

	Whole Kingdom	Bangkok
1962/63	16.93	6.96
1975/76	15.47	6.98
1980/81	12.09	4.99

Source : National Statistical Office, issues of Household Expenditure Survey (for 1962/63) and Socio-Economic Surveys (for 1975/76 and 1980/81)

the resources available to the Commerce Ministry (Siamwalla and Wongtrangan 1985), is politically convenient. Hence, we have the paradoxical symbiosis between an export tax and a price support program.

The shift in political focus also affected the consumption subsidy program. After 1974, there was less and less support for this program. The Ministry of Commerce probably would have been willing to drop the program except for the fact that the reserve requirement was a good tool for managing export trade. It can be contrasted to changes in premiums, which, after 1974, required a cabinet decision. Table 2.3 shows the greater variability of the export tax equivalent of the rice reserve ratio after 1975. Table 2.6 shows the number of announced changes in the premium rate and rice reserve ratio. That the Commerce Ministry increasingly resorted to the rice reserve ratio is again visible, reconfirming that the rice reserve ratio in the period 1975-82 functioned less and less as a consumption subsidy program and increasingly as an export management tool.

#### Conclusion

The dominant role of the bureaucracy in the rice trade (as distinct from the case of sugar discussed below) was possible because neither consumers nor producers were well organized. Further, management of such trade allowed considerable resources to flow to the Commerce Ministry and later to the Agriculture Ministry. This gave them considerable autonomy, particularly from the public resource allocation problems that concern agencies like the Finance Ministry.

This autonomy was valuable to the officials of the two ministries--particularly the Commerce Ministry--and was jealously guarded. Nevertheless, these bureaucrats did not exist in a vacuum. We have already indicated

TABLE 2.6  
NUMBER OF ANNOUNCED CHANGES IN THE PREMIUM RATE  
AND THE RICE RESERVE REQUIREMENT

Year	Premium	Rice Reserve Requirement
1955	2	0
1956	3	0
1957	3	0
1958	3	0
1959	6	0
1960	2	0
1961	2	0
1962	2	4
1963	0	1
1964	0	0
1965	0	0
1966	0	2
1967	11	2
1968	5	2
1969	4	0
1970	1	0
1971	2	0
1972	2	4
1973	3	8
1974	7	3
1975	4	2
1976	2	2
1977	2	3
1978	0	3
1979	0	6
1980	2	4
1981	1	1
1982	0	1
1983	1	0
1984	0	0
1985	0	0
Total	70	48

Source : Department of Foreign Trade, Ministry of Commerce.

certain important shifts that took place in the political environment that impinged on Commerce Ministry decisions. Table 2.7 summarizes these shifts in terms of the relative weights that the body politic as a whole assigned to different objectives (for an earlier effort, see Siamwalla 1975).

Most of the specific objectives listed in Table 2.7 are self-explanatory, but two need further elucidation. The Taxing Foreigner objective reflects the perception by policymakers that with its significant share of international trade in rice, Thailand could exert some influence over the world price. Consequently, export taxes were defended as the means whereby monopoly profits could be captured.

A second elucidation of the table concerns the item Bureaucratic/Political Resources included under government Resources. As explained in detail in the discussion of quantitative measures, the system of rice taxation generated many extrabudgetary resources. Access to these resources became an end in itself for some policymakers, particularly in the Ministries of Commerce and Agriculture.<sup>18</sup>

A few observations need to be made to ensure a correct interpretation of Table 2.7 and similar tables (3.2, 3.5, and 3.7 in chapter 3). This is best shown with the help of a diagram. Figure 2.2 shows the indifference curves  $I^0$  and  $I^*$  of the government defined over the objectives space  $x_1 - x_2$ . Included in the diagram is a policy possibility curve (PPC) that shows the possibilities open to the government to attain various objectives, given financial, administrative, and other constraints. We have

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18. Although these resources were ultimately largely abused and led to considerable corruption, it is necessary to add that many of the policymakers defending the system, particularly the bureaucrats, did not themselves profit by the abuses.

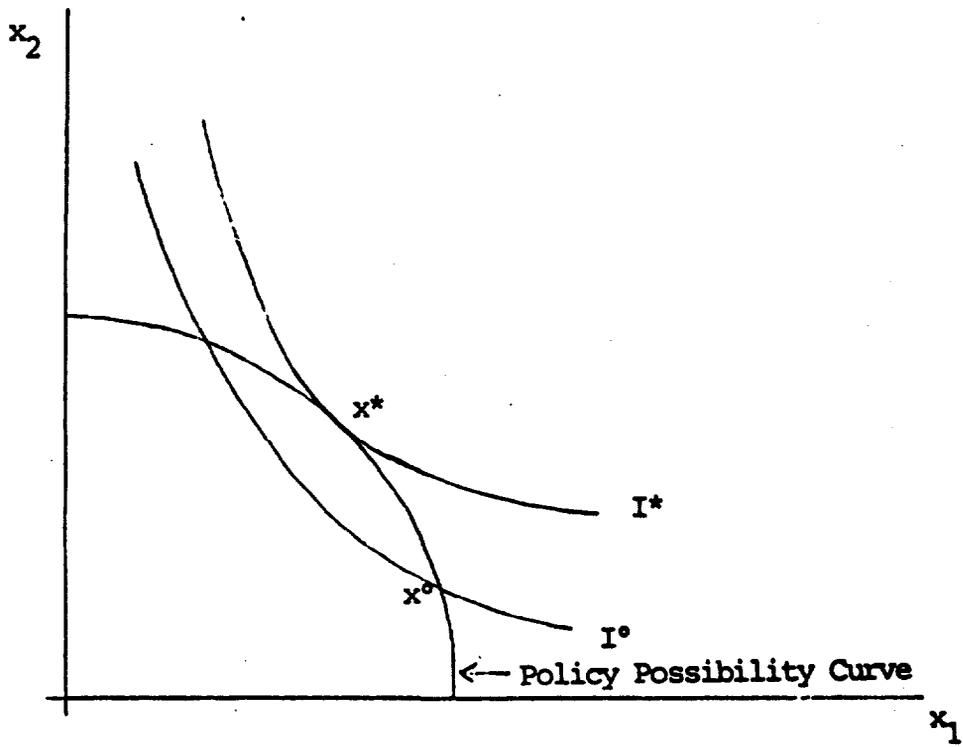
TABLE 2.7

RELATIVE WEIGHTS OF OBJECTIVES OF RICE PRICE POLICIES

Objectives	1960-1965	1966-1974	1975-1984	Effect on Domestic Price
Domestic Price Stability	0.1	0.35	0.3	+ / -
Consumer Welfare	0.35	0.2	0.15	-
Producer Welfare	0.05	0.05	0.2	+
- Farmers	(0.05)	(0.05)	(0.15)	
- Rice Mills	(0)	(0)	(0.05)	
Government Resources	0.4	0.2	0.15	-
- Treasury	(0.35)	(0.15)	(0)	
- Bureaucratic/Political Resources	(0)	(0.05)	(0.15)	
Taxing Foreigners	0.2	0.2	0.2	-

Source: Authors' subjective judgment

FIGURE 2.2  
POLICY CHOICE AND TRADE-OFF



drawn the policy possibility curve to slope downward, showing a trade-off, but this need not be the case. Thailand, as an exporter, can increase consumer welfare and government revenues at the same time, at least up to a point. In such a case, the PPC will have a positive slope.

The point  $x^0$  can be thought of as the initial nonintervention point, and shows the level of two objectives attained by the government if it does nothing at all. In moving to  $x^*$ , the government has revealed itself to prefer  $x^*$  to  $x^0$ . We surmise from the distance of the move from  $x^0$  to  $x^*$  what relative weights are assigned to different objectives, and this is what we describe in Table 2.7.

It can be seen that the relative weights shown in Table 2.7 reflect not only the preference of the government but also the initial conditions as well as the cost of implementing different policies (i.e., the nature of PPC). It is only with this background that the judgments in Table 2.7 and other similar tables in the volume can be interpreted.

Thus, the high weight given to government resources in 1960-65 reflects the significant share of the export premium in government revenue in that period. Concomitantly, its declining weight among the objectives reflects a decline in that share. Similarly, the increase in weight for the price stability objective reflects the instability in the world rice market price that characterized the 1966-74 period. Table 2.8 indicates the variances of the logarithms of the deviation of deflated rice prices in the

TABLE 2.8

VARIANCE OF LOGARITHMS OF DEFLATED BORDER AND DOMESTIC  
RICE PRICES FROM TREND VALUES : 1960-1984<sup>a/</sup>

Period	Variance of Logarithm of Deflated Border Price	Variance of Logarithm of Deflated Domestic Price
1960-1965	0.0052	0.0147
1966-1974 (1966-1972)	0.1321 0.0405	0.0298 0.0283
1975-1984	0.0602	0.0144
1960-1984	0.0765	0.0199

Note : <sup>a/</sup> The definition of variance used for each subperiod T

$$\text{of length } n_T \text{ is } (n_T - 1)^{-1} \sum_{t \in T} ((x_t - m_t) - (\bar{x}_t - \bar{m}_t))^2$$

where  $x_t$  is the value of the logarithm of deflated price,

$m_t$  is the trend value from a time-regression covering the whole period 1960-1984,

$\bar{x}_t$  is the subperiod mean of  $x_t$ , and

$\bar{m}_t$  is the subperiod mean of  $m_t$ .

Sources : Domestic and border prices are from column (6) and (7) of Table 2.3.

The deflator which is the GDP deflator for non-agricultural value added is from the National Accounts Division, NESDB.

domestic market and at the border from their trend values.<sup>19</sup> There was no attempt to stabilize domestic prices in the first period (1960-65). Indeed, the variance of the logarithms of border prices was higher than that of domestic prices. This is what we would expect if the tax rate was kept constant at a high rate. It was only after 1966 that the objective of stabilization came to the forefront. To avoid being misguided by the impact of the two extraordinary years of 1973 and 1974, we calculated the variance for the middle period both with and without the two years. The stabilization effect of policy comes through clearly, whether or not the two years are included. The decline in the weight for consumer welfare reflects the steady decline in the weight of rice in the consumer budget (Table 2.5 above).

In contrast to the changes in the objective environment described above, the rise in the Producer Welfare objective reflects, we believe, a genuine change in the political framework and can be best characterized as a change in the government's preference.

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19. If  $x_t$  is the logarithm of either one of the prices and  $m_t$  is the trend value, then the variance for a subperiod T of length nT is

$$\sum_{t \in T} \frac{[(x_t - m_t) - (\bar{x}_t - \bar{m}_t)]^2}{nT-1} . \quad \text{The second term, } \bar{x}_t - \bar{m}_t, \text{ is}$$

necessary because even though it may be zero for the whole time series (1960-84), it is not for each of the subperiods.

Chapter 3

HISTORY, INSTRUMENTALITIES, AND OBJECTIVES OF  
GOVERNMENT INTERVENTION: SUGAR, MAIZE, AND RUBBER

Here, following a similar plan to that of chapter 2, we take up the history, instrumentalities, and objectives of government intervention in sugar, maize, and rubber, along with a few other commodities and inputs.

Sugar

Historical and Organizational Background. Thailand has a long history of sugar production. Sir John Bowring, the British envoy who arrived in Bangkok in 1855 to sign the trade treaty that opened up Siam to foreign trade, predicted that sugar, not rice, would be the country's dominant export commodity. For more than a decade after Bowring's remark, events seemed to bear out his forecast. But after 1870, for reasons that are still obscure, the industry went into a secular decline from which it did not recover until the 1930s (Ingram 1973). During the sixty-year domestic sugar slump, the country's needs for sweeteners were met mostly from three sources: from muscovado, which is formed by boiling cane juice into a brown mass and removing the molasses; from jaggery, a product of coconut trees that is refined in a process like that for muscovado and that yields a product very similar to it; and from imported sugar.

The 1930s saw the revival of the cane sugar industry. A few sugar production plants were promoted by government officials and also by a protectionist tariff policy. But the industry was still relatively small. Cane-crushing capacity was quite limited, and the industry had to rely on muscovado as raw material. It is believed that this backward, two-tier

technology (cane to muscovado, muscovado to sugar) was expensive, but entry into the trade was easy because capital requirements were low.

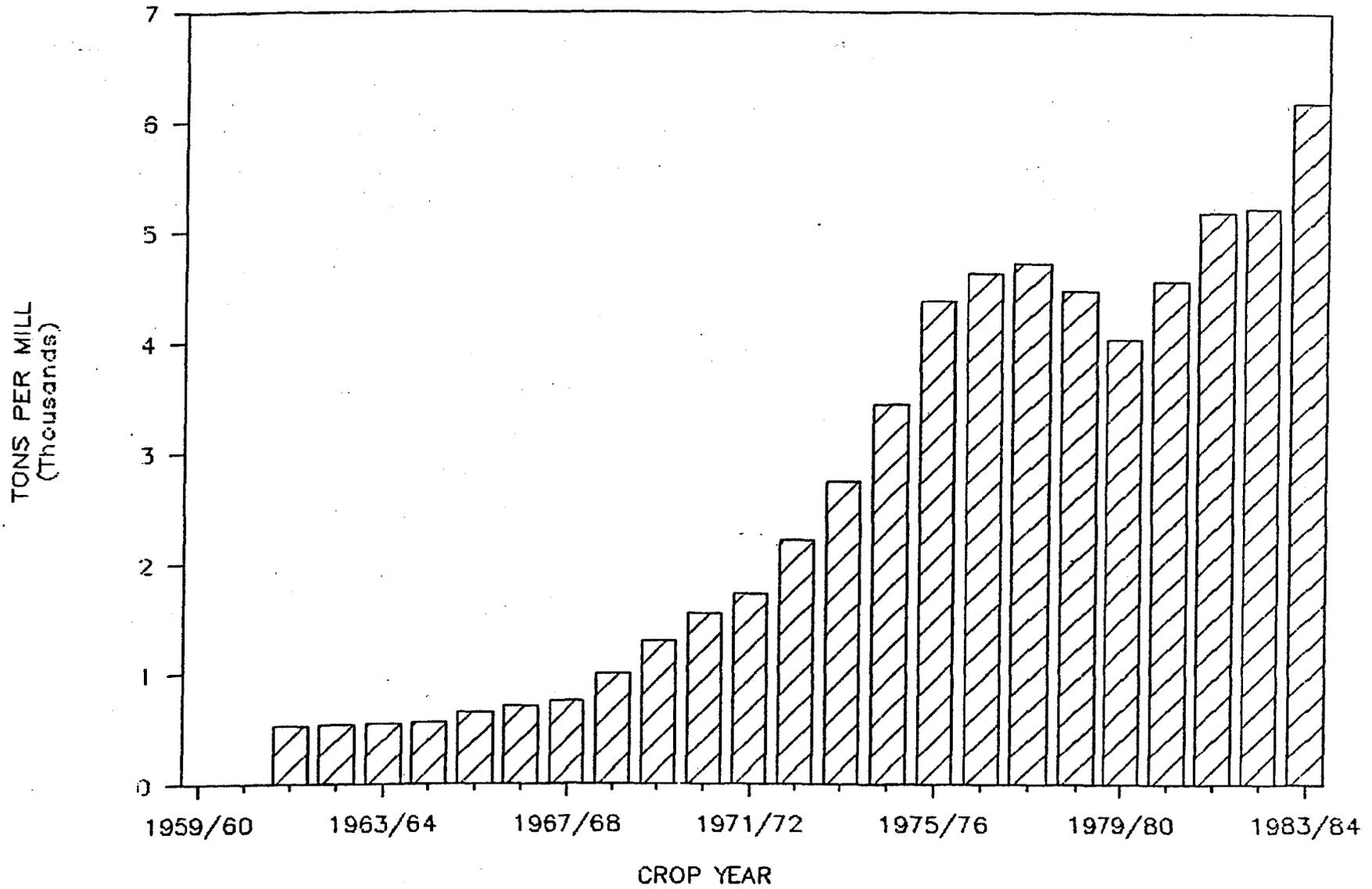
This structure, which lasted until the 1960s, introduced a degree of flexibility into the Thai sugar industry--an important characteristic given the recurrent lurches of the domestic sugar market from glut to shortage and back again. Before the advent of large-scale cane-crushing mills in the 1960s, the responsiveness of cane production to sugar prices (lagged one year for period of production) was very high. Not only were farmers responsive (Dowling and Jessadachart 1978), but, more important, the elasticity of transmission from sugar to cane prices was quite high.

This structure changed drastically in the 1960s, partly as a consequence of certain interest group politics, which are discussed in later. The production of individual mills expanded enormously (Figure 3.1). An industrial structure in which the large mills mostly purchased muscovado at arm's length from the small crushing mills, which, in turn, bought cane at arm's length from the growers, was transformed into one in which large, integrated mills contracted to buy cane directly from the growers. This structural shift not only was an important economic phenomenon in itself but led to a major realignment of political power within the sugar industry. Paradoxically, despite the enormous size and assets of the new sugar mills, the growers emerged from this transformation as a very powerful group. In fact, by 1975 they were easily the most politically organized and most prosperous bloc among Thai farmers. Because the growth of this group was closely linked to the evolution of policies to be described below, some explanation of it is called for.

FIGURE 3.1

# SCALE OF SUGAR MILLS

(CAPACITY PER MILL)



Source: Ministry of Industry

An integrated sugar mill handles a massive amount of sugarcane every day. Even a small mill may handle 4,000 tons of cane a day, and some of the larger ones from 15,000 to 20,000 tons. The flow of this material must be carefully scheduled. Many sugar areas in the world are dominated by large, integrated plantation-mills, and scheduling is a problem internal to the firm. The system that emerged in Thailand, in contrast, comprises a large number of small growers, and Thai sugar mills have never been attached to plantations.

In Thailand, farmers who wish to grow sugarcane must contract with a mill at planting time. Farmers who have enough land to grow cane and deliver at least 2,000 tons of it per season to the mill contract directly with the mill. Small growers contract with an intermediary "quotaman," usually a large farmer who in turn contracts with one or more mills (Siamwalla 1978). Many quotamen were owners of muscovado plants that were eliminated by the new mills (Kirakul 1975).

On signing a contract with the mill, a quotaman or a large farmer commits himself to a particular pattern of delivery of the cane to the mill. The total quantity to be delivered during a season is fixed, although some allowance is given for bad weather. Neither side makes a commitment on price at this time. Instead, the price is determined about a month before the new crushing season begins.

Because sugarcane is highly perishable, and because the market is volatile and contracts to deliver to particular mills are binding, cane growers can be very much at the mercy of the mills at harvest time. But growers modified this vulnerability by forming associations for collective bargaining with the mill owners. The first such association was formed in 1964 in the main cane area in the West and started to bargain informally in the 1964-65 season, with formal bargaining and written contracts following a

year later. In the East, the other center of cane growing, an association was formed in 1969. By 1971, collective bargaining had become the norm in the sugar industry (Kirakul 1975).

By 1969, officials in the Ministry of Industry were present as witnesses to the signing of the industry contract (Kirakul 1975). The role of the government steadily increased because it controlled the domestic price of sugar, which had an effect on what the mills could offer.

The sugarcane growers' associations that participate in these contracts are essentially controlled by large farmers and by quotamen, whose careers as producers of muscovado gave them the organizing ability and commercial background to make effective bargains. Small growers do not have much say in these associations, but they do share in the fixed surcharge per ton of cane received by the associations.

Sugar Price Policies. The task that policymakers set for themselves after World War II was to protect the sugar industry as a whole--that is, both growers and millers. The government's aim is an "adequate" return for the industry. The government faces two major problems in trying to reach this objective.

The first is the nature of the world sugar market. Thailand, unlike other sugar producers, has never had large quotas in sheltered markets through such arrangements as the Lome Convention or the U.S. sugar quota. Export revenues, therefore, are subject to the large fluctuations characteristic of the residual world market.

The second is that although the government is solicitous of the producers' interests, it has been reluctant to expend budgetary resources in support of the sugar industry, particularly after 1958. Before then, the government itself had invested in a number of plants. But by the 1961-62

season, these plants had only a 21.9 percent share of production (Jessadachtr 1977), and by 1984-85, that share had declined to 5.5 percent.

The instrument usually chosen by the government involved a cross-subsidy between domestic and world markets--that is a "home-price scheme" (Corden 1971). In such a scheme, the government aims for a particular producer price,  $P_p$ . Because government cannot control the world price,  $P_w$ , it has to set the consumer price,  $P_c$ , so that:

$$P_wX + P_cC > P_pY \quad (1)$$

where X is the volume of sugar exported, C the volume consumed, and Y the volume produced.

In this way, the government avoids having to expend additional money to help the producers. The procedure used to implement this cross-subsidy has differed over the years, but the basic consistency is remarkable and can be traced as far back as 1950, when Thailand was importing sugar.<sup>21</sup> When Thailand emerged as an exporter in 1960, that year's large surplus exacerbated the problem because it coincided with a depressed world market. The government then introduced various systems of cross-subsidy, which we enumerate briefly here.

The first cross-subsidy system was an attempt at cartelization in 1960-61. In 1960, the government tried to get sugar mills to sell their sugar to a government trading corporation--the Thai Sugar Corporation--whose monopoly profits were to be used to finance an export subsidy. This attempt

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21. Of course, when sugar was being imported, it was relatively easy for the government to support sugar producers and earn revenue at the same time by the simple device of imposing a large tariff or otherwise pursuing a restrictive import policy.

at cartelization quickly came to an end because many mills wished to remain outside and to become "free riders."

The second cross-subsidy scheme was the cess and subsidy system, 1962-66. This idea was pressed, with legislative backing, when the Sugar Act of 1961 authorized the collection of levy on the production of refined sugar. The proceeds were to go to the Sugar Industrial Aid Fund (SIAF). A small proportion of this fund was earmarked for research, development, and promotional activities. The bulk, however, had to go to finance an export subsidy. The model for this approach appears to have been a rubber replanting program enacted a year earlier (see the section on rubber below).

The levy-and-subsidy scheme failed because the government was unable to control the volume of production. The SIAF became insolvent after the world sugar boom of 1963 led to a considerable expansion of sugar capacity in the face of depressed world market in 1965 and 1966. The 1961 Sugar Act was therefore annulled in 1965.

The collapse of the levy-and-subsidy scheme was followed by two years (1967 and 1968) of near-zero exports. Exports in 1967 were confined to the U.S., where Thailand has a small quota of about 14,000 tons. In 1968 there was not enough production to export even that much. Although this was the outcome of previous low prices and bad weather, the closing of sugar trade was in line with government policy at the time which was to discourage sugar exports until Thailand could become efficient enough to export sugar without subsidies. It was in this atmosphere that the Sugar Act of 1968 was passed.

During the era of production control, 1968-83, the government attempted to control sugar prices primarily by detailed regulation of production levels (see the subsection on administration below). This, in theory, could also direct sugar sales toward domestic and export markets in

the proportion desired by the government. Conceived in the period of chronic surplus, the control system worked well enough when world prices were low relative to domestic prices. But when the world sugar price moved sharply upward, as it did in 1973-74 and in 1980, the system failed. It was partly dissatisfaction with that failure that led to the introduction of a 70/30 system in 1982.

The 70/30 system was derived from the cross-subsidization techniques implicit in earlier practice and was incorporated into law in the Sugar Act of 1984. A revenue-sharing method, the 70/30 system actually had been introduced on a trial basis for the 1982-83 crop. Under the system, still in effect in 1987, the pricing of sugarcane is determined, first, by calculating the revenue from the sales of all sugar, both in the domestic and the export markets. Then, this sum is divided by the amount of the sugarcane delivered to all the mills, and 70 percent of the resulting quotient is set as the price of each ton of sugarcane delivered to the mill. The system requires that the quantities destined for the various markets be subject to central control. Thus, distribution quotas are fixed as follows: Quota A represents sugar assigned to the domestic market, Quota B represents sugar supplied to the Thai Can and Trading Corporation (TCST) for export, and Quota C represents the residual which may be exported freely.

As the policies evolved, the government used various administrative devices to ensure proper control over the trade and to ensure that the prices and quantities used to calculate the total size of the pie did reflect reality.

Table 3.1 gives the effects of these policies on the prices received by growers and millers and paid by consumers. To make the different prices

TABLE 3.1  
EFFECTS OF INTERVENTION ON SUGAR PRICES

(Current baht/ton, Raw sugar basis)

Year	Border Price	Grower Price	Miller Price	Consumer Price	Proportionate Deviation from Border Price (a)		
					Grower Price	Miller Price	Consumer Price
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960	1,397.87	n.a.	4,628.24	n.a.	n.a.	2.3109	n.a.
1961	1,951.85	n.a.	4,230.79	n.a.	n.a.	1.1676	n.a.
1962	1,160.83	3,412.94	3,450.01	3,810.00	1.9401	1.9720	2.2821
1963	2,648.33	3,251.04	4,751.50	4,900.00	0.2276	0.7941	0.8502
1964	3,221.67	3,236.03	5,393.61	5,140.00	0.0045	0.6742	0.5954
1965	1,184.17	2,690.41	2,452.57	2,540.00	1.2720	1.0711	1.1450
1966	1,650.91	2,409.75	2,783.53	3,050.00	0.4596	0.6861	0.8475
1967	2,175.56	2,383.91	3,649.68	3,480.00	0.0958	0.6776	0.5996
1968	2,054.00	2,918.96	4,178.08	4,030.00	0.4211	1.0341	0.9620
1969	2,368.57	2,630.01	3,661.55	3,560.00	0.1104	0.5459	0.5030
1970	1,708.00	2,114.84	2,729.76	2,880.00	0.2382	0.5982	0.6862
1971	2,182.22	2,229.29	3,107.67	3,520.00	0.0216	0.4241	0.6130
1972	3,262.50	2,544.50	3,452.33	4,210.00	-0.2201	0.0582	0.2904
1973	4,305.56	3,043.35	4,175.83	4,110.00	-0.2932	-0.0301	-0.0454
1974	8,762.22	3,308.87	5,514.90	4,420.00	-0.6224	-0.3706	-0.4956
1975	10,676.00	4,720.61	6,596.98	4,470.00	-0.5578	-0.3821	-0.5813
1976	6,069.17	4,807.96	5,594.94	5,220.00	-0.2078	-0.0781	-0.1399
1977	4,646.80	4,528.02	4,677.15	4,760.00	-0.0256	0.0065	0.0244
1978	3,817.52	5,150.38	4,212.02	5,020.00	0.3491	0.1033	0.3150
1979	4,024.51	5,602.52	4,679.43	5,590.00	0.3921	0.1627	0.3890
1980	6,498.66	6,315.12	8,631.22	10,110.00	-0.0282	0.3282	0.5557
1981	8,931.60	8,023.18	9,190.78	10,190.00	-0.1017	0.0290	0.1409
1982	5,841.11	7,949.03	6,546.32	10,720.00	0.3609	0.1207	0.8353
1983	4,036.85	6,119.16	5,833.22	10,910.00	0.5158	0.4450	1.7026
1984	4,194.20	6,421.31	6,828.53	10,960.00	0.5310	0.6281	1.6131

Note : (a) Proportionate deviation of price X from border price PB is defined as  $(PX-PB)/PB$

- Sources: (1) Department of Customs, Ministry of Finance.  
 (2) Calculated from cost to produce one ton of raw sugar  
 (3) See texts.  
 (4) Department of Internal Trade, Ministry of Commerce.  
 (5) =  $((2)-(1))/(1)$   
 (6) =  $((3)-(1))/(1)$   
 (7) =  $((4)-(1))/(1)$

comparable, we adjusted the data so that they were expressed on a raw sugar basis at the Bangkok wholesale level, (i.e. excluding export costs). The border price also was reduced to the Bangkok wholesale equivalent.

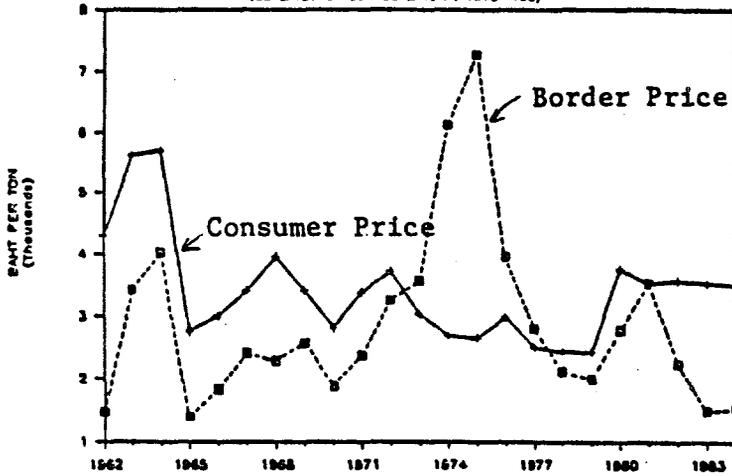
Consumer prices and cane-grower prices were constructed from existing series on white sugar and sugarcane prices, which were then converted to a raw sugar basis.

To convert the cane price to the grower price for sugar, we divided the former by the extraction rate and added the processing cost. There is a series for the processing costs (Jessadachatr 1977: Table F.26) based on data from the Sugar and Sugarcane Office, up to 1975, and there are other bits of data for 1983-84 and 1984-85, from a bank study. We interpolated from these for the missing years. By and large, the cost for cane, for which we have firm data, constituted an almost constant 70 percent of the total cost (excluding molasses), so we are on relatively firm ground with this method of calculating producer prices.

The miller price for 1961-67 was obtained from direct estimates of wholesale prices of white sugar (Jessadachatr 1977), again adjusted to a raw sugar basis. From 1968 onward, because the cross-subsidization policies centered on the mills, there were two prices that millers received--border and domestic prices. We therefore defined the miller's price as a weighted average of the two prices, the weights being the share of export and domestic consumption in total production. Some adjustments were made to these data by adding special government subsidies for certain years, for example 1975-76, 1981-82, and 1982-83.

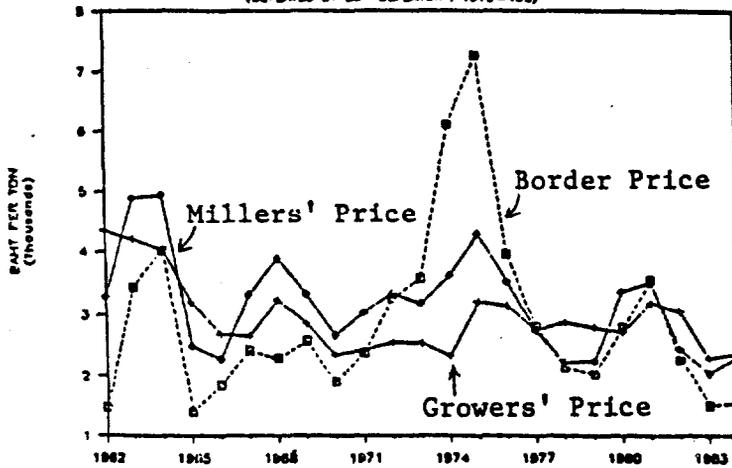
Figure 3.2 shows the movement of the consumer price against the border price. Aside from the period of very high protection in the early

FIGURE 3.2  
CONSUMER AND BORDER PRICE MOVEMENTS  
(DEFLATED BY GDP DEFLATOR : 1972=100)



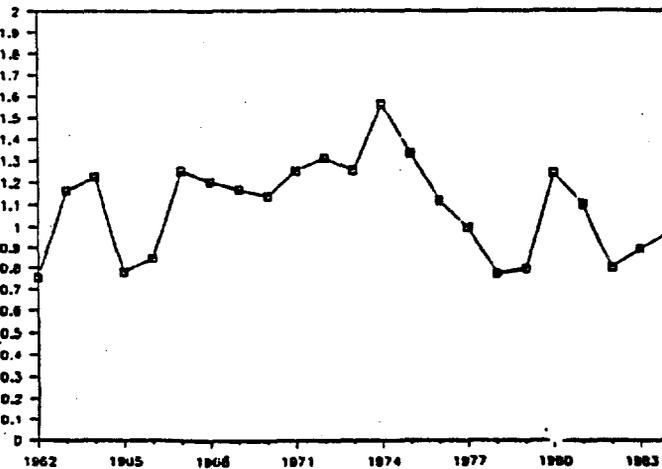
Source: Table 3.1

FIGURE 3.3  
PRODUCER AND BORDER PRICE MOVEMENTS  
(DEFLATED BY GDP DEFLATOR : 1972=100)



Source: Table 3.1

FIGURE 3.4  
RATIO OF MILLERS' PRICE TO GROWERS' PRICE



Source: Table 3.1

1960s, consumer prices appear to have been stabilized relative to the border price. Further, with the exception of the period 1973-76, the domestic consumer price tended to stay well above the border price. The higher price level, of course, was necessary to finance producers' subsidies. As figure 3.3 indicates, the degree of cross-subsidization became less as the share of exported sugar leaped in the early 1970s. Variations in producer prices must follow international prices more closely, because there is less room for the government to maneuver consumer prices to offset movements of world prices.

The relation between growers' and millers' prices indicated in Figure 3.4 is essentially that between cane and sugar prices, but we are expressing both in terms of raw sugar prices. Our data show that organization of the growers had relatively little impact until about the mid-1970s, when the government began to take a more active role in the bargaining. The growers' associations therefore appear to have been more effective as political pressure groups than as bargaining groups capable of independent dealings with the mills alone. Only when they got the state to wield power on their behalf did they make favorable gains.

Administration of the Sugar Policy. The recurrent theme in the administration of sugar policies in Thailand has been the attempt to have a dualistic price structure in the domestic market. The government has sought independent controls over producer and consumer prices. As we have noted, this desire can be squared with budget constraints only if there is cross-subsidization among consumers, producers, and the export market. The direction in which the cross-subsidy flows depends on the movement of world prices and the level of domestic production. Given the paucity of years when world sugar prices were high, the tendency has been for consumers to subsidize sugar exports.

As there are now two domestic prices that may be policy targets--the consumer price and the producer price--the simple administrative method used for the other crops studied in this volume (i.e., control at the border) no longer suffices. As it turns out, neither export regulation nor border taxation was the prime control mechanism for sugar. The border measures merely complemented other policy measures, even though exports accounted for approximately two-thirds of production in the latter 1970s.

The chief administrative problem is to apportion the supply of sugar properly between domestic and export markets. The reason underlying the government's belief that such actions are feasible appears to be increasing concentration in the milling sector of the industry. The mills thus became the focus of governmental controls.

The Sugar Acts of 1961, 1968, and 1984 show various attempts to control sugar production and distribution. The cess-and-subsidy system of 1961-66 was relatively transparent and was the most elegant and economical approach from an administrative point of view. But this approach had two problems, one administrative and the other systemic. First, administration of the tax required close government monitoring of the level of production. There was therefore no economy of information that would normally favor the adoption of a price rather than a quantity mechanism.

Second, in a system that depends on the price mechanism, such as the levy-and-subsidy scheme, it is assumed that there is no need for central control of production. In the system practiced in Thailand, where the levy was collected at given rate and the subsidy rate was fixed by tender, the absence of production controls would have been workable only if it was assumed that producers had rational expectations and set their production levels to ensure that the scheme would work. Unfortunately, the way the government set

up the tender for the subsidy provided the wrong incentive. The government fixed an exportable quantity and allowed the bidders to tender the subsidy rate to exhaust that surplus. The government thus could maintain some control over domestic prices, but it had no way to ensure that the levy amount would be sufficient. The alternative would have been for the government to set up a tender wherein a fixed amount of money would be set up and bidders would have competed by offering to export higher tonnages. This would ensure that the budget constraint was respected, but then the domestic price would no longer be under control.

The system set up by the government, imperfect as it was, could have worked if some learning had taken place. This presupposes a reasonably stable environment, essentially stable domestic production, and stable world prices. But very high sugar prices in the world market in 1963 were followed by slump in 1964-65. An increase in Thai sugar production followed the 1963 boom by one year and was caught in the slump. The Sugar Industry Assistance Fund (SIAF) set up to administer the subsidy thereupon ran out of money, and the levy-and-subsidy scheme foundered.

The lesson learned by the government from this experience was the need for production controls. Actually, the 1961 Act did empower the minister of industry to control sugar production, but it did not give him a bureaucracy with which to enforce decisions. The 1968 Act gave the ministry both the authority and the wherewithal, and the Sugar Office was set up. More important than this bureaucratic change, however, was the reorganization of the grower-miller structure described earlier. The 1968 Act gave detailed powers to the government to regulate sugar production at two levels. At one level, the government attempted to control the capacity of the industry and of the individual plants. At another, it attempted to control the use of that

capacity to produce different types of sugar, of which there are three main types in Thailand: plantation white sugar, a grade of sugar consumed domestically; refined sugar, also domestically consumed, but in much smaller quantities, mostly by soft-drink bottlers; and raw sugar, the type of sugar most commonly traded internationally.

By allocating production quotas for the three types, the government could direct sugar to different destinations and could force the sugar mills to be the cross-subsidizing agents.<sup>22</sup> This method assumes, of course, that the government can control totally the level of production of each type of sugar. A second assumption is that the government could accurately know the present levels of production and domestic demand, both for consumption and for storage, and could also accurately forecast their future levels.

The puzzle for the analyst is that, although such degrees of omniscience naturally arouse disbelief, the system actually worked tolerably well. This was more true for the years when world sugar prices were low. One would expect that in such years there would be so much incentive for the mills to divert sugar to the better-priced domestic market that regulated sugar prices could no longer be sustained and would begin to decline. Then, as domestic sugar prices declined, the cross-subsidy scheme would become infeasible. This did not happen to any great extent, however.

The only times government production control policy ran into serious trouble were when world prices were high. Shortages appeared in the domestic market in 1980, and the government was forced to import about 80,000 tons of sugar. Then, and at other such times, the government attempted to ensure that sufficient sugar remained for the domestic market by various devices. For

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22. Actually, it uses other means to direct sales between domestic and export markets as well.

example, the government required in January-February 1975 that all mills sell all their white sugar to a special distribution center. In February 1980, the government required millers and traders to declare their stockholdings to the Ministry of Commerce. And in June 1980, the government prohibited unauthorized movements of sugar. None of these measures really worked, however. The failures of 1974-75 and 1980 are probably best explained by the hoarding induced by the expectation of a price increase. (Remember that these were the years when the general price level was increasing rapidly, so that expectations that the nominal price of sugar would be increased were rife.)

Why the system worked in years when world prices were low and did not work when world prices were high is difficult to understand. There is circumstantial evidence that the government underestimated domestic consumption and total production. In 1982-83, when there was a Central Sugar Distribution Agency, domestic sugar sales jumped from 400,000 to 600,000 tons (Ramsay, forthcoming). Such an underestimate causes the government to set an exportable surplus volume that is conservative. The mills then have extra tonnage to feed into the more lucrative domestic market. This tonnage is beyond the scrutiny of the government and, more importantly, of the cane growers' associations. This, in turn, implies some leeway for the mills at the annual cane-price bargaining sessions.

The inadequacy of the system became all too evident in 1980 and led to a series of moves that culminated in the Sugar Act of 1984, which provided a permanent legal basis for the 70/30 system. There was considerable conflict, both among the sugar mills and among the growers, before the scheme was enacted. The administrative changes were directed, however, toward even greater control of sugar production, and toward an attempt at control of the domestic distribution system.

The theme of the 1984 Sugar Act was the imposition of a tripartite (government, grower, and miller) system of control on sugar production, domestic distribution, and exports.

At the export level, a new sugar trading company, the Thai Cane and Sugar Trading Corporation (TCST) was established, jointly owned and controlled by the three groups. This company has a predetermined volume of the export market, fixed at 600,000 tons yearly. Thailand's sugar mills have to supply this amount (Quota B) to the company. The main purpose in setting up the company was for the three parties concerned to be in line with the world market situation. The average proceeds earned from the firm's sugar exports are the basis used in calculating the total export proceeds of Thailand, including the portion exported freely under Quota C by other firms. The average proceeds per ton earned by TCST during the year are used to estimate the same variable for Quota C exports.

At the production level, government control involves the registration of growers and of heads of farmers' groups (this is an attempt on the part of the government to undermine the power of the quotamen). The sugar production level is set by a national tripartite committee. Except for the composition of the committee, this is no different from the old system. What is new is a monitoring system at every mill. Instead of a lone official from the Ministry of Industry who would be susceptible to threats or bribes (or both), a mill-level tripartite body does the monitoring. In the first few years of operation there has been a genuine attempt to establish an effective monitoring system, but it is doubtful whether it can be sustained.

The method used to control domestic distribution is based on the fact that the internationally traded product is raw sugar, whereas the product of domestic consumption is white sugar. Production is monitored largely to

ensure that the amount of the different kinds of sugar produced is compatible with the different quotas for domestic and foreign markets. Reinsurance was sought by setting up a Central Sugar Distribution Agency in 1982, but the agency was dissolved in early 1985 as a result of political maneuvering.

Interest Group Politics in Sugar. Whereas the appropriate framework for analyzing rice politics was the bureaucratic model, the most appropriate model for analyzing sugar politics seems to be the interest group model, at least for the period from 1968 to 1982, prior to the emergence of the 70/30 system.<sup>23</sup> A different treatment is required for sugar than for rice and other crops because cane farmers are better organized than rice farmers or any other farm group in the country. In addition, sugar milling is an oligopolistic industry, and, in that sense, sugar millers are more organized than rice millers. Finally, after the growers' association was formed, the political problem for sugar every year has centered on collective bargaining for sugar-cane prices.

Because of the very strong pressures exerted by growers and millers, the role of the main bureaucracy in charge of sugar policy, the Ministry of Industry, is limited. The role of the Commerce Ministry has been even smaller, except in the years of shortages.

A second major difference that distinguishes sugar from other commodities is that starting in 1961, there has always been a distinctive legal framework for sugar.

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23. See Ramsay (forthcoming) for the nuances of the various models.

The third difference is that the politics of sugar have always had a murky side--more so than any other agricultural commodity in Thailand.<sup>24</sup> As the industry became stronger and its political clout grew, the stakes became correspondingly larger, but part of the story remains unfathomable.

It cannot be overemphasized that the major turning point in sugar politics coincided with the rise of modern sugar mills in the late 1960s. Both the Sugar Acts of 1961 and 1968 were drafted before interest-group politics became the determinant of sugar policies. From 1961 to 1968, the government's major interest was to protect the sugar industry--which meant, essentially, the sugar mills. Cane growers were supposed to reap benefits indirectly by selling to the mills.

The collapse of the levy-and-subsidy scheme caused the formulation of sugar policy to fall into the hands of the National Economic Development Board (NEDB). This planning agency tried to take a long-term view, one of the few times that was attempted. The NEDB's diagnosis of the problem was that the sugar industry was technologically backward. Thus, immediate policy was to ensure price stability through storage. No plan for exports was to be made until this technological backwardness was overcome. The 1968 Act, therefore did not envisage exports, but instead was designed to regulate production. Unfortunately, the language of the Act did not anticipate how rapidly

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24. For example, until 1974, sugar exports were monopolized by the Thai Sugar Corporation. The corporation was owned partly by the government and partly by the mills. The board of directors included army generals, a banker, and civilian politicians closely associated with the Sarit-Thanom governments. After the cess-and-subsidy period, the corporation did not appear to have much activity. In fact, as exports resumed after 1969, it seemed to be merely collecting nominal commissions from sugar mills who made all the other decisions. Yet, when discussions were raised and the decision finally made to set up a second sugar exporting company in 1974, it was done against fierce opposition--far out of proportion to what the firm was apparently doing. The same applied to the Board reshuffles in 1982 and 1984.

technologically superior capacity might be installed and how soon an exportable surplus might recur. Both came about within two years of the 1968 Act. By 1970 the government was attempting to ban new capacity as a stopgap, but it was not able to enforce the ban (Jessadachatr 1977).

Actually, by 1970 the government had begun to lose control over the industry. Partly responsible was the combination of sugarcane growers into association, which was complete by 1970. Since then, the growers have become increasingly aggressive in bargaining with the mills, and as Ramsay (forthcoming) has put it, "governments increasingly have lost their position as magisterial judges of the industry's fate that they retained in the decades from 1937 to the late 1960s, and have been drawn more and more into the role of broker between well organized, conflicting groups of planters and millers."

Soon, government concessions to interest groups expanded. As growers' and millers' representatives grew more intransigent, it became commonplace for the government to step in and offer "sweeteners" in the form of subsidies or reduced taxes.<sup>25</sup>

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25. For the 1976-77 crop year, the government concessions were (1) an export subsidy of Baht 200 per ton in case the world price dropped below Baht 4,800 per ton, and (2) a reduction of business tax on exported sugar from 7.7 percent to 1.65 percent. For the 1977-78 crop year, the concessions were (1) an export subsidy not exceeding Baht 300 per ton to top up the export proceeds to reach Baht 4,500 per ton and (2) business tax removed for all exported sugar. For the 1979-80 crop year, the government removed the business tax for all exported sugar. For the 1981-82 crop year, it provided a production subsidy of Baht 30 per ton of sugarcane. For the 1982-83 crop year, the government (1) set the business tax on exported sugar at 1.5 percent, and (2) "took note of" a loan of \$78 million borrowed from commercial banks by the Thai Cane and Sugar Corporation, a semipublic exporting company set up under the experimental 70/30 system of that year. The purpose of the loan was to "stabilize" prices (i.e., exports were to be subsidized that year). Later, when the sugar prices were supposed to rebound, the money was to be repaid. The company could not repay that loan, of course, because sugar prices never rebounded. As of this writing (September 1987), attempts are still being made to persuade the government to take over the debt.

The 70/30 system was designed to end conflict within the sugar industry. Ironically, however, the system engendered probably the most violent conflict of all. They included an assassination (of the secretary general of the growers' federation), two boardroom "coups" (of the Thailand Sugar Corporation, the oldest among the sugar exporting firms), and the splitting of the growers' federation into two.

The lines that were drawn in this new round of contention were not, as one would expect, between millers and growers but between two groups of millers. The roots of this conflict go back to a much older and persistent competition. Broadly speaking, there were two factions of millers, one dominated by the largest sugar group in the country, the Thai Rung Ruang, and another comprising almost all of the other sugarcane producers.

The original proponents of the 70/30 system were a group of academics-turned-technocrats, bureaucrats, and a few knowledgeable managers within the sugar industry. They were joined later by the second group of millers. The first group of millers adamantly opposed the 70/30 system. To the surprise of all, particularly the original proponents, the division between the two millers' groups came to dominate the discussion, and it split the growers' federation into two camps supporting and opposing the 70/30 system. Even the Ministry of Industry was split, with the Minister supporting one side and the deputy minister in charge of sugar policy supporting the other.

What was the conflict between the mill groups about? Characteristically for all matters concerning sugar, the true causes probably will never be known. The best explanation is that it constituted a struggle for control over the domestic market. Even though domestic sugar is a mere third of total sugar production, the higher price normally obtained for it makes it far more

attractive to produce than exported sugar. It appears that opponents of the 70/30 system had a better domestic sugar distribution network than the proponents of 70/30. Naturally, the established interests resented the inroads they believed would be made into this part of their income from the 70/30 revenue-sharing system. This was so particularly because the Central Sugar Distribution Agency, established in 1982, was designed to make an effective accounting of the volume of sugar sold domestically. That this was at least one bone of contention is supported by Ramsay's (forthcoming) observation that the routing of proponents of the 70/30 system in the counsels of government (through most of 1984), coincided with the disbanding of the distribution agency (in January 1985).

The proponents of the 70/30 system, however, achieved one thing. During their ascendancy, they managed to enshrine the design of the system into law, the Sugar Act of 1984, probably the most elaborate among all Thai laws pertaining to agriculture. The law and its accompanying regulations set a clear framework for how proceeds from domestic and overseas sugar sales were to be divided between millers and growers. The proponents' hope was that this would eliminate conflict. Their shortcoming was in failing to set up an information base (particularly regarding the domestic market) that would be relatively immune to tampering. As a result, conflict within the sugar industry has moved to another plane: Who will control the relevant information base?

#### Conclusion

If we accept that the major protagonists in sugar politics are conflicting interest groups, particularly for the period 1968-84, then the notion of a unified set of objectives for the government on sugar (as given in, say, Table 2.7 for rice), must be taken with more than a pinch of salt. Table 3.2 was

TABLE 3.2

RELATIVE WEIGHTS OF OBJECTIVES OF SUGAR POLICIES

Objectives	1960-1967	1968-1974	1975-1984
Price Stability	0.3	0.4	0.3
Consumer Price	(0.2)	(0.2)	(0.1)
Grower Price	(0.1)	(0.2)	(0.2)
Producer Welfare	0.5	0.6	0.7
Growers	(0.1)	(0.3)	(0.45)
Sugar Mills	(0.4)	(0.3)	(0.25)
Self-Sufficiency	0.2	0	0

drawn up to make Thai sugar comparable with other commodities, and with sugar in other countries. The dominance of producers' interests, is reflected in the large weights assigned to producer welfare and producer price stability. The consumer interest is considered only in terms of price stability.

The objective Self-Sufficiency persisted in the period 1960-67 because Thailand was just emerging from its importer status, and without a proproducer policy it probably would have returned to that status. The desire to avoid such a relapse no doubt was at work at the time.

The Maize Export Quota System. Maize exports began to expand in the late 1950s and continued growing until the early 1970s, when they leveled off at about 2.5 to 3 million tons. Until the early 1970s, almost the entire maize output was sold abroad. Since then, the extremely rapid growth of the domestic broiler industry has caused an increasing amount of maize to be retained for home-market consumption, and domestic consumption now accounts for about one-quarter of total production.

Government intervention in maize exports until 1981 (when intervention ceased) was guided by a rather strange set of motives. The root of the intervention goes back to the 1960s when Japan and (somewhat later) Taiwan were almost the sole buyers of Thai maize (Table 3.3). These two countries insisted on a season-long schedule of deliveries. In this arrangement, the Thai Maize Traders' Association and the Japanese Feed Importers' Association (the practice with the Taiwanese was similar) would conclude a sales contract lasting one marketing season (beginning in August and continuing until January of the following year). This sales contract normally would set the volumes of maize to be shipped and would establish a pricing formula, whereby the FOB Bangkok price of the maize was linked to Chicago quotations of the previous

TABLE 3.3  
IMPORTER SHARES OF THAI MAIZE  
(Percentage)

Year	Japan	Taiwan	Others
1967	58.53	12.57	28.90
1968	42.76	25.38	31.86
1969	31.50	29.16	39.33
1970	44.88	30.89	24.22
1971	49.39	17.19	33.42
1972	45.68	27.27	27.05
1973	33.80	22.45	43.75
1974	42.51	20.33	37.16
1975	39.27	5.69	55.04
1976	40.91	18.93	40.16
1977	25.94	25.27	48.79
1978	27.65	0.00	72.35
1979	23.28	3.57	73.15
1980	5.04	7.50	87.46
1981	0.80	3.88	95.32
1982	6.56	6.75	86.70
1983	0.40	0.27	99.33
1984	0.19	1.61	98.20
1985	0.94	0.17	98.90

Sources : Department of Customs,  
Ministry of Finance.

two months (Houck 1972). Because of these fluctuations, and because of demand fluctuations from noncontract countries (i.e., countries other than Japan and Taiwan), domestic prices did not move in step with the prices to be obtained from export sales. There were thus occasions when exporters were tempted to renege on their contracts. This became the occasion for the government to intervene.

The government's role in the process in general was as follows. It would issue monthly export quotas based on historical performance to both the contract and the noncontract markets. For the contract markets, the amount of maize stipulated had to be shipped, whereas for other markets the quota represented a ceiling. Between February and July, a period of relatively low trade, free export of maize was allowed.

Trading in quotas was widespread, although the practice was officially disallowed. Quota prices for the contract markets could be negative, in theory, because the constraint was an equality (the tonnage quota had to be shipped). In fact, it was positive most of the time. For non-contract markets the price was positive, of course, because the constraint was an inequality.

There were two reasons for the positive prices. First, the government tended to be conservative in its estimates of supplies, and therefore it was relatively restrictive in its quota allocations. Second, in later years, when domestic consumption became significant, the Ministry of Commerce claimed that it was ensuring end-of-season supplies of maize for the livestock industry.

The quota system came to an end in December 1981.

The quota system created a quota rent. To calculate the quota rent from data on border prices and domestic wholesale prices (whose series goes

back only to 1967), we have assumed that the real exporter margins (loading costs, normal profits, etc.) were constant throughout the period 1967-84 and specifically equal to the margin between 1982 and 1984, when exports were freely allowed. We thus calculated real exporter margins as the difference between border prices and domestic wholesale prices, averaged over the years 1982 to 1984. Then we extrapolated these margins back to the period before 1981 and deducted them from the difference between border and domestic wholesale prices for those years.

All these calculations were performed on both sets of prices deflated by the nonagricultural goods deflator (PNA). The figures are shown in the first two columns of Table 3.4. The nominal prices are given in the 1st two columns.

#### The Low-Key Politics of Maize

Like rice growers and unlike sugar growers, Thailand's maize farmers are unorganized smallholders. But, unlike rice, maize has been primarily an export crop. Large-scale domestic consumption only began with the growth of the broiler industry. Until the last few years, the broiler industry was a domestically oriented industry. As such, it could pass on to consumers any movement in the domestic price of maize. The Commerce Ministry sometimes cited the broiler industry's needs to justify its intervention, but the latter generally did not attempt to pressure the government.

Without the clash of different interests, maize policy discussions were rather low key. Maize is also unique in that intervention eventually gave way to full liberalization.

The system of contract sales to Japan and Taiwan required centralized control to ensure performance. Under the quota system, the Ministry of

TABLE 3.4  
DIRECT PRICE INTERVENTION ON MAIZE

Year	Prices Deflated by PNA (a)			Nominal Prices	
	Domestic Price (Baht/ton) (1)	Border Price (Baht/ton) (2)	Negative of Quota Rent (proportion of border price) (3)	Domestic Price (Baht/ton) (4)	Border Price (Baht/ton) (5)
1960	n.a.	1,383.82	n.a.	n.a.	1,067.41
1961	n.a.	1,411.03	n.a.	n.a.	1,127.28
1962	n.a.	1,337.43	n.a.	n.a.	1,100.96
1963	n.a.	1,320.45	n.a.	n.a.	1,092.16
1964	n.a.	1,327.50	n.a.	n.a.	1,142.02
1965	n.a.	1,447.57	n.a.	n.a.	1,257.18
1966	n.a.	1,302.65	n.a.	n.a.	1,193.36
1967	1,254.63	1,322.77	-0.0515	1,161.92	1,225.03
1968	1,036.92	1,093.19	-0.0515	970.39	1,023.05
1969	1,167.55	1,186.03	-0.0156	1,117.21	1,134.89
1970	1,281.83	1,317.11	-0.0268	1,229.01	1,262.84
1971	1,233.64	1,279.49	-0.0358	1,202.03	1,246.71
1972	1,163.52	1,095.43	0.0622	1,163.52	1,095.43
1973	1,542.66	1,708.53	-0.0971	1,784.20	1,976.05
1974	1,820.63	1,868.76	-0.0258	2,555.04	2,622.58
1975	1,715.22	1,834.41	-0.0650	2,483.14	2,655.68
1976	1,478.38	1,528.34	-0.0327	2,217.46	2,292.38
1977	1,296.70	1,292.45	0.0033	2,131.25	2,124.28
1978	1,169.58	1,196.98	-0.0229	2,113.97	2,163.49
1979	1,324.87	1,388.91	-0.0461	2,637.92	2,765.42
1980	1,301.38	1,376.33	-0.0545	3,022.28	3,196.35
1981	1,155.47	1,265.97	-0.0873	2,959.68	3,242.74
1982	1,064.60	1,064.60	0.0000	2,850.41	2,850.41
1983	1,136.67	1,136.67	0.0000	3,128.87	3,128.87
1984	1,075.70	1,075.70	0.0000	3,084.90	3,084.90

Notes : (a) (1) and (2) are deflated by the Value Added Deflator for the Non-Agricultural Sector (1972=100)

Sources : (1) Department of Business Economics, Ministry of Commerce.  
 (2) Department of Customs, Ministry of Finance.  
 The border price of maize is the net of exporter margins.  
 (3) = ((1)-(2))/(2).

Commerce had two levers of control. First, if an exporter reneged on contracts, the firm could be cut off from the list of those eligible to receive quotas. Second, if domestic prices rose relative to Chicago prices (to which the selling prices to the Japanese and Taiwanese markets were linked), and the traders threatened to renege on their contracts, quotas to third markets could be curtailed sharply so that maize could be shipped to the two contract markets.

Even though the burden of these measures was eventually borne by growers through lower prices for their maize, the measures could be defended as a protection of long-run Thai interests since the two contract markets purchased such a large share of Thai maize.

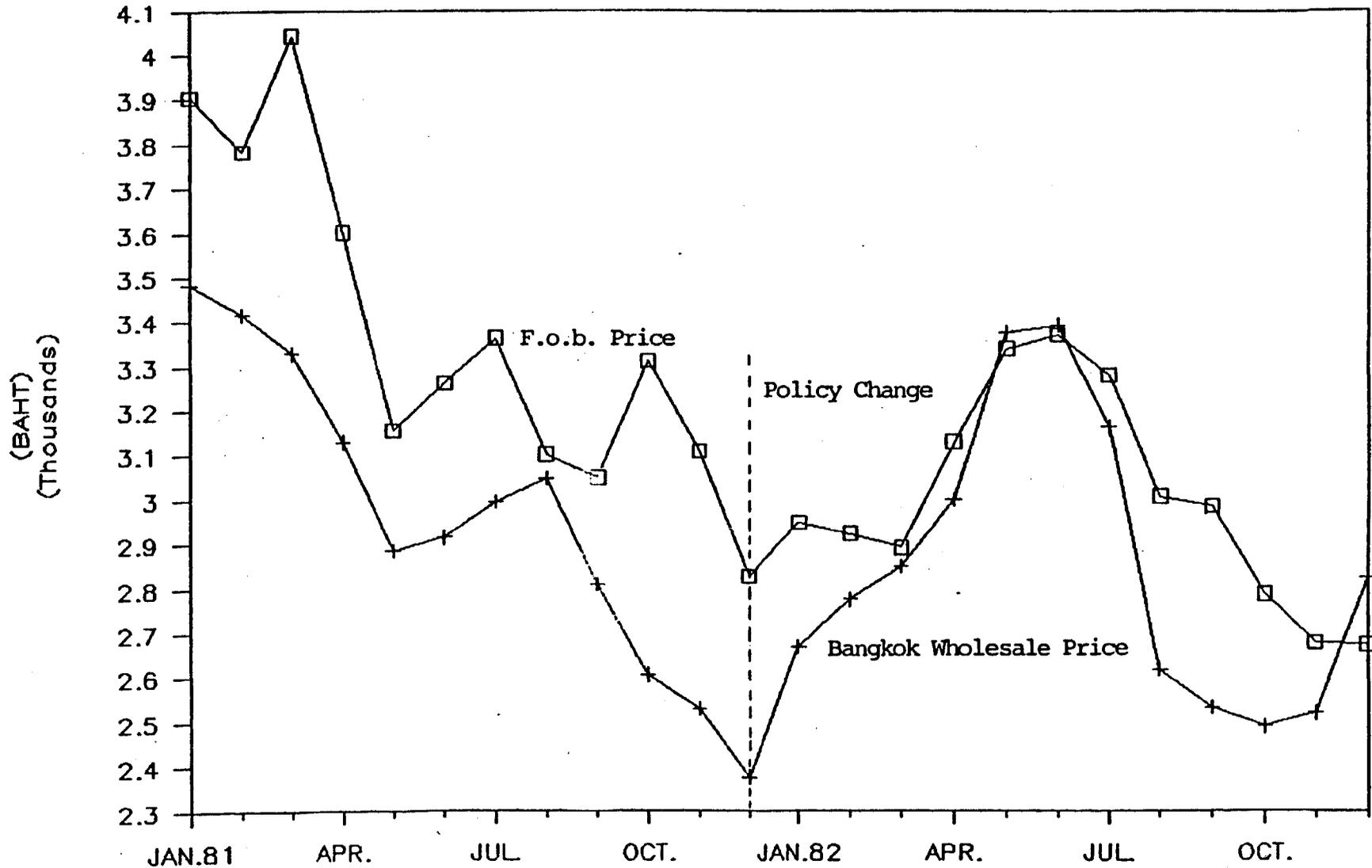
By about 1975, however, this justification for intervention began to wear thin. As the economies of other Asian countries grew, their demand for livestock increased, causing the demand for maize to grow commensurately. Japan and Taiwan thus no longer dominated the maize trade, and Japan, in fact, became more and more marginal. In part, this was because Japanese importers found it more profitable to buy from the United States because, as Thai exports to other markets grew, the Thai price began to edge up relative to the US price.

By the time these developments occurred, however, many Thai exporters, particularly the small ones, were reluctant to give up the quota rents obtained under the old system. A long struggle ensued over whether the quota system would continue. In December 1981, the cabinet directed the Ministry of Commerce to lift the quota system and to liberalize the maize trade completely. The immediate occasion for this was a sharp and continuous fall in local maize prices during most of 1981 (Figure 3.5). The timing could not have been better. The border price (which was the real cause of the fall)

FIGURE 3.5

# MAIZE PRICE MOVEMENT : 1981-1982

(NOMINAL)



Sources: F.o.b. Price from Department of Customs, Ministry of Finance  
 Bangkok Wholesale Price from Department of Business Economics, Ministry of Commerce

bottomed out in December of 1981 and picked up afterward, independent of the Thai government's decision.<sup>26</sup> Consequently, the task of proving the fig. 3.5 superiority of free trade and establishing a permanent free trade policy for maize became immensely easier for reformers.

Table 3.5 provides a weighting of maize policies for the period 1961-81, when seasonal contracts and quota system were in effect.

### Rubber

The Thai government has levied an export duty on rubber since 1935. At that time, the duty was levied on a specific basis. In 1938, the government changed it to a flat 7 percent ad valorem rate (Ingram 1973). There were also some restrictions on planting as a result of Thailand's membership in the second international rubber regulation scheme (Silcock 1970; Stifel 1973). Because of market instability connected with the Korean War and its aftermath, the tax basis was changed to a progressive rate in 1955, and this system remains in force today. At times, the progressive duty makes rubber the most heavily taxed of Thailand's agricultural commodities. There have been no quantitative restrictions on production or exports since about 1960.

In 1958, a World Bank mission provided technical assistance to help the government prepare Thailand's first public development plan. The mission suggested a replanting program modeled on those of Malaysia and Sri Lanka. The program involved subsidizing rubber growers to replace the trees grown by

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26. It could be argued that Figure 3.5 shows the domestic price rising relative to the export price as well. One has to be careful in so interpreting the data, however. Because of higher storage costs in Thailand than elsewhere, Thai maize is rushed out as soon as it is harvested (the harvest months begin in July and peak in September and October, tailing off in November). The tail end of the export season is toward January and February. During the main export season, a gap thus normally opens between the FOB price and the domestic wholesale price. This gap closes during the slack export period from February to June.

TABLE 3.5  
RELATIVE WEIGHTS OF OBJECTIVES OF MAIZE PRICE POLICIES  
1961 - 1981

Objectives	1961-1971	1971-1981
Ensuring foreign contract performance	1.0	0.8
Domestic Consumers (Animal Feed Compounders)	0	0.2

Source: Authors' subjective judgment.

smallholders, the main producers of Thai rubber. The subsidy cost was to be recovered by a tax on rubber exports (World Bank 1959).

Although the Bank mission proposed that this program should start in six or seven years, the government decided to forge ahead and passed a Rubber Replanting Fund Act in 1960. The tax system thus was brought to Thailand, and its proceeds have been used to finance the rubber replanting program. The tax, in force since 1961, is levied in addition to the export duty. Although the fund has been accumulating money, the rate of replanting has been quite slow because much of the fund is used for administrative purposes rather than for replanting (Tinakorn 1980). The rate has begun to increase since the Office of the Rubber Replanting Fund was reorganized following the approval of a US\$50 million World Bank Loan in 1977. Since then, the office has become much more effective in administering funds. In the analysis that follows, the tax part of the program is considered part of pricing policy, but the replanting subsidy is not, because it is a grant given to rubber growers.<sup>27</sup>

Both the export duty and the tax are levied at a rate that is progressive with respect to price (see Table A.9). The per ton taxes on rubber shown in Table 3.6 are calculated from the total tax revenue and tonnage exported. Thus, duty and tax have combined to make rubber one of the most heavily taxed agricultural commodities in Thailand.

To ask whether such heavy taxation has raised political opposition is to ask essentially the same question as Sherlock Holmes: Why did the dog refuse to bark? Among the major commodities, rubber raises the least amount of political heat, but has not always been so. In 1934 the question of

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27. See Bertrand (1983) for an analysis of the entire replanting program.

TABLE 3.6  
EXPORT DUTY AND CESS IN RUBBER  
AND THEIR EFFECT ON DOMESTIC PRICE

(Baht per ton, nominal)

Year	Export Duty (1)	Cess (2)	Total Tax (3)	Border Price (4)	Implied Domestic Price (5)	Negative of Tax as Proportion of Border Price (6)
1960	1,845.44	0.00	1,845.44	14329.39	12483.95	-0.1288
1961	1,039.08	515.27	1,554.34	10897.34	9343.00	-0.1426
1962	854.90	468.78	1,323.68	9992.09	8668.41	-0.1325
1963	925.38	414.31	1,339.69	9316.84	7977.15	-0.1438
1964	704.75	420.38	1,125.13	8619.23	7494.10	-0.1305
1965	750.73	435.01	1,185.74	8611.29	7425.55	-0.1377
1966	667.59	422.46	1,090.05	8316.55	7226.50	-0.1311
1967	386.25	389.05	775.30	6581.42	5806.13	-0.1178
1968	263.46	371.79	635.24	6325.94	5690.70	-0.1004
1969	970.62	454.43	1,425.05	8764.75	7339.70	-0.1626
1970	448.59	490.44	939.02	7208.29	6269.26	-0.1303
1971	56.92	505.16	562.09	5310.29	4748.20	-0.1058
1972	46.64	505.28	551.92	5013.77	4461.85	-0.1101
1973	1,367.91	487.46	1,855.37	10837.14	8981.76	-0.1712
1974	1,894.99	559.98	2,454.97	13003.21	10548.24	-0.1888
1975	1,044.73	546.89	1,591.62	9583.78	7992.16	-0.1661
1976	2,139.68	632.81	2,772.49	13309.54	10537.05	-0.2083
1977	2,413.81	811.82	3,225.63	14475.26	11249.63	-0.2228
1978	3,062.77	869.78	3,932.55	17285.45	13352.90	-0.2275
1979	4,494.61	1,097.43	5,592.05	22834.04	17242.00	-0.2449
1980	5,438.79	1,429.97	6,868.76	26309.19	19440.43	-0.2611
1981	3,069.67	1,090.02	4,159.69	22006.47	17846.78	-0.1890
1982	1,242.68	929.81	2,172.49	16558.17	14385.68	-0.1312
1983	2,527.71	1,107.59	3,635.30	20252.11	16616.81	-0.1795
1984	1,993.40	1,184.80	3,178.20	21095.10	17916.90	-0.1507

Source : (1) and (4) Department of Customs, Ministry of Finance.  
 (2) Before 1980 : Pranee Tinakorn "Study of National Rubber Marketing System in Thailand and the Rubber-related Government Agency," 1980  
 After 1980 : Office of Rubber Replanting Aid Fund.  
 (3) = (1)+(2)  
 (5) = (4)-(3)

whether Thailand should join an international rubber scheme brought down Thailand's first parliamentary government (Stifel 1973).

One possible explanation for the current situation is that rubber is primarily a product of the South, a region somewhat remote from the concerns of Bangkok. Stifel wrote in 1973 of the "apathy and misunderstanding concerning rubber which has persisted to Bangkok to the present day." This goes a long way to explain the situation in the 1960s and early 1970s, when parliamentary government was weak, and covers the sharp increase in export duty rates in 1966 (see the chronology in Table A.9).

This explanation does not suffice for the present period, however, even though the parliamentary government that has evolved since 1973 is still weak. The South is now represented in the capital, and its elected representatives form an important bloc, with some individuals ranking high in the government. At the very least, representatives of the South can place the issue of rubber taxes on the political agenda. The only time they have done so, however, was in 1981, when rubber prices were declining rapidly.

The main explanation for the lack of political challenges to high export taxes on rubber probably lies in the automatic stabilizing mechanism arising out of their progressivity. The administration of rubber export taxes is extremely simple. The government makes bimonthly announcements of the world price it will use for assessing the value of exported rubber. This price is purely technical. Furthermore, rubber exporters alone among the major exporters require no licenses. All of this means that the government does not need to exercise much discretionary power. Further, rubber is harvested and sold through the year, not during a particular season. The result of all this is that there is no natural time for rubber to appear on the political agenda, and thus it is usually ignored.

The problem with a sliding-scale system of taxation is, of course, the bracket creep that occurs with inflation. Thailand had two periods of double-digit inflation associated with the two oil shocks. Both times, rubber prices shot up and then declined in both nominal and real terms (Figure 3.6). Displacement of the price level, however, led to a permanent upward change in the nominal price. Without a change in the brackets, the tax rose to a higher plateau (Figure 3.7) without the growers realizing it. Consequently, tax rates for rubber in the period 1974-80 were about 50 percent higher than in 1968-73, even though the tax scale remained unchanged and the real border price increased by a mere 20 percent (Table 3.7).

#### Other Commodities and Inputs

For completeness' sake, we sketch here policies on other commodities and on fertilizers. We do not examine their effects in detail, however, because, for the years of our study, the policies were in effect for only short time, or had only a small effect. Intervention in these commodities has acquired importance in the 1980s, however, and will probably loom large in the future.

Cassava. Until 1980, trade in cassava pellets, which were almost entirely exported to the European Community (EC) was free of intervention. In 1980, as a result of European pressure, a voluntary export restraint agreement (VER) was initialled. Although the agreement had not been ratified by the cabinet by 1981, the Ministry of Commerce tried to implement it then. The consequent price decline led to public protests and to the withdrawal of the export restriction. In 1982, however, the EC obtained Indonesian and Brazilian agreements to let it unbind itself from its tariff commitment under GATT (Sathirathai and Siamwalla 1987). Consequently, Thailand found it necessary to ratify a VER that capped the export level at an average of 4.975 million tons per year.

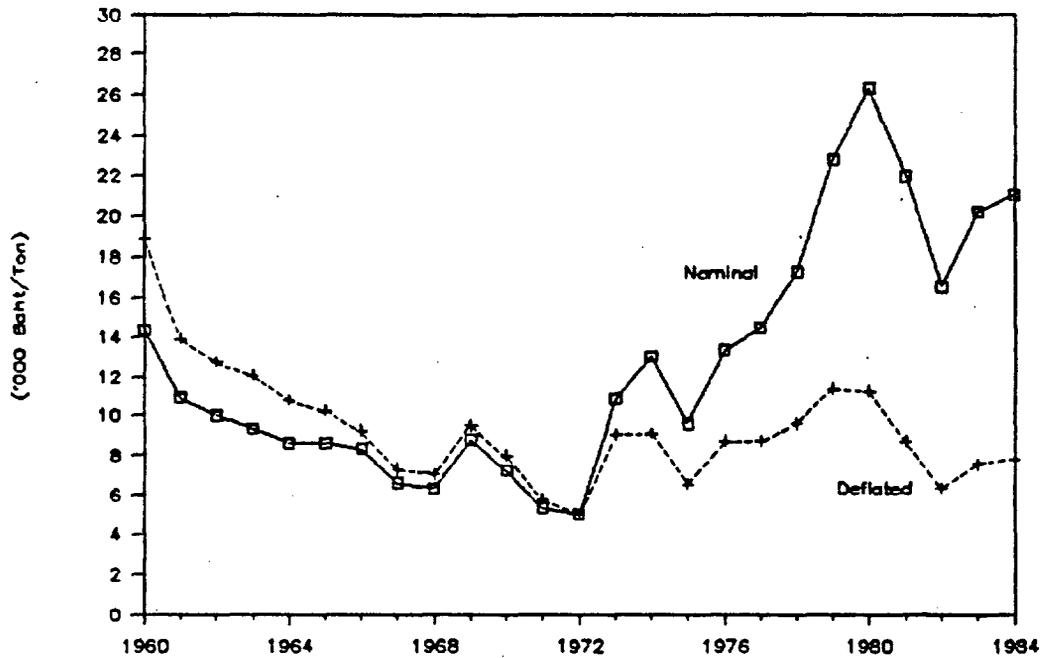
TABLE 3.7  
REAL BORDER PRICE OF RUBBER AND AVERAGE TAX RATES<sup>a</sup>

Year	Real Border Price (baht/ton)	Average Tax Rate (percentage)
1968-1973	7,376.29	13.01
1974-1980	9,329.20	21.71

Note : <sup>a</sup> Border Price deflated by GDP deflator (1972=100)

Source : from Table 3.6

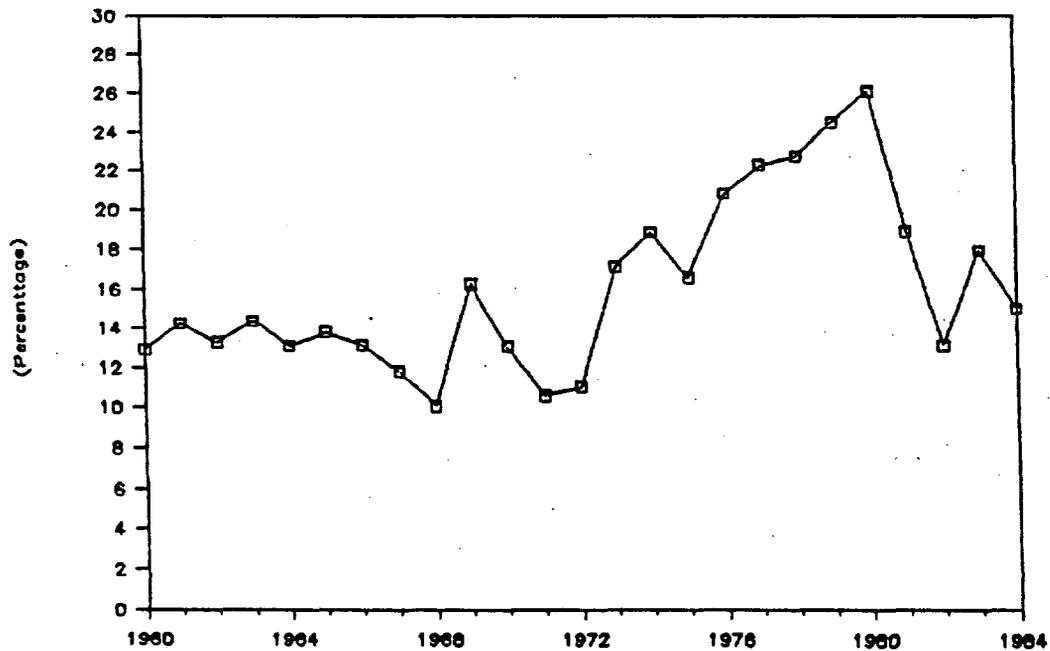
FIGURE 3.6  
NOMINAL AND DEFLATED<sup>a/</sup> BORDER PRICE OF RUBBER



Source: Table 3.6

a/ Deflated by GDP Deflator, 1972 = 100

FIGURE 3.7  
TOTAL TAX AS PERCENT OF BORDER PRICE FOR RUBBER



Source: Table 3.6

The quota allocation mechanism kept changing and entailed various types of rent dissipation without a long-run impact on price (different from what it would be if quotas were auctioned or allocated in other nondissipative ways, e.g., on the basis of exporters' historical performance; Siamwalla 1986). One measure introduced in 1984 could have had a substantial impact on prices. A portion of the EC quota was allocated on the basis of export performance to the non-EC countries. This implied that the profits from the EC quota rent were used to subsidize non-EC exports. This cross-subsidy was about 15 to 20 percent, but was relevant only for 1984. Therefore, we have not included cassava in our study.

Soybeans. Imports of soybeans, soybean oil, and soybean meal were subject to a tariff that increased slightly over time, beginning in the early 1960s. Since 1982, imports of soybeans have required a license.

The Ministry of Agriculture and Cooperatives also tried to assist farmers by requesting that soybean crushers buy soybeans from the farm at a price higher than the world price. There was no monitoring of purchase prices, however.

The expansion of the animal feed industry greatly stimulated the demand for soybean meal. Soybean meal imports, taxed at 8.87 percent, increased rapidly after the mid-1970s. Until 1984, pressure from animal feed producers, on the one hand, and from vegetable oil consumers, on the other, led to a relatively liberal import regime for soybean products, with a duty rate of 8.8 percent.

In 1984, the soybean crushers submitted a proposal to the government to guarantee the farmgate price of soybeans as requested by the government, subject to the condition that the government guaranteed the market for their soybean meal. A quota system was adopted for imports of soybeans and soybean

meal. To import soybeans and soybean meal, the importer must present evidence of purchase from the domestic soybean market (especially from the Marketing Organization for Farmers; MOF) and the soybean meal producer, respectively. In 1984, the ratio of imported beans to domestic beans was set at 1:1. For meal, the ratio was 2:1. However, because of the effective subsidy on exports of soybean meal to Brazil and Argentina, it has been more economical to import soybean meal, as opposed to soybeans, and there was very little importing of the latter. The ratio of soybean meal imported to soybean meal purchased domestically changed to 4:3 in November 1984. The tariff remained at 8.8 percent. This quota system increased the domestic price of soybean meal by about 10 percent above the world price. It has increased the domestic price of soybeans by only 3 to 5 percent above the world price (Setboonsarng and Amaranand, forthcoming). Because this increase is relatively small, it was not included in our calculations.

Palm Oil. Palm oil imports were subject to an ad valorem tax until 1976, when there was an influx of crude palm oil imports, whose level jumped from about 100 tons in 1975 to over 7,000 tons in 1976. The government then changed the tax from the ad valorem tax to a specific tax in 1977. This rate increased from Baht 0.75 per liter to Baht 1.32 per liter for the crude palm oil (CPO) in 1982. The rate for refined, bleached, and deodorized (RBD) palm oil increased from Baht 1.00 to Baht 4.40. In 1985, the rates for CPO and RBD changed to Baht 2.50 and Baht 5.50 per liter. Therefore, there has been a steady increase in the protection of domestically produced CPO. Since palm oil imports dropped drastically because of the increase in domestic production (which appears to have occurred independently of the protectionist policy), the impact of this import tax is very small, and we ignored it in our calculations.

Cotton. In 1960, the government imposed a specific tax of Baht 0.33 per kilogram on uncarded cotton and Baht 0.45 per kilogram on carded cotton. There was no change in this rate until October 1984. The specific tax was changed to an ad valorem tax of 6.665 percent (including business tax) as part of the general restructuring of the tax and tariff systems. Because of this implied low tax rate, cotton was excluded from our calculations.

Fertilizers. Between June 1968 and October 1973, imports of nitrogenous fertilizers were monopolized by the Chemical Fertilizer Corporation, operator of an inefficient fertilizer plant in northern Thailand. The monopoly was granted to keep the firm afloat. The resulting implicit taxation on Thai farmers was about 35 percent on ammonium sulphate and 50 percent on urea between 1971 and 1973 (Manarungsan 1978, Tables 4.7 to 4.10).

Fortunately, this high implicit tax did not apply to mixed fertilizers, particularly ammonium phosphate (16-20-0 and 20-20-0), the main fertilizers used for rice. Imports of these continued and indeed increased substantially because of the restriction on imports of straight nitrogens.

After 1973, fertilizer imports were free of all restrictions or even tariffs (except for an 8 percent tariff on urea). There was an interlude of a few months in 1978 when a 20 percent duty was imposed on all mixed fertilizer imports, to protect a second fertilizer plant, but public protests led the government to rescind that duty.

Table 3.8 gives the shares of fertilizers and pesticides in the gross value of output in rice, maize, sugarcane, and rubber from years when fertilizer use was already high (1975, 1980, and 1982). Because of their low shares, we decided not to give them separate consideration. Also, in the various quantitative analyses below, we have not looked into the issue of effective rates of protection (or disprotection) because intermediate inputs are of such little consequence.

TABLE 3.8  
INPUT COEFFICIENTS: FERTILIZERS AND PESTICIDES  
(Share of Gross Value of Output)

	1975	1980	1982
Paddy	0.032749	0.049732	0.051265
Maize	0.005495	0.009352	0.011310
Sugarcane	0.058036	0.066767	0.052604
Rubber	0.027205	0.032838	0.042333

Source: Input-output Tables 1975, 1980 and 1982, National Accounts Division, NESDB.

Chapter 4

INDUSTRIAL AND MACROECONOMIC POLICIES

AFFECTING AGRICULTURE

Since about the early 1960s, pricing policy decisions generally have been insulated from the pressures arising from budget constraints. The general style of intervention adopted by the Thai government has been to avoid spending budget funds on intervention. Where specific subsidies have been involved--for example, for rice consumers or sugar producers--special modes of cross-subsidization have been created. Such arrangements preclude the Finance Ministry or the planning agency (NESDB) from playing an active role in pricing policies. They also minimize the interaction between pricing policies and those policies that affect the sector as a whole, because the latter are considered only in the context of aggregate public expenditure and investment programs.

Factors Affecting the Agricultural Sector as a Whole

The returns that Thailand's farmers receive for their products are influenced by policies that appear unrelated to agriculture--namely industrial, monetary, and fiscal policies. We quantify these effects below, but first we review the course of these three types of policies over the last few decades.

Industrial Policies. In its industrialization efforts between 1938 and 1958, the government of Thailand directly invested in several public

enterprises.<sup>28</sup> These investments increasingly ran into trouble (Golay et al. 1969; World Bank 1959). A turnabout in economic policy in 1958 led to a new method of promoting investments. Two decrees were promulgated in 1958 to replace the ineffective investment promotion law of 1954, and a Board of Investment (BOI) was created to render assistance to investors.

The importance of the BOI lies not so much in its grants of promotional privileges--in the form of tax holidays, exemptions from taxes on imports of machinery and raw materials, and the like--but in its role as a forum where private businesses can legitimately submit requests to the government for these privileges. The government, in a sense, became involved in the private sector's decisions. Having become involved, it also became responsible for the survival of these enterprises. Because the guiding philosophy of BOI in the 1960s was import substitution, protection of industry became the norm.

The BOI emphasized promotion of industry by offering tariff protection, exemption from import tariffs on machinery, and income tax holidays. Although some large-scale agricultural plants (such as those in the sugar, vegetable oil, and animal feed industries) were able to take advantage of the BOI privileges, most agroprocessing industries in Thailand (such as rice milling and rubber processing) are small- and medium scale industries that could not gain access to BOI assistance. Thus, BOI policies were clearly, albeit implicitly, biased against agriculture.

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28. We are indebted to Pranee Tinakorn for making available to us material from her study on the political economy of equity and growth, also conducted for the World Bank.

Reinforcing investment promotion policy was the government's tariff policy, which was firmly under the control of the Ministry of Finance.<sup>29</sup> The revenue motive for collecting tariffs, which was paramount in the late 1950s and early 1960s, gradually eroded, particularly after major tariff revisions in 1964 and 1971. A 1974 revision was a liberalizing one, but a revision in 1978 increased protection. Under a revision in 1982, variations in tariff rates increased significantly.

Tentatively in the 1970s, and more firmly in the 1980s, the government adapted a much more export-oriented industrial strategy. The procedure to obtain rebates for duties and domestic taxes paid on the imported components of exported goods was simplified and liberalized. Most important, the government appeared more willing to pursue a more active exchange rate policy, particularly after 1984.

Monetary and Exchange Rate Policies. Thailand's monetary policies were very conservative until about 1975 as evidenced by the Bank of Thailand's success in maintaining a fixed nominal exchange rate of the baht against the dollar for a remarkable period of twenty-six years (1955-81). The origins of this conservatism and the absence of any tampering by the politicians with the Bank's operation came from respect for the Bank's performance during World War II and the Korean War (Silcock 1967). Furthermore, the Bank has remained singularly unsullied by corruption. This alone lends credence to the Bank's policy position.

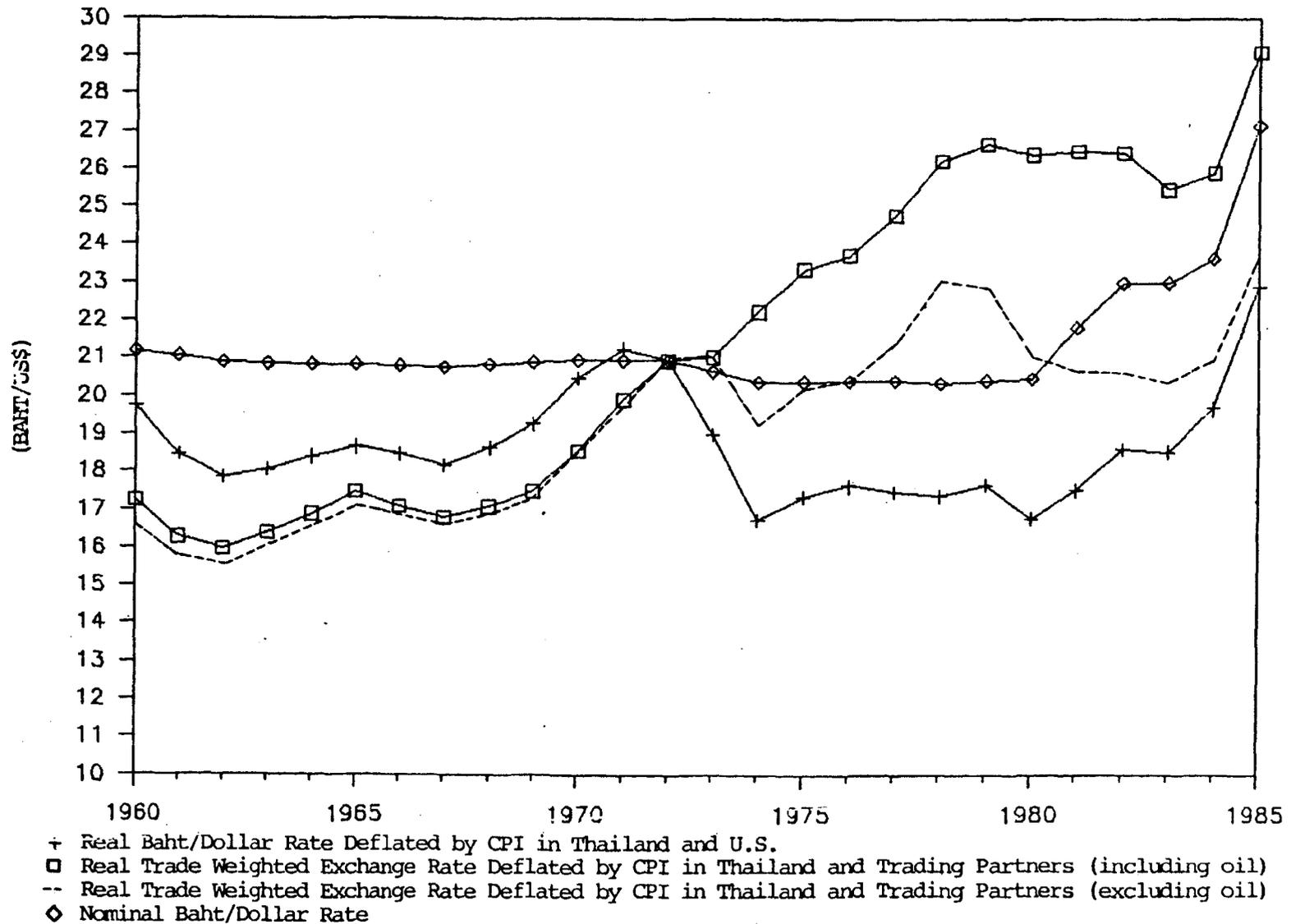
The nominal exchange rate by itself is insufficient to indicate the stringency or looseness of monetary policies. Figure 4.1 shows the movements of three versions of the real exchange rate between 1960 and 1985, in addition

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29. The 1977 amendment to the Investment Promotion Act gave the BOI power to levy a special import surcharge to help out promoted firms.

FIGURE 4.1

REAL AND NOMINAL EXCHANGE RATES, 1960-1985



Note: The real rates are calculated as indices and forced to equal the baht/dollar nominal rate in 1972.

Source: BOT, Department of Customs & International Financial Statistics Yearbook

to the nominal exchange rate. The first version is a simple real baht/dollar exchange rate obtained by dividing the nominal rate by the Thai consumer price index (CPI) multiplied by the U.S. CPI. The second version in the figure (the dotted line) shows a trade-weighted real exchange rate, excluding oil. This is a Divisia index of real exchange rates vis-à-vis Thailand's trading partners, the weights used being the total volume of non-oil trade between Thailand and its partners. The third version of the real exchange rate is almost the same as the second, the difference being the inclusion of oil. This was done by including the real price of oil (baht price of oil at the border deflated by the Thai CPI) as one of the "exchange rates" in the index. All indices are made to pass through the 1972 nominal exchange rate.

The baht depreciated significantly between 1969 and 1972, when the Thai CPI lagged behind the inflation rate in most industrial countries. In the post-1971 world of floating exchange rates, however, the baht has remained remarkably stable. A relative fall of the baht (i.e., a rise in the exchange rate) in the late 1970s was a consequence of the fall of the dollar. But as the dollar rose sharply between 1979 and 1985, the baht was prevented from rising by two devaluations against the dollar, in July 1981 and November 1984. If the impact of the oil price increases of the 1970s is calculated, then of course the baht depreciated considerably during that decade.

Monetary policies also began to change after the mid-1970s. The oil shocks and international currency fluctuations no doubt played major roles in explaining the shift, but there was a change in attitude at the Bank of Thailand as well. The older generation of central bankers, whose careers were marked by the instabilities of the 1940s and early 1950s, gave way to a new generation whose careers began with the development era of Field Marshal Sarit. These newer bankers placed less emphasis on stability, and they used

credit as a development tool. There was also precocious growth in nonbank financial institutions, growth that in the end turned out to be unsustainable. The collapse of share prices on the fledgling Stock Exchange of Thailand led to runs on various credit companies, and the central bank found it expedient to appropriate large sums of money to rescue these insolvent institutions.

The more relaxed monetary policy of recent years went hand-in-hand with more profligate fiscal policies and with access to loans from foreign commercial banks. The result was a ballooning of the current account deficit in the late 1970s and early 1980s.

Fiscal Policies. Thai fiscal policies up to World War II were extremely conservative; the main objective was to avoid excessive foreign borrowing (Ingram 1973). The immediate postwar period, however, saw continuous fiscal deficits. These resulted in an economic crisis that led to a series of reforms between 1955 and 1959 carried out under the leadership of the Ministry of Finance and the Bank of Thailand. The basic thrust of these reforms was to introduce more transparency and discipline into the budgetary process.

The reforms raised the share of government revenue from 9.9 percent of GDP in 1950-52 to between 12 and 14 percent GDP throughout the 1960s and 1970s (Table 4.1). The remarkably steady ratio implies that most of the budgetary deficits were related to expenditure surges. The key surge occurred in 1969, when the fiscal deficit as a percentage of GDP rose sharply and leveled off at about 4.5 percent. This surge was caused by sharp increases in spending on defense (and law and order), education, and agricultural

TABLE 4.1

GOVERNMENT EXPENDITURES AND REVENUES  
AND BALANCE OF PAYMENT DEFICITS ON CURRENT ACCOUNT

(Million baht, nominal)

Year	Central Government Revenue	Central Government Expenditure	Deficit	Current Account Deficit	Percent of GDP			
					Central Government Revenue	Central Government Expenditure	Fiscal Deficit a/	Current Account Deficit
1961	7,449.0	7,786.0	337.0	-592.0	12.6	13.2	0.6	-1.0
1962	8,104.3	8,513.2	408.9	543.3	12.7	13.3	0.6	0.9
1963	8,851.4	9,615.7	764.3	1,292.6	13.0	14.1	1.1	1.9
1964	9,909.9	10,451.5	541.6	452.9	13.3	14.0	0.7	0.6
1965	11,872.3	12,477.7	605.4	316.1	14.1	14.8	0.7	0.4
1966	13,119.1	14,295.9	1,176.8	-590.4	12.9	14.1	1.2	-0.6
1967	14,852.7	16,510.8	1,658.1	1,038.9	13.7	15.2	1.5	1.0
1968	16,850.3	19,325.7	2,475.4	2,954.0	14.4	16.5	2.1	2.5
1969	18,361.7	21,171.1	2,809.4	4,156.1	14.3	16.5	2.2	3.2
1970	18,807.9	24,289.1	5,481.2	5,196.9	13.8	17.9	4.0	3.8
1971	19,886.6	27,167.6	7,281.0	3,632.7	13.8	18.8	5.0	2.5
1972	21,532.4	28,823.1	7,290.7	1,062.8	13.1	17.5	4.4	0.6
1973	27,173.7	32,481.4	5,307.7	997.2	12.5	15.0	2.5	0.5
1974	38,187.0	36,181.5	-2,005.5	1,784.6	14.1	13.3	-0.7	0.7
1975	39,084.1	45,814.0	6,729.9	12,368.3	13.1	15.3	2.3	4.1
1976	43,596.6	59,751.7	16,155.1	8,977.9	12.9	17.7	4.8	2.7
1977	53,956.5	66,414.1	12,457.6	22,391.7	13.7	16.9	3.2	5.7
1978	65,193.1	77,908.4	12,715.3	23,444.9	13.9	16.6	2.7	5.0
1979	78,669.1	91,823.2	13,154.1	42,591.2	14.1	16.5	2.4	7.7
1980	95,556.0	121,214.2	25,658.2	42,409.4	14.0	17.7	3.7	6.2
1981	111,963.0	133,322.6	21,359.6	56,049.3	14.2	17.0	2.7	7.1
1982	116,057.7	157,177.7	41,120.0	23,138.2	13.7	18.6	4.9	2.7
1983	143,634.7	166,459.0	22,824.3	66,285.7	15.5	18.0	2.5	7.2
1984	148,078.5	181,261.7	33,183.2	49,468.3	14.9	18.3	3.3	5.0

Note : a/ Negative numbers indicate surpluses.

- Sources : 1. Quarterly Bulletin, Bank of Thailand, for figures of government revenue and expenditure. (many volumes)  
2. National Income of Thailand, NESDB, Office of the Prime Minister, Thailand. (for calculation of percent of GDP)

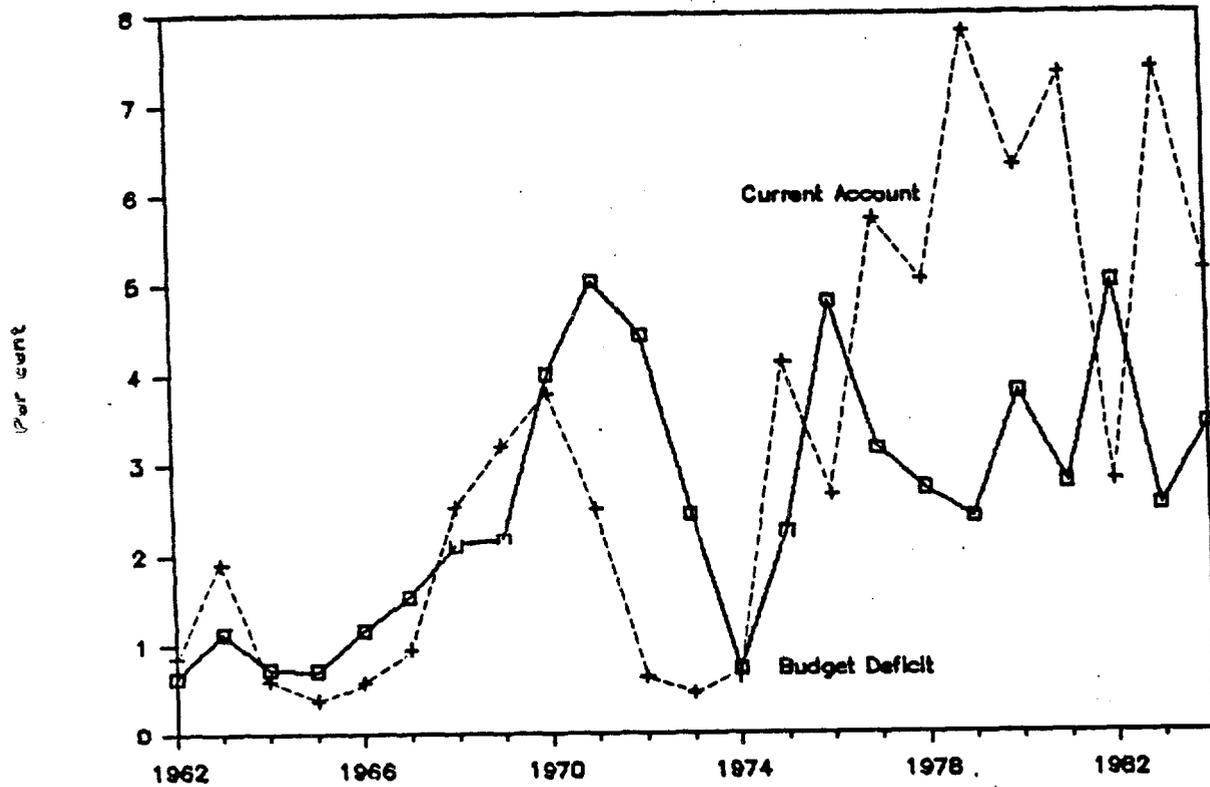
investment. The late 1960s were a period of deepening political crisis for the military regime, and the expenditure surge was a means of temporarily resolving political conflicts. This episode came to an end with the commodity boom and the oil shock of 1973-74, after which high expenditures resumed.

Prior to 1973 there was a close correlation between the fiscal deficit and the current account deficit, but this correlation did not hold for the latter half of the 1970s (Figure 4.2). The current account deficit rose steeply from about 1976 onwards, but without as large an increase in the fiscal deficit. The following is an attempt to explain the period after 1973, based on data and analysis from the Thailand Development Research Institute (TDRI 1986). These data go back only to 1975, however, and do not allow us to judge whether the arguments made below are also relevant for the period before that date.

Table 4.2 shows the savings-investment gaps of the public and private sectors as a whole. Despite the large unexplained component Statistical Discrepancy from the national accounts, the picture that emerges is that the public sector deficit was responsible for the bulk of the current account deficit from the mid-1970s onward.

Also, there has been a gradual decline in the private sector surplus that finances a part of the public sector deficit. This has largely been because of a decline in the propensity to save. The TDRI (1986a) study indicates that the policy-relevant aspect of this decline lies in a shrinking of the share of agriculture in national income, since farm households have a higher marginal propensity to save.

FIGURE 4.2  
BUDGET DEFICIT AND CURRENT ACCOUNT DEFICIT  
as % of GNP



Source: Quarterly Bulletin, Bank of Thailand (many volumes)

TABLE 4.2

PRIVATE AND PUBLIC SECTOR DEFICITS  
AS PERCENT OF GDP

Year	Private Sector (1)	Public Sector (2)	Statistical Discrepancy of the National Accounts (3)	Net Balance (4)	Current Account Balance (5)
1970	1.60	-4.00	-0.70	-3.10	-3.80
1971	2.20	-4.40	-1.20	-3.40	-2.50
1972	5.70	-4.00	2.90	4.60	-0.60
1973	8.80	-1.70	4.20	11.30	-0.50
1974	3.20	2.00	2.70	7.90	-0.60
1975	3.70	-2.10	2.50	4.10	-4.10
1976	5.60	-5.10	1.60	2.10	-2.50
1977	2.00	-4.10	2.50	0.40	-5.60
1978	3.70	-4.80	1.70	0.60	-4.90
1979	2.80	-5.70	1.70	-1.20	-7.50
1980	4.80	-7.70	2.30	-0.60	-6.50
1981	3.80	-7.20	2.90	-0.50	-7.00
1982	5.30	-7.70	0.40	-2.00	-2.60
1983	2.00	-6.40	2.10	-2.30	-7.10
1984	2.20	-7.20	-1.00	-6.00	-4.80
1985	3.30	-7.10	-0.70	-4.50	-4.10

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Source : National accounts Division and Bank of Thailand, compiled in the Thailand Development Research Institute, 1986 TDRI Year-End Conference on Resources Management, December 13-14, 1986, Pattaya

The data in Table 4.1 differ from those in Figure 4.2 in that the latter include items within public sector accounts besides the central government budget. Table 4.3 shows the public sector accounts. Note that Table 4.2 (other than the current account balance) employs national account concepts of surplus and deficit, whereas the deficits in Table 4.3 employ the financial flow concept. The latter are for fiscal years (October to September), not calendar years. The data indicate that from 1975 onward, state enterprises increased their demands for resources and thus contributed to the current account deficit.

We mentioned earlier that the ballooning of the current account deficit in the latter half of 1970s coincided with the period when Thailand, along with a large number of middle-income developing countries, discovered that it was possible to borrow large sums of money from commercial banks in the industrialized countries. The reasons for the banks' willingness to lend to developing countries have been well documented, and at that time Thailand presented a particularly attractive financial picture because of its earlier conservative policies. The question is why the Thai government was willing to abandon those more conservative policies. An important impetus was the more competitive political system that emerged after 1973, which forced various governments to spend more liberally to retain power.

Since about 1982, when Prime Minister Prem Tinasulanonda began to consolidate his power, political competition has subsided somewhat. Technocrats within the government have slowly managed to reassert the earlier conservative tenets of monetary and fiscal policies, and the trend of public sector deficits has begun to move downward.

TABLE 4.3  
COMPONENTS OF THE PUBLIC SECTOR DEFICIT  
(As % of GDP)

Fiscal Year	Central Government (1)	Local Government (2)	State Enterprises (3)	Total (4)
1975	1.74	-0.10	0.03	1.67
1976	3.33	-0.10	0.63	3.86
1977	2.93	-0.08	1.40	4.26
1978	3.53	-0.10	2.06	5.49
1979	3.10	-0.08	1.49	4.50
1980	4.12	-0.10	3.38	7.40
1981	3.31	-0.04	2.90	6.16
1982	5.52	-0.09	2.22	7.65
1983	3.45	-0.06	1.66	5.04
1984	2.99	-0.07	1.50	4.42
1985	3.66	-0.09	2.28	5.85

Note: The deficits are financial-flow deficits. Negative numbers indicate surpluses.

Source: Thailand Development Research Institute (1986a).

Given the various crosscurrents influencing the formulation of Thai macroeconomic policies, it is difficult to judge what the "normal" or sustainable current account deficit should be without engaging in a modeling exercise beyond the scope of the present study. Therefore, we examine two polar cases: one that assumes the entire current account deficit is unsustainable and thus is a distortion caused by the unwillingness of the government to adjust exchange rates, and another that assumes that the entire deficit is "normal" and sustainable. The implied impact on the agricultural sector is examined under these two presuppositions, which provide bounds for the true estimate.

#### The Effect of Industrial and Macroeconomic Policies on Exchange Rates

The industrial and macroeconomic policies outlined in the previous section affect agricultural prices in two ways. One is the effect of industrial protection policies in boosting the prices of nonagricultural goods and thus reducing the purchasing power of each baht earned by the agricultural sector. This effect is discussed in the next section.

The other is the impact that industrial and macroeconomic policies have on the equilibrium exchange rate, both of them tending to increase the baht/dollar exchange rate. The exchange rate impact affects both agricultural prices and nonagricultural prices, but in differing proportions, because the shares of nontradable components within the two sectors are not the same. This section examines the impact of the industrial protection and macroeconomic policies on exchange rates.

We have used the elasticity approach to calculate that impact. The simple formula for the adjustment is as follows:

$$\left[ \frac{\Delta R}{R} \right] = \frac{-\sum_i M_i E_{M_i} t_{M_i} - \sum X_i E_{X_i} t_{X_i}}{-\sum M_i E_{M_i} + \sum X_i E_{X_i}} \quad (1)$$

where: R is the exchange rate

M<sub>i</sub> is the value of the import of good i

E<sub>M<sub>i</sub></sub> is the price elasticity (algebraic sign) of import of good i.

t<sub>M<sub>i</sub></sub> is the rate of import tax on good i

and X<sub>i</sub>, E<sub>X<sub>i</sub></sub> and t<sub>X<sub>i</sub></sub> are the corresponding parameters on the export side.

In all the discussions, the elasticities are expressed in algebraic (not absolute) values.

We have estimates of elasticities of imports disaggregated into ten groups (Table A.10). The import tax rate (Table A.11) for each commodity group is obtained by dividing the import duty revenue for that commodity group by its import value. For petroleum and petroleum products, we included domestic interest taxes in the import tax rate. These function virtually as import taxes because there is very little domestic oil production.

On the export side, for rice and maize, which have substantial domestic consumption, we use the following equation to obtain the elasticity of supply for export:

$$E_{F_i} = E_{D_i} (P_i/X_i) - E_{D_i} (C_i/X_i) \quad i = r \text{ (for rice) or } z \text{ (for maize)}$$

where:

E<sub>F<sub>i</sub></sub> is the elasticity of supply for export of good i

E<sub>D<sub>i</sub></sub> is its elasticity of domestic supply

E<sub>D<sub>i</sub></sub> is its elasticity of domestic demand

P<sub>i</sub> is its volume of production

$C_i$  is its volume of consumption

$X_i$  is its volume of exports.

Because  $C_i/X_i$  and  $P_i/X_i$  vary over time,  $EFS_i$  would also vary over time.

Equation 1 is applicable only if it is supposed that Thailand is a nonsignificant trader. This is not true with respect to rice, so we have to consider the foreign elasticity of demand. The  $Ex_i$  for rice in Equation 1 has to be replaced by:

$$Ex_r = -E_{Fr} (|E_{FD_r}| - 1) (|E_{FD_r}| + E_{FS_r})^{-1}$$

(Bautista et al. 1979), where  $E_{FD_r}$  is the elasticity of foreign demand for Thai rice.

For sugar, the matter is complicated by the existence of different levels of producer and consumer wedges. Had there been a simple export tax,  $tx_s$ , we would use the term  $-X_s Ex_s tx_s$  in the numerator of Equation 1. The term expresses the effect of the export tax  $tx_s$  on the value of exports through the elasticity  $Ex_s$ . This effect can be decomposed into two parts--the effect of a producer-subsidy equivalent, equaling  $-tx_s$ , and the effect of the consumer tax equivalent,  $tx_s$ . Now, the producer subsidy and consumer tax equivalents are different at  $-tp_s$  and  $tcs$ , respectively, so the coefficient  $X_s Ex_s$  of  $tx_s$  in Equation 1 would have to be decomposed as follows:

$$\begin{aligned} X_s Ex_s &= X_s (\partial X^*_s / \partial p_s) (p_s / X^*_s) \\ &= X_s (\partial (P_s - C_s) / \partial P_s) (p_s / X^*_s) \\ &= X_s (\partial P_s / \partial p_s) (p_s / P_s) (P_s / X^*_s) \\ &\quad - X_s ((\partial C_s / \partial P_s) (p_s / C_s) (C_s / X^*_s)) \\ &= X_s E_{ss}(P_s / X^*_s) - X_s E_{ds}(C_s / X^*_s) \end{aligned} \tag{2}$$

where:

Xs is the value of sugar exports

X\*s is the volume of sugar exports

Ess is the elasticity of domestic supply of sugar

Ps is the volume of sugar production

Cs is the volume of sugar consumption

tps is the tax on sugar producers

tcs is the tax on sugar consumers

Eds is the elasticity of domestic demand for sugar

ps is the world price of sugar.

The different producer subsidy and consumer tax equivalents (-tps and tcs) then can be separately attached to the two terms of Equation 2 to read:

$$- XsEsstps(Ps/X*s) - XsEdstcs(Cs/X*s),$$

which will replace the simple  $-Xs Exs tps$  in the numerator of Equation 1. Expression 2 will also replace the term  $XsExs$  in the denominator of Equation 1.

The estimate of tcs is obtained from the consumer/border-price differential in Table 3.1, column 7. The estimate for tps is obtained from a more complex model of the sugar sector that takes into account some rationing. We explicate this in chapter 5. The elasticity of rubber export is 0.20, the same as the short-run elasticity of supply given in chapter 5. The elasticity of tin export is 0.25, as given in Table 4.4. The figures for production/export and consumption/export ratios of those commodities, where these are relevant, are available in Table A.13.

The final formula used for the adjustment of the exchange rate is as follows:

$$\begin{aligned}
 (\Delta R/R)_1 = & - \sum_i \{(MiEmi)/D\} tmi - \sum_j \{(XjExj)/\} txj - \{SzEFSz\}/D\} tz & (3) \\
 & - \{(XrExr)/D\} tr - [\{(Ps/X*s) (SxEss)/D\} tps \\
 & + \{(CS/X*s) (XSEDS)/D\} TCS]
 \end{aligned}$$

where:

tz is the quota rent rate on maize (from Table 3.3, column 3),

tr is the total export tax and tax-equivalent rates on rice (from Table 2.3, column 9,

and

$$\begin{aligned}
 D = & - \sum_i MiEmi + \sum_j XjExj + XzEFSz + XrExz + \{(Ps/X*s)(XsEss) \\
 & - (Cs/X*s)(SxEds)\}
 \end{aligned}$$

Note that the j's in the second summation sign run over all exported commodities other than rice, maize, and sugar.

The first concept of equilibrium exchange rate (EER1) takes into account only the trade policies. It is calculated from the following definition:

$$EER1 = 1 + (\Delta R/R)^1$$

TABLE 4.4  
ELASTICITIES OF SUPPLY FOR EXPORT  
FOR SELECTED COMMODITIES

Year	Rice					Maize			Rubber	Tin	Others
	Elasticity of Domestic Supply	Elasticity of Domestic Demand	Elasticity of Supply for Export	Elasticity of Foreign Demand	Elasticity of Supply of Foreign Exchange from Rice w.r.t. Rice Prices	Elasticity of Domestic Supply	Elasticity of Domestic Demand	Elasticity of Supply for Export	Elasticity of Supply	Elasticity of Supply	Elasticity of Supply
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1960	0.40	-0.12	2.15	-4	1.04	2.00	-0.35	2.11	0.20	0.25	1.00
1961	0.39	-0.12	1.83	-4	0.94	1.92	-0.35	1.93	0.20	0.25	1.00
1962	0.38	-0.12	2.35	-4	1.11	1.83	-0.35	1.85	0.20	0.25	1.00
1963	0.37	-0.12	2.13	-4	1.04	1.75	-0.35	1.77	0.20	0.25	1.00
1964	0.36	-0.12	1.66	-4	0.88	1.66	-0.35	1.70	0.20	0.25	1.00
1965	0.35	-0.12	1.68	-4	0.89	1.58	-0.35	1.62	0.20	0.25	1.00
1966	0.34	-0.12	2.04	-4	1.01	1.49	-0.35	1.56	0.20	0.25	1.00
1967	0.33	-0.12	2.66	-4	1.20	1.41	-0.35	1.51	0.20	0.25	1.00
1968	0.32	-0.12	2.92	-4	1.27	1.32	-0.35	1.49	0.20	0.25	1.00
1969	0.31	-0.12	3.22	-4	1.34	1.24	-0.35	1.46	0.20	0.25	1.00
1970	0.30	-0.12	3.39	-4	1.38	1.15	-0.35	1.38	0.20	0.25	1.00
1971	0.29	-0.12	2.24	-4	1.08	1.07	-0.35	1.20	0.20	0.25	1.00
1972	0.28	-0.12	1.66	-4	0.88	0.98	-0.35	1.30	0.20	0.25	1.00
1973	0.27	-0.12	3.64	-4	1.43	0.90	-0.35	0.98	0.20	0.25	1.00
1974	0.26	-0.12	3.53	-4	1.41	0.81	-0.35	1.12	0.20	0.25	1.00
1975	0.25	-0.12	3.43	-4	1.38	0.73	-0.35	0.96	0.20	0.25	1.00
1976	0.24	-0.12	1.75	-4	0.91	0.64	-0.35	0.89	0.20	0.25	1.00
1977	0.23	-0.12	1.09	-4	0.64	0.56	-0.35	0.81	0.20	0.25	1.00
1978	0.22	-0.12	1.83	-4	0.94	0.47	-0.35	0.70	0.20	0.25	1.00
1979	0.21	-0.12	1.21	-4	0.70	0.39	-0.35	0.63	0.20	0.25	1.00
1980	0.20	-0.12	1.07	-4	0.71	0.30	-0.35	0.56	0.20	0.25	1.00
1981	0.20	-0.12	1.09	-4	0.72	0.30	-0.35	0.35	0.20	0.25	1.00
1982	0.20	-0.12	0.87	-4	0.59	0.30	-0.35	0.55	0.20	0.25	1.00
1983	0.20	-0.12	0.91	-4	0.61	0.30	-0.35	0.45	0.20	0.25	1.00
1984	0.20	-0.12	0.77	-4	0.54	0.30	-0.35	0.55	0.20	0.25	1.00

- Sources : 1. See Chapter 5 for (1), (2), (4), (6), (7), (9).  
2. (3), (8) =  $EFS = (P/X)*EDS + (C/X)*EDD$   
3. (5) =  $EFS*(EFD - 1)/(EFS + EFD)$   
4. Wiwat Maek-aroon, "The Utilization of Natural Gas in Fertilizer Industry." Master Theses, Faculty of Economics, Chulalongkorn University, 1981 (in Thai) for (10).  
5. (11) = assumed value.

The second concept of equilibrium exchange rate (EER2) takes into account the current account deficit, and is defined by the following pair of equations:

$$\begin{aligned} (\Delta R/R)2 &= (\Delta R/R)^1 - CAD/D && (4) \\ EER2 &= 1 + (\Delta R/R)^2 \end{aligned}$$

where CAD is the current account deficit.

In Table 4.5, both EER1 and EER2 are tabulated together, with some earlier estimates using parallel methodology.

The additive nature of Equations 3 and 4 allows us to decompose the effects of specific government policies (e.g., import taxes of sugar policies). They are, in fact, the individual terms of  $(\Delta R/R)1$  in Equation 3 and  $(\Delta R/R)2$ . Table 4.6 gives the decomposition result. The importance of import taxes in causing overvaluation is no surprise. Their average levels have been relatively less variable over time than the other components. The variations, when they occur, are explained more by oil tax reductions designed to cushion the impact of oil price increases in 1973 and 1979. The movements of the total deviation are explained by the decline in the importance of rice export taxes in the 1960s and the rise of current account deficits from 1975 onward. To be noted also are some extraordinary movements in the contributions of rice export taxes and sugar policies between 1973 and 1976 as a result of domestic stabilization policies reflecting the world commodity boom at that time.

During the years of the commodity boom, export taxation was particularly heavy, but the current account deficit was relatively low. Both factors

TABLE 4.5

## ACTUAL AND EQUILIBRIUM EXCHANGE RATES

(Baht per dollar, nominal)

Year	Actual Exchange Rate (1)	Equilibrium Exchange Rate (EER1) a/ (2)	Equilibrium Exchange Rate (EER2) b/ (3)	Alternative Estimates		
				Concept of Exch. Rate	Estimate	Source
1961	20.87	-	-	-	-	-
1962	20.69	22.72	23.28	-	-	-
1963	20.65	22.36	23.57	-	-	-
1964	20.65	22.11	22.48	-	-	-
1965	20.65	22.46	22.70	-	-	-
1966	20.62	22.79	23.18	-	-	-
1967	20.57	22.34	22.91	-	-	-
1968	20.64	22.81	24.36	-	-	-
1969	20.75	23.49	25.57	(EER1)	(1969): 24.10	Akrasanee(1973)
1970	20.83	23.50	26.07	-	-	-
1971	20.83	24.03	25.77	(EER1)	(1971): 25.23	Chatdarong(1975)
1972	20.83	23.55	23.98	-	-	-
1973	20.49	22.39	22.68	-	-	-
1974	20.25	20.87	21.21	-	-	-
1975	20.26	21.70	24.16	(EER2)	(1975): 21.77	Ajanant(1984)
1976	20.30	22.35	23.93	-	-	-
1977	20.30	22.84	26.06	-	-	-
1978	20.24	22.53	25.29	(EER1)	(1978): 24.00	Sornman(1981)
1979	20.33	22.52	26.46	-	-	-
1980	20.38	22.19	25.32	-	-	-
1981	21.72	23.73	27.62	-	-	-
1982	22.90	25.50	27.27	(EER2)	(1982-84): 24.44	Anantpiriyakul(1985)
1983	22.90	25.72	30.18	-	-	-
1984	23.54	26.41	29.51	(EER2)	(1984): 24.19	Tawarangkoon(1984)

Notes: a/ EER1 is the equilibrium exchange rate ignoring current account deficit.

b/ EER2 includes adjustment to eliminate the current account deficit.

Sources : 1. Actual exchange rate: Bank of Thailand.  
2. Equilibrium exchange rate: See text.

TABLE 4.6

PERCENT CHANGE IN EQUILIBRIUM EXCHANGE RATE FROM THE ACTUAL  
IF VARIOUS POLICIES ARE REMOVED

Year	Import Taxes	Rice Taxes	Rubber Taxes	Tin Royalty	Sugar Policies	Maize Policies	Other Export Taxes	Total Trade Policies	Current Account Deficit	Total Trade and Macro Policies
1962	12.49	-6.76	-0.25	-0.20	4.66	0.00	-0.11	9.82	2.69	12.51
1963	12.85	-6.65	-0.23	-0.20	2.60	0.00	-0.11	8.27	5.88	14.15
1964	11.98	-6.75	-0.19	-0.23	2.40	0.00	-0.12	7.09	1.78	8.87
1965	12.84	-6.13	-0.18	-0.29	2.65	0.00	-0.10	8.78	1.17	9.94
1966	13.50	-4.32	-0.14	-0.29	1.92	0.00	-0.10	10.57	1.89	12.46
1967	14.10	-5.92	-0.09	-0.23	1.14	-0.30	-0.10	8.60	2.78	11.38
1968	15.87	-5.84	-0.08	-0.22	1.23	-0.32	-0.13	10.50	7.51	18.01
1969	16.25	-3.58	-0.19	-0.22	1.15	-0.10	-0.11	13.20	9.98	23.18
1970	15.13	-2.95	-0.12	-0.23	1.30	-0.17	-0.11	12.84	12.32	25.16
1971	15.57	-2.47	-0.08	-0.23	2.93	-0.23	-0.10	15.41	8.36	23.77
1972	13.63	-2.54	-0.07	-0.21	2.03	0.33	-0.10	13.06	2.07	15.14
1973	11.93	-3.96	-0.20	-0.17	2.22	-0.40	-0.14	9.28	1.40	10.68
1974	10.47	-7.93	-0.17	-0.20	1.10	-0.16	-0.05	3.07	1.67	4.73
1975	12.86	-3.58	-0.10	-0.17	-1.46	-0.35	-0.07	7.13	12.13	19.27
1976	12.15	-1.38	-0.18	-0.20	-0.01	-0.14	-0.12	10.10	7.76	17.87
1977	13.40	-1.55	-0.18	-0.30	1.22	0.01	-0.09	12.49	15.87	28.36
1978	12.67	-2.24	-0.20	-0.37	1.58	-0.04	-0.06	11.34	13.63	24.97
1979	10.90	-1.38	-0.26	-0.38	2.02	-0.07	-0.03	10.79	19.35	30.14
1980	8.83	-1.35	-0.23	-0.37	2.12	-0.08	-0.02	8.91	15.37	24.28
1981	8.70	-1.62	-0.13	-0.26	2.67	-0.08	-0.02	9.26	17.92	27.18
1982	9.16	-0.53	-0.08	-0.23	3.06	0.00	-0.03	11.36	7.71	19.07
1983	10.54	-0.31	-0.12	-0.16	2.37	0.00	-0.02	12.30	19.51	31.80
1984	10.02	-0.23	-0.10	-0.17	2.69	0.00	-0.00	12.20	13.16	25.35

Source: See text.

combine to make the equilibrium exchange rate (EER2) low relative to neighboring years. Can we attribute this drop in EER2 to government policies? In one sense we can, because the government did tax away the windfall profits and, by refusing to spend them all, contributed to the fall in the current account deficit. But in another sense, we cannot find the government responsible for the fall in the current account deficit. Had the government not intervened, the producers would have reaped windfall gains, and if they rationally expected this to be temporary, they might have placed these receipts in liquid assets or in money. Such actions also would have led to a reduction in the current account deficit. Thus, it is not clear whether the dip in EER2 between 1973 and 1975 can be attributed entirely to government policies.

#### Agricultural Goods Prices Relative to Nonagricultural Goods Prices

The relative border prices in the columns 1, 4, 7 and 10 of Table 4.7 are the border prices of the selected commodities calculated at the nominal exchange rate (NR), and divided by the unadjusted value added deflator PNA. The price index we use for PNA is the value added deflator for the non-agricultural sector, taken from the national accounts. The base year for this index is 1972. These relative prices are denoted  $BP_i$ . They measure the relative prices of these four commodities only if the direct effect of intervention in the prices of these commodities is removed.

To obtain the border prices that take into account government intervention that affects exchange rates as well as the value added deflator, the  $BP_i$ 's have to be adjusted to  $BP_i^*$  as follows:

$$BP_i^* = BP_i \cdot (EER/NR) \cdot (PNA/P^*NA)$$

TABLE 4.7

DEFLATED BORDER PRICES FOR FOUR SELECTED COMMODITIES

Year	RICE		MAIZE		RUBBER		SUGAR	
	Unadjusted (1)	(adj. for export price effect) Adjusted(2)	Unadjusted (4)	Adjusted(5)	Unadjusted (7)	Adjusted(8)	Unadjusted (10)	Adjusted(11)
1960	1,644.23	n.a.	1,383.42	n.a.	18,576.99	n.a.	1,812.23	n.a.
1961	1,849.65	n.a.	1,411.03	n.a.	13,640.35	n.a.	2,443.16	n.a.
1962	1,929.13	2,181.81	1,337.43	1,484.98	12,138.30	13,477.39	1,410.17	1,554.74
1963	1,812.73	2,071.97	1,326.45	1,449.42	11,264.36	12,364.55	3,201.92	3,514.65
1964	1,635.77	1,798.98	1,327.50	1,441.40	10,019.13	10,878.80	3,744.92	4,066.24
1965	1,615.45	1,792.59	1,447.57	1,593.36	9,915.39	10,914.05	1,363.50	1,500.83
1966	1,916.37	2,134.22	1,302.65	1,450.71	9,078.19	10,110.19	1,802.10	2,005.96
1967	2,220.07	2,448.97	1,322.77	1,459.16	1,487.23	7,839.26	2,349.14	2,591.34
1968	2,078.37	2,328.53	1,093.19	1,224.82	1,287.15	6,759.66	2,459.11	2,584.25
1969	1,833.64	2,095.05	1,186.03	1,355.12	1,442.82	9,159.71	2,194.83	2,811.23
1970	1,447.27	1,643.85	1,317.11	1,496.01	1,615.80	7,518.07	2,475.31	2,828.21
1971	1,317.28	1,569.64	1,279.49	1,574.61	1,606.58	5,449.92	1,781.40	2,023.37
1972	1,565.02	1,842.79	1,095.43	1,289.86	1,307.82	6,494.00	2,239.60	2,668.66
1973	2,370.89	2,948.48	1,708.53	1,959.47	1,978.74	5,903.65	3,262.50	3,641.55
1974	3,182.77	3,338.50	1,868.76	1,960.20	1,983.05	10,746.23	3,722.68	4,269.44
1975	2,289.46	2,439.45	1,636.41	1,754.58	2,107.83	9,718.98	6,243.65	6,548.14
1976	1,767.47	1,923.29	1,528.34	1,683.00	1,743.56	8,673.50	9,374.44	1,857.56
1977	1,804.66	1,982.84	1,292.45	1,427.22	1,561.42	8,807.04	4,046.33	4,403.05
1978	2,030.24	2,229.05	1,196.98	1,314.19	1,422.68	9,725.41	2,827.21	3,122.02
1979	1,765.85	1,929.88	1,388.91	1,517.92	1,692.05	10,499.89	2,312.09	2,510.33
1980	1,983.63	2,226.91	1,376.33	1,545.11	1,698.96	11,468.20	2,021.27	2,209.03
1981	2,077.05	2,351.11	1,265.97	1,433.01	1,599.46	12,533.48	2,798.29	3,161.45
1982	1,395.06	1,564.12	1,066.60	1,193.61	1,253.11	8,591.38	3,486.92	3,946.99
1983	1,305.21	1,479.09	1,136.67	1,268.10	1,416.69	6,184.31	2,101.60	2,445.91
1984	1,221.95	1,406.00	1,075.70	1,250.67	1,333.91	7,357.30	1,466.53	1,661.91
						8,415.52	1,462.51	1,673.20

Sources : Unadjusted Deflated Border prices are obtained by dividing the border prices (from Tables 2.3, 3.1, 3.4 and 3.6) by the value added deflator for nonagriculture (from Table A.12 Column (1)) Adjusted deflated border prices are obtained by a procedure outlined in the text. The exchange rates are given in Table 4.5 and the deflators are from Table A.12

This formula indicates that the additional intervention by the government affects the border prices that should serve as the standard for comparison with actual domestic prices. Two adjustments to B<sub>Pi</sub> have to be made. The first is to take account of the exchange rate effect of the intervention. That is the role of the term EER/NR. This adjustment is straightforward and uses the figures from Table 4.5. The two concepts of EER give rise to two versions of adjusted border prices.

The second adjustment is to take into account the fact that the deflator used in B<sub>Pi</sub> is PNA, the price of nonagricultural goods. Now the tradable portion of the nonagricultural sector is subject to intervention as well. PNA therefore has to be adjusted to take into account both the tariff protection in the sector and the effect of the exchange rate deviation as analyzed earlier. The steps of this adjustment are outlined below.

Define two components of PNA as:

$$PNA = WTPNAT + WPNAN$$

where PNAT and PNAN are the tradable and nontradable components of PNA, and WT are their respective weights. To obtain P\*NA, we need to replace PNAT in the definition of PNA by an adjusted P\*NAT. To obtain the latter, we need to make two adjustments to PNAT, one for exchange rate and one for protection rate, as defined by:

$$P^*NAT = PNAT (EER/NR)/(1 + t_m)$$

where EER is one of the equilibrium exchange rates (EER1 or EER2), NR is the nominal exchange rate, and  $t_m$  is the adjustment for import taxes. There are two concepts of P\*NA corresponding to the two concepts of EER, and we call them P1\*NA and P2\*NA, respectively.

The tradable components of the nonagricultural sector are taken to consist of manufacturing and mining.

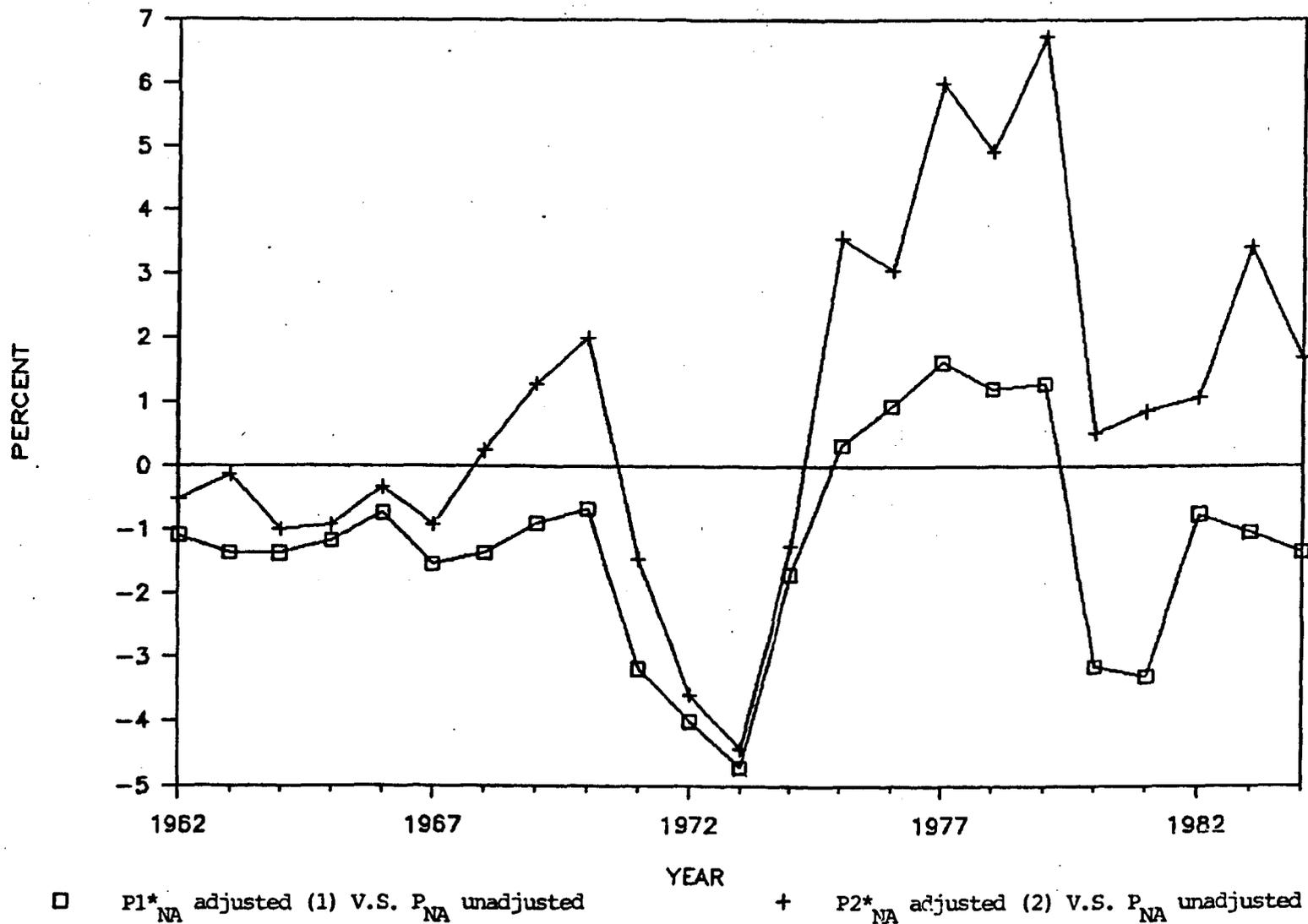
The adjustment (EER/NR) is as before. The problem is with  $t_m$ . As far as mining is concerned, an export royalty is levied, and because almost all mining products are exported, we have adjusted the GDP deflator for mining upward. A more complicated problem arises with the manufacturing sector. Because we are working with value added deflators, we have based the adjustments on the realized effective rates of protection calculated at intervals by Narongchai Akrasanee and his colleagues.<sup>30</sup>

The results of these adjustments on P\*NA, given in Table A.12, are shown in Figure 4.3. They turn out to be quite small because the service sector is quite large within the nonagricultural sector. This is an important finding. It means that trade and macroeconomic policies, particularly the latter, have a sharper impact on tradable agricultural commodities vis-à-vis the nonagricultural sector than industrial protection policies as such. The relative price of the former, with respect to the latter, is therefore sharply affected.

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30. The sources are: Akrasanee 1975: 120-123, for 1964; Akrasanee 1975: 142-147, for 1971; Akrasanee 1975: 158-163, for 1974; Ministry of Finance 1984: 51-53, for 1975; and Akrasanee and Jongtanasarsombat 1980: 12-18, for 1980.

FIGURE 4.3  
 PERCENT DEVIATION OF ADJUSTED  
 NONAGRICULTURAL PRICE INDEX FROM ACTUAL



Source: Appendix Table A.12

Because there are two concepts of EER, there are two concepts of adjusted border prices to match. These deflated border prices will be called  $BP1*_i$  and  $BP2*_i$ . These are presented for the four commodities in Table 4.7.

With these adjustments in border prices, the direct price effects of government intervention given in chapters 2 and 3 (and repeated in Tables 4.8 and 4.9 for the various commodities) have to be augmented by including the various indirect effects. To obtain the total price effect of direct and indirect government intervention, the new border prices,  $BP*_i$  have to be compared to domestic prices. The deviations between the  $BP*_i$ 's and these deflated domestic prices are shown in Tables 4.8 for sugar and 4.9 for all the other crops. In the case of rice, two series are given. One is the rate of protection assuming the border price to be unaffected by Thai government policies (small-country assumption) and the other shows the effect relative to what the export price would be if Thai government policies were removed. Again, the two concepts of EER give rise to two versions of "total price effect." We will refer to these in the rest of the study as Total 1 and Total 2 effects.

It can be seen that the rates of protection for all crops other than sugar are substantially negative. With the direct disincentive effect declining to quite low levels in more recent years, most of the disincentive that remains is an indirect effect arising from the impact of trade and macro-economic policies on the exchange rate. For sugar, domestic prices have tended to be well above border prices. Sugar producers therefore are generally well protected, confirming the description in chapter 3 of the politics of the sugar industry.

TABLE 4.8

DIRECT AND TOTAL EFFECTS OF GOVERNMENT  
INTERVENTIONS ON SUGAR PRICES

Year	GROWER PRICE			MILLER PRICE			CONSUMER PRICE		
	Direct (1)	Total(1) (2)	Total(2) (3)	Direct (4)	Total(1) (5)	Total(2) (6)	Direct (7)	Total(1) (8)	Total(2) (9)
1960	n.a.	n.a.	n.a.	2.3109	n.a.	n.a.	n.a.	n.a.	n.a.
1961	n.a.	n.a.	n.a.	1.1676	n.a.	n.a.	n.a.	n.a.	n.a.
1962	1.9401	1.6480	1.5996	1.9720	1.6767	1.6278	2.2821	1.9560	1.9020
1963	0.2276	0.1184	0.0740	0.7941	0.6345	0.5697	0.8502	0.6856	0.6187
1964	0.0045	-0.0749	-0.0867	0.6742	0.5419	0.5223	0.5954	0.4694	0.4507
1965	1.2720	1.0641	1.0475	1.0711	0.8816	0.8665	1.1450	0.9487	0.9330
1966	0.4596	0.3107	0.2939	0.6861	0.5140	0.4946	0.8475	0.6589	0.6377
1967	0.0958	-0.0066	-0.0254	0.6776	0.3208	0.4921	0.5996	0.4501	0.4227
1968	0.4211	0.2684	0.2070	1.0341	0.8155	0.7276	0.9620	0.7512	0.6664
1969	0.1104	-0.0282	-0.0872	0.5459	0.3530	0.2708	0.5030	0.3155	0.2355
1970	0.2382	0.0901	0.0093	0.5982	0.4071	0.3028	0.6862	0.4845	0.3745
1971	0.0216	-0.1427	-0.1864	0.4241	0.1951	0.1342	0.6130	0.3537	0.2846
1972	-0.2201	-0.3376	-0.3467	0.0582	-0.1013	-0.1137	0.2904	0.0959	0.0809
1973	-0.2932	-0.3837	-0.3897	-0.0301	-0.1543	-0.1626	-0.0454	-0.1677	-0.1758
1974	-0.6224	-0.6400	-0.6441	-0.3706	-0.4000	-0.4069	-0.4956	-0.5191	-0.5246
1975	-0.5578	-0.5850	-0.6152	-0.3821	-0.4201	-0.4622	-0.5813	-0.6070	-0.6356
1976	-0.2078	-0.2720	-0.3056	-0.0781	-0.1528	-0.1919	-0.1399	-0.2096	-0.2461
1977	-0.0256	-0.1176	-0.1934	0.0065	-0.0885	-0.1669	0.0244	-0.0724	-0.1521
1978	0.3491	0.2288	0.1351	0.1033	0.0049	-0.0717	0.3150	0.1977	0.1064
1979	0.3921	0.2738	0.1427	0.1627	0.0639	-0.0456	0.3890	0.2709	0.1401
1980	-0.0282	-0.1344	-0.2128	0.3282	0.1831	0.0759	0.5557	0.3858	0.2603
1981	-0.1017	-0.2064	-0.2890	0.0290	-0.0909	-0.1855	0.1409	0.0079	-0.0970
1982	0.3609	0.2138	0.1562	0.1207	-0.0004	-0.0479	0.8353	0.6369	0.5592
1983	0.5158	0.3376	0.1910	0.4450	0.2751	0.1353	1.7026	1.3849	1.1235
1984	0.5310	0.3382	0.2346	0.6281	0.4231	0.3129	1.6131	1.2841	1.1073

ources : The direct price effect, (Columns (1), (4) and (7) measure the proportionate deviation of the various nominal domestic prices from the unadjusted border price from Columns (5) to (7) from Table 3.1

The total price effects measure the proportionate deviations of the deflated prices (nominal prices from Table 3.1 divided by the value-added deflator for nonagricultural goods from Appendix Table A.12) from the real border prices in Table 4.7

TABLE 4.9

DIRECT AND TOTAL EFFECTS OF GOVERNMENT  
INTERVENTION ON RICE, MAIZE AND RUBBER PRICES

Year	RICE			RICE Adjusted for export price effect			MAIZE			RUBBER		
	Direct (1)	Total(1) (2)	Total(2) (3)	Direct (4)	Total(1) (5)	Total(2) (6)	Direct (7)	Total(1) (8)	Total(2) (9)	Direct (10)	Total(1) (11)	Total(2) (12)
1960	-0.4315	n.a.	n.a.	-0.3313	n.a.	n.a.	n.a.	n.a.	n.a.	-0.0869	n.a.	n.a.
1961	-0.4229	n.a.	n.a.	-0.3347	n.a.	n.a.	n.a.	n.a.	n.a.	-0.1419	n.a.	n.a.
1962	-0.3886	-0.4494	-0.4594	-0.2859	-0.3569	-0.3686	n.a.	n.a.	n.a.	-0.1230	-0.2101	-0.2246
1963	-0.4187	-0.4704	-0.4914	-0.3195	-0.3801	-0.4047	n.a.	n.a.	n.a.	-0.1226	-0.2007	-0.2324
1964	-0.4553	-0.4984	-0.5047	-0.3714	-0.4211	-0.4284	n.a.	n.a.	n.a.	-0.0981	-0.1693	-0.1799
1965	-0.4440	-0.4949	-0.4989	-0.3601	-0.4186	-0.4233	n.a.	n.a.	n.a.	-0.1193	-0.1999	-0.2063
1966	-0.3514	-0.4176	-0.4250	-0.2641	-0.3392	-0.3476	n.a.	n.a.	n.a.	-0.1106	-0.2014	-0.2116
1967	-0.4040	-0.4597	-0.4699	-0.2892	-0.3556	-0.3678	-0.0515	-0.1402	-0.1564	-0.0932	-0.1779	-0.1935
1968	-0.4888	-0.5438	-0.5659	-0.3559	-0.4251	-0.4530	-0.0515	-0.1534	-0.1944	-0.0255	-0.1302	-0.1724
1969	-0.3857	-0.4623	-0.4950	-0.2581	-0.3507	-0.3901	-0.0156	-0.1384	-0.1908	-0.1243	-0.2336	-0.2802
1970	-0.3210	-0.4022	-0.4465	-0.1829	-0.2806	-0.3339	-0.0268	-0.1432	-0.2067	-0.1394	-0.2423	-0.2985
1971	-0.3519	-0.4561	-0.4838	-0.2583	-0.3775	-0.4093	-0.0358	-0.1909	-0.2321	-0.0840	-0.2313	-0.2705
1972	-0.3414	-0.4407	-0.4484	-0.2682	-0.3785	-0.3870	0.0622	-0.0979	-0.1103	-0.0770	-0.2162	-0.2269
1973	-0.5648	-0.6205	-0.6242	-0.4044	-0.4807	-0.4858	-0.0971	-0.2127	-0.2204	-0.1036	-0.2164	-0.2260
1974	-0.6304	-0.6476	-0.6517	-0.4755	-0.4999	-0.5057	-0.0258	-0.0712	-0.0819	-0.2158	-0.2524	-0.2610
1975	-0.4636	-0.4966	-0.5332	-0.3176	-0.3596	-0.4061	-0.0650	-0.1225	-0.1863	-0.1451	-0.1977	-0.2560
1976	-0.2121	-0.2759	-0.3093	-0.1576	-0.2259	-0.2616	-0.0327	-0.1111	-0.1521	-0.1728	-0.2398	-0.2749
1977	-0.2641	-0.3336	-0.3909	-0.2199	-0.2935	-0.3543	0.0033	-0.0915	-0.1695	-0.2485	-0.3194	-0.3779
1978	-0.4029	-0.4561	-0.4976	-0.3163	-0.3772	-0.4247	-0.0229	-0.1100	-0.1779	-0.2070	-0.2777	-0.3328
1979	-0.2904	-0.3507	-0.4175	-0.2392	-0.3038	-0.3755	-0.0461	-0.1272	-0.2170	-0.2387	-0.3034	-0.3751
1980	-0.3094	-0.3849	-0.4406	-0.2611	-0.3418	-0.4014	-0.0545	-0.1577	-0.2340	-0.3090	-0.3845	-0.4402
1981	-0.3060	-0.3869	-0.4507	-0.2573	-0.3439	-0.4122	-0.0873	-0.1937	-0.2776	-0.2524	-0.3396	-0.4083
1982	-0.1372	-0.2305	-0.2670	-0.1155	-0.2111	-0.2486	0.0000	-0.1081	-0.1504	-0.1355	-0.2290	-0.2656
1983	-0.0970	-0.2031	-0.2905	-0.0805	-0.1886	-0.2776	0.0000	-0.1176	-0.2143	-0.1796	-0.2761	-0.3554
1984	-0.0721	-0.1889	-0.2517	-0.0611	-0.1793	-0.2429	0.0000	-0.1259	-0.1936	-0.1988	-0.2997	-0.3539

Sources : The direct price effects (Columns (1), (4), (7) and (10)) measure the proportionate deviations of the various nominal domestic prices from the unadjusted border price from Tables 2.3, 3.4 and 3.6

The total price effects measure the proportionate deviations of the deflated prices (nominal prices from Tables 2.3, 3.4 and 3.6 divided by the value-added deflator for nonagricultural goods from Appendix Table A.12) from the real border prices in Table 4.7

The emergence of the indirect effect as an important factor adversely affecting the agricultural sector remains largely unnoticed in policy discussions, both within and outside the government. These points were raised only when the government had to defend devaluation in 1981 and 1984. Even then, the government did not obtain any support from farmers' groups against opponents of the devaluation. Exporters, a vocal group in matters relating to agricultural trade questions, suffered short-term losses (some of them heavy) and therefore could not be relied on for unbiased judgment at such times. Because the two devaluations took place during a very weak worldwide agricultural market, their effect was canceled out by falling dollar prices. Thus, no obvious lesson emerged from these two experiments.

Chapter 5

EFFECTS OF PRICE INTERVENTION ON  
OUTPUT, CONSUMPTION, AND TRADE

This chapter traces the consequences of the price intervention measures that were outlined in previous chapters. The first section gives the effects of these price wedges on rice, maize, and rubber output. Available results on supply elasticities are used. The second section sets up a small econometric model for sugar, allowing us to calculate the output effect of sugar policies. The third section traces the consumption effects, and the fourth section gives the impact on foreign exchange earnings.

The raw data used for the absolute levels of production, consumption, and exports of the various commodities in the estimates below are shown in Table A.13.

The Output Effect of Price Intervention on Rice, Maize, and Rubber

Elasticity of Supply Estimates. Table A.14 provides the array of supply elasticities that have been estimated by other researchers for rice, maize, rubber, and sugar. (Most of these estimates were compiled by Thanapornpan 1983 and Kunwatanusom 1983.) Although the range of estimates is wide, one point to be noted is that the elasticities generally tend to decline over time. This shows up more convincingly in studies that split up the same series or employ the same methodology. Compare Behrman (line 15) against Dowling and Krongkaew (line 30). The latter consciously follows the methodology of the former. Compare also the two estimates of Prakongtanapan (lines 21 and 22).

The explanation for this shift in elasticities is that Thailand has expanded its agricultural output largely through expansion of land under cultivation. The decline in elasticity is particularly sharp for upland (non-rice) crops.

For this study, we have used our judgment in reducing the numerous econometric estimates cited in Table A.14 into those presented in Table 5.1. For each of the short-run or long-run elasticities, we have presented initial-year (1960) and final-year (1980) estimates. The elasticities for the intermediate years are linearly interpolated from the estimates at the two endpoints.

We have assumed that the response shows a simple geometric distributed lag. The short- and long-run elasticities (SRE and LRE) are then linked by adjustment coefficients  $\lambda$  as follows:

$$\lambda = 1 - \frac{\text{SRE}}{\text{LRE}}$$

The values of  $\lambda$  for the three crops are shown in the last column of Table 5.1.

Most attempts at econometric estimations of cross elasticities of supply have been relatively unsuccessful. Consequently, we have ignored them.

The Short-Run Effect. The calculation of the short-run output effect makes use of the following simple formula:

$$\Delta \text{QSR}_t = \text{SRE} \cdot \Delta P_{t-1}$$

where:

TABLE 5.1  
ESTIMATES OF PRICE ELASTICITIES OF SUPPLY  
USED IN THIS STUDY

---

	Short Run		Long Run		Adjustment Coefficient ( $\lambda$ )
	1960	1980	1960	1980	
Rice	0.4	0.2	0.8	0.4	0.5
Maize	2.0	0.3	3.0	0.45	0.33
Rubber	0.2	0.2	1.5	1.5	0.87

---

Note: The figures for intermediate years are linearly interpolated between the two end years. For the years after 1980, the figures for 1980 are used.

Source: Authors' judgments based on Appendix Table A.14

$\Delta QSR_t$  is the proportionate deviation of output from a non-intervention position

SRE is the short-run elasticity

and

$\Delta P_{t-1}$  is the proportionate deviation of price from a non-intervention position.

The  $\Delta P$ 's are obtained from Table 4.9. The data given there are for the direct effect and for two types of total effects of intervention on price. The short-run total effects of prices that are applied to Equation 1 are slightly different from those shown in Table 4.9. The figures shown in Table 4.9 incorporate the effect of trade intervention in the nonagricultural sector (i.e., the deviation of PNA from P\*NA). Because it is somewhat unrealistic to expect farmers to respond in the short-run to the distortion in the non-agricultural sector, we have used yet another version of the adjusted border price, BP\*\*, from that defined in chapter 4. The new definition used specifically for tracing this short-run total effect is:

$$BP^{**} = BP^* \cdot P^*NA/PNA$$

The deviation  $\Delta P_{t-1}$  is calculated using this version of the border price as the base.

The Cumulative (Long-Run) effect. The calculation of the long-run effect on output makes use of this formula:

$$\Delta QLR_t = \sum_{i=1}^{t=t} SRE_t \cdot \lambda_i \Delta P_{t-i}$$

where:

- $\Delta QLR_t$  signifies the cumulative (long-run) effect of price intervention, expressed as a proportionate deviation from nonintervention output
- $SRE_t$  represents the short-run elasticities of supply; for many commodities these vary over time, hence the t subscript
- $t_0$  is the starting point of the ata
- $\lambda$  is the coefficient of adjustment (from Table 5.1)
- $\Delta P_t$  is the effect of intervention on prices (from Table 4.9).

This time, for total effects, the  $\Delta P_t$ , as reported in Table 4.9, is used without adjustment, because we are concerned with the long run.

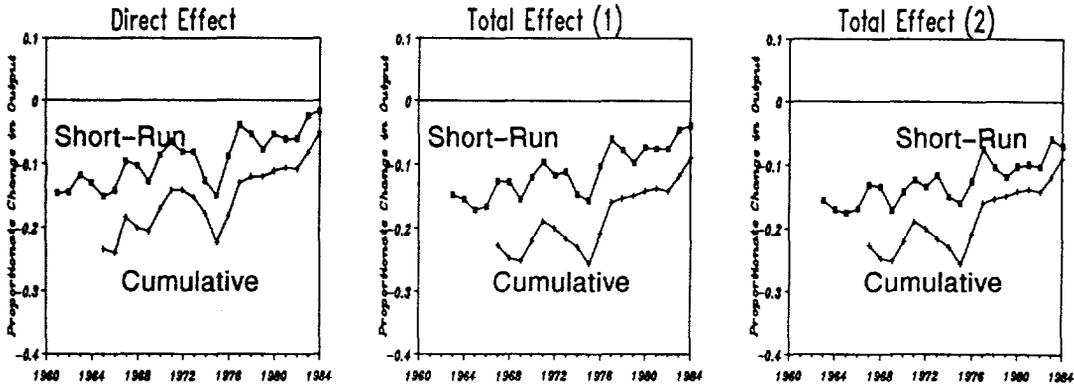
The results of the calculation are shown in Figure 5.1. The tabular presentation is given in Tables A.16 to A.21. Because the method implies a simple mapping of price wedges into quantity wedges via supply elasticities, the movements in Figure 5.1 faithfully reflect the movements of price wedges reported earlier. The gradual dismantling of rice and maize intervention is reflected in the reduction of the output effect. In addition to the declining price wedges, the declining supply elasticities for rice and maize also make for a smaller impact over time. The remaining indirect effect dominates the total effect in the later years.

#### The Effect of Intervention on Sugar Output

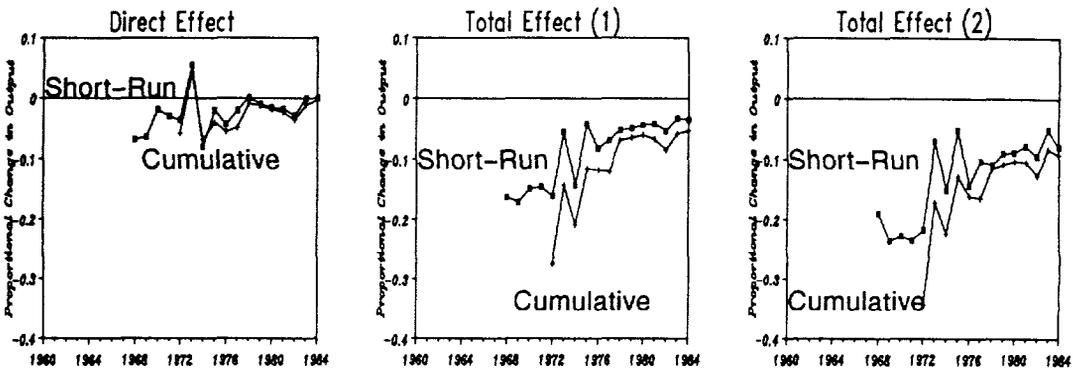
As indicated in chapter 3, the sugar industry has been subject to a more complex type of intervention than the other commodities, and it warrants a more specific analysis than exists in the literature. We divide our analysis into two parts. The first gives the formulation and estimation of a

Figure 5.1. Short-Run and Cumulative Changes in Output Due to Price Intervention

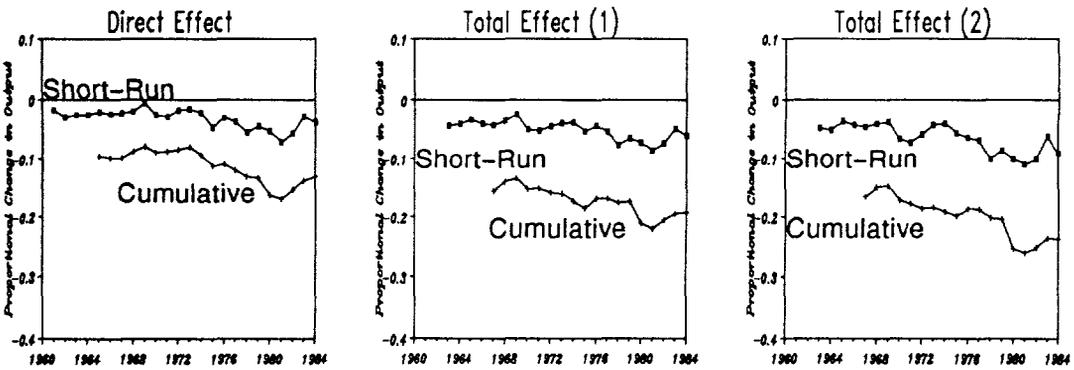
(a) Rice



(b) Maize



(c) Rubber



Source: Appendix Tables A.16-A.21.

specially constructed econometric model.<sup>31</sup> The second provides simulations of the model to trace the short- and long-run effects on output.

Formulation and Estimation of a Sugar Industry Model. As discussed in chapter 3, the sugar industry was vertically unintegrated in the 1960s. Growers could plant as much sugarcane as they wished. The first step in processing was to crush the cane and produce the muscovado, a storable good, which could itself be directly consumed as a low-grade sweetener. Usually, muscovado was sold to a centrifugal plant, which granulated the sugar. The analysis for this period is thus straightforward. The quantity of cane supplied (Q) can be expressed conventionally as follows:

$$Q = Q(P^*, CAP) \quad (1)$$

where CAP is the capacity of the mills and P\* is the price received by cane growers. (This is true for the 1960s only. For the 1970s, P\* will have a different definition; see below.) Note that all cane and sugar prices used in the estimation are from Table 3.1 and thus are converted to a raw sugar basis.

From about 1970 onward, as the sugar industry very rapidly became integrated, the older arm's-length transaction between growers and muscovado plant owners was no longer possible. Delivery of cane to an integrated, highly capital intensive plant has to be precisely scheduled. Millers now required growers to contract with them before planting cane. The market for cane in the old sense ceased to exist, and farmer decisions to grow cane became regulated by the mills.

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31. We are indebted to Professor Yair Mundlak for helping us with the specification of the model.

As pointed out in chapter 3, unionization among the growers was concurrent with, and was intimately connected to, change in the industry's structure. By 1973, the union movement was complete, and the growers began to share in the quota rent implied by supply restrictions.

The problem with Equation 1 now is that growers no longer adjust to growers' price (PG) directly, for, as PG begins to increase as a result of these changes, there is more and more of an element of quota rent in it. We can perhaps more clearly establish this point geometrically by referring to Figure 5.2. Here, S-S1 is the conventional supply curve. For the period 1961-70, when we observe the (Q, PG) combination, we observe it on the supply curve (allowing for the usual random disturbance). But after about 1971 onward, the (Q, PG)-combination is no longer on the supply curve. For example, if PG is equal to AC in Figure 5.2, the growers are no longer free to produce as much as they wish, on a point such as D. They are constrained to produce OC. The amount AB is the quota rent. We shall not ask who has been obtaining the quota rent, because that would entail analysis of the system of quota allocation. The amount  $x = AC/BC$  is an adjustment we have to place on PG to obtain the marginal cost of sugar (i.e., to get back on the supply curve).

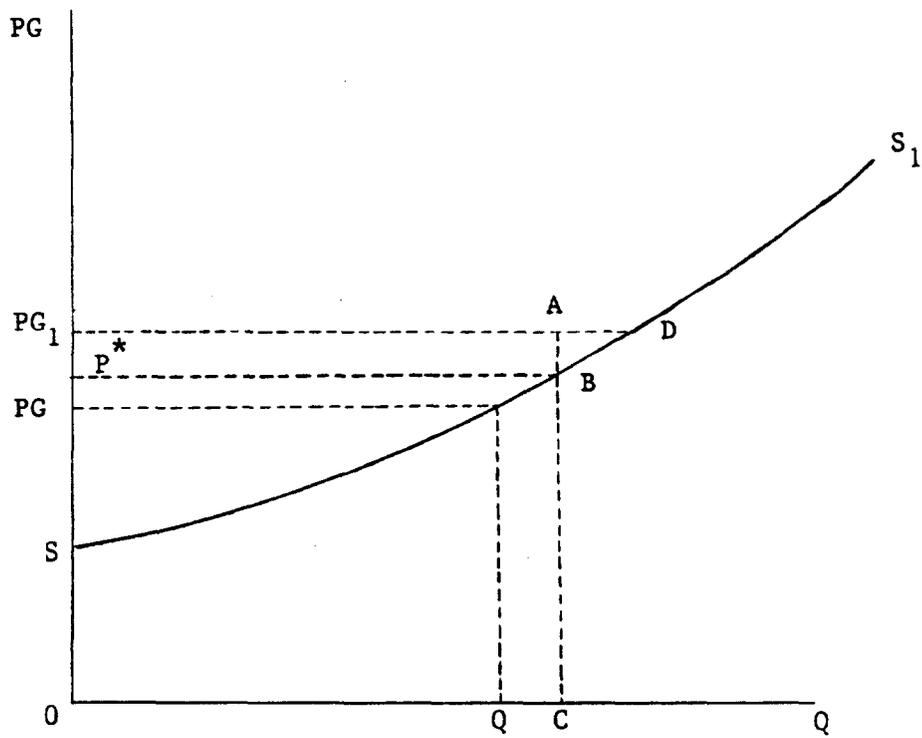
To estimate the impact of this quantitative restriction, we retain Equation 1 but add the following:

$$P^* = PG/x \quad (2)$$

for the 1971-84 period. Equation 2 is applicable for 1961-70 if we set  $x = 1$ .

Because neither  $P^*$  nor  $x$  is observable, we hypothesize that:

FIGURE 5.2  
SUPPLY OF SUGAR



$$x = x(\text{PMe}, \text{CAP}) \quad (3)$$

where PMe is the expected millers' price.

By substituting Equation 3 into Equation 2 and then into Equation 1, we obtain the reduced form:

$$Q = Q(\text{PG}/(x(\text{PMe}, \text{CAP})), \text{CAP}) \quad (4)$$

This will be the basis of our estimation. More specifically, we intend to obtain the parameter values of:

$$\ln Q = a_0 + a_1 \ln(\text{PG}/x) + a_2 \ln \text{CAP} \quad (5)$$

$$\ln x = b_0 + b_1 \ln \text{PMe} + b_2 \ln \text{CAP} \quad (6)$$

where  $\ln x$  is constrained to equal zero for the 1960s.

Equations 5 and 6 may be combined to read:

$$\begin{aligned} \ln Q = a_0 + a_1 \ln \text{PG} - (a_1 b_0 D + a_1 b_1 D \ln \text{PMe} \\ + a_1 b_2 D \ln \text{CAP}) + a_2 \ln \text{CAP} \end{aligned} \quad (7)$$

where D is a dummy variable taking the value of zero in the 1960s and 1 in the 1970s. This equation will be the object of our estimate. Note that the structure of the equation allows the identification of all the parameters.

To implement Equation 7 empirically, a few more steps have to be taken, as follows:

First, sugar in Thailand is grown as a ratoon crop with one primary crop followed by two ratoon crops. The observed output of any given year (denoted by Q above) is actually a combined result of decisions taken one, two, and three years earlier. Consequently, all the independent variables in Equation 7 have been geometrically averaged with weights 0.4, 0.3, and 0.3 for their values one, two, and three years earlier, respectively.

Second, a decision must be made to define D in Equation 7 more precisely. This causes a slight problem, because the process of modernization of the sugar mills took place during the late 1960s and early 1970s, whereas the unionization of the growers began in 1964. We have chosen to define D to take the value zero for 1961 to 1970 and 1 from 1971 onward.

Third, the expected price P<sub>Me</sub> for any year must be estimated. Our reasoning assumes that a miller expects the price he receives in any given year to be an average of the domestic price and the border price.<sup>32</sup> Beforehand, he expects the price he receives to be:

$$P_{Me} = W_1.P_{Ce} + W_2.P_{Be}$$

where P<sub>Ce</sub> is the expected domestic consumer price, P<sub>Be</sub> the border price of sugar, and W<sub>1</sub> and W<sub>2</sub> the shares of sugar consumed at home and exported.

Because of the rigidities in government pricing policy for domestic sugar, we assume that the expected consumer price P<sub>Ce</sub> is last year's price. For P<sub>Be</sub> we ran an autoregressive regression and obtained:

---

32. In some years, there were export premia that taxed away some of the receipts from export sales. But these were very temporary phenomena that arose ex post when there were misjudgments in price policies.

$$\begin{aligned} \text{PBe} &= 1410.19 + 0.8202.\text{PB}(-1) - 0.3206.\text{PB}(-2) && (8) \\ & && (3.85) \quad \quad (-1.49) \end{aligned}$$

$$R^2 = 0.4432 \quad \text{DW} = 1.8630$$

Observations: 1962-84

From these assumptions we obtained a series on P<sub>Me</sub>. P<sub>Me</sub> was then subjected to the averaging treatment required by the argument in Equation 1.

Fourth, and turning finally to the estimation of Equation 7, we have chosen to use first a principal component for all the terms involving D (Appendix 1 gives the steps involved in the estimation). We have chosen this method because the presence of D as a multiple in both variables leads to multicollinearity problems. After various trial regressions we opted for the following equation:

$$\begin{aligned} \ln Q &= -1.5649 + 1.0934.W.\ln PG + 0.9529.D.W.\ln.\ln PME \\ &\quad - 6.9329.D) + 0.5420.W.\ln CAP + U_1 && (9) \end{aligned}$$

In Equation 9, W is defined as  $W = 0.4L + 0.3L_2 + 0.3L_3$ , where L is the lag operator. (For various test statistics for the estimated parameters in Equation 9, see Appendix 1.) The capacity variable in the rent equation (D. $\ln$ CAP) has been dropped because it yields a statistically insignificant coefficient. We also experimented with having a price index for alternative crops as an explanatory variable, but we dropped it as insignificant.

Equation 9 is a short-run equation in the sense that CAP is supposed to be a given. For long-run simulations, we estimate an equation that explains CAP as follows:

$$\ln \text{CAP} = -7.5921 + 0.6655 \ln \text{PMe} + 0.9161 \ln Q_{-1} + 0.1460 \text{TX} + U_2 \quad (10)$$

(-3.09)    (2.73)                    (11.54)                    (5.73)

Adjusted  $R_2 = 0.960$                     D.W. = 2.14

Observations: 1965-84

where TX is a time trend variable that is defined to equal 1,2,..9 for the years 1964-72 and is constant at 9 for the years after 1972.

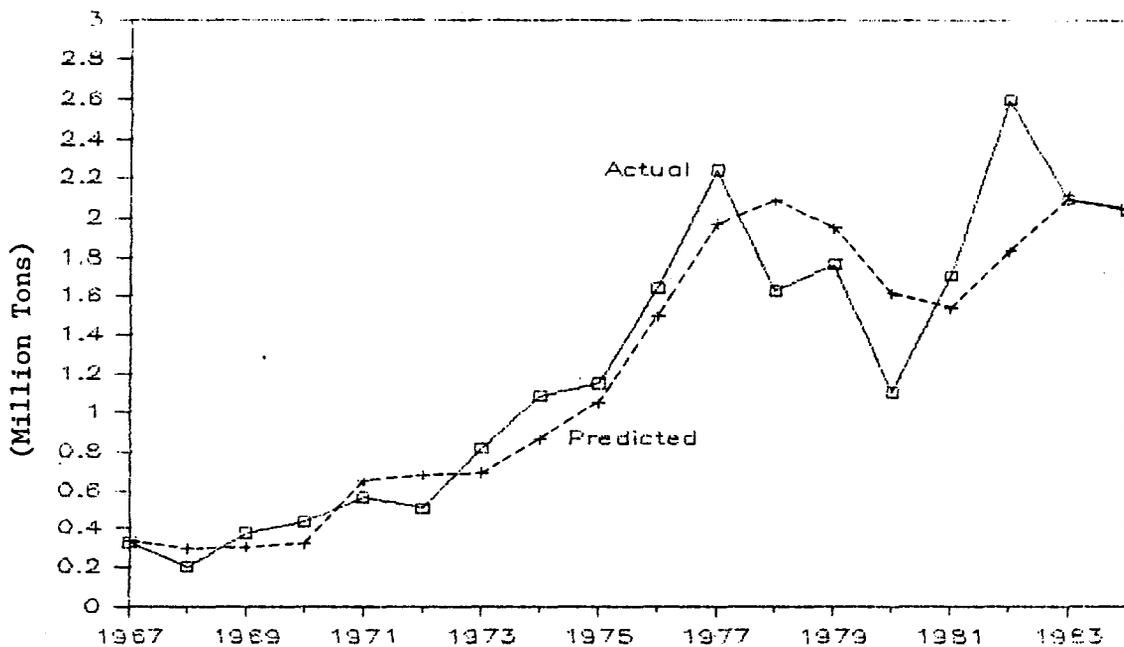
If combined and lnCAP are eliminated, Equations 9 and 10 define a dynamic system because this system has ln Q as a dependent variable and ln  $Q_{-1}$  as an explanatory variable. To validate the model, it is possible to use a static simulation by using actual, predetermined variables (including lagged endogenous variables, in this case, ln  $Q_{-1}$ ), and by comparing the computed values of the dependent variables against their actual values. Such comparisons are displayed in Figure 5.3. For sugar output, the  $R_2$  between predicted and actual values is 0.86.

A dynamic simulation using actual exogenous variables and the calculated lagged endogenous variable (i.e., ln $Q_{-1}$ ) as inputs can also be conducted to obtain the value of the dependent variable of the following period. The comparison of values computed in this fashion against their actual values is displayed in Figure 5.4. For sugar output, the  $R_2$  between actual and predicted values is 0.86, a satisfactory performance for the model, although it does have some problems explaining the severe gyrations of the late 1970s and early 1980s.

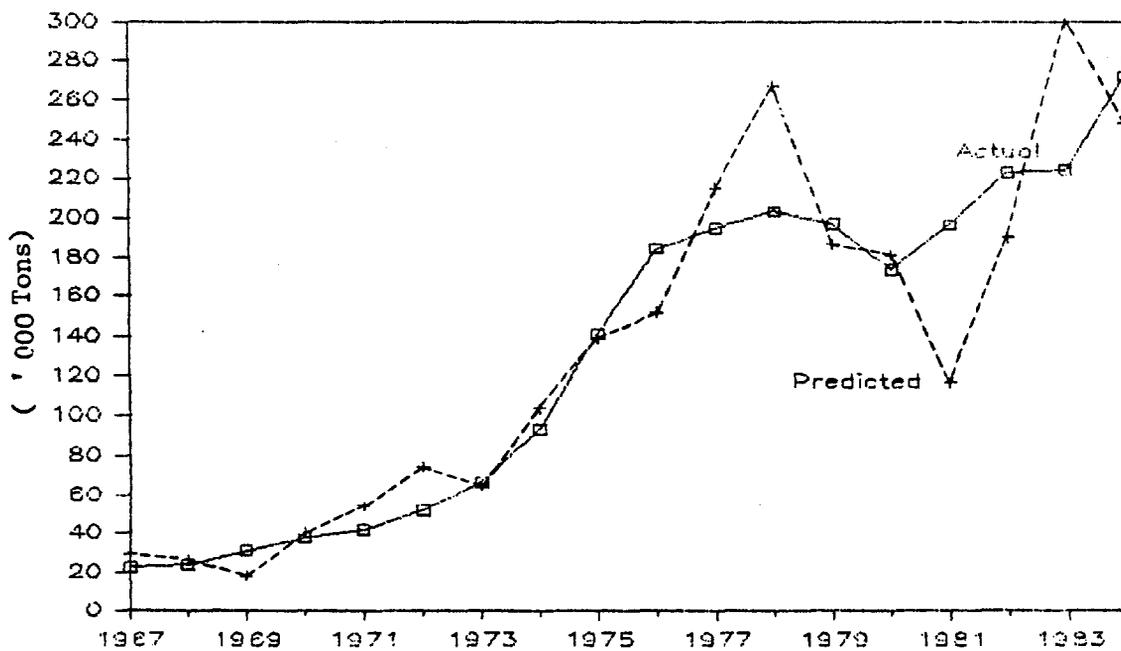
FIGURE 5.3

COMPARISON OF ACTUAL AND STATISTICALLY SIMULATED  
VALUE OF SUGAR OUTPUT AND MILL CAPACITY

(a) SUGAR OUTPUT

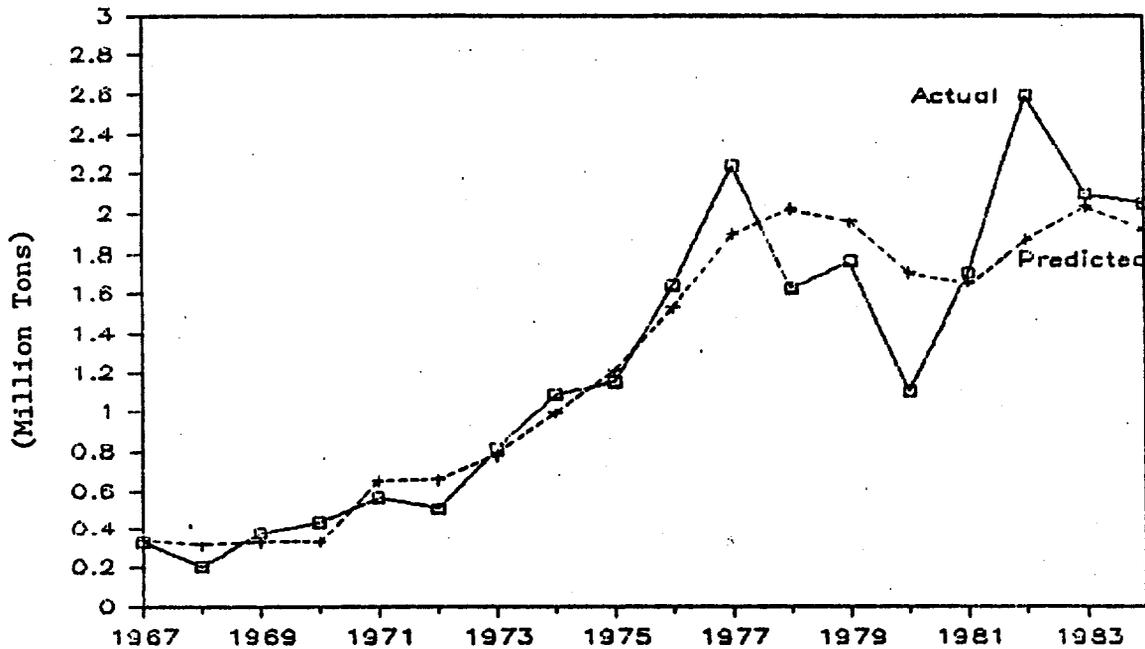


(b) MILL CAPACITY

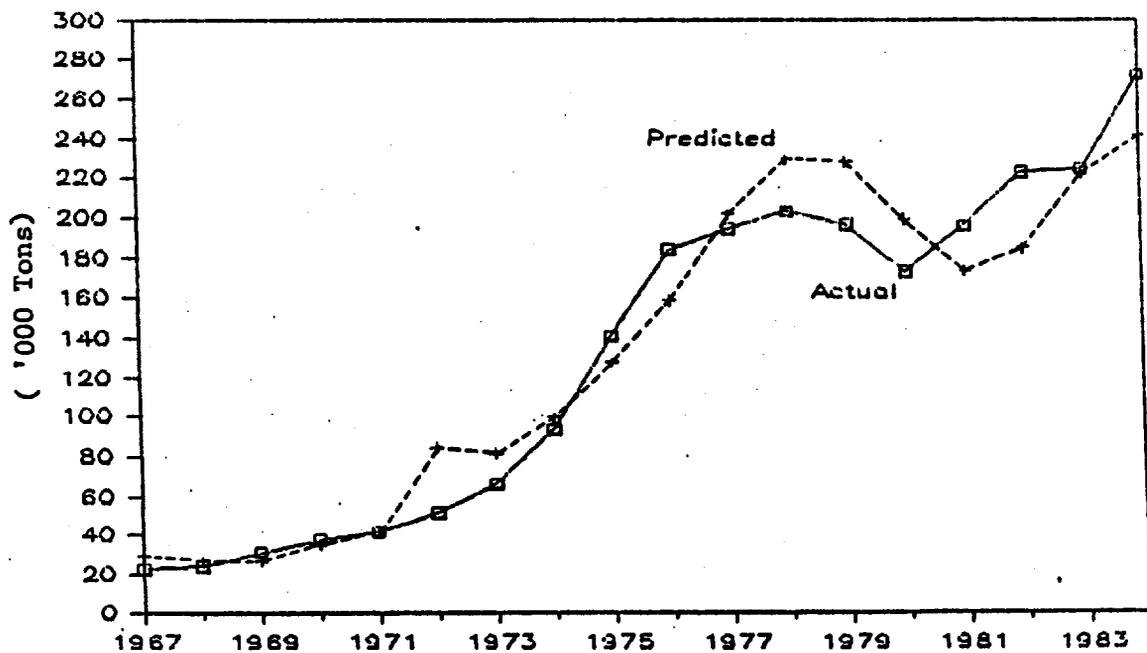


COMPARISON OF ACTUAL AND DYNAMICALLY SIMULATED VALUE  
OF SUGAR OUTPUT AND MILL CAPACITY

(a) SUGAR OUTPUT



(b) MILL CAPACITY



Model Simulation to Obtain the Output Effect: Short Run. Equation 8 yields sufficient information for us to trace the short-run impact of a total liberalization of sugar policies. The counterfactual case we are proposing to analyze is as follows:

First, the price of cane received by farmers will be set at the level compatible with the border price. Because we have expressed all prices (including the growers' price PG) on a border price basis, we shall thus be assuming that:

$$PG = PBe \quad (11)$$

Similarly, consumers will also be paying PB for their sugar, and mills will expect to receive PBe for their output. For the period 1961-70, this is all the adjustment that will be imposed.

For the period 1971-84, the following further adjustments are also required.

To begin with, we proposed that a liberalization, with the domestic sugar price being the same as the border price, would lead to elimination of the quota rent. In terms of the model, we are setting:

$$D = 0 \quad (12)$$

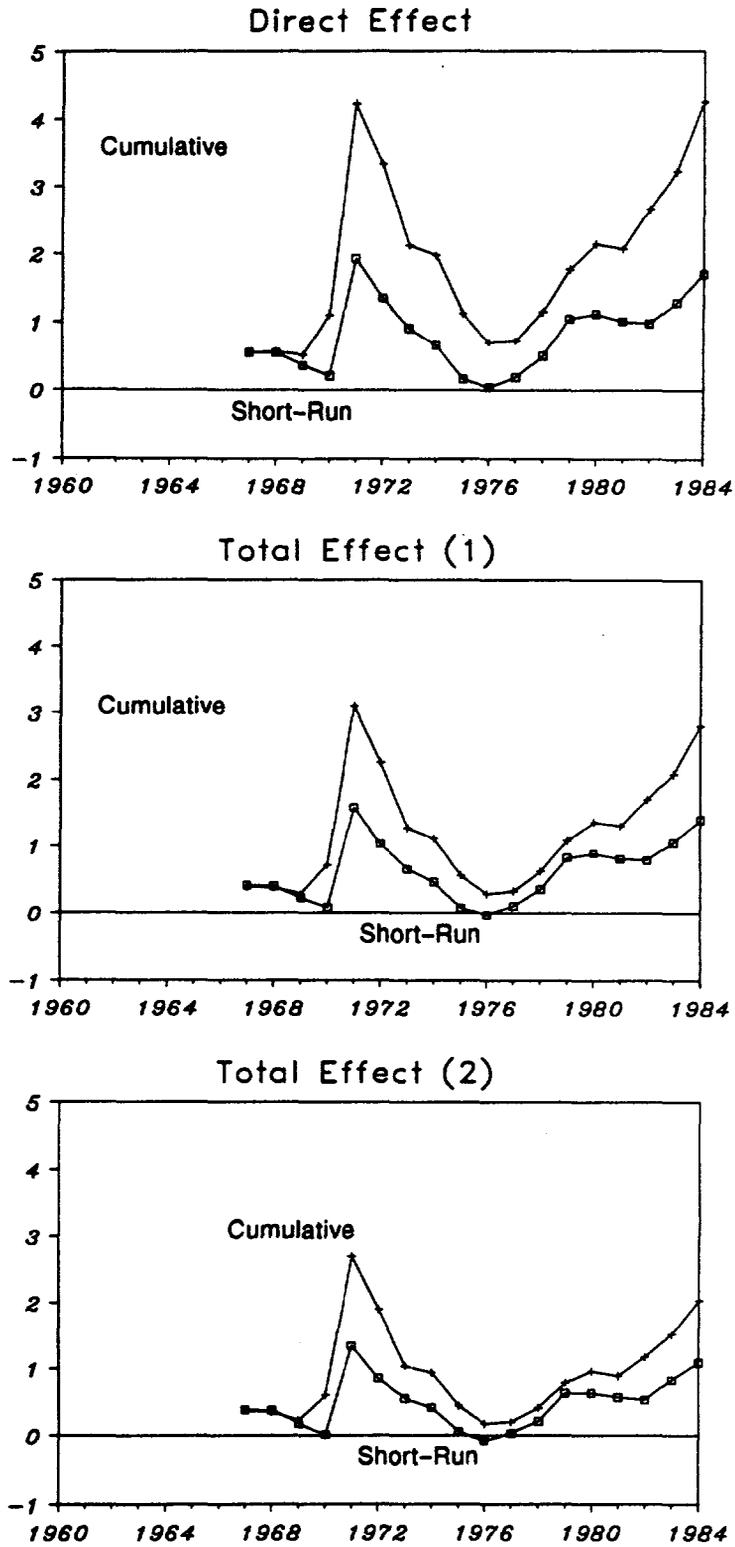
There is a strong assumption here that the quantitative restriction in sugar is ultimately traceable to government intervention and that the thrust of such intervention is to protect the incomes of the existing producers, both millers and growers.

In addition, the short-run simulation assumes that the milling capacity that exists at any given time cannot be varied in response to the policy change. The capacity variable is also a proxy for the amount of land that can grow sugarcane. This bulky crop can only be grown close to a mill-- in the short run, it is not economical for a mill to expand its supply area beyond a certain limit. We also checked whether the simulation shows an impossibly high capacity utilization (i.e., use beyond 180 days). The results are well within the limits imposed.

Figure 5.5 and Table A.22 show the short-run effect of the various interventions on sugar output. Note that the scale of Figure 5.5 differs from Figure 5.1 above. It can be seen that the impact of intervention on output has been huge. The reasons are, first, the price wedges involved were extremely large, as can be seen in Table 4.8. Second, there is the added impact of the quantitative restriction on cane growing to consider. Last, the elasticity of supply for sugar is also quite large, namely, about 1.

Model Simulation to Obtain the Output Effect: Long Run. To obtain the long-run impact, we allow capacity to vary with changes in the economic environment, so that the counterfactual scenario would require, in addition to the change discussed above, that the  $P_m$  in the capacity Equation 10 be replaced by  $P_{Be}$ . For the total, cumulative effect, additional estimations must be made. Equation 8, which gives the estimates of  $P_{Be}$ , uses the series of border prices that include only the direct effect of intervention (column 10 of Table 4.7). Including the indirect effects would yield a different series of  $P_B$  (columns 11 and 12 of Table 4.7). We therefore have to estimate the expected border prices from these series. The results of the estimation are the following two autoregressive equations:

Figure 5.5. Short-Run and Cumulative Changes in Output of Sugar Due to Price Intervention (proportionate change in output)



Source: Appendix Table A.22, A.23

$$\text{PB1e} = 1584.32 + 0.8554.\text{PB1}(-1) - 0.3556.\text{PB1}(-2)$$

(3.81)                      (-1.63)

Adjusted  $R^2$  = 0.4083                      DW = 1.8888

Observations: 1964-83

$$\text{PB2e} = 1745.34 + 0.7984.\text{PB2}(-1) - 0.3182.\text{PB1}(-2)$$

(3.51)                      (-1.43)

Adjusted  $R^2$  = 0.3609                      DW = 1.9075

Observations: 1964-83

where PB1 and PB2 are the two variants of border prices that include the indirect effects, and where the final e signifies expectations.

To obtain the long-term impact of policies, we have used the dynamic simulation method, whereby the error terms from actual data estimation are incorporated into future changes. The results of this simulation are reported in Table A.23. The resultant deviations of the output are also shown in Figure 5.5.

The results of the long-run simulation show an even more dramatic impact of sugar policies on output, because, aside from the impact on sugarcane production, there is also the impact on milling capacity. In 1984, the direct effect of protection leads to an output about five times what it would have been if the sugar had been traded freely at world market prices. If, however, the indirect disprotective effects are taken into account, then the impact is somewhat smaller.

The most critical impact of government policies was in the late 1960s and early 1970s. Without the protection extended in the late 1960s, the industry nearly would have disappeared. As it turned out, protection not only shored up the industry but enabled it to expand quite rapidly, and its output more than doubled between 1969 and 1973. Luckily, this expansion came just in time for the great boom of 1973 and 1974, enriching the industry well beyond expectations.

#### The Consumption Effect of Price Intervention

Table A.15 gives existing estimates of demand elasticities and their sources for rice, maize, and sugar. Rubber is excluded because the domestic use of rubber is estimated at less than 5 percent of total production. As with output elasticities, we have used our judgment to construct Table 5.2 below.

The price effects from Table 4.7 and columns 7-9 of Table 4.8 are used with the above price elasticities to obtain the consumption effects shown in Figure 5.6 and are reported in Tables A.24, A.25, and A.26.

#### The Effect of Price Intervention on Foreign Exchange Earnings

The output and consumption effects computed in the earlier sections allow us to trace their effect on foreign exchange earnings. For all commodities other than rice, the calculation is straightforward. The output effect minus the consumption effect gives the trade effect in tons. Multiplying this by the border price gives the effect on foreign exchange earnings. For rice, the effect on the border price of the price intervention has to be factored in. The calculations of the effect on foreign exchange employ the following formula:

TABLE 5.2  
ESTIMATES OF PRICE ELASTICITIES OF DEMAND  
USED IN THIS STUDY

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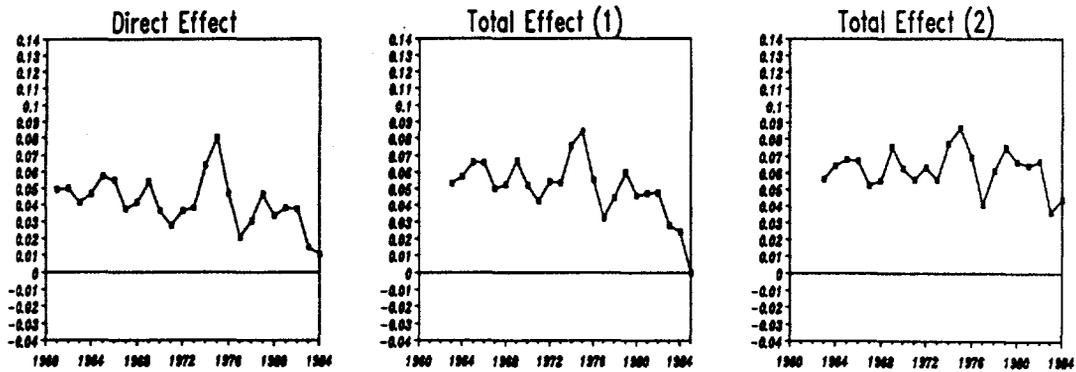
Rice	-0.12
Maize	-0.54
Sugar	-0.90

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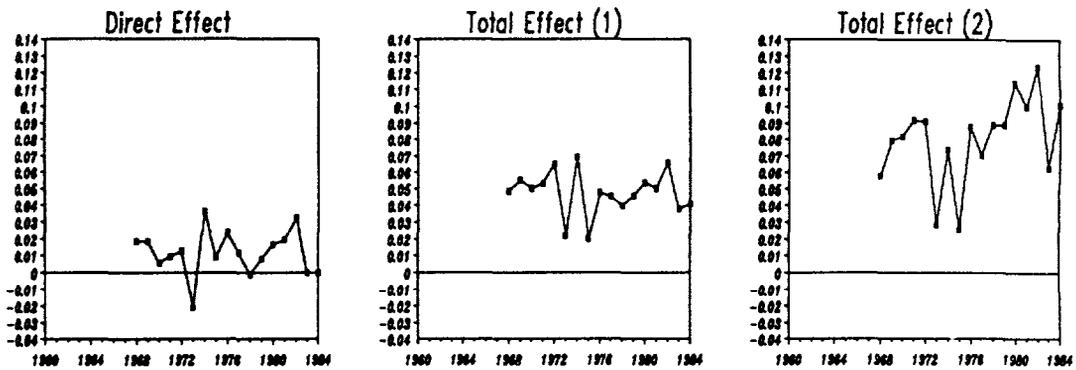
Source: Authors' judgments based on Appendix  
Table A.15

Figure 5.6. Short-Run Changes in Consumption Due to Price Intervention  
(proportionate change in output)

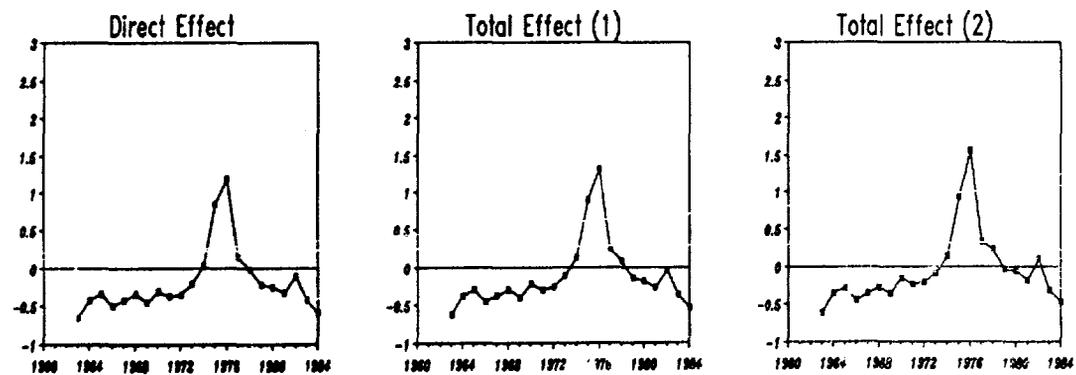
(a) Rice



(b) Maize



(c) Sugar



Source: Appendix Tables A.24-A.26.

Effect on foreign exchange = Actual border price times (actual production minus actual consumption) minus border price without intervention times (production without intervention minus consumption without intervention)

The commodity-by-commodity calculations are relegated to Tables A.27 to A.34. Tables 5.3 and 5.4 show the combined effects of the various interventions on foreign exchange earnings. The important role of rice is as expected. Again to be noted is the large impact of sugar intervention, which in some years matched rice in scale, although not in direction. Indeed the impact of sugar intervention was such that, without it in some years, sugar would have changed from an exportable to an importable good (see Tables A.29 and A.33).

TABLE 5.3

## SHORT-RUN EFFECT OF GOVERNMENT INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(in million constant US \$)

Year	(A) Direct Effect						(B) Total Effect (1)						(C) Total Effect (2)					
	Rice	Maize	Sugar	Rubber	Total	% of Total Exports	Rice	Maize	Sugar	Rubber	Total	% of Total Exports	Rice	Maize	Sugar	Rubber	Total	% of Total Exports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	-128.21	n.a.	n.a.	-3.80	-132.01	-22.74	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	-141.43	n.a.	n.a.	-4.08	-145.51	-21.71	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	-111.52	n.a.	n.a.	-3.52	-115.04	-18.05	-141.94	n.a.	n.a.	-5.90	-147.84	-23.19	-149.77	n.a.	n.a.	-6.52	-156.29	-24.52
1964	-124.65	n.a.	n.a.	-3.75	-128.40	-20.07	-150.21	n.a.	n.a.	-5.71	-155.91	-24.37	-167.24	n.a.	n.a.	-7.03	-174.27	-27.24
1965	-148.33	n.a.	n.a.	-3.42	-151.75	-18.80	-170.06	n.a.	n.a.	-5.13	-175.19	-21.70	-175.30	n.a.	n.a.	-5.55	-180.85	-22.40
1966	-164.89	n.a.	n.a.	-3.41	-168.30	-20.19	-195.29	n.a.	n.a.	-5.39	-200.68	-24.08	-199.14	n.a.	n.a.	-5.65	-204.79	-24.57
1967	-164.40	n.a.	46.18	-2.51	-120.73	-13.69	-215.97	n.a.	37.16	-4.34	-183.15	-20.78	-224.64	n.a.	35.64	-4.65	-193.65	-21.97
1968	-129.29	-6.25	21.51	-2.41	-116.44	-13.48	-159.13	-16.92	17.22	-4.04	-162.87	-18.86	-168.18	-20.41	16.08	-4.54	-177.05	-20.50
1969	-146.26	-7.46	52.43	-2.91	-104.19	-13.06	-177.58	-22.90	41.03	-5.71	-165.16	-20.70	-198.03	-34.12	34.73	-7.58	-205.00	-25.70
1970	-81.97	-2.40	21.74	-3.87	-66.51	-8.22	-113.96	-22.94	12.70	-6.67	-130.87	-16.17	-135.34	-38.61	7.01	-8.61	-175.54	-21.69
1971	-56.78	-4.30	65.91	-2.36	2.47	0.32	-85.71	-24.90	56.10	-4.46	-58.97	-7.71	-110.19	-44.77	48.31	-6.30	-112.94	-14.77
1972	-87.03	-2.69	54.39	-1.83	-37.16	-4.33	-127.58	-14.12	46.20	-4.24	-99.75	-11.62	-147.26	-20.27	41.08	-5.44	-131.89	-15.37
1973	-138.27	11.46	104.62	-4.33	-26.52	-2.46	-188.60	-12.46	77.70	-8.98	-132.34	-12.26	-195.95	-16.24	69.18	-9.68	-152.69	-14.14
1974	-352.89	-25.78	148.70	-7.98	-237.96	-16.05	-408.71	-49.77	98.90	-11.86	-371.42	-25.06	-416.68	-53.35	86.91	-12.42	-395.55	-26.68
1975	-267.02	-6.05	-37.80	-5.47	-316.34	-15.14	-278.77	-13.29	-76.06	-6.30	-374.41	-17.91	-284.90	-17.14	-85.40	-6.73	-394.16	-18.86
1976	-137.76	-10.76	-47.94	-6.99	-203.45	-11.80	-160.93	-21.84	-75.45	-9.62	-267.84	-15.53	-197.85	-40.55	-101.46	-13.93	-353.79	-20.51
1977	-62.53	-2.55	44.44	-10.12	-30.77	-1.40	-96.26	-9.97	15.34	-14.32	-105.21	-4.79	-120.61	-15.57	-12.39	-17.42	-165.99	-7.56
1978	-93.17	0.34	67.48	-13.20	-38.54	-1.60	-134.67	-11.94	46.13	-19.46	-119.94	-4.97	-181.26	-26.65	21.09	-26.81	-213.64	-8.85
1979	-141.12	-2.47	121.75	-18.32	-40.15	-1.53	-179.15	-13.87	102.17	-26.07	-116.92	-4.45	-220.49	-26.72	81.01	-34.75	-200.95	-7.65
1980	-104.76	-4.52	130.70	-17.60	3.82	0.12	-142.82	-14.34	107.93	-24.21	-73.44	-2.40	-202.52	-30.22	75.05	-34.97	-192.66	-6.29
1981	-130.20	-4.34	217.38	-14.79	68.05	2.05	-159.48	-10.94	187.61	-19.05	-1.87	-0.06	-212.52	-21.65	141.79	-25.90	-118.28	-3.57
1982	-80.73	-5.93	147.94	-7.73	53.55	1.65	-101.06	-11.88	128.88	-11.16	4.77	0.15	-139.96	-22.07	94.92	-17.07	-84.19	-2.59
1983	-29.70	0.00	117.64	-6.29	81.65	2.70	-53.38	-8.05	103.64	-11.18	31.03	1.03	-68.75	-13.19	90.02	-14.30	-6.21	-0.21
1984	-21.37	0.00	178.09	-9.05	147.67	5.50	-48.59	-10.28	157.37	-14.46	84.04	3.13	-87.37	-24.95	130.66	-22.22	-3.89	-0.14

Sources : Tables A.27-A.30

Actual export values : Bank of Thailand, *Monthly Bulletin*, various issues.

TABLE 5.4

## CUMULATIVE EFFECT OF GOVERNMENT INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(in million constant US \$)

Year	(A) Direct Effect						(B) Total Effect (1)						(C) Total Effect (2)						
	Rice	Maize	Sugar	Rubber	Total	% of Total Exports	Rice	Maize	Sugar	Rubber	Total	% of Total Exports	Rice	Maize	Sugar	Rubber	Total	% of Total Exports	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	-228.32	n.a.	n.a.	-12.83	-241.15	-41.55	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	-273.63	n.a.	n.a.	-12.51	-286.14	-42.68	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	-291.22	n.a.	46.18	-9.68	-254.72	-39.96	-369.02	n.a.	36.79	-16.33	-348.56	-54.67	-379.74	n.a.	35.39	-17.51	-361.86	-56.76	
1968	-232.28	n.a.	21.72	-9.09	-219.66	-34.33	-292.02	n.a.	16.97	-15.55	-290.61	-45.42	-302.41	n.a.	15.81	-16.73	-303.33	-47.40	
1969	-221.48	n.a.	56.00	-11.64	-177.12	-21.94	-275.14	n.a.	42.81	-21.18	-253.50	-31.40	-293.58	n.a.	36.54	-23.51	-280.55	-34.75	
1970	-146.20	n.a.	35.33	-10.56	-121.43	-14.57	-194.52	n.a.	25.99	-19.28	-187.81	-22.54	-215.47	n.a.	21.21	-22.18	-216.43	-25.97	
1971	-111.55	n.a.	75.13	-7.98	-44.40	-5.04	-154.69	n.a.	64.92	-14.97	-104.74	-11.88	-180.68	n.a.	57.88	-18.07	-140.86	-15.98	
1972	-140.97	-4.37	69.98	-7.41	-82.77	-9.58	-207.60	-27.05	60.93	-15.32	-189.05	-21.89	-235.03	-37.19	56.66	-18.60	-234.17	-27.11	
1973	-229.28	9.08	137.85	-16.03	-98.39	-12.33	-331.69	-35.84	104.26	-35.19	-298.45	-37.41	-355.44	-44.46	94.16	-41.36	-347.12	-43.51	
1974	-463.34	-22.18	255.62	-21.59	-251.50	-31.08	-596.09	-76.77	183.83	-44.01	-533.05	-65.87	-616.44	-83.07	164.21	-49.52	-584.82	-72.27	
1975	-372.63	-12.24	144.37	-16.20	-256.70	-33.56	-425.80	-39.42	60.97	-29.12	-433.36	-56.66	-435.77	-44.10	35.85	-31.95	-475.97	-62.23	
1976	-255.84	-13.92	86.58	-23.26	-206.45	-24.06	-297.86	-31.61	16.02	-38.45	-351.90	-41.01	-327.38	-46.19	-15.67	-43.47	-432.71	-50.43	
1977	-180.08	-6.28	136.83	-28.88	-78.41	-7.26	-226.76	-17.80	69.32	-43.14	-220.37	-20.41	-257.85	-25.57	35.44	-48.82	-296.81	-27.49	
1978	-178.77	-1.58	106.67	-38.75	-112.44	-7.59	-234.34	-15.63	69.95	-54.56	-234.58	-15.83	-280.16	-28.35	44.50	-64.72	-328.73	-22.18	
1979	-200.29	-3.02	147.46	-53.44	-109.29	-5.23	-252.50	-17.96	115.91	-73.03	-227.58	-10.89	-298.05	-31.52	92.00	-89.13	-326.70	-15.63	
1980	-189.48	-5.37	158.01	-59.70	-96.55	-5.60	-246.82	-18.58	127.03	-81.55	-219.91	-12.75	-310.40	-34.21	93.77	-102.60	-353.43	-20.49	
1981	-202.36	-5.53	273.06	-48.38	16.78	0.76	-262.04	-17.62	226.28	-66.59	-119.97	-5.46	-325.34	-28.99	177.29	-83.11	-260.15	-11.84	
1982	-130.35	-7.29	214.15	-32.70	43.80	1.81	-172.10	-17.99	183.04	-46.84	-53.89	-2.23	-217.23	-28.77	150.68	-60.06	-155.38	-6.43	
1983	-78.97	-2.08	148.67	-35.47	32.17	1.22	-119.73	-13.89	128.79	-53.43	-58.26	-2.22	-147.86	-20.86	113.30	-67.62	-123.05	-4.68	
1984	-52.21	-0.64	204.69	-34.10	117.75	3.84	-96.38	-14.83	180.07	-53.36	15.51	0.51	-137.28	-28.18	152.74	-69.39	-82.10	-2.68	

Sources : Tables A.31-A.34

Actual export values : Bank of Thailand, Monthly Bulletin, various issues.

Chapter 6

EFFECTS ON RESOURCE FLOWS BETWEEN THE  
AGRICULTURAL SECTOR AND THE GOVERNMENT AND BETWEEN  
THE AGRICULTURAL SECTOR AND THE REST OF THE ECONOMY

This chapter examines two resource flows: between agriculture and the government, and between agriculture and the rest of the economy (including the government). The chapter looks only at resource flows induced by government policies and thus does not consider flows that take place independently--for example, through private cross-sectoral investments.

Transfers Between the Agricultural Sector and the Government

The net transfer between agriculture and the government sector is total government revenue from the agricultural sector minus government expenditure on the agricultural sector.

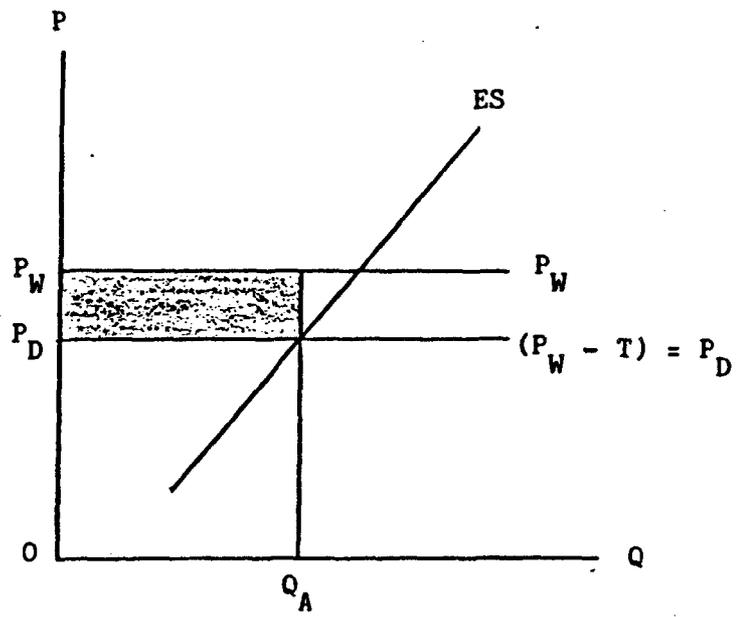
We first deal with government revenue generated from crop-specific taxation on rice, sugar, and rubber. Maize intervention takes the form of an export quota that has no impact on government revenue.

If the world price is fixed, the transfer from the agricultural sector to the government budget is measured from the tax rate times the actual quantity of export ( $Q_a$ )--that is  $(P_w - P_d) \cdot Q_a$ . The shaded area in Figure 6.1, part A, illustrates the measurement of this transfer.

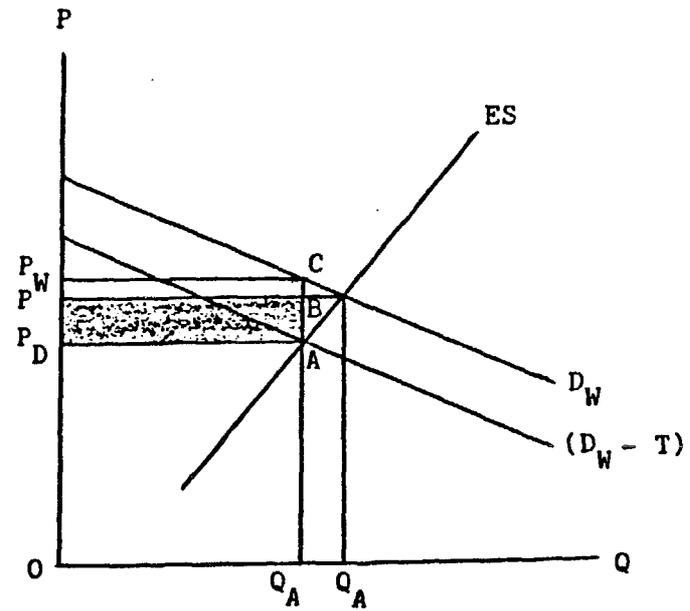
In case of rice, Thailand's export tax has had an influence on the world price. The change in the world price in response to the change in Thai export quantity must be considered. There will be a reduction in the world price when the export quantity increases, and vice versa. In such cases, the

FIGURE 6.1

TRANSFER OF AGRICULTURE TO GOVERNMENT



(a)



(B)

tax revenue come from two sources. First, there is the transfer from the foreign buyer -- area  $PBCP_w$  in Figure 6.1, part B. Second, there is the transfer from the domestic market, the cross-hatched area PDABP in Figure 6.1, part B.

Because we are interested in the transfer from the agricultural sector to the government budget, the first part of the transfer must be removed from consideration.

The tables in this section show the real transfers, obtained by deflating the nominal transfers by a specially constructed rural consumer price index, the source and methods for which are described in the next section. Some specific details on the estimation of the transfers from three major crops to government revenue are presented in the following sections.

Rubber. This is the least complicated commodity among the three because its world price is fixed and its government policy is transparent. There are two imposts on rubber exports. The larger is the export duty, which goes directly to the central budget (Table 6.1, column 1). The smaller is the levy. The levy goes into a Rubber Replanting Fund (RRF), which extends grants to farmers wishing to replace their trees with newer, more productive trees. The RRF not only uses funds from the levy but also obtains loans, mostly from the World Bank, to expand the program. The levy collected is regarded as a recovery of the grant thus extended. Table 6.1 (columns 2 and 3) shows revenues accruing to and disbursement from the RRF.

It should be noted that the figures reported in Table 6.1 are based on actual government receipts. These receipts and disbursements are deflated by the rural area consumer price index.

TABLE 6.1

DIRECT GOVERNMENT REVENUES AND EXPENDITURES ON RUBBER

(million baht, deflated by rural CPI, 1972=100)

Year	Export Duty (1)	Export Cess Revenue (2)	Replanting Fund Disbursement (3)	Net Revenue (4)
1960	399.12	0.00	0.00	399.12
1961	238.29	118.17	0.00	356.46
1962	198.12	108.64	19.81	286.95
1963	206.28	92.36	38.88	259.75
1964	179.76	107.23	67.22	219.76
1965	185.22	107.32	65.01	227.53
1966	152.86	96.73	66.17	183.43
1967	87.30	87.93	72.01	103.23
1968	71.01	100.21	88.66	82.56
1969	281.59	131.84	112.70	300.73
1970	128.27	140.23	139.52	128.98
1971	17.75	157.51	159.13	16.13
1972	15.16	164.17	190.19	-10.87
1973	468.40	166.91	205.54	429.77
1974	480.59	142.02	192.47	430.14
1975	236.44	123.77	212.37	147.83
1976	527.42	155.98	243.97	439.44
1977	587.93	197.74	244.36	541.31
1978	704.27	200.00	266.99	637.29
1979	1,091.62	266.54	299.32	1,058.84
1980	975.73	256.54	334.12	898.15
1981	502.24	178.34	379.15	301.44
1982	228.86	171.24	439.54	-39.44
1983	460.20	201.65	429.87	231.98
1984	375.38	223.11	432.66	165.83

Sources : Column (1) from the Budget Bureau.  
Column (2) and (3) from Office of the Rubber Replanting Fund.

Rural CPI calculated by applying rural weights to Bangkok price movements.

Rural weights are obtained from Household Expenditure Surveys 1962/63 and Socioeconomic Surveys 1975/76 and 1980/81.

Rice. Export intervention in rice has been of four types. First, there is the export duty, which accrues to central government funds. Second, there is the export premium, which accrues to the Farmers' Aid Fund. Third, there is the rice reserve requirement, which was used for cheap rice distribution, although in its last years, 1979-81, funds mostly accrued to the Ministry of Commerce and covered losses from deteriorating stocks. Last, there are export quotas, which create rents for exporters.

Because we are interested in the effect on government revenues, we will ignore the rice reserve requirement in this discussion because it involves a "direct" transfer from the exporter to the consumer without an effect on government revenue, or else it covers total losses. Similarly, the export quotas do not bring in any revenue for the government, and we will ignore them as well.

Table 6.2 shows the revenue, as estimated from the tax-rate data as well as from the actual tax-collection data from the export duty and export premium. These revenues diverged from the actual revenues received by the government, however. One reason for the divergence is that both the duty and the premium are collected at different rates for different grades of rice. In this study, they have been aggregated into a unified rate for "paddy" by weighing the rates for the various grades of rice according to a "typical" milling outturn. To the extent that the mix of exported rice differs from the assumed milling outturn, the estimates and the actual revenues will not be the same.

Another reason for the divergence between estimated and actual data is that the assumption that all exported rice is subject to an export premium is incorrect. Rice exported on a government-to-government (G-to-G) basis is subject to special treatment. (Between 25 and 50 percent of Thailand's

TABLE 6.2

## DIRECT GOVERNMENT REVENUES AND EXPENDITURES ON RICE

(million baht, deflated by rural CPI, 1972=100)

Year	Revenue							Expenditure				Net Transfers to Budget	
	Premium			Duty		Total Revenue	Total Revenue	Revenue Paid by Domestic Producers	Price Support	Fertilizer	Total Irrigation		Total Expenditure
	Computed	Actual		Computed	Actual								
		Rec'd by Treasury	Rec'd by FAF			(Rec'd by Treasury)							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
1960	1,168.25	954.77	0.00	174.09	182.72	1,342.34	1,137.48	742.66	0.00	0.00	384.85	384.85	357.81
1961	1,512.07	1,136.48	0.00	222.31	234.61	1,734.37	1,371.09	941.36	0.00	0.00	289.61	289.61	651.75
1962	1,242.09	907.61	0.00	172.24	191.74	1,414.33	1,099.35	692.61	0.00	0.00	379.18	379.18	313.44
1963	1,412.31	1,010.91	0.00	192.26	205.48	1,604.57	1,216.39	793.15	0.00	0.00	441.80	441.80	351.36
1964	1,859.20	1,516.53	0.00	268.31	237.59	2,127.52	1,754.11	1,239.79	0.00	0.00	616.36	616.36	623.43
1965	1,849.67	1,415.32	0.00	258.63	230.63	2,108.30	1,645.95	1,159.81	0.00	0.00	899.50	899.50	260.31
1966	1,421.92	1,163.13	0.00	237.32	217.12	1,659.23	1,380.25	914.29	0.00	0.00	1,063.64	1,063.64	-149.36
1967	1,827.05	1,086.27	0.00	275.46	224.96	2,102.51	1,311.23	787.03	0.00	0.00	1,309.77	1,309.77	-522.74
1968	1,648.25	1,363.43	0.00	215.95	185.05	1,864.20	1,548.48	894.72	0.00	0.00	1,583.65	1,583.65	-688.93
1969	1,150.32	1,102.18	0.00	179.42	145.84	1,329.74	1,248.02	691.59	0.00	0.00	1,537.61	1,537.61	-846.02
1970	877.92	559.47	0.00	146.88	123.97	1,024.80	683.44	370.00	0.00	0.00	1,905.60	1,905.60	-1,535.61
1971	869.95	227.37	0.00	184.39	145.71	1,054.34	373.09	239.31	0.00	0.00	1,966.24	1,966.24	-1,726.93
1972	1,080.42	164.46	0.00	249.46	186.41	1,329.88	350.87	248.02	0.00	0.00	1,543.88	1,543.88	-1,295.87
1973	597.66	295.19	0.00	130.46	128.73	728.12	423.93	221.82	0.00	0.00	1,229.22	1,229.22	-1,007.40
1974	2,592.14	2,200.45	0.00	212.29	455.37	2,804.43	2,655.82	1,411.73	0.00	0.00	1,038.79	1,038.79	372.94
1975	867.98	851.47	563.76	159.22	340.35	1,027.20	1,755.58	945.46	291.59	301.16	1,340.47	1,933.22	-987.76
1976	727.48	273.98	311.21	293.18	257.72	1,020.66	842.91	586.03	82.67	51.12	1,914.09	2,047.88	-1,461.65
1977	974.36	700.30	544.54	419.54	379.40	1,393.91	1,624.23	1,275.46	132.16	128.31	2,157.80	2,418.27	-1,142.81
1978	645.64	438.11	568.90	263.10	272.61	908.74	1,279.62	877.22	270.56	223.50	2,263.47	2,757.54	-1,880.32
1979	1,008.38	0.00	652.98	353.63	312.65	1,362.01	965.63	741.80	605.20	216.53	2,535.90	3,357.63	-2,615.82
1980	809.09	0.00	634.42	405.76	360.75	1,214.85	995.17	784.80	514.78	135.69	2,452.79	3,303.26	-2,518.45
1981	552.20	0.00	426.05	473.00	444.80	1,025.21	870.85	684.39	102.38	200.60	2,507.43	2,810.41	-2,126.02
1982	389.54	0.00	294.33	430.29	367.80	819.83	662.13	543.62	483.93	216.87	2,821.63	3,522.43	-2,978.81
1983	304.43	0.00	n.a.	306.71	317.84	611.14	n.a.	n.a.	n.a.	n.a.	2,944.40	n.a.	n.a.
1984	223.74	0.00	n.a.	230.58	218.49	454.32	n.a.	n.a.	n.a.	n.a.	2,281.67	n.a.	n.a.

Sources : Computed premium and duty revenues obtained by multiplying premium and duty rates in Table 2.3 by quantity exported in Table A.13  
 Actual premium and duty revenue data are from the Budget Bureau,  
 FAF revenues; price support and fertilizer subsidies data are from Thanapornpun (1981, 1985)  
 Irrigation expenditures are from the Comptroller-General's Department, Ministry of Commerce.

exported rice is on a G-to-G basis.) The export premium on G-to-G rice is often either reduced or waived. Since 1975, the profits made by the Ministry of Commerce from this reduction or remission have been either retained by the ministry for various purposes (see chapter 2 above) or distributed as patronage to such organizations as the Marketing Organization for Farmers (MOF) or the Cooperative Federation. The mode of distribution is to give these organizations the right to fulfil the contract negotiated by the ministry.

Because we are dealing here with outflows from agriculture to the government budget, we will use the actual revenue collected by the government. But in the next section, where we deal with transfers to the rest of the economy, we will use the amount of transfer measured from the tax rates.

There is an additional adjustment to be made on rice. The data presented in Table 6.2 refer to the actual or estimated cash movements between the rice sector and the government budget. The export premium and duty fall not only on the domestic market but also on foreigners. Because Thailand has some power in the world rice market, part of the tax revenue comes from foreign importers of rice. Consequently, actual revenues in Table 6.2 have to be multiplied by the wellknown expression for the share of indirect tax burden falling on producers:  $|EFD|/(|EFD| + EFS)$ . The values of these parameters are discussed in chapter 4. The result of this adjustment is given in column 8 of Table 6.2.

There is also a transfer from the government specifically to the rice sector. The three main items recognized are the expenditure for the price support program, the fertilizer subsidy, and the government expenditure

on irrigation. All expenditures on irrigation have been attributed to rice because almost the entire irrigated area is used for rice cultivation.

The price support and the subsidy program for fertilizer used in rice production are new activities that respond to the changing political atmosphere after 1973. The funding of these two programs came from the Farmers' Aid Fund (FAF), which came into operation in 1975. Irrigation is included as a specific transfer back to the rice sector, because, in Thailand, almost all irrigation investments are aimed at the rice sector.

Sugar. The central thrust of government intervention in sugar is a "home price scheme" that involves little financial flow between the sector and the government (see the discussion in chapter 3). Occasionally, there are subsidies and taxes. These are shown in Table 6.3.

The Agricultural Sector as a Whole. Table 6.4 shows the net transfer of these major agricultural commodities to government revenue, with and without the inclusion of road expenditures. Columns 5 and 6 show the total expenditures on agriculture with and without expenditures on roads. The transfer to the government is shown in column 7 of the same table. This is the sum of the revenues from various taxes from Table 6.1-6.3. Column 8 and 9 provide a summary of the net resource flow between the agricultural sector and the government. A positive number indicates a net withdrawal of resources from the agricultural sector to the government, whereas a negative number indicates a reverse flow.

With roads included, the net flow of resources has been from the government to agriculture, and this flow has increased over time. This is because, as the economy has grown, revenues from taxes on agricultural products have diminished (see the discussion on the dwindling importance of

Table 6.3

DIRECT GOVERNMENT REVENUES AND EXPENDITURES ON SUGAR

(million baht, deflated by rural CPI, 1972=100)

Year	Government Revenue			Export Subsidy (4)	Expenditure from FAF		Net Revenue (7)=(1)+ (2)+(3)-(4) -(5)-(6)
	Business Tax a/ (1)	Export Cess Revenue a/ (2)	Premium (3)		Price Support (5)	Promote Crop Planting (6)	
1960	0.15	0.00	0.00	0.00	0.00	0.00	0.15
1961	0.06	0.00	0.00	0.00	0.00	0.00	0.06
1962	0.89	49.80	0.00	140.09	0.00	0.00	-89.39
1963	2.51	56.58	0.00	117.59	0.00	0.00	-58.50
1964	2.78	28.74	0.00	57.00	0.00	0.00	-25.48
1965	1.74	49.05	0.00	175.82	0.00	0.00	-125.03
1966	1.54	46.84	0.00	47.54	0.00	0.00	0.83
1967	0.52	0.00	0.00	0.00	0.00	0.00	0.52
1968	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1969	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1970	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1971	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1972	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1973	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1974	175.89	0.00	209.17	0.00	0.00	0.00	385.06
1975	303.16	0.00	328.56	0.00	0.00	90.22	541.50
1976	315.17	0.00	42.73	0.00	236.47	18.66	102.76
1977	77.37	0.00	-5.98	0.00	53.97	7.14	10.28
1978	34.07	0.00	1.43	0.00	41.77	20.63	-26.90
1979	33.79	0.00	0.05	0.00	112.43	11.37	-89.96
1980	0.00	0.00	19.41	0.00	23.99	12.64	-17.22
1981	26.14	0.00	97.10	0.00	130.36	0.00	-7.12
1982	71.87	0.00	160.35	0.00	198.36	0.00	33.87
1983	33.48	0.00	8.61	0.00	1.79	0.00	40.31
1984	52.41	0.00	n.a.	n.a.	n.a.	n.a.	n.a.

Note : a/ Government revenues from business tax and export cess revenues are obtained from export quantity multiplied by the tax and cess rates, respectively.

Sources : Jessadachatr for business tax rates upto 1974, export subsidies and cess rates.  
Thanapornpun, (1981 and 1985), for premium revenues and expenditures from FAF.  
The business tax rates after 1975 are from the Ministry of Finance.

TABLE 6.4

## NET RESOURCE FLOWS BETWEEN THE AGRICULTURAL SECTOR AND GOVERNMENT

(million baht, deflated by rural CPI, 1972=100)

Year	Government Expenditure on Agriculture						Resource Flow from Agriculture to Government (7)	Net Transfer to Government	
	Non-Investment		Investment		Total Expenditure on Agriculture			Road Included (8)	Road Excluded (9)
	Road Included (1)	Road Excluded (2)	Road Included (3)	Road Excluded (4)	Road Included (5)	Road Excluded (6)			
1960	526.56	325.58	441.21	213.90	967.76	539.48	1141.93	174.17	602.45
1961	620.04	338.97	679.59	288.87	1299.63	627.84	1297.87	-1.76	670.03
1962	748.43	512.14	847.81	334.79	1596.25	846.93	1050.07	-546.17	203.14
1963	871.39	554.77	916.10	424.57	1787.49	979.34	1150.87	-636.62	171.54
1964	928.11	532.25	1257.85	644.17	2185.96	1176.42	1558.30	-627.66	381.88
1965	1157.60	760.06	1822.17	908.87	2979.78	1668.93	1503.14	-1476.64	-165.79
1966	1202.85	793.82	2699.07	1213.86	3901.92	2007.67	1212.25	-2689.67	-795.42
1967	1329.08	846.93	3599.90	1436.57	4928.98	2283.51	962.79	-3966.19	-1320.72
1968	1582.70	1012.37	4386.91	1647.65	5969.62	2660.03	1065.94	-4903.67	-1594.08
1969	1738.60	1114.70	4519.14	1611.57	6257.74	2726.27	1105.02	-5152.72	-1621.25
1970	1864.06	1220.17	4718.99	1941.13	6583.05	3161.30	638.50	-5944.55	-2522.80
1971	1901.53	1222.47	4846.58	2007.65	6748.11	3230.13	414.57	-6333.54	-2815.56
1972	1920.81	1202.02	4574.95	1619.26	6495.76	2821.29	427.34	-6068.43	-2393.95
1973	1929.29	1190.21	3530.56	1307.94	5459.85	2498.15	857.13	-4602.71	-1641.02
1974	1825.93	1155.00	2762.65	1080.57	4588.58	2235.57	2419.40	-2169.18	183.83
1975	3001.60	2234.14	3481.91	1406.32	6483.51	3640.46	1937.38	-4546.14	-1703.08
1976	2809.82	2062.14	4996.26	2230.84	7806.08	4292.98	1627.34	-6178.74	-2665.64
1977	3015.33	2274.71	6042.67	2803.46	9058.01	5078.17	2132.52	-6925.49	-2945.65
1978	3280.66	2549.43	5668.36	2832.42	8949.01	5381.85	1817.00	-7132.01	-3564.85
1979	3832.51	3110.12	6171.51	3061.10	10004.02	6171.21	2133.81	-7870.21	-4037.40
1980	3336.76	2750.06	7095.34	3354.26	10432.10	6104.32	2036.48	-8395.62	-4067.84
1981	2998.74	2457.55	6631.65	3450.67	9630.39	5908.22	1488.21	-8142.18	-4420.01
1982	3801.53	3178.50	6961.85	3761.95	10763.37	6940.45	1175.95	-9587.43	-5764.51
1983	3136.96	2446.09	6630.24	3710.57	9767.21	6156.66	n.a.	n.a.	n.a.
1984	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Sources : Column (1)-(6), Comptroller-General's Department, Table 6.1-6.3.  
Column (7), sum of Columns(1) and (2) Table 6.1, Column (8) Table 6.2,  
Column (1) to (3) but minus Column (4) of Table 6.3.  
Columns (8) and (9) are obtained by deducting Columns (5) and (6),  
respectively, from Column (7).

revenues from the rice premium in chapter 2). General government revenues from other sectors, on the other hand, have continued to provide resources to agriculture. By 1982 the government was pouring seven times the amount of resources into agriculture that it was getting out of agriculture through price policies. Transfers between agriculture and government therefore explain very little about the actual course of policies.

A sidelight on the use of fiscal resources is obtained by looking at the share that agriculture takes up in government expenditures and investment relative to the share of agriculture in the GDP, as is shown in Table 6.5.<sup>33</sup> The figures again show a clearly increasing bias toward agriculture in government expenditures.

To ensure correct interpretation of the data, an important caveat is in order. "Government" as used here excludes public enterprises, which operate mostly outside the agricultural sector. The capital expenditures of public enterprises are rarely financed out of the central government budget. Mostly, public enterprises borrow directly, both domestically and overseas, but their loans are guaranteed by the government.

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33. The value added figure in agriculture from which the shares in Table 6.5 are obtained is adjusted to eliminate the undervaluation of agriculture induced by government policies. The method used is to add the net resource flow from agriculture to the rest of the economy (whose method of calculation is given in the next section and is shown in Figure 6.2) to the aggregate value added of the agricultural sector. Because there are nine possible concepts of resource flows, we have chosen to present only the instantaneous case and to use EER2 to adjust the exchange rate. The recalculations for all nine possibilities are relegated to the Appendix (A.35 to A.37). The results do not show much difference. A second adjustment is also made, this time to the aggregate GDP figures. Removal of rice export barriers would reduce the world rice price. This reduction benefits foreigners, and it therefore has been deducted from aggregate GDP.

TABLE 6.5

## GOVERNMENT INVESTMENT AND TOTAL EXPENDITURE BIAS

(Absolute numbers)

Year	Share of Agriculture in Government Investment		Share of Agriculture in Government Expenditure		Adjusted Share of Agriculture in GDP a/	Index of Bias			
						Investment		Expenditure	
	Roads Included (1)	Roads Excluded (2)	Roads Included (3)	Roads Excluded (4)		Roads Included (6)	Roads Excluded (7)	Roads Included (8)	Roads Excluded (9)
1960	0.2845	0.1379	0.1128	0.0629	n.a.	n.a.	n.a.	n.a.	n.a.
1961	0.3514	0.1494	0.1355	0.0655	n.a.	n.a.	n.a.	n.a.	n.a.
1962	0.3956	0.1562	0.1580	0.0838	0.4278	0.9246	0.3651	0.3692	0.1959
1963	0.3425	0.1587	0.1558	0.0854	0.4244	0.8070	0.3740	0.3671	0.2011
1964	0.3727	0.1909	0.1691	0.0910	0.3989	0.9344	0.4785	0.4239	0.2281
1965	0.4132	0.2061	0.1973	0.1105	0.3920	1.0541	0.5258	0.5035	0.2820
1966	0.4874	0.2192	0.2155	0.1109	0.3954	1.2328	0.5544	0.5450	0.2804
1967	0.5641	0.2251	0.2354	0.1091	0.3695	1.5266	0.6092	0.6370	0.2951
1968	0.5697	0.2140	0.2475	0.1103	0.3466	1.6437	0.6173	0.7140	0.3181
1969	0.5570	0.1986	0.2426	0.1057	0.3294	1.6909	0.6030	0.7365	0.3209
1970	0.5351	0.2201	0.2397	0.1151	0.2758	1.9400	0.7980	0.8691	0.4174
1971	0.5161	0.2138	0.2277	0.1090	0.2876	1.7944	0.7433	0.7915	0.3789
1972	0.5338	0.1889	0.2108	0.0916	0.3194	1.6713	0.5915	0.6600	0.2867
1973	0.4981	0.1845	0.1874	0.0857	0.4054	1.2286	0.4551	0.4622	0.2115
1974	0.4724	0.1848	0.1712	0.0834	0.4352	1.0856	0.4246	0.3933	0.1916
1975	0.4519	0.1825	0.1950	0.1095	0.3694	1.2234	0.4941	0.5278	0.2964
1976	0.4807	0.2146	0.2018	0.1110	0.3196	1.5040	0.6715	0.6315	0.3473
1977	0.5257	0.2439	0.2120	0.1188	0.2911	1.8063	0.8380	0.7283	0.4083
1978	0.5056	0.2526	0.2000	0.1203	0.2865	1.7645	0.8817	0.6980	0.4198
1979	0.5483	0.2720	0.2043	0.1260	0.2667	2.0561	1.0198	0.7662	0.4727
1980	0.5608	0.2651	0.2005	0.1173	0.2604	2.1538	1.0182	0.7699	0.4505
1981	0.5369	0.2794	0.1858	0.1140	0.2526	2.1256	1.1060	0.7354	0.4512
1982	0.5136	0.2775	0.1856	0.1197	0.2014	2.5503	1.3781	0.9218	0.5944
1983	0.5492	0.3073	0.1636	0.1031	0.2045	2.6859	1.5032	0.8003	0.5045
1984	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note : a/ The adjustment is to add back to the value added in agriculture the extraction of resources out of agriculture

Sources : Column (1) to (4) from column (3) to (6) of Table 6.4 divided by Total Public Expenditure.

Column (6) = Column (1) divided by column (5).  
 Column (7) = Column (2) divided by column (5).  
 Column (8) = Column (3) divided by column (5).  
 Column (9) = Column (4) divided by column (5).

There is a possible explanation for the different direction of biases in investment and in expenditures--namely, that agriculture, particularly rice culture, is intensive in public capital, notably in irrigation, which has to be undertaken by the government for technical reasons.

#### Transfer Between the Agricultural Sector and the Rest of the Economy

Government policies not only influence the amount that the government extracts from particular sectors but also lead to implicit transfers between the consumers and producers of those goods and services by shifting relative prices.

The basic idea involved in the calculations below is as follows. We reestimate the nominal income that would accrue to the sector if the price intervention were removed. We also reestimate the rural CPI, again assuming the removal of all intervention. If we then take the difference between the real actual income (actual nominal income deflated by actual CPI) and the real recalculated income (recalculated nominal income deflated by recalculated rural CPI), the results indicate the real transfers out of agriculture. We have done the recalculations for the instantaneous period, for the short run, and for the long run. The following subsection outlines the steps taken in the recalculation of nominal income and of the rural CPI.

Recalculation of Nominal Income. The nominal income received by the agricultural sector for any given crop is here taken simply as the price of that crop times the quantity produced. As mentioned in chapter 3, we are ignoring the costs of intermediate inputs. Removal of government intervention would change the prices of the product and would affect the quantity of crop produced in the short run and long run (but not instantaneously).

More formally, let  $Y^* = \sum Y_i^*$  be the nominal incomes in the alternative scenarios. (There are three timeframes--instantaneous, short-, and long-run--and three sorts of effects--direct, Total 1 and Total 2. Thus, there are altogether nine concepts of  $Y^*$ .) Let RCPI and RCPI\* stand for actual and alternative rural CPI, respectively. Then the transfer out of agriculture as a result of government price policies is  $(Y/RCPI) - (Y^*/RCPI^*)$ .

For each of the four crops, the changes in price are of differing magnitudes, depending on whether only the direct effect of government intervention is considered or the indirect effects are also taken into account. Chapters 2 and 3 give direct price effect calculations, and chapter 4 extends the calculations to include the two types of indirect effects. Arising out of each of these three versions of the effect on prices, we calculated in chapter 5 the effect on crop production. The recalculation of nominal income without government intervention is therefore straightforward. The following equation defines typical recalculated income for the short run and long run for a given commodity,  $i$ :

$$Y_i^* = P_i Q_i + (P_i^* - P_i) (Q_i + Q_i^* - Q)/2 \quad (1)$$

where:

$P_i$  and  $Q_i$  are the actual price and quantity produced of the commodity  $i$ ,

$P_i^*$  is the price without government intervention, and

$Q_i^*$  is the quantity produced if government intervention is removed

(from chapter 5).

Actually, this simpler expression would also serve:

$$Y_i^* = P_i Q_i + (P_i^* - P_i) Q_i \quad (2)$$

This is in fact the expression used for the instantaneous case, but the term  $(Q_i^* - Q_i)/2$  has been added in to approximate the extra producers' surplus earned on the incremental production.

Because we are dealing with the agricultural sector as a whole, we have to deal with commodities other than the four crops that we have so far treated, at least as far as indirect effects are concerned. As we pointed out in chapter 3, direct intervention for all the other commodities is small, but the indirect effects are not insignificant, particularly because the exchange rate effects influence the incomes from tradable crops. Therefore, we split the rest of the agricultural sector into tradable and nontradable components.<sup>34</sup> Further, we assumed that the prices received by the tradable component of the agricultural sector will move upward in the same proportion as the upward movement of the exchange rate. This upward movement of prices is then converted into an upward movement of income through Equation 2, because there are no extant estimates of the supply elasticity of these commodities as a group to obtain  $Q_i^*$ .

Recalculation of the Rural CPI. The consumer price index in a rural area should be calculated from the consumption basket of the rural household and the retail price for each community in the rural area. However, because rural retail prices were not available, retail prices in Bangkok were used in the calculation, the assumption being that rural area and Bangkok retail

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34. The traded commodities include cassava, mungbeans, castor beans, soybeans, groundnuts, tobacco, cotton, kenaf, jute, and kapok.

prices are highly related. The basis for the difference between rural CPI and Bangkok CPI is that the pattern of rural expenditure is significantly different from the urban basket of consumption.<sup>35</sup>

For this calculation, the rural consumption basket was obtained from the 1963-64 Household Expenditure Survey and from the Socioeconomic Surveys of 1975-76 and 1980-81. The expenditures are classified into seven categories: rice, maize, sugar, other traded agricultural products, nontraded agricultural products, traded nonagricultural products, and nontraded nonagricultural products. From the shares of expenditures in these three years, the shares for the interim years were obtained by simple interpolation and adjusted to ensure that the share sums to 1.

The rural CPI is then calculated for the case of direct and indirect effects. Thus, the price index adjusted for the direct effects is calculated from the following formula:

$$\begin{aligned}
 \text{CPI}_D^R &= \sum_i w_i^R P_{i'}^R + w_{at}^R P_{at}^R + w_{ant}^R \\
 &+ (1-w_i^R - w_{at}^R - w_{ant}^R) [w_{nat}^R P_{nat}^R + (1-w_{nt}^R) P_{nt}^R]
 \end{aligned}
 \tag{3}$$

where:

$\text{CPI}^R$  is the rural consumer price index  
 $w_i^R$  is the expenditure share of the agricultural commodity  $i$  in the rural area

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35. Table 7.2 in the next chapter shows that the expenditure for rice, for example, is substantially higher in rural areas.

- $w_{at}^R$  is the expenditure share of the other traded agricultural commodities in the rural area
- $w_{ant}^R$  is the expenditure share of the nontraded agricultural commodities in the rural area
- $w_{nat}^R$  is the expenditure share of the nonagricultural traded commodities in the rural area
- $PA'_i$  is the price index of agricultural commodity  $i$  evaluated at the border price
- $P'_{at}$  is the border price index for other traded agricultural commodities
- $P_{ant}$  is the price index for nontraded agricultural commodities
- $P'_{nat}$  is the price index for nonagricultural traded commodities
- $P_{nt}$  is the price index for the nonagricultural nontraded commodities.

As for the total effects, the prices of all traded commodities will be their respective border prices evaluated at equilibrium exchange rates.

These rural CPIs (reported in Table A.41) are then used in deflating the nominal transfer to arrive at the real transfer.

Real Transfers out of Agriculture. The recalculations outlined above give us the real incomes of the agricultural sector in the alternative scenarios when all government price intervention is removed. Comparing those with the actual income received by the agricultural sector yields the results on the real transfers out of agriculture.

The results of the calculation for total gross transfers are given in Table 6.6. The commodity-by-commodity calculations are shown in Tables A.38 to A.40 (the nominal transfer is reported in Tables A.35 to A.37). By deducting total government expenditure on agriculture (including roads)

TABLE 6.6

## RESOURCE FLOWS FROM AGRICULTURE TO THE REST OF THE ECONOMY

(million baht, deflated by rural CPI, 1972=100)

Year	Gross Resource Flows from Agriculture to the Rest of Economy								
	Instantaneous			Short Run			Cumulative		
	Direct (1)	Total(1) (2)	Total(2) (3)	Direct (4)	Total(1) (5)	Total(2) (6)	Direct (7)	Total(1) (8)	Total(2) (9)
1960	3,852.09	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	4,929.83	n.a.	n.a.	5,384.89	n.a.	n.a.	n.a.	n.a.	n.a.
1962	3,585.67	5,346.50	5,628.03	4,944.64	n.a.	n.a.	n.a.	n.a.	n.a.
1963	4,748.26	6,359.42	6,983.36	5,347.05	7,128.62	7,840.10	n.a.	n.a.	n.a.
1964	5,609.36	7,156.71	7,365.36	6,166.49	7,831.47	8,137.61	n.a.	n.a.	n.a.
1965	4,927.86	6,699.89	6,836.97	6,275.08	8,241.83	8,419.70	6,682.59	n.a.	n.a.
1966	4,562.43	6,913.55	7,170.40	5,368.11	7,957.35	8,256.76	5,787.47	n.a.	n.a.
1967	7,327.74	9,956.98	10,434.92	7,885.94	10,620.34	11,159.14	8,290.76	11,438.86	12,045.50
1968	6,925.32	9,485.47	10,563.71	7,414.38	10,257.10	11,490.25	7,952.63	11,041.03	12,346.32
1969	4,949.52	8,029.43	9,459.99	5,369.12	8,804.96	10,545.63	5,744.76	9,287.34	11,031.80
1970	2,738.22	5,513.14	7,143.44	2,918.06	5,942.64	7,871.37	3,175.24	6,166.40	8,047.86
1971	3,978.05	7,360.16	8,512.18	4,143.24	7,732.10	9,127.86	4,372.44	7,841.30	9,166.21
1972	5,343.50	8,777.54	9,119.28	5,493.42	9,202.59	9,681.77	5,683.58	9,678.30	10,246.13
1973	12,879.76	16,889.33	17,240.23	13,219.76	17,649.42	18,090.88	13,716.05	18,805.11	19,451.53
1974	23,199.53	25,878.89	26,427.98	23,930.22	27,165.38	27,855.23	24,163.93	28,195.84	29,074.73
1975	13,252.86	16,781.60	19,984.38	13,774.62	17,697.77	21,242.94	13,461.55	17,963.56	21,821.61
1976	5,535.32	9,762.49	11,787.19	5,726.75	10,223.67	12,611.83	5,771.94	10,567.72	13,049.26
1977	5,851.46	10,931.85	14,799.45	5,978.45	11,228.90	15,376.81	6,318.85	11,829.87	16,239.29
1978	6,942.46	11,512.99	14,692.41	7,376.50	12,127.65	15,644.43	7,856.47	12,797.96	16,474.18
1979	5,787.55	10,429.13	15,427.18	6,418.05	11,222.00	16,581.43	6,736.66	11,696.76	17,300.34
1980	7,870.15	12,006.87	16,193.85	8,091.30	12,384.87	16,979.40	8,418.87	12,939.26	17,797.20
1981	8,496.23	13,016.65	18,127.92	8,648.80	13,284.30	18,782.35	8,869.80	13,761.86	19,571.41
1982	743.37	4,685.64	6,518.76	1,287.30	5,193.76	7,105.99	1,599.66	5,599.13	7,614.78
1983	603.32	4,790.63	9,267.23	1,032.39	5,194.63	9,690.30	1,269.40	5,566.67	10,342.42
1984	280.68	4,862.10	8,141.35	759.84	5,307.13	8,695.71	947.77	5,609.46	9,127.07

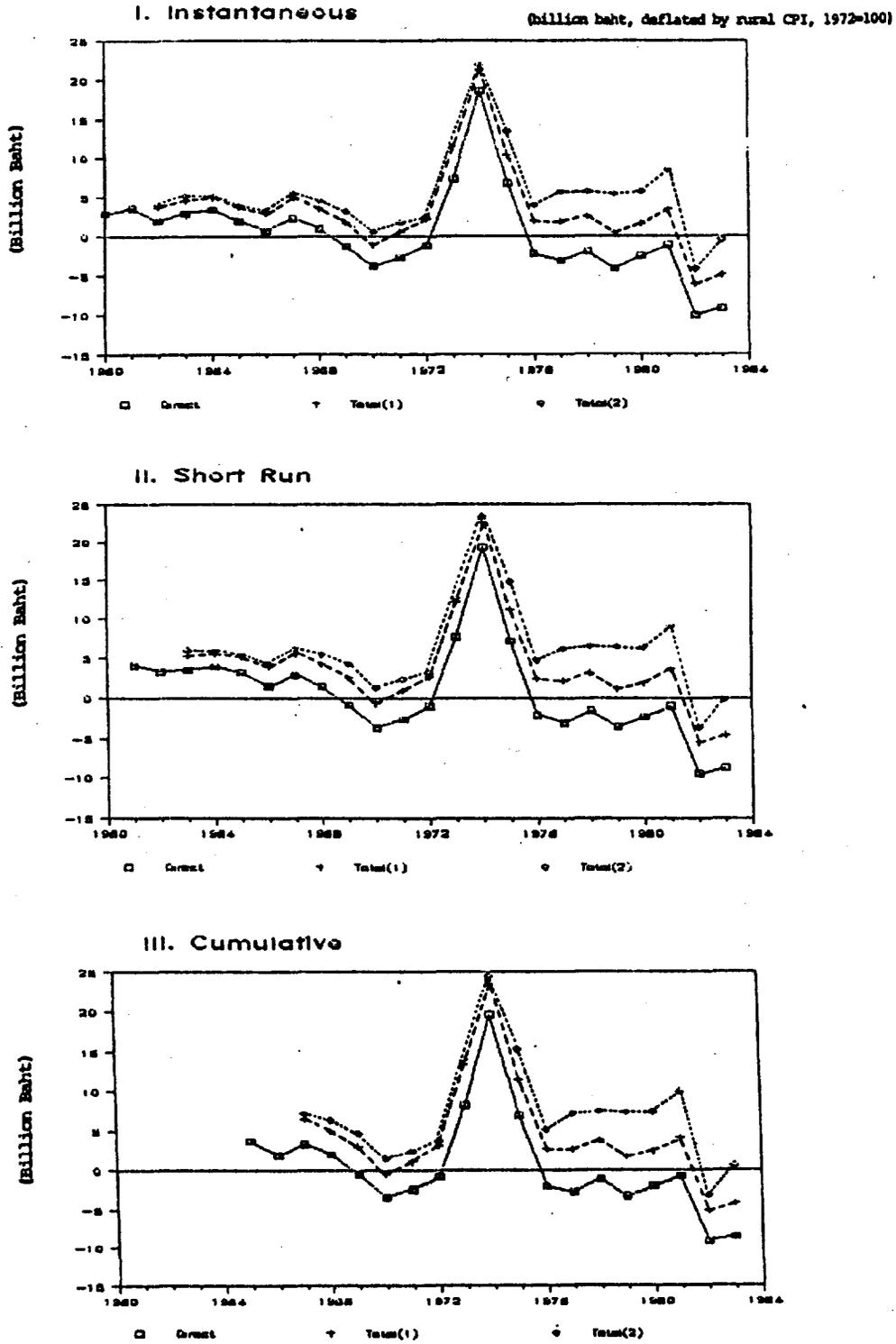
Sources : Appendix Table A.38 to A.40

(available in Table 6.4) from the figures in Table 6.6, we can obtain the net resource flows from agriculture to the rest of the economy. These are graphed in Figure 6.2.

The picture that emerges is one of a generally downward trend in the resource flow from agriculture, interrupted by an increased rate of extraction in the mid-1970s, made possible (or politically necessary) by the worldwide commodity boom during that period. The increased extraction of the mid-1970s was accomplished by heavier direct intervention. This slackened sharply in 1982. In the meantime, however, the government's decision to incur large current account deficits during the early 1980s implies that it has adopted a new mechanism for penalizing the agricultural sector--namely, an overvalued exchange rate. Powerful as this mode of extraction is, it still caused the net level of extraction from agriculture after the miniboom of 1980-81 to be about the same as, or only slightly more than, the early 1960s, when direct intervention was the prevailing mode. In proportion to the size of the agricultural sector, therefore, the rate of extraction has gone down. If one offsets the extraction from the agricultural sector against the continually increasing flow of government resources back to the agricultural sector (as has been done in Figure 6.2), the downward trend would be emphasized.

FIGURE 6.2

REAL NET RESOURCE FLOWS FROM AGRICULTURE  
TO THE REST OF THE ECONOMY



Sources : Table 6.6, netted out by Column (5) of Table 6.4

Chapter 7

INCOME DISTRIBUTION EFFECTS OF  
AGRICULTURAL PRICING POLICIES

The income distribution effect of government intervention was estimated by comparing the change in the real income of each household group with and without government intervention. Two sets of information were required--income from each of the crops grown and from other sources for each household group, and the pattern of expenditure of each crop and on other commodities for each household group.

This information could not be obtained for the entire study period. This study therefore focuses on the year for which the data are available and uses data tapes from the 1980-81 Socioeconomic Survey (SES), which refer to events in 1980, to generate information on both the source of income and the pattern of expenditure for each household group.

Because the discussion of the income distribution impact of government policy in the agricultural sector is for 1980, a brief description of the economic conditions and government intervention in that year is in order.

Economic Conditions and Government Intervention in 1980

After the second oil shock in 1979, the prices of agricultural products started to climb, and world prices for most export crops from Thailand became quite favorable. However, there was a general reduction in the output of agricultural products in 1980 because of a drought. Data from Table A.13 show that the 1980 rice, rubber, and sugarcane outputs were lower, sometimes sharply lower, than in 1979. The output of maize was only slightly above that of 1979.

Government policy for each of the major crops responded to these market conditions. These crop-specific policies and their effects have been discussed in the previous chapters. The following discussion focuses on 1980.

Rice: The 1980 shortfall in rice output, coupled with a high world price, stimulated the government to increase the export tax to protect consumers from the impact of the higher prices. Table 2.3, column 10, shows an overall export taxation rate of 26 percent in 1980.

Maize: There was little government intervention in maize to start with, and maize did not suffer much loss in production. However, the increase in the world price stimulated a small increase in government intervention. Column 3 of Table 3.4 shows that the difference between the domestic price and the border price (adjusted for terms of trade effect) was 5.4 percent in 1980.

Rubber: The loss in the output of rubber in 1980 was close to 10 percent compared with 1979. The nominal world price of rubber was at its all-time high, however (column 4 of Table 3.6). Taxation of rubber, progressive with respect to price, was also at its peak, at 26 percent.

Sugarcane: The drop in sugarcane production in 1980 was quite large (from 1.7 million tons in 1979 to 1.1 million tons in 1980). This drastic drop in output caused chaos in the domestic sugar market. In fact, it was the only year since 1960 in which Thailand had to import sugar.

In 1980, the subsidy given to sugarcane production was at one of the highest rates of the past two decades. The millers' price and the consumers' price were about 33 percent and 55 percent higher than the world price, respectively (columns 6 and 7 of Table 3.1).

Even though 1980 was not a typical year in terms of the absolute level of government intervention, the general direction of the intervention was the same. The absolute change in income for each income group may not have reflected the typical level of government intervention effect, but the general pattern of the effect was not changed. The relatively high level of inter-vention in this year may have helped to magnify the effect and may have made it easier to detect its impact.

#### Categorization of Households

Households in the SES are divided into three income strata: poor, medium, and rich. The cutoff points for the rich and the poor are the 70th and 30th percentiles. They are the bottom and top 30 percent of all households. The medium-income group is the 40 percent in the middle. A second classification divides the household into four groups: rural rice, rural nonrice (i.e., farmers who grow crops other than rice), rural nonfarm (i.e., nonagricultural households living in rural areas), and urban.

Therefore, there are twelve household categories recognized in this study. Their distribution is shown in Table 7.1 and Figure 7.1. The relative poverty of the rice-growing population and the low number of urban households classified as poor are noteworthy. An important (and usually overlooked) group is the rural nonfarm household group, which is also relatively better off than other rural groups.

#### Sources of Income

The income of each household group is divided into two major components: farm and off-farm.

TABLE 7.1  
DISTRIBUTION OF THE NUMBER OF HOUSEHOLDS IN EACH HOUSEHOLD GROUP

(UNIT : HOUSEHOLDS)

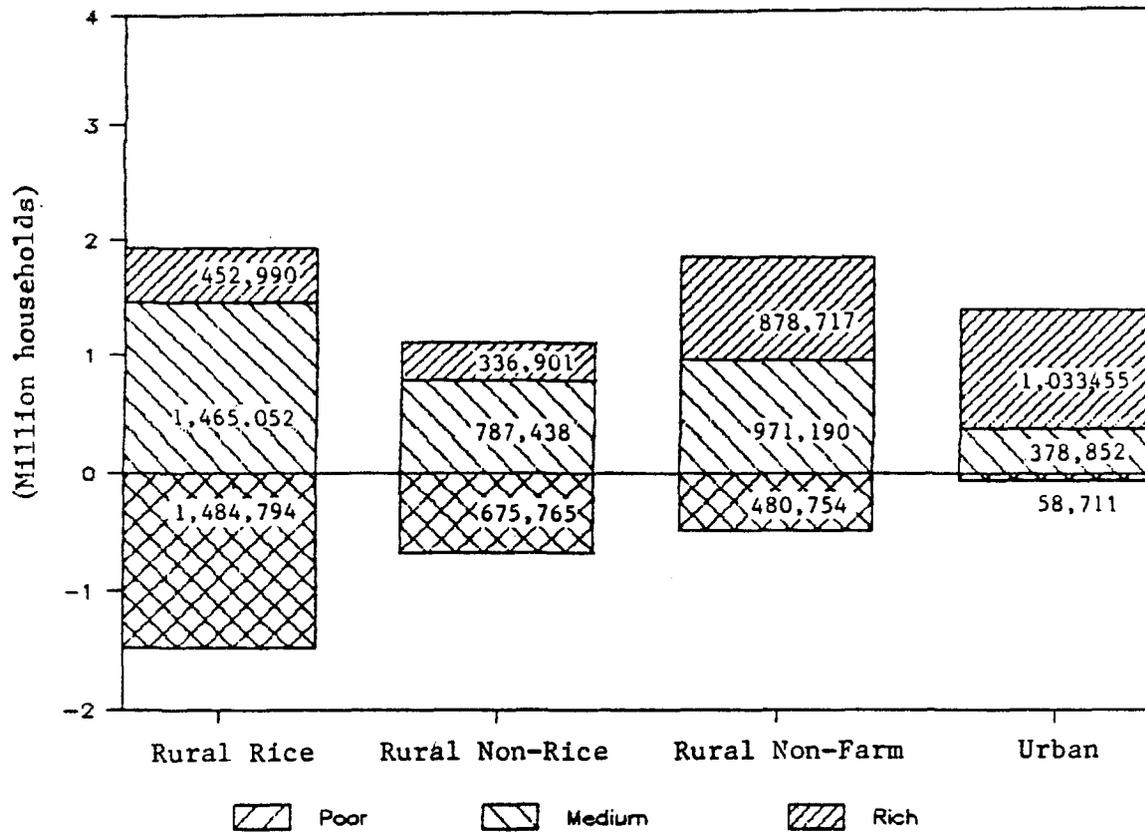
INCOME STRATA	RURAL			URBAN	TOTAL
	RICE	NON-RICE	NON-FARM		
RICH	452,990 (5.03)	336,901 (3.74)	878,717 (9.76)	1,033,455 (11.48)	2,702,063 (30.01)
MEDIUM	1,465,052 (16.27)	787,438 (8.74)	971,190 (10.79)	378,852 (4.21)	3,602,532 (40.01)
POOR	1,484,794 (16.49)	675,765 (7.50)	480,754 (5.34)	58,711 (0.65)	2,700,024 (29.98)
TOTAL	3,402,836 (37.79)	1,800,104 (19.99)	2,330,661 (25.88)	1,471,018 (16.34)	9,004,619 (100.00)

Note : Figures in parentheses show percentage of total number of households.

Source : National Statistical Office, Socioeconomic Survey 1980/81 data tapes.

FIGURE 7.1

DISTRIBUTION OF NUMBER OF HOUSEHOLDS IN EACH HOUSEHOLD GROUP



Source: Computed from Socio-economic Survey 1980/81

Farm income: Farm income is defined as net revenue generated by the farm. Wages obtained from hiring out labor, even to other agricultural enterprises, are considered here as an off-farm activity.

The survey gives the total revenue for each separate crop, but the costs of farming are given for all crops in the aggregate. Therefore, net income from a single crop cannot be computed from the survey data. But this does not diminish the value of the survey for the purposes of this study, because most of the intervention is in output markets. The effect on income can be calculated by adjusting the price of the output, assuming an unchanged price of input. In the calculation of the short-term and cumulative effects, however, the values of the inputs have to be adjusted to reflect the changed level of output.

Data on other agricultural revenues (i.e., other than the four crops), nonagricultural incomes, and agricultural input costs are divided into traded and nontraded components. Within the nontraded components, wage incomes and wage payments for farm activities are separated from the rest.

Off-farm income: Off-farm income is defined as the income obtained outside the farm, through the production of traded and nontraded goods and from wages, both in cash and in kind. The source of income for each household group is given in Table 7.2. Note that the proportion of farm income is usually the highest among rich farmers, both rice and nonrice, and becomes less as total income falls. On the other hand, for the rural nonfarm and urban households, a higher share of farm income is associated with a lower income, although their shares of farm income are very small (less than 5 percent of the total income). Another interesting point is that rice-growing households obtain less from working outside the farm than do nonrice households.

TABLE 7.2

## SOURCES OF INCOME FOR THE TWELVE HOUSEHOLD GROUPS

Household Group	Rice	Sugarcane	Rubber	Maize	Other Agriculture		Farm Operating Cost			Farm	Off-Farm Income			Total			
					Traded		Non-traded		Wages	Income	Traded		Non-traded		Wages	Income	
															Rice	Non-Rice	
A. Levels (Baht/Year/Capita)																	
Rural :																	
Rice Rich	10770.19	24.58	52.90	247.65	854.16	4829.37	-738.53	-2763.03	-1263.70	12013.59	103.05	6025.70	3.08	795.23	18940.65		
Rice Medium	3740.53	10.46	45.12	76.99	487.84	1147.30	-241.87	-1054.88	-340.39	3871.10	10.51	2461.78	3.27	540.70	6887.36		
Rice Poor	1507.98	0.50	10.98	26.12	259.67	453.26	-124.82	-539.70	-119.37	1474.62	4.81	1271.67	5.31	271.42	3027.83		
Non-Rice Rich	2760.82	2118.62	1388.12	797.50	2808.71	7813.29	-496.09	-4041.78	-1279.04	11870.15	119.06	7297.00	6.85	1347.47	20640.53		
Non-Rice Medium	1233.69	204.56	437.59	374.97	929.49	2156.83	-200.30	-1127.25	-317.38	3692.20	90.77	2407.43	8.45	773.97	6972.82		
Non-Rice Poor	622.16	283.95	196.38	187.09	587.14	825.44	-295.27	-926.40	-359.65	1120.84	24.34	1157.40	65.60	358.14	2726.32		
Non-Farm Rich	253.94	41.76	16.43	11.80	78.38	515.27	-37.34	-324.30	-105.74	450.20	569.41	11051.43	41.20	11605.86	23718.10		
Non-Farm Medium	214.87	1.53	8.24	2.02	132.25	227.13	-56.53	-246.33	-49.30	233.88	302.69	3706.00	177.88	2896.56	7317.01		
Non-Farm Poor	146.81	0.00	4.45	4.16	56.21	121.91	-32.64	-135.66	-31.74	133.50	172.44	1382.36	217.56	1285.02	3190.88		
Urban :																	
Rich	45.67	15.82	12.33	0.43	191.89	180.07	-5.23	-175.42	-54.55	211.01	392.10	12942.51	0.17	13862.80	27408.59		
Medium	45.50	0.89	9.01	1.01	114.51	101.67	-12.35	-122.99	-34.40	102.84	242.71	3839.63	0.00	3797.65	7982.83		
Poor	92.68	0.00	12.78	0.92	220.46	109.89	-24.42	-277.72	-35.78	98.75	110.04	1853.69	0.00	1176.03	3238.31		
B. Shares (Percent)																	
Rural :																	
Rice Rich	56.86	0.13	0.28	1.31	4.51	25.50	-3.90	-14.59	-6.67	63.43	0.54	31.81	0.02	4.20	100.00		
Rice Medium	54.31	0.15	0.66	1.12	7.08	16.66	-3.51	-15.32	-4.94	56.21	0.15	35.74	0.05	7.85	100.00		
Rice Poor	49.80	0.02	0.36	0.86	8.58	14.97	-4.12	-17.82	-3.94	48.70	0.16	42.00	0.18	8.96	100.00		
Non-Rice Rich	13.38	10.26	6.73	3.86	13.61	37.85	-2.40	-19.58	-6.20	57.51	0.58	35.35	0.03	6.53	100.00		
Non-Rice Medium	17.69	2.93	6.28	5.38	13.33	30.93	-2.87	-16.17	-4.55	52.95	1.30	34.53	0.12	11.10	100.00		
Non-Rice Poor	22.82	10.42	7.20	6.86	21.54	30.28	-10.83	-33.98	-13.19	41.11	0.89	42.45	2.41	13.14	100.00		
Non-Farm Rich	1.07	0.18	0.07	0.05	0.33	2.17	-0.16	-1.37	-0.45	1.90	2.40	46.59	0.17	48.93	100.00		
Non-Farm Medium	2.94	0.02	0.11	0.03	1.81	3.10	-0.77	-3.37	-0.67	3.20	4.14	50.65	2.43	39.59	100.00		
Non-Farm Poor	4.60	0.00	0.14	0.13	1.76	3.82	-1.02	-4.25	-0.99	4.18	5.40	43.32	6.82	40.27	100.00		
Urban :																	
Rich	0.17	0.06	0.04	0.00	0.70	0.66	-0.02	-0.64	-0.20	0.77	1.43	47.22	0.00	50.58	100.00		
Medium	0.57	0.01	0.11	0.01	1.43	1.27	-0.15	-1.54	-0.43	1.29	3.04	48.10	0.00	47.57	100.00		
Poor	2.86	0.00	0.39	0.03	6.81	3.39	-0.76	-8.58	-1.10	3.05	3.40	57.24	0.00	36.32	100.00		

Source: Socio-Economic Survey, 1980/81

### Pattern of Household Expenditure

For each household group, we obtained the direct and indirect consumption for each of the four selected crops. Rice consumption was simply obtained from the share of expenditures each household spent on rice. The proportion of the expenditure on maize was obtained from the share of the expenditures the households spent on chicken and eggs. Maize cost was then assumed to take up 7 percent of the cost of chicken meat and eggs.<sup>36</sup> The consumption of sugar was also estimated from the direct consumption of sugar and a proportion (70 percent) of the value of the consumption of confectionery reported in the SES.

Rubber is not consumed directly. Strictly speaking, it should appear as part of the consumption of manufactured goods, but we chose to ignore it because the proportion of rubber consumed domestically is very small.

The pattern of expenditure for all the household groups is reported in Table 7.3. By inspecting the change in the proportion of expenditure across the three income levels (poor, medium, and rich) in each household category, one can detect the pattern of income elasticity for each commodity. For example, the proportion of rice expenditure declines as one moves to the higher income class for each household category, suggesting a less-than-unitary income elasticity for rice. Traded and nontraded nonagricultural commodities have income elasticities greater than 1. Note also that the non-agricultural, nontraded commodities have an extremely high expenditure share.

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36. This was estimated from the information on the cost of animal feeds used in the production of chicken and eggs (TDRI, 1985).

TABLE 7.3

## PATTERN OF HOUSEHOLD EXPENDITURE

## A. Levels (Baht/Year/Captia)

Household Group	Rice	Sugarcane	Maize	Other Agriculture		Non-agriculture		Total Expenditures
				Traded	Non-traded	Traded	Non-traded	
<b>Rural :</b>								
Rice Rich	1409.49	51.69	51.68	556.57	1484.32	2543.10	7407.49	13504.34
Rice Medium	1207.96	27.74	28.83	336.82	1037.65	1304.52	3444.14	7387.65
Rice Poor	986.05	18.33	15.65	178.76	753.62	712.32	1953.22	4617.94
Non-Rice Rich	1313.29	64.53	64.99	968.96	1243.72	3199.22	9009.26	15863.98
Non-Rice Medium	1092.19	44.90	32.64	444.60	910.95	1533.93	3867.65	7926.86
Non-Rice Poor	948.76	27.40	20.09	252.11	693.99	919.82	2336.18	5198.35
Non-Farm Rich	1048.47	85.63	75.75	957.24	1116.35	5458.29	13534.06	22275.78
Non-Farm Medium	955.70	41.87	39.52	483.14	890.50	1498.61	4765.27	8674.61
Non-Farm Poor	883.37	31.33	19.69	243.44	641.35	807.90	2244.40	4871.49
<b>Urban :</b>								
Rich	670.65	82.95	71.03	1052.07	800.69	4188.79	18721.90	25588.08
Medium	675.37	62.40	40.61	699.16	654.16	1577.47	7031.71	10740.89
Poor	719.14	46.74	27.73	465.37	615.46	1010.44	4597.86	7482.74

## B. Shares (Percent)

<b>Rural :</b>								
Rice Rich	10.44	0.38	0.38	4.12	10.99	18.83	54.85	100.00
Rice Medium	16.35	0.38	0.39	4.56	14.05	17.66	46.62	100.00
Rice Poor	21.35	0.40	0.34	3.87	16.32	15.43	42.30	100.00
Non-Rice Rich	8.28	0.41	0.41	6.11	7.84	20.17	56.79	100.00
Non-Rice Medium	13.78	0.57	0.41	5.61	11.49	19.35	48.79	100.00
Non-Rice Poor	18.25	0.53	0.39	4.85	13.35	17.69	44.94	100.00
Non-Farm Rich	4.71	0.38	0.34	4.30	5.01	24.50	60.76	100.00
Non-Farm Medium	11.02	0.48	0.46	5.57	10.27	17.28	54.93	100.00
Non-Farm Poor	18.13	0.64	0.40	5.00	13.17	16.58	46.07	100.00
<b>Urban :</b>								
Rich	2.62	0.32	0.28	4.11	3.13	16.37	73.17	100.00
Medium	6.29	0.58	0.38	6.51	6.09	14.69	65.47	100.00
Poor	9.61	0.62	0.37	6.22	8.23	13.50	61.45	100.00

Source: Socio-Economic Survey 1980-81

This high share appears to match the very high service sector share in Thailand's GDP (see Table 1.5).

Changes in Household Real Incomes: Estimation Method

The income data for each household were recalculated to take account of the impact of government intervention. Following essentially the same method as in chapter 6, we made our calculations in two steps. First, we recalculated the nominal incomes of the different household categories. Second, we calculated the impact on the cost of living index for each household category.

When comparing the differential impact of policies on households belonging to various income strata, we encountered the problem of shifting income distribution. We had, then, two alternative methods for presenting the results. One was to fix the population of households in each income strata even if the policy change would make some households in the poorer strata richer than some in the upper strata, and vice versa. The other method, which we chose, was to fix the cutoff points at the same 30 to 70 percent of real income in the actual situation (i.e., with existing intervention). After the intervention was removed, certain households would cross these cutoffs in both directions, and the population of households categorized as rich, medium, and poor then would differ from the original. Therefore, when we say that the income of rich rice-growing households changed in a particular fashion, it must be understood that the change was across different sets of households.

The assumptions used in the recalculation of the nominal incomes are as follows. First, we assumed that there is no impact of agricultural price intervention on nominal wage rate and on nominal prices of nontraded goods,

both on the income and expenditure sides.<sup>37</sup> The impact is principally on the gross revenues from the four crops for direct effect, and on these and on incomes from the traded sectors for total effects.

Second, although we have included the impact on incomes from, and expenditures on, traded goods as a result of the change in the equilibrium exchange rate (which is a result of removing intervention), we are defeated by the problems of including the redistributive effects of industrial protection. Calculating the impact on household cost of living (i.e., the consumer cost of the protection) is possible, but calculating the benefit impact on incomes (i.e., the production-subsidy equivalent of protection) is impossible. The structure of the data simply does not allow it. Thus, in reading our reports on the "Total 1" and "Total 2" effects below, the reader should be aware that these terms now have meanings different from those given in the previous chapters.

Third, the impact on the output of the commodities is proportional to the price deviation and to the elasticities in chapter 5. For each commodity, the elasticity is the same across households. Increased output, of course, would induce an increase in farm operating costs. The ratio of an increased input cost by component to an increased output value is assumed equal to the average cost share of that component in the production for that year--as compiled by the Office of Agricultural Economics, Ministry of Agriculture and Cooperatives.

Fourth, the increased expenditure on wages for labor (hired by farmers) as a result of the adjustments in the third point above are

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37. There is an impact on wage expenditures and receipts, however (see the discussion of wages below).

distributed as increased income to all households in the rural areas and to the urban poor in proportion to their existing cash wage income.

Fifth, the wage income that is paid out in rice is adjusted by the full change in the price of rice.

Sixth, we assumed that the quota rents arising from various government measures at the border accrue exclusively to the rich urban household.<sup>38</sup> We assume that the quota rent in sugar, on the other hand, accrues to sugar-producing households in proportion to their income from that crop.

Seventh, the change in the cost of living for each household group is calculated using the same method as in chapter 6, using Equation 3 of that chapter. Because this is a "with/without" comparison, the index is set at 1 for the actual case (with intervention), and indices are then computed for the cost of living relative to this level.

Eighth, although we have allowed for movements of the population across the three income strata, we do not have any way to incorporate population movements from one group to another--for example, from rice-growing to nonrice growing groups or to urban areas. The households are assumed to stay in the groups to which they belong.

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38. There is a slight technical problem here. Because the population of the household in each income stratum would shift as a result of the removal of policy intervention, the set of households due to receive the quota rents would also shift. We assume, therefore, that the quota rents accrue only to the very top of the rich urban households and not to the marginally rich who will be involved in the movement across the cutoff points. The effect of the quota rents, therefore, is largely seen in the average income of the rich urban households alone and not in the movements of the households.

### Changes in Household Real Incomes: Results

Because there are three timeframes--instantaneous, short-, and long-run and three types of effects--direct, Total 1, and Total 2, we make nine recalculations of household real incomes. The resultant effects on the real incomes are reported in Table 7.4 and Figures 7.2 and 7.3. The effects on nominal incomes are reported in Tables A.42 to A.44, and the effects on the cost of living are reported in Table A.45. The detailed effects on real incomes of the twelve household groups are shown in Tables A.46 to A.48.

The results indicate that the main beneficiaries of the intervention in 1980-81 were the rich urban households and that the source of this benefit was the quota rents. Rich, middle, and poor ricefarmers all suffered from the intervention, as did the rich nonrice farmers. Income disparities in the rural areas were reduced as a result of the intervention, but in the urban areas they were aggravated. The rural/urban differential was also increased. The indirect effect (through the equilibrium exchange rates) affected the urban population and the richer strata in the rural areas more than the others--both when the effect was positive (as among the nonfarm population) and when it was negative.

We also calculated the movements of population across the different income strata for the instantaneous case only, and the results are shown in Figure 7.4. If direct policy intervention is removed, the reduction in the rice-growing population categorized as poor is striking (as much as 15 percent, as is the reduction among farmers of crops other than rice (about 7 percent). Against this, the increase (of about 3 percent) in the poverty level of the nonfarm rural population and of the urban population (of 2 percent) is quite small. The total reduction in the population classified as

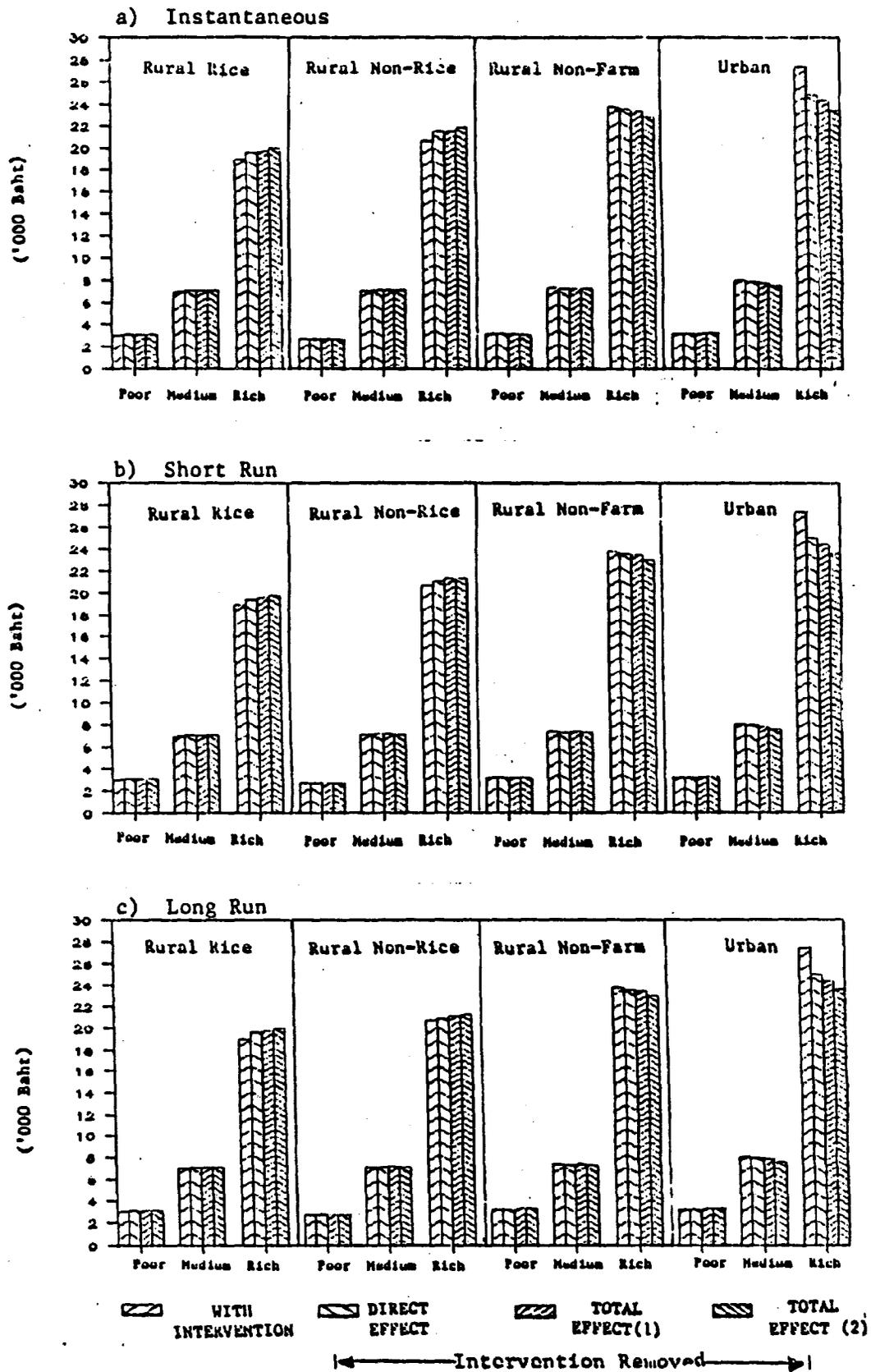
TABLE 7.4

EFFECT OF GOVERNMENT INTERVENTIONS ON REAL INCOME, 1980/81  
(PERCENTAGE OF CHANGE)

Types of Effects	(Percent)											
	Rural Rice			Rural Non-Rice			Rural Non-Farm			Urban		
	Poor	Medium	Rich	Poor	Medium	Rich	Poor	Medium	Rich	Poor	Medium	Rich
<b>A. Direct Effects :</b>												
Instantaneous	-2.24	-1.91	-3.37	-1.16	-2.23	-3.88	0.21	0.73	0.74	0.19	1.84	10.15
Short-Run	-2.34	-1.65	-2.38	0.71	-1.68	-1.63	0.12	0.98	0.78	0.54	1.49	9.83
Long-Run	-2.63	-2.07	-3.11	2.48	-1.40	-1.04	-0.61	1.13	0.82	0.58	1.47	9.82
<b>B. Total Effects(1) :</b>												
Instantaneous	-2.48	-2.06	-3.80	-1.03	-2.12	-4.20	0.79	0.90	1.67	0.22	3.62	12.57
Short-Run	-2.63	-2.05	-3.23	0.10	-2.14	-3.01	-0.48	0.54	1.35	-0.18	3.11	12.21
Long-Run	-3.37	-2.37	-3.53	1.06	-1.95	-2.32	-2.15	0.50	1.42	-0.27	3.06	12.20
<b>C. Total Effects(2) :</b>												
Instantaneous	-2.26	-2.02	-5.18	0.86	-1.76	-5.87	1.82	1.49	3.74	-2.49	6.07	16.86
Short-Run	-2.92	-2.06	-4.40	0.41	-1.37	-3.00	-0.14	1.26	3.47	-1.61	5.77	16.44
Long-Run	-3.44	-2.14	-4.80	1.03	-1.27	-2.66	-1.67	1.40	3.54	-1.70	5.70	16.42

Source : See Text.

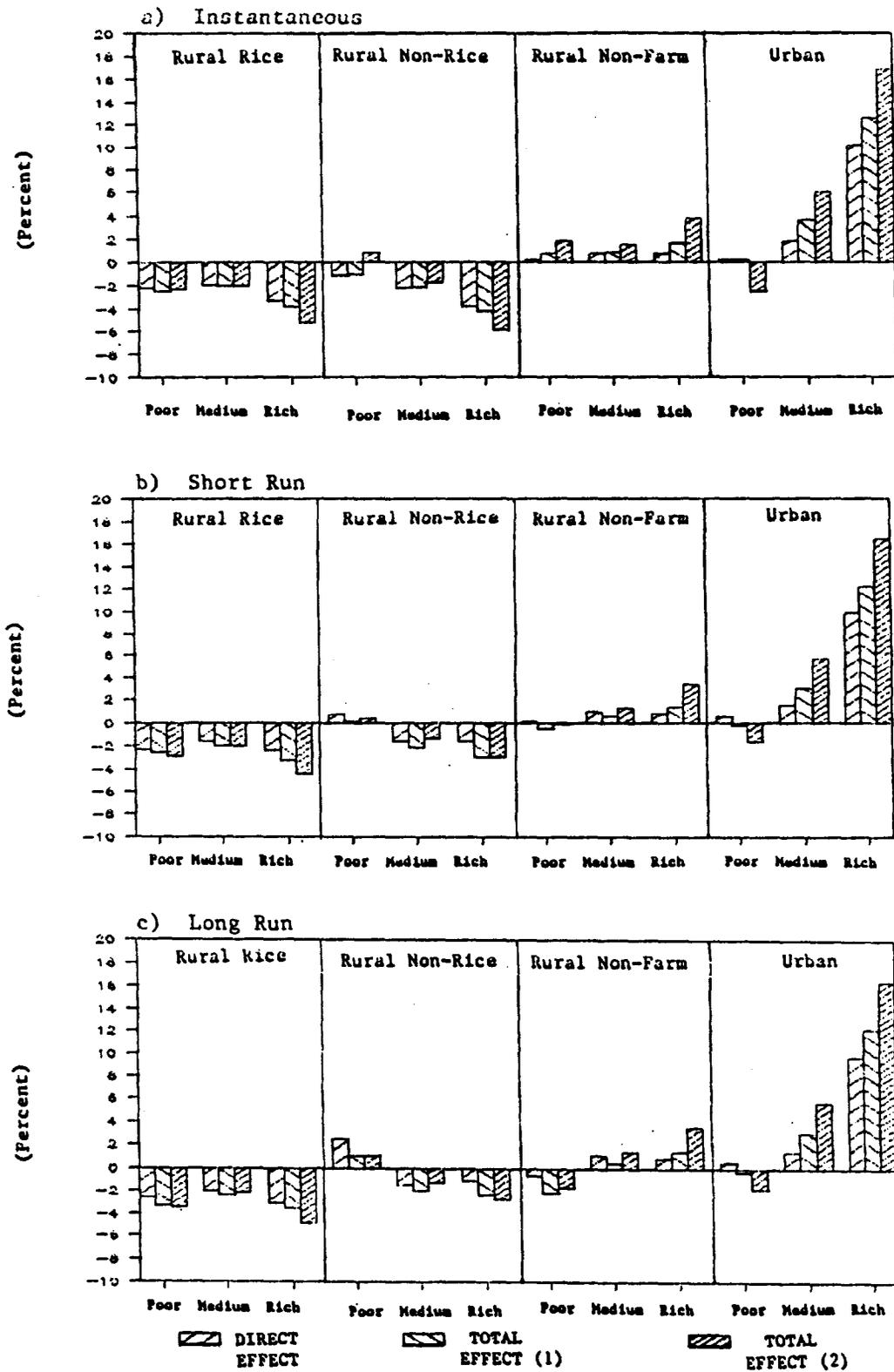
REAL INCOMES WITH AND WITHOUT INTERVENTION, 1981



Sources : Table 7.2 and Appendix Table A.46 to A.48

FIGURE 7.3

CHANGES IN REAL INCOMES DUE TO INTERVENTION, 1981



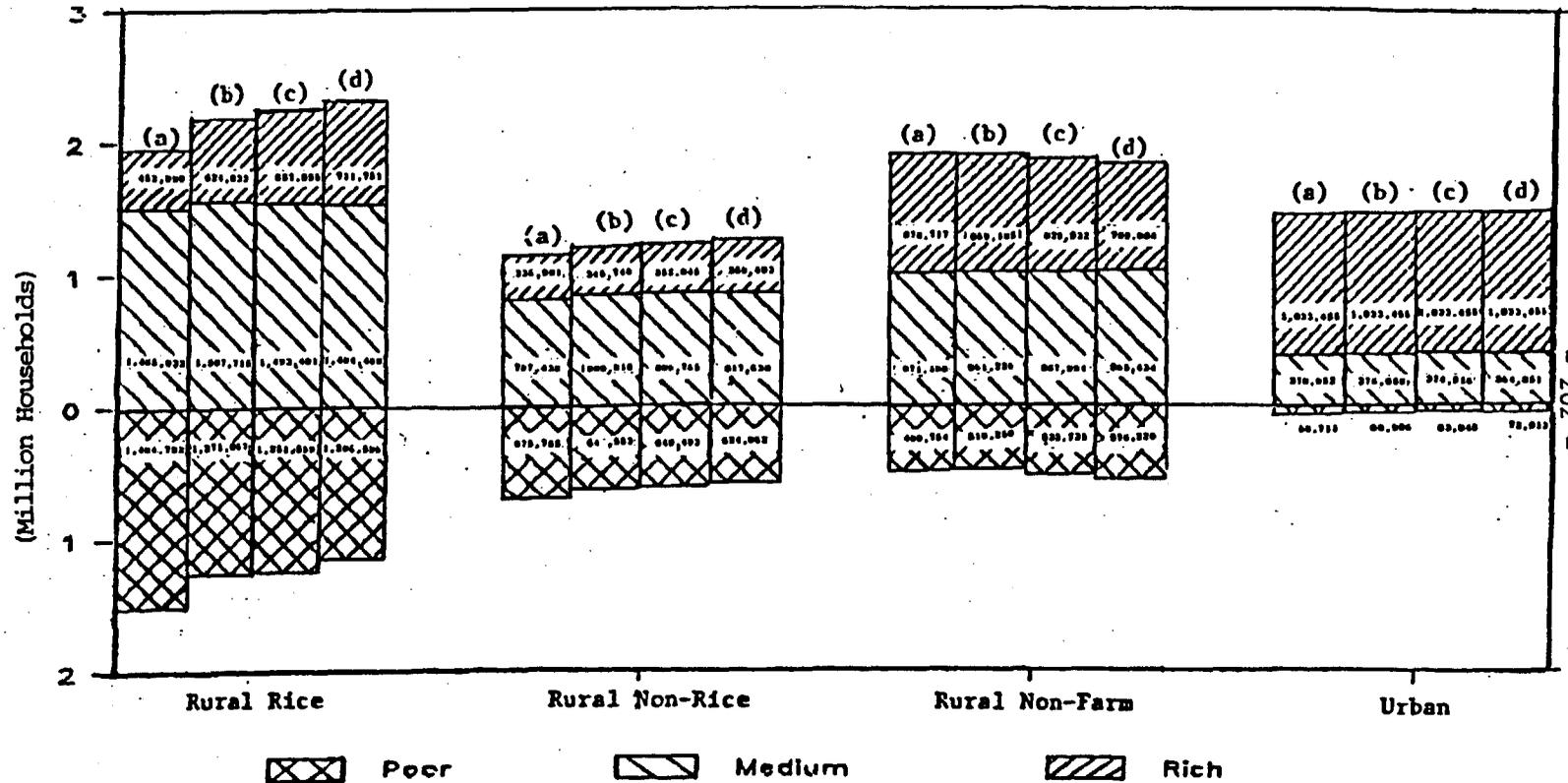
Sources : Appendix Table A.46 to A.48

FIGURE 7.4

DISTRIBUTION OF NUMBER OF HOUSEHOLDS IN EACH HOUSEHOLD GROUP

WITH AND WITHOUT INTERVENTION, 1981

(INSTANTANEOUS CASE)



- Note : (a) With Intervention  
 (b) Without Intervention (Direct Effect)  
 (c) Without Intervention (Total Effect(1))  
 (d) Without Intervention (Total Effect(2))

Source : Computed from Socio-economic Survey 1980/81

poor is 10 percent. This result is strikingly different from that of Trairatvorakul (1984), who examined the impact of rice policies only, using similar data for 1975-76 but a different method. He found that the impact on the poverty level was relatively small.

The results for the indirect effect do not indicate anything different from those for the direct effects, except for an increase in the magnitudes of the changes.

Chapter 8

CONCLUSION

We have now examined in detail the nature, instrumentalities, and extent of government price intervention in each of Thailand's four major export commodities--rice, sugar, maize, and rubber. We chose to describe them individually because the measures pertaining to each crop evolved essentially independently of the others, both in fact and in the minds of those charged with designing and implementing them. Thai governments have compartmentalized their agricultural policies because they have perceived relatively little spillover effect of the policies for one crop on the output and consumption of another. The reasons for this are, first, the existence of a land surplus that has veiled the opportunity cost of supporting one crop in terms of the lost output of another, and, second, the dominance of rice as a staple food, which makes for rather small consumption substitution effects among the three food crops that we have examined.

The independent evolution of policies for the different crops is reflected in the separate politics for each of them. Among the four commodities, sugar is clearly unique. Because of its specific structure, and because of the concentration of cane farmers around the mills, the sugar industry is effectively organized into two major pressure groups--growers and millers. The two are ostensibly adversarial, but they have been effective in using the threat of conflict between them to wring concessions from the government. The government, in turn, has been able to pass on the burden of these concessions--mostly to the domestic consumer--because concentration in the sugar industry makes the administration of a home-price scheme feasible. Such a scheme cannot be envisaged for the other three crops.

The processing and handling of these other crops have not stimulated the creation of any nongovernment organization that might exert pressure on the government. Consequently, the politics of these crops is internal to the bureaucracy. This is particularly so for rice. Its importance in the economy, and the increasing complexity of the legal framework that guides policymaking, led to a diffusion of decision-making among different ministers. Interdepartmental horse-trading became the norm, and resources available in the contending departments began to dictate the shape of the policies that emerged. With regard to maize and rubber, decision-making powers are more concentrated, in the ministries of Commerce and Finance, respectively. This makes for a somewhat greater degree of policy stability.

Generally, for farm crops (with the exception of sugar), organizations representing producers are weak, and therefore there is little pressure on the government to increase prices. When an elected parliamentary system has been in operation, as has been mostly the case since 1973, the members of Parliament have pressed actively for measures to help farmers in their districts. Significantly, they have seldom campaigned to eliminate export taxes, which would have benefited all farmers growing those crops. They usually have preferred to have government engage in price support operations because that is the best way for them to garner patronage money for their supporters.

Relatively more powerful than the farmers, as political pressure groups, are the exporters. Paradoxically, they are powerful precisely because most of the measures of the government occur at the point of export. Thus, before introducing trade measures, bureaucrats and ministers find it prudent to consult with exporters on various technical aspects of intervention. This gives individual exporters an entree into the policymaking process that

farmers cannot aspire to achieve. The entree is particularly valuable to exporters in that inside information allows them to reap large speculative profits from their trading.

Much of the debate surrounding price intervention has taken place at the time a particular intervention was implemented. Do the consequences of intervention then have any impact on the policies? Probably not.

The Thai government's actions have been driven mostly by a desire to influence prices directly, generally with an awareness that tampering with prices will affect farmers' willingness to produce for the market. The government was probably less sensitive to the incentive effect in the case of rice, but then, the actual elasticity of supply for rice is small. In any case, even if less rice were produced as a consequence of its extractive policies, the government would not be penalized in any way. In Thailand, in most years, the government generally has considered surplus rice production the greater nuisance, because it has had to make greater efforts to sell the rice in the world market.

For sugar, where the policies have generally been to boost rather than depress prices, the government is fully aware that Thailand is over-producing a commodity for which the world will pay only a low price. Yet, despite the sometimes severe problems involved in administering sugar policy, the government finds itself unable to resist popular pressure to continue its support of the industry.

If we take "liberalization" to mean action taken with the knowledge that trade distortions have become counterproductive and that correcting these distortions will improve economic welfare, then only the dismantling of the barriers to maize trade and the sharp reduction in rubber export duties in the early 1980s can be considered liberalization measures. The dismantling of

rice trade barriers that occurred at the same time cannot be considered a liberalization. Rather, it was a response to sharply deteriorating world market conditions and was in keeping with the government's traditional practice of stabilizing prices.

This brings us to a major problem in analyzing liberalization with respect to agricultural goods, as distinct from industrial goods (Bhagwati 1978; Krueger 1978). World agricultural markets are much more volatile than industrial markets, and agricultural prices gyrate in response. Consequently, not much learning takes place, because the experience of any given year is almost unique. Only when the average distortion becomes very large, as in the case of rubber in the early 1980s, has there been a movement toward correction.

Yet if we look at the attitude that the various governments have had toward the agricultural sector as a whole (rather than toward liberalization as such), then, clearly, the results of chapter 6 indicate a discernible change in attitudes. Transfers out of agriculture to the rest of the economy generally have declined (allowing for fluctuating world prices), not only through the reduction of trade barriers but also through the infusion of increasing government funds and the growth of subsectors such as the sugar industry. Here, quantitative results are in line with the prevailing political rhetoric, which increasingly has emphasized rural development. We would like to stress, however, that this shift in political attitudes is an autonomous event and is not a response to the effects of previous policies.

The beneficial effect of the increasing infusion of resources into agriculture was canceled, however, by the effect of lax fiscal policy, starting in the mid-1970s. The tax system in Thailand, which has proved difficult to reform, has caused government revenues to remain stuck at about

14 to 15 percent of GDP, whereas expenditure needs have been inching up toward 18 to 19 percent. Large public sector deficits became the norm in the late 1970s, with inevitable consequences for the balance of payments. This led to an increase in the overvaluation of the baht from 14 percent during the 1960s to about 25 percent in the 1980s. This overvaluation, of course, implied a transfer out of the agricultural sector.

There are many reasons for the profligate macroeconomic policies of the late 1970s and early 1980s. The first is the combination of the second oil price increase and the ready availability of petrodollars to finance postponement of needed adjustments. The second is that the sharp political conflicts of the mid-1970s led to a heavy increase in military expenditures, financed again by foreign loans. Finally, in the early 1980s, an erroneous decision was made to retain the tie of the baht to the dollar even though the latter was rapidly appreciating. Ready availability of foreign loans again made this exchange rate policy possible. It is highly probable that real wages (and urban incomes generally) were thereby kept at an unsustainably high level, although lack of adequate research on wage behavior means that this conclusion is far from definitive. The artificial sustenance of urban wages (if it took place) implied that the agricultural sector was again penalized.

It is also notable that there was no clear voice from within the agricultural sector on the macroeconomic policy moves of the late 1970s and early 1980s, not even in 1981 and 1984, when the baht devaluations should have established the link between macroeconomic policies and agricultural incomes in people's minds. The second devaluation, which appears to have been very successful in achieving its (mostly macroeconomic) objectives, however, took place against a backdrop of a very rapid decline in agricultural prices worldwide, so that the beneficial effect of the devaluation on agriculture was not readily apparent.

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APPENDIX 1

Appendix 1

ESTIMATING THE SUGAR OUTPUT EQUATION

The sugar output equation to be estimated is specified in chapter 5 as follows:

$$\ln Q = a_0 + a_1 \ln PG - (a_1 b_0 D + a_1 b_1 D \ln PMe + a_1 b_2 D \ln CAP + a_2 \ln CAP)$$

The final results indicate that the term  $D \ln CAP$  is insignificant, and we will therefore ignore it in the rest of the presentation. The presence of  $D$  in many of the terms gives rise to severe multicollinearity problems. We have adopted the principal components approach to overcome the multicollinearity. The estimation steps are as follows:

Step I: A principal component of the variables  $D$  and  $D \ln PMe$  was obtained as follows:

$$Z_1 = 0.999D + 0.999D.W \ln PMe$$

Observations: 1966-84

Recall the definition of  $W$  as equal to  $0.4L + 0.3L^2 + 0.3L^3$ , where  $L$  is the lag operator.

Step II: An estimate of the output equation using Z1 was obtained as follows:

$$\begin{aligned} \ln Q = & -0.6584 + 1.0887.W.\ln PC + 0.3240 Z1 + 0.5160.W.\ln \\ & (-0.1368) (1.6194) \quad (2.7012) \quad (4.4960) \\ & CAP + e1 \end{aligned} \tag{1}$$

$$\text{Adjusted } R^2 = 0.8898 \quad \text{D.W.} = 1.6441$$

Observations: 1965-84

where e1 is the error term.

Step III: Define:

$$\ln QZ1 = 0.3240 Z1 + e1 \tag{2}$$

and obtain the following estimate:

$$\begin{aligned} \ln QZ1 = & -0.5279 + 0.9529.D.W.\ln PMe - 6.9329.D + e2 \tag{3} \\ & (1.61) \quad (-1.46) \end{aligned}$$

$$\text{Adjusted } R^2 = 0.6508$$

Observations: 1965-84

With the exception of the constant term -0.5279, this is essentially the rent equation.

Step IV: Define:

$$\ln QZ3 = \ln Q - (\ln QZ1 - e2) \quad (4)$$

and obtain the following estimate:

$$\ln QZ3 = -0.9870 + 1.0934 \text{ W.ln PG} + 0.5420 \text{ W.ln CAP} + e3 \quad (5)$$

(1.85)                      (8.76)

$$\text{Adjusted } R^2 = 0.8185 \quad \text{DW} = 1.8983$$

Observations: 1965-84

Step V: From Equation 4, we have:

$$\ln Q = \ln QZ3 + \ln AZ1 - e2$$

Substituting the values of  $\ln QZ3$  and  $\ln QZ1$  from Equations 4 and 3 we obtain:

$$\ln Q = -1.5649 + 1.0934 \text{ W.ln PG} - 6.9329D - 0.9529 \text{ D.W.ln PMe} \\ + 0.5420 \text{ W.ln CAP}$$

**STATISTICAL APPENDIXES**

APPENDIX TABLE A.1

POPULATION AND ITS CHANGES  
1920-1979

Year	Population Level (mn.)	Period	Population Changes (per 1000)		
			Crude Birth Rate	Crude Death Rate	Natural Growth Rate
1920	9.21				
1929	11.50	1920-29	49.4	28.3	21.1
1939	14.46	1930-39	47.6	25.1	22.5
1947	17.44	1940-49	40.6	20.7	19.9
1960	26.26	1950-59	44.9	13.8	31.1
1970	34.40	1960-69	41.4	10.7	30.7
1980	44.82	1970-79	35.6	8.6	27.0

Source : U.N. Population of Thailand, Country Monograph Series No.3, 1976 and National Statistical Office, Survey of Population Change 1974-76. Cited in Pananiramai.

APPENDIX TABLE A.2

## DISTRIBUTION OF AREA AND POPULATION BY REGION 1960, 1970 AND 1980

Unit : Million

Region	Area (mn.hectars)	1960			1970			1980		
		Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Northeast	16.9	8.68 (33.1)	0.31 (1.2)	8.99 (34.2)	11.58 (33.7)	0.45 (1.3)	12.03 (35.0)	15.06 (33.6)	0.64 (1.4)	15.70 (35.0)
North	17.0	5.36 (20.4)	0.37 (1.4)	5.73 (21.8)	7.05 (20.5)	0.44 (1.3)	7.49 (21.8)	8.42 (18.8)	0.67 (1.5)	9.09 (20.3)
Central	10.4 <sup>a/</sup>	5.57 (21.2)	0.56 (2.1)	6.13 (23.3)	6.82 (19.8)	0.72 (2.1)	7.54 (21.9)	8.77 (19.6)	0.96 (2.1)	9.73 (21.7)
South	7.0	2.94 (11.2)	0.33 (1.3)	3.27 (12.5)	3.82 (11.1)	0.45 (1.3)	4.27 (12.4)	4.90 (10.9)	0.70 (1.6)	5.60 (12.5)
Bangkok	-	0.44 (1.7)	1.70 (6.5)	2.14 (8.1)	0.58 (1.7)	2.50 (7.3)	3.08 (9.0)	-	4.70 (10.5)	4.70 (10.5)
Whole Kingdom	51.3	22.99 (87.5)	3.27 (12.5)	26.26 (100.0)	29.85 (86.7)	4.56 (13.3)	34.41 (100.0)	37.15 (82.9)	7.67 (17.1)	44.82 (100.0)

Notes : Figures in parentheses are percentages of total population.

a/ Includes Bangkok.

Source : National Statistical Office, Population and Housing Census, 1960, 1970 and 1980.

APPENDIX TABLE A.3  
POPULATION AND EDUCATIONAL LEVEL

(Percent of population in the age group)

Age	MALES							FEMALES						
	No Education less than 4 years	Completed 4 years	Completed 5-9 years	Completed 10 years	Completed More than 10 years Education	Other Studies	No Education less than 4 years	Completed 4 years	Completed 5-9 years	Completed 10 years	Completed More than 10 years Education	Other Studies		
	1960							1960						
6-10	59.54	37.89	1.52	0.24	0.00	0.00	0.81	59.61	37.77	1.66	0.23	0.00	0.00	0.7
11-14	8.13	38.02	40.33	13.20	0.02	0.00	0.30	10.90	33.96	45.20	9.72	0.02	0.00	0.1
15-19	9.25	11.73	58.90	14.49	3.27	1.22	1.14	14.44	11.20	63.49	7.53	2.14	1.01	0.1
20-24	12.62	14.63	58.70	4.31	4.64	3.52	1.58	21.23	14.52	58.30	1.84	1.86	1.94	0.3
25-29	16.06	15.10	58.49	3.78	2.95	2.15	1.47	25.61	15.20	54.99	1.88	0.99	1.01	0.3
30-34	16.62	14.54	56.59	5.44	3.22	2.03	1.55	30.98	15.85	48.26	2.69	1.10	0.78	0.3
35-39	25.03	16.35	44.64	7.00	2.90	2.22	1.87	50.97	14.57	30.30	2.30	0.77	0.68	0.4
40-44	36.99	15.80	34.72	6.33	1.58	1.94	2.64	69.83	10.73	16.93	1.28	0.31	0.44	0.4
45 & over	60.10	12.59	19.72	3.14	0.68	0.99	2.77	90.62	3.43	4.83	0.47	0.11	0.12	0.4
15 & over	27.37	13.96	45.99	6.23	2.66	1.92	1.88	45.63	11.16	38.45	2.54	1.04	0.84	0.3
	1970							1970						
6-10	46.59	38.20	3.18	0.34	0.00	0.00	1.70	46.45	48.04	3.54	0.35	0.00	0.00	1.6
11-14	4.23	23.37	52.37	19.15	0.05	0.01	0.82	6.09	20.31	57.44	15.36	0.15	0.01	0.7
15-19	4.67	4.32	67.81	15.24	4.15	2.86	0.95	7.65	4.26	71.62	10.19	2.15	2.61	0.7
20-24	5.58	4.52	68.97	6.25	6.82	6.21	1.65	9.94	4.71	71.08	4.00	4.14	5.04	1.0
25-29	7.79	6.11	67.16	4.34	7.14	5.25	2.21	14.64	6.97	68.06	2.16	3.23	3.55	1.3
30-34	11.36	9.12	65.05	3.05	4.38	4.65	2.39	21.00	10.39	61.75	1.47	1.43	2.28	1.6
35-39	13.70	9.42	64.94	3.16	3.08	3.00	2.71	23.67	10.60	59.95	1.69	0.99	1.25	1.8
40-44	15.94	10.04	59.70	4.45	3.46	3.20	3.19	33.26	11.75	48.25	2.27	1.20	1.22	2.0
45 & over	43.38	11.29	31.57	4.21	1.55	2.01	5.99	75.58	5.94	13.98	0.93	0.37	0.47	2.7
15 & over	17.11	7.78	57.90	6.48	4.12	3.66	2.95	30.98	6.99	52.53	3.57	2.00	2.25	1.6
	1980							1980						
6-10	33.63	58.08	5.25	1.16	0.00	0.00	1.88	33.20	57.82	5.80	1.28	0.00	0.00	1.8
11-14	2.52	18.55	35.36	42.11	0.20	0.01	1.25	3.22	15.79	39.01	40.67	0.29	0.02	1.0
15-19	2.57	3.29	47.12	28.77	9.68	7.55	1.03	3.95	3.00	54.18	22.71	7.22	8.23	0.7
20-24	2.89	2.54	58.75	8.87	9.83	15.63	1.48	4.98	2.70	65.84	6.52	4.41	14.55	0.9
25-29	3.66	2.46	67.35	6.49	7.40	11.49	1.15	6.60	3.03	71.97	5.05	3.39	9.26	0.7
30-34	4.61	3.26	68.68	5.44	8.18	8.58	1.26	8.53	4.16	72.59	3.71	4.01	6.24	0.7
35-39	6.61	4.98	68.12	3.84	7.85	7.28	1.32	12.63	6.31	70.74	2.02	3.18	4.37	0.7
40-44	9.84	7.57	67.82	2.74	5.06	5.45	1.53	18.26	9.30	66.16	1.39	1.59	2.47	0.8
45 & over	27.49	8.45	52.00	3.69	3.01	3.02	2.32	48.92	8.05	38.37	1.36	0.80	0.99	1.4
15 & over	10.00	4.80	58.38	10.00	7.11	8.19	1.52	18.35	5.14	58.39	7.06	3.50	6.55	0.9

Source : National Statistical Office, 1960 Population Census.,  
1970 and 1980 Population and Housing Censuses.

APPENDIX TABLE A.4

GNP AND SHARE OF INVESTMENT AND TRADE  
(IN US\$ 1972 PRICES)

Year	Real GNP (million US\$)	a/ Real GNP per capita (US\$)	Share (%) in Current GNP of			
			b/ Investment	Saving	Import	Export
1960	3,422.18	129.69	15.69	15.56	18.90	17.52
1961	3,604.69	132.62	15.15	16.16	18.57	18.81
1962	3,897.23	139.21	18.43	17.57	19.14	17.02
1963	4,227.38	146.61	21.49	19.59	19.92	16.40
1964	4,475.72	150.70	20.09	19.49	20.36	18.82
1965	4,794.66	156.73	20.18	19.81	19.56	18.25
1966	5,393.89	171.19	23.59	24.19	19.44	19.08
1967	5,751.35	177.22	22.79	21.81	21.98	19.76
1968	6,223.99	186.20	24.31	21.64	22.58	18.49
1969	6,690.10	194.31	26.30	23.10	21.69	17.37
1970	7,219.26	198.49	26.10	22.28	21.49	16.65
1971	7,550.20	202.04	24.12	21.61	20.56	17.40
1972	7,889.51	205.61	20.50	19.85	20.60	19.40
1973	8,620.60	218.94	23.93	23.47	21.32	19.68
1974	9,133.01	226.17	24.78	24.19	25.03	22.27
1975	9,763.75	235.91	26.39	21.38	23.84	19.20
1976	10,574.07	249.28	24.25	20.77	23.61	21.18
1977	11,313.23	260.43	26.36	21.04	27.13	21.57
1978	12,343.00	277.65	27.33	22.39	25.80	21.74
1979	12,960.24	285.09	29.33	21.70	30.35	24.12
1980	13,664.97	294.15	27.70	21.07	30.43	24.94
1981	14,323.41	301.62	25.44	18.26	30.58	25.61
1982	14,843.79	306.12	21.69	19.01	25.83	25.72
1983	15,791.88	319.29	23.61	16.30	28.27	23.02
1984	16,654.69	330.48	23.82	18.95	27.47	25.18

Notes : (a) Population data used in the calculation of real GNP per capita were obtained from National Statistical Office, Office of the Prime Minister, Thailand (estimated figures for 1957 - 1969), and the Working Group on Population Projections of the Sub-Committee on Population Policy and Planning (estimated figures for 1970 - 1984).  
(b) Investment is the gross domestic investment defined as the summation of gross fixed capital formation and change in stocks. Saving refers to gross domestic saving.

Source : National Income of Thailand, NESDB, Thailand. (many volumes)

APPENDIX TABLE A.5  
RATES OF INFLATION : 1960-1984

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Percentage Rates of Change in

Year	Consumer Price Index	GDP deflator
1960	n.a.	2.54
1961	1.24	3.72
1962	2.46	0.05
1963	0.90	-1.54
1964	1.98	3.54
1965	0.87	5.47
1966	3.76	6.87
1967	3.99	0.30
1968	2.14	-0.30
1969	2.10	2.34
1970	0.77	-1.80
1971	2.04	1.55
1972	3.91	8.63
1973	11.78	20.20
1974	23.30	18.85
1975	4.07	2.78
1976	4.97	3.94
1977	8.40	8.58
1978	8.76	8.62
1979	10.26	11.60
1980	19.92	16.43
1981	13.41	7.99
1982	5.37	3.39
1983	3.38	3.21
1984	0.73	1.02
Average	5.86	5.64

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Sources : CPI : Business Economics Department,  
Ministry of Commerce.  
GDP deflator : National Accounts Division,  
National Economic and  
Social Development Board.

APPENDIX TABLE A.6  
 INDICES FOR FOOD PRODUCTION AND  
 RICE CONSUMPTION  
 (1974-76 =100)

Year	Indices for Food Production		Apparent Per capita Rice (a) Consumption (kg.)
	Total	Per capita	
1960	53.87	85.90	151.34
1961	57.35	88.38	163.27
1962	62.31	93.85	178.79
1963	66.76	97.56	177.04
1964	65.49	92.92	172.84
1965	66.76	91.99	174.87
1966	78.20	104.07	176.68
1967	68.03	88.27	236.92
1968	74.39	92.92	189.03
1969	80.75	97.56	200.97
1970	82.02	96.63	215.06
1971	86.47	97.56	202.13
1972	78.01	84.73	189.81
1973	94.10	99.42	186.51
1974	91.85	94.42	216.10
1975	102.21	102.22	197.38
1976	105.94	103.36	195.56
1977	104.63	99.67	167.39
1978	121.66	113.25	171.67
1979	114.05	103.79	185.86
1980	117.66	104.68	164.13
1981	128.22	111.57	177.54
1982	131.04	111.53	163.89
1983	132.66	110.47	154.94

Note : (a) Rice consumption is defined as domestic production, less export.

Source : 1 FAO Production Yearbook, FAO of the United Nations, 1967, 1973, 1983 (for indices for food production).  
 2 Faculty of Economics, Thammasat University. (for rice export and production, and adjusted by Agriculture and Rural Development Program, TDRI, for rice production in 1952 - 1969)

APPENDIX TABLE A.7  
CHANGES IN RICE RESERVE POLICY

Date	Rice Reserve Ratio		Grade of Rice Required	Reserve Rice Price
	Percentage	Exported grade		
19 Mar. 1962	15 %	Unknown	Unknown	Unknown
1 May. 1962	15 %	All Grade	Certain (to be announced) proportion of (a) 10% (b) 1st Grade Special	(a) 1,550 (b) 1,420
1 Jun. 1962	5 %	All Grade	5 % Broken	1,600
15 Oct. 1962	15 %	All Grade	Certain (unknown) proportion of (a) 5 % broken (b) 10 %	(a) 1,670 (b) 1,620
1 Jan. 1963			-----Reserve Requirement Abolished-----	
3 Aug. 1966	10 %	All Grade	Certain (unknown) proportion of (a) 5 % (b) 10 %	Unknown
12 Oct. 1966	15 %	All Grade	67 % of (a) 5 % broken Plus 33 % of (b) 10 % broken	(a) 2,000 (b) 1,950
1 Mar. 1967	10 %	All Grade	50 % (a) 5 % broken and/or (b) 10 % broken (5 % broken must greater than 30 %) 50 % (c) 60 % broken and/or (d) 100 % broken	(a) 2,000 (b) 1,950 (c) and (d) unknown.
1 May. 1967	10 %	All Grade	75 % of (a) 5 % broken 25 % of (b) 10 % broken	(a) 2,000 (b) 1,950
8 Mar. 1968	5 %	All Grade	Unknown	Unknown
1 Jun. 1968			-----Reserve Requirement Abolished-----	
18 Aug. 1972	5 %	All Grade	25 % Broken	1,803.30
21 Aug. 1972	15 %	All Grade	25 % Broken	1,803.30
18 Sep. 1972	0 %	-	-	-
10 Nov. 1972	10 %	All Grade	5 % Broken	1,800
19 Jan. 1973	10 %	All Grade	90 % of (a) 5 % Broken plus 10 % of (b) 10 % Broken	(a) 1,900 (b) 1,750
5 Mar. 1973	25 %	All Grade	40 % of (a) 5 % Broken 60 % of (b) 10 % Broken	(a) 2,000 (b) 1,900

APPENDIX TABLE A.7  
CHANGES IN RICE RESERVE POLICY

Date	Rice Reserve Ratio		Grade of Rice Required	Reserve Rice Price
	Percentage	Exported grade		
1 Apr. 1973	50 %	All Grade	Optional combination of (a) 5 % broken or (b) 10 % broken	(a) 2,000 (b) 1,900
1 June 1973	100 %	All Grade	Optional combination of (a) 5 % broken or (b) 10 % broken	(a) 2,000 (b) 1,900
3 Aug. 1973	200 %	All Grade	35 % of (a) 5 % broken 35 % of (b) 10 % broken 30 % of (c) 15 % broken	(a) 2,000 (b) 1,900 (c) 1,800
14 Sep. 1973	200 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 2,000 (b) 1,900
4 Oct. 1973	200 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken (except 100 % reserve 100 %)	(a) 2,000 (b) 1,900
6 Dec. 1973	100 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 2,000 (b) 1,900
31 Jan. 1974	50 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 2,000 (b) 1,900
30 Oct. 1974	50 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 2,500 (b) 2,400
25 Dec. 1974	100 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 2,750 (b) 2,650
7 Nov. 1975	50 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 2,750 (b) 2,650
4 Dec. 1975	50 %	All Grade	Optimal combination of (a) 5 % broken or (b) 10 % broken	(a) 3,150 (b) 3,050
2 Jan. 1976	-----Reserve Requirement Abolished-----			
13 Oct. 1976	(1) 30 %	(1) 100 % and 5 % broken	40 % of (a) 5 % Broken 60 % of (b) 15 % Broken	(a) 3,800 (b) 3,000
	(2) 15 %	(2) Other grades, cargo, parboiled and A1 special broken rice		
	(3) 10 %	(3) All other broken rice and glutinous rice		
30 Mar. 1977	(1) 20 %	Unchanged	All exported rice reserved in 15 % Broken	3,000

APPENDIX TABLE A.7  
CHANGES IN RICE RESERVE POLICY

Date	Rice Reserve Ratio		Grade of Rice Required	Reserve Rice Price
	Percentage	Exported grade		
	(2) 10 % (3) 5 %			
21 Jul. 1977	(1) 40 % (2) 20 % (3) 10 %	Unchanged	All exported rice reserved in 15 % Broken	3,000
19 Nov. 1977	(1) 50 % (2) 30 % (3) 20 % (4) 20 %	(1) 100 %, 5 % broken parboiled and A1 extra special broken rice (2) Other grades and glutinous rice (3) Cargo rice (4) All other broken	All exported rice reserved in 15 % Broken	3,000
1 Feb. 1978	(1) 100 % (2) 100 % (3) 100 % (4) 50 %	Unchanged	Reserved in (a) 100 % and/or (b) 5 % broken and/or (c) 15 % broken and/or (d) glutinous rice 10 % long grain	(a) 3,470 (b) 3,170 (c) 3,000 (d) 3,920
17 Aug. 1978	(1) 100 % (2) 50 % (3) 50 % (4) 0 %	Unchanged	Reserved in (a) 100 % and/or (b) 5 % broken and/or (c) 15 % broken and/or (d) glutinous rice 10 % long grain The proportion is assigned by DFT	(a) 3,470 (b) 3,170 (c) 3,000 (d) 3,920
1 Nov. 1978	50 %	All kinds of rice and A1 extra special broken	Reserved in (a) 100 % and/or (b) 5 % broken and/or (c) 15 % broken and/or (d) glutinous rice 10 % long grain The proportion is assigned by DFT	(a) 3,470 (b) 3,170 (c) 3,000 (d) 3,920
28 Feb. 1979	50 %	All kinds of rice and A1 extra special broken	60 % of (a) 100 % 40 % of (b) glutinous rice 10 % long grain	(a) 3,470 (b) 3,230
27 Apr. 1979	50 %	All kinds of rice and A1 extra special broken	Reserve in 25 % Broken	2,900
6 Jun. 1979	50 %	All kinds of rice and A1 extra special broken	Reserve in 15 % Broken	3,000
11 Jun. 1979	50 %	All kinds of rice and A1 extra special broken	Reserve in 25 % Broken	2,900
17 Jul. 1979	50 %	All kinds of rice and A1 extra special broken	Reserve in 15 % Broken	3,000

APPENDIX TABLE A.7  
CHANGES IN RICE RESERVE POLICY

Date	Rice Reserve Ratio		Grade of Rice Required	Reserve Rice Price
	Percentage	Exported grade		
22 Feb. 1979	50 %	All kinds of rice and A1 extra special broken	60 % of (a) 100 % 40 % of (b) O-cha rice *	(a) 3,300 (b) 3,000
15 Feb. 1980	50 %	All kinds of rice and A1 extra special broken	Reserved in O-cha rice	3,000
17 May 1980	50 %	All kinds of rice and A1 extra special broken	Reserved in O-cha rice	2,700
9 Jul. 1980	50 %	All kinds of rice and A1 extra special broken	Reserved in O-cha rice	2,950
15 Oct. 1980	(1) 60 %	(1) All kinds of rice and A1 extra special	Reserved in O-cha rice	3,150 (delivered before 30 Jun. 1981)
	(2) 10 %	(2) All other broken		3,050 (delivered (1 Jul.-30 Nov. 1981))
28 Oct. 1981	===== Reserved in terms of money=====			
	(see Table A.8)			
12 May. 1982	-----Rice Reserve Abolished-----			

Note : \* O-cha rice is mixed from 20 % of 15 % broken rice  
and 80 % of glutinous rice 10 % long grain

APPENDIX TABLE A.8

RICE RESERVE FOR DOMESTIC CONSUMPTION COLLECTED IN MONEY  
(OCT 28, 1981 - MAY 12, 1982)

Grade of Rice to be exported	28 Oct. 81	7 Dec. 81	7 Jan. 82	2 Feb. 82	12 May 82
1. Rice 100% and 5%	2,000.0	1,000.0	750.0	350.0	-
2. Rice 10% - 20%	1,750.0	875.0	427.5	215.0	-
3. Parboiled rice - 20%	2,000.0	875.0	437.5	215.0	-
4. Cargo 100% - 20%	1,750.0	875.0	437.5	215.0	-
5. Glutinous Rice 10% - 20%	1,750.0	875.0	437.5	215.0	-
6. Broken A1 extra Special	1,750.0	875.0	437.5	215.0	-
7. All Broken A1 (except extra special)	650.0	325.0	-	-	-
8. Other Broken	300.0	150.0	-	-	-

Source : Department of Foreign Trade, Ministry of Commerce.

APPENDIX TABLE A.9

CHRONOLOGY OF RUBBER EXPORT DUTY AND CESS CHANGES

(a) Duty

Various rates ranging from 5 to 20 per cent

Rate Change Announced in November 1967

<u>Smoked Sheets</u>	Duty Rates
If assessed price is less than 5.90 baht/kg.	1 per cent
If assessed price is higher than 5.90 baht/kg.	40 per cent on the excess over 5.90 baht
<u>Crepes</u>	
If assessed price is less than 5.06 baht/kg.	1 per cent
If assessed price is higher than 5.06 baht/kg.	40 per cent on the excess over 4.92 baht
<u>Concentrated Latex</u>	
If assessed price is less than 3.57 baht/kg.	1 per cent
If assessed price is higher than 3.57 baht/kg.	40 per cent of the excess over 3.20 baht
<u>Fresh Latex</u>	
If assessed price is less than 2.08 baht/kg.	1 per cent
If assessed price is higher than 2.08 baht/kg.	40 per cent on the excess over 1.86 baht
<u>Others</u>	
If assessed price is less than 3.57 baht/kg.	1 per cent
If assessed price is higher than 3.57 baht/kg.	40 per cent on the excess over 3.48 baht

Rate Change Announced in June 1970

<u>Smoked Sheets (Change)</u>	
If assessed price is less than 5.95 baht/kg.	1 per cent
If assessed price is higher than 5.95 baht/kg.	40 per cent on the excess over 5.80 baht
<u>Block Rubber (newly introduced)</u>	
If assessed price is less than 6.30 baht/kg.	1 per cent
If assessed price is higher than 6.33 baht/kg.	40 per cent on the excess over 6.33 baht

All other rates remain unchanged.

Rate Change Announced in July 1981

Duty reduced from base as calculated before by flat amounts per kg. as follows:

Smoked sheets	2.00	baht/kg.
Block rubber	1.80	baht/kg.
Crepes	1.70	baht/kg.
Others	1.20	baht/kg.

Rate Change Announced in October 1984

Duty further reduced by flat amounts per kg. as follows:

Smoked sheets	0.80	baht/kg.
Block rubber	1.40	baht/kg.
Crepes	0.30	baht/kg.
Fresh latex	0.15	baht/kg.
Concentrated latex	0.26	baht/kg.
Others	0.53	baht/kg.

Rate Change announced in April 1985

Duty further reduced by flat amounts per kg. as follows:

Smoked sheets	0.50	baht/kg.
Block rubber	0.85	baht/kg.
Crepes	1.00	baht/kg.
Fresh latex	1.02	baht/kg.
Concentrated latex	1.74	baht/kg.
Others	0.03	baht/kg.

(b) Cess

Introduced since August 1960

If assessed price is less than 10 baht/kg., the cess is 0.50 baht  
 If assessed price is more than 10 baht/kg., the cess is 0.50 baht/kg.  
 plus 1% of the excess over 10 baht/kg.

## APPENDIX TABLE A.10

## PRICE ELASTICITIES OF DEMAND FOR IMPORTS

Group	Elasticity	Source
1. Food	-0.4390	Sathaporn Chinajitr (1975)
2. Beverages and tobacco	-2.8090	Sathaporn Chinajitr (1975)
3. Crude material	-1.0000	Not available, assumed to be -1
4. Mineral fuel and lubricants	-0.4396	Virabongsa Ramangkura (1974)*
5. Animal, vegetable oil and fat	-4.0000	SIAM 2 Model, NESDB.
6. Chemicals	-0.5866	Sathaporn Chinajitr (1975)
7. Manufactured goods	-1.2014	Sathaporn Chinajitr (1975)
8. Machinery and transports	-1.2363	Sathaporn Chinajitr (1975)
9. Miscellaneous manufactured goods	-1.6315	Sathaporn Chinajitr (1975)
10. Miscellaneous transaction and commodities	-1.0000	Not available, assumed to be -1

Note: \* The figure is cited in Narongchai Akrasanee and colleagues. " The Structure of Differential Incentives and Effects on Industrialization and Employment: A Case Study of Thailand." Faculty of Economics, Thammasat University, 1975.

APPENDIX TABLE A.11

## IMPLICIT TAX RATES OF VARIOUS CATEGORIES OF IMPORTS

Year	(Percent)									
	Food	Beverage and tobacco	Crude materials	Mineral fuel and lubricant	Animal, vegetable oil and fat	Chemicals	Manufactured goods	Machinery and transports	Miscellaneous manufactured goods	Miscellaneous transaction and commodities
1960	27.30	112.00	4.20	49.63	-	17.60	14.10	18.50	22.60	2.00
1961	31.60	71.10	3.90	51.05	-	19.00	14.00	21.20	24.60	3.80
1962	31.40	77.60	9.30	49.91	22.20	20.50	17.20	16.20	22.40	4.20
1963	28.70	77.80	8.90	47.27	22.20	19.40	18.40	16.30	21.70	5.60
1964	28.50	76.50	8.90	46.27	22.90	18.50	18.20	16.00	22.40	4.70
1965	27.90	82.30	7.30	65.10	21.20	18.40	16.90	16.60	25.10	3.50
1966	31.20	80.40	7.10	47.90	23.10	17.40	18.40	17.80	23.70	4.80
1967	31.50	81.20	8.20	72.56	24.30	17.20	18.60	17.30	22.80	4.00
1968	32.30	70.80	8.20	69.21	23.70	17.30	21.50	17.90	25.00	5.40
1969	28.00	65.10	8.70	84.23	28.80	17.80	23.90	18.00	21.40	4.80
1970	36.00	77.20	7.60	71.00	25.70	17.30	21.90	17.00	26.10	4.90
1971	36.50	82.90	6.70	61.19	23.10	18.10	20.60	18.80	22.00	6.40
1972	31.10	64.90	6.10	55.50	32.60	17.10	17.90	19.10	17.20	5.60
1973	27.30	62.90	5.10	43.15	31.30	18.40	14.80	19.20	20.50	17.50
1974	18.96	57.65	3.57	24.96	25.39	14.50	10.92	18.78	24.99	17.18
1975	22.63	52.96	1.85	17.89	21.61	14.95	15.01	24.14	19.89	22.49
1976	23.35	57.86	1.83	17.40	14.72	15.41	14.82	27.34	17.72	3.80
1977	24.22	58.58	1.65	17.10	12.85	16.70	14.30	29.46	15.56	2.49
1978	20.14	54.58	2.36	20.82	15.65	17.30	16.61	27.73	18.37	2.01
1979	16.93	51.84	3.13	24.17	11.18	16.83	11.64	22.66	9.38	2.08
1980	12.14	51.06	3.37	21.10	5.92	117.99	12.06	14.92	9.24	1.17
1981	15.96	43.40	2.14	18.99	10.39	15.77	10.81	14.54	11.03	2.50
1982	17.40	49.59	3.94	20.10	17.88	16.03	11.97	15.19	12.00	2.38
1983	19.61	44.43	4.54	22.90	19.75	17.42	12.78	17.04	12.51	4.11
1984	16.05	52.03	4.27	25.82	13.67	17.11	12.34	16.64	11.37	2.73

Sources : 1. Sathaporn Chinajit (1975) for 1960 - 1974.  
 2. For 1975 - 1984, the tax rates were obtained from the data of the Government Revenues Report, Budget Bureau, Office of the Prime Minister, which are classified into commodity groups according to the codes of the Bank of Thailand.

APPENDIX TABLE A.12  
ADJUSTMENTS OF VALUE ADDED DEFLATORS  
FOR NON-AGRICULTURE (PNA)

Year	Unadjusted							Adjusted (1)			Adjusted (2)		
	Total Non-Ag.	Manufacturing		Mining		Non-Tradable		Total Non-Ag.	Manufacturing	Mining	Total Non-Ag.	Manufacturing	Mining
	(1)	Weight (2)	Value (3)	Weight (4)	Value (5)	Weight (6)	Value (7)	(8)	(9)	(10)	(11)	(12)	(13)
1962	82.32	0.21	89.04	0.02	67.40	0.77	80.95	81.42	81.69	94.69	81.89	83.68	97.01
1963	82.71	0.21	87.86	0.02	68.76	0.77	81.72	81.58	79.56	95.44	82.60	83.89	100.63
1964	86.03	0.21	87.59	0.02	91.26	0.77	85.45	84.85	78.51	120.51	85.16	79.82	122.52
1965	86.85	0.21	88.22	0.03	102.49	0.76	85.90	85.83	79.14	136.67	86.05	79.99	138.14
1966	91.61	0.21	92.40	0.03	95.94	0.76	91.22	90.93	84.40	131.74	91.31	85.85	133.99
1967	92.61	0.21	99.20	0.03	93.41	0.76	90.75	91.19	88.58	122.65	91.76	90.84	125.79
1968	93.58	0.21	99.27	0.03	87.66	0.76	92.24	92.30	89.17	116.54	93.81	95.24	124.47
1969	95.69	0.22	99.89	0.03	97.68	0.75	94.39	94.82	91.85	129.67	96.91	99.95	141.10
1970	95.88	0.23	93.54	0.03	107.98	0.75	96.19	95.23	86.94	142.46	97.80	96.43	158.01
1971	97.44	0.24	98.83	0.03	103.75	0.74	96.76	94.35	81.79	138.91	96.02	87.71	148.97
1972	100.00	0.24	100.00	0.03	100.00	0.73	100.00	96.00	80.07	133.35	96.42	81.54	135.79
1973	115.66	0.25	112.98	0.02	106.49	0.72	116.87	110.20	88.64	140.27	110.53	89.78	142.08
1974	140.34	0.26	143.47	0.02	155.24	0.72	138.76	137.96	130.74	197.07	138.58	132.85	200.26
1975	144.77	0.26	146.55	0.02	163.46	0.72	143.68	145.24	145.09	211.77	149.94	161.53	235.75
1976	149.99	0.27	148.19	0.02	178.05	0.71	149.95	151.39	149.01	240.92	154.59	159.52	257.91
1977	164.36	0.28	155.35	0.02	230.83	0.70	166.02	167.02	157.53	330.55	174.20	179.75	377.18
1978	180.75	0.28	169.63	0.02	258.53	0.70	182.75	182.92	167.80	381.71	189.65	188.34	428.44
1979	199.11	0.28	189.73	0.02	278.39	0.70	200.39	201.65	187.46	422.67	212.49	220.20	496.49
1980	232.24	0.28	221.98	0.02	303.20	0.70	234.06	224.93	182.87	462.71	233.43	208.59	527.79
1981	256.15	0.28	245.42	0.02	289.27	0.70	259.42	247.70	205.50	419.16	258.32	239.08	487.65
1982	267.74	0.27	244.60	0.02	334.17	0.71	275.02	265.70	229.05	457.06	270.60	244.85	488.59
1983	275.27	0.28	243.87	0.02	373.36	0.71	285.20	272.42	226.68	485.91	284.68	265.94	570.07
1984	286.78	0.28	255.31	0.02	393.19	0.70	296.23	282.92	233.52	504.83	291.63	260.83	563.86

Sources : 1. Columns (1) - (7) National Account Division, National Economic and Social Development Board.  
2. Columns (2), (4) and (6) are the sector shares in constant price GDP for the year.  
3. Columns (9), (10), (12) and (13) are adjusted by the process described in Section 4.3.  
4. Column (8) = [column (9) \* column (2)] + [column (10) \* column (4)] + [column (6) \* column (7)].  
5. Column (11) = [column (12) \* column (2)] + [column (13) \* column (4)] + [column (6) \* column (7)].

APPENDIX TABLE A.13

PRODUCTION, EXPORT AND CONSUMPTION  
OF AGRICULTURAL PRODUCTS

(thousand tons)

Year	RICE			MAIZE			SUGAR			RUBBER		
	Production	Export	Consumption									
1960	7,873	1,822	6,051	544	519	25	429	6	423	171	170	1
1961	9,111	2,388	6,724	598	595	3	463	2	461	186	185	2
1962	9,510	1,926	7,584	728	722	6	343	43	300	195	194	1
1963	9,883	2,148	7,735	932	923	10	271	53	218	198	187	12
1964	10,651	2,873	7,778	912	896	16	407	49	358	211	217	-6
1965	10,977	2,872	8,105	1,160	1,132	27	436	84	353	217	211	7
1966	10,719	2,284	8,435	1,226	1,180	46	385	55	330	218	202	16
1967	13,895	2,246	11,649	1,299	1,222	76	329	15	314	219	211	8
1968	11,192	1,618	9,574	1,417	1,289	128	205	0.05	205	258	252	6
1969	12,034	1,550	10,484	1,714	1,503	211	378	16	362	282	276	5
1970	13,463	1,612	11,851	1,938	1,677	261	439	56	383	287	277	10
1971	13,856	2,411	11,445	2,300	2,099	201	566	175	392	316	308	8
1972	14,236	3,201	11,035	1,315	1,062	253	510	408	102	337	325	12
1973	12,413	1,286	11,127	2,339	2,191	148	818	275	543	368	390	-23
1974	14,761	1,539	13,222	2,500	1,969	531	1,087	444	643	382	363	19
1975	13,819	1,441	12,377	2,863	2,342	521	1,154	595	558	349	332	17
1976	15,559	2,990	12,569	2,675	2,142	533	1,643	1,124	519	393	373	20
1977	15,482	4,464	11,018	1,677	1,309	367	2,244	1,653	591	431	399	32
1978	13,997	2,434	11,563	2,791	2,173	617	1,629	1,040	589	467	442	25
1979	17,040	4,238	12,802	2,863	2,142	721	1,768	1,190	578	534	521	14
1980	15,791	4,238	11,552	2,998	2,141	857	1,103	452	651	465	453	12
1981	17,368	4,594	12,774	3,449	3,210	238	1,707	1,119	589	508	473	35
1982	17,774	5,734	12,041	3,002	2,158	845	2,597	2,206	391	576	545	31
1983	16,879	5,267	11,611	3,552	2,873	679	2,099	1,537	562	594	557	37
1984	19,549	6,998	12,551	4,226	3,063	1,162	2,053	1,242	811	617	592	25

Sources : Production from the Office of Agricultural Economics, Ministry of Agriculture & Cooperatives  
Export from the Department of Customs, Ministry of Finance.  
Consumption is the domestic disappearance, namely production minus exports.

APPENDIX TABLE A.14

ESTIMATES OF ELASTICITIES OF PRODUCTION  
WITH RESPECT TO PRICE FOR RICE, MAIZE, RUBBER AND SUGAR

Line	Crop	Source	Year of Study	Value of elasticity		Concept of Price	Period	Dependent Variable
				Short run	Long run			
1	Rice	Arromdee	1968	0.4800	-	(1)	1951-1965	Rice Production
2	Rice	Chaiwat Konjing	1970	0.4530	-	(2)	1952-1966	Paddy Production
3	Rice	Ramangkura	1972	0.2600	-	-	1953-1969	Production
4	Rice	Ganjarerndee	1975	0.1744	0.2067	(3)	1960-1972	Paddy Production
5	Rice	Wong	1978	0.4065	0.9110	(4)	1951-1972	Rice Production
6	Rice	Wattanuchariya	1978	0.1880	-	(5)	1951-1975	Paddy Production
7	Rice	Wattanuchariya	1978	0.2628	-	(5)	1951-1975	Planted Area & Yield
8	Rice	Khaisri Konjing	1979 a	0.6400	2.6700	(6)	1956-1976	Rice Production
9	Rice	Khaisri Konjing	1979 b	0.4500	1.5100	(6)	1957-1976	Rice Production
10	Rice	Setboonsarng and Evenson	1983	0.0180	-	-	1966-1979	Paddy Production
11	Rice	Lokaphadhana	1981	0.1804	0.6478	(7)	1959-1979	Rice Production
12	Rice	Trairatvorakul	1984	0.3700	0.6500	(20)	1957-1979	Paddy Production
13	Rice	Behrman	1968	0.4000	1.0200	-	1947-1962	Market Surplus
14	Rice	Ooraikul	1976	0.598-2.681	-	-	-	Market Surplus
15	Rice	Behrman	1968	0.1800	0.3100	(8)	1940-1963	Planted Area
16	Rice	Arromdee	1968	0.190-0.390	0.20-0.30	(1)	1951-1965	Planted Area
17	Rice	Ramangkura	1972	0.1700	-	(9)	1953-1969	Planted Area
18	Rice	Ramangkura	1976	0.1009	-	(9)	1953-1969	Planted Area
19	Rice	Chaipravat	1975	0.0700	-	(10)	1951-1971	Planted Area
20	Rice	Prakongtanapan	1976	0.1700	0.7100	(11)	1951-1973	Planted Area
21	Rice	Prakongtanapan	1976	0.2000	0.3100	(11)	1951-1964	Planted Area
22	Rice	Prakongtanapan	1976	0.1000	0.1300	(11)	1965-1973	Planted Area
23	Rice	Wattanuchariya	1978	0.2111	-	(5)	1951-1975	Planted Area
24	Rice	Kanivichaporn	1979	0.0924	0.0924	(12)	1952-1975	Planted Area
25	Rice	Suwanphitoon	1982	0.1342	0.9866	(13)	1967-1980	Planted Area
26	Rice	Pongsrihadulchai	1981	0.1000	-	-	1969-1977	Planted Area
27	Rice (9 provinces)	Teera Ashakul	1983	0.3600	0.5500	(16)	1967-1981	Planted Area
28	Rice (wet season)	Jaruma Ashakul	1985	0.1400	0.6400	(15)	1967-1982	Planted Area
29	Rice (dry season)	Jaruma Ashakul	1985	2.3300	1.4200	(15)	1972-1983	Planted Area
30	Rice	Dowing and Krongkaew	1983	0.0900	0.5100	(8)	1964-1975	Planted Area
31	Rice (wet season)	Trairatvorakul	1984	0.2870	0.5700	(21)	1957-1979	Planted Area
32	Rice	Loohawenchit	1978	0.3600	-	-	1955-1972	Planted Area
33	Rice (wet season)	Trairatvorakul	1984	0.0410	-	(22)	1957-1979	Yield
34	Rice (dry season)	Trairatvorakul	1984	0.5890	-	(22)	1957-1979	Yield
35	Maize	Ganjarerndee	1975	2.5722	14.0100	-	1960-1972	Production
36	Maize	Lokaphadhana	1981	0.2200	1.1900	(7)	1954-1979	Production
37	Maize	Setboonsarng and Evenson	1983	0.2873	-	-	1966-1979	Production
38	Maize(8 provinces)	Behrman	1968	2.0600	4.5800	-	1949-1963	Planted Area
39	Maize	Dasri	1972	0.5200	-	-	1950-1970	Planted Area
40	Maize	Loohawenchit	1977	8.4000	-	(17)	1958-1972	Planted Area
41	Maize(8 provinces)	Teera Ashakul	1983	0.2300	0.2500	(16)	1967-1981	Planted Area
42	Maize	Jaruma Ashakul	1985	-0.2100	-0.2300	(15)	1967-1982	Planted Area
43	Maize	Pongsrihadulchai	1981	0.3200	-	-	1969-1977	Planted Area
44	Maize(14 provinces)	Dowling and Krongkaew	1983	0.5239	-	-	1963-1977	Planted Area

APPENDIX TABLE A.14

ESTIMATES OF ELASTICITIES OF PRODUCTION  
WITH RESPECT TO PRICE FOR RICE, MAIZE, RUBBER AND SUGAR

Line	Crop	Source	Year of Study	Value of elasticity		Concept of Price	Period	Dependent Variable
				Short run	Long run			
45	Rubber	Stifel	1972	0.7709			1926-1937	Production
46	Rubber	Stifel	1972	0.1500			1950-1968	Production
47	Rubber	Ganjarerndee	1975	0.0711			1960-1972	Production
48	Rubber	Dowling	1979	0.092-0.265	( 1 Year)	(18)	1915-1975	Production
49	Rubber	Dowling	1979	0.639-1.917	( 5 Year)	(18)	1915-1975	Production
50	Rubber	Dowling	1979	1.205-2.641	(12-15 Year)	(18)	1915-1975	Production
51	Rubber	Lokaphadhana	1981	0.3289	0.4939	(7)	1965-1979	Production
52	Sugarcane	Dowling and Jessadachatr	1978	0.620-1.010	2.0-5.0		1956-1976	Production
53	Sugarcane	Dowling and Jessadachatr	1978	0.570-1.960			1956-1976	Change in Planted Area
54	Sugarcane	Pongrihadulchai	1981	1.7600	-		1969-1977	Planted Area
55	Sugar	Lokaphadhana	1981	0.9600	1.8200	(19)	1960-1979	Production

## Concepts of Price

- (1) Paddy Price deflated by retail price index.
- (2) Bangkok wholesale price of paddy (1st grade) deflated by wholesale price index.
- (3) Expected domestic price of rice.
- (4) Wholesale price of rice.
- (5) Paddy price.
- (6) Wholesale price of rice, 5%.
- (7) Bangkok wholesale price of rice (maize, rubber smoked sheet No.3) deflated by the wholesale price index (1968=100)
- (8) Bangkok wholesale price of paddy deflated by retail price index of low-income people in Bangkok area
- (9) Price index of rice deflated by GNP deflator (1962 = 1.00).
- (10) Expected price of paddy (until July).
- (11) Relative price index between the average (December-April) Bangkok wholesale price of paddy (2 nd grade) and price of other crops excluding rice.
- (12) Bangkok wholesale price of rice 5% deflated by the wholesale price index.
- (13) Farmgate price deflated by the consumer price index.
- (15) Farmgate price deflated by the index of farmgate price of alternative crops.
- (16) Farmgate price deflated by the price of alternative crops weighted by the area currently planted in each alternative crop.
- (17) Domestic price of maize deflated by the Price index of non-rice.
- (18) Relative price of rubber and rice.
- (19) Retail price of sugar deflated by the consumer price index (Oct. 1964-Sept. 1965 = 100).
- (20) The expected price of paddy after the harvest season.
- (21) Lagged price of paddy deflated by the wholesale price index or the index of non-rice crops.
- (22) The lagged average price of paddy deflated by the fertilizer price index.

APPENDIX TABLE A.15

ESTIMATES OF ELASTICITIES OF CONSUMPTION WITH  
RESPECT TO PRICE AND INCOME FOR RICE, MAIZE, AND SUGAR

Line	Crop and Income Class	Source	Year of Study	Value of elasticity		Concept of Price	Period
				Price	Income		
1	Rice	Lokaphadhana	1981	-0.1234	0	(1)	1959-1979
	a/						
2	Rice NG. Bottom 25%	Trairatvorakul	1984	-0.7360	0.4010		1975/76
3	Rice NG. Middle 50%	Trairatvorakul	1984	-0.7140	0.0840		1975/76
4	Rice NG. Top 25%	Trairatvorakul	1984	0	0		1975/76
5	Rice NG. Total	Trairatvorakul	1984	-0.6360	0.1260		1975/76
	b/						
6	Rice G. Bottom 25%	Trairatvorakul	1984	0	0.5920		1975/76
7	Rice G. Middle 50%	Trairatvorakul	1984	-0.5780	0.2760		1975/76
8	Rice G. Top 25%	Trairatvorakul	1984	0	-		1975/76
9	Rice G. Total	Trairatvorakul	1984	-0.4310	0.2860		1975/76
10	Sugar	Lokaphadhana	1981	-0.8673	-	(2)	1960-1979
11	Sugar	Thanavibulchai	1973	-0.9500	-		
12	Maize	Setboonsarng, et al. and Amaranand.	1986	-0.5471	-		1982

a/ Nonglutinous

b/Glutinous

## Note :

- (1) Bangkok wholesale price of rice (maize, rubber smoked sheet No.3) deflated by the wholesale price index (1968=100).
- (2) Retail price of sugar deflated by the consumer price index (Oct 1964-Sept 1965 = 100).

APPENDIX TABLE A.16

## SHORT-RUN EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF RICE

(Unit : Tons)

Year	Actual Production (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Production without Intervention (2)	Proportionate Difference (3)	Production without Intervention (4)	Proportionate Difference (5)	Production without Intervention (6)	Proportionate Difference (7)
1960	7,873,140	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	9,111,499	10,660,008	-0.1453	n.a.	n.a.	n.a.	n.a.
1962	9,509,565	11,102,273	-0.1435	n.a.	n.a.	n.a.	n.a.
1963	9,882,705	11,194,271	-0.1172	11,589,120	-0.1472	11,693,203	-0.1548
1964	10,650,699	12,234,050	-0.1294	12,588,974	-0.1540	12,831,009	-0.1699
1965	10,976,792	12,913,538	-0.1500	13,226,833	-0.1701	13,303,530	-0.1749
1966	10,718,698	12,475,483	-0.1408	12,837,463	-0.1650	12,884,091	-0.1681
1967	13,895,361	15,375,099	-0.0962	15,892,114	-0.1256	15,981,338	-0.1305
1968	11,192,024	12,483,899	-0.1035	12,818,640	-0.1269	12,922,632	-0.1339
1969	12,033,958	13,792,266	-0.1275	14,226,141	-0.1541	14,519,271	-0.1712
1970	13,462,690	14,724,129	-0.0857	15,283,124	-0.1191	15,675,579	-0.1412
1971	13,856,000	14,802,683	-0.0640	15,329,523	-0.0961	15,797,138	-0.1229
1972	14,236,196	15,478,515	-0.0803	16,111,142	-0.1164	16,429,645	-0.1335
1973	12,412,674	13,504,467	-0.0808	13,958,699	-0.1108	14,027,386	-0.1151
1974	14,760,521	16,889,692	-0.1261	17,283,642	-0.1460	17,341,112	-0.1488
1975	13,818,788	16,237,847	-0.1490	16,362,891	-0.1555	16,428,701	-0.1589
1976	15,558,872	17,053,383	-0.0876	17,328,593	-0.1021	17,780,646	-0.1250
1977	15,482,101	16,105,085	-0.0387	16,456,223	-0.0592	16,716,178	-0.0738
1978	13,997,331	14,783,211	-0.0532	15,162,827	-0.0769	15,609,500	-0.1033
1979	17,039,587	18,455,741	-0.0767	18,868,644	-0.0969	19,331,851	-0.1186
1980	15,790,538	16,677,758	-0.0532	17,019,820	-0.0722	17,576,698	-0.1016
1981	17,368,094	18,494,002	-0.0609	18,763,214	-0.0744	19,265,139	-0.0985
1982	17,774,323	18,907,075	-0.0599	19,207,973	-0.0746	19,800,467	-0.1023
1983	16,878,516	17,312,765	-0.0251	17,671,097	-0.0449	17,909,225	-0.0576
1984	19,548,943	19,892,158	-0.0173	20,341,054	-0.0389	21,003,149	-0.0692

Sources : Output in tons of "paddy" from Table A.13  
See text for sources and methods of calculation for other figures.

APPENDIX TABLE A.17

## SHORT-RUN EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF MAIZE

(Unit : Tons)

Year	Actual Production (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Production without Intervention (2)	Proportionate Difference (3)	Production without Intervention (4)	Proportionate Difference (5)	Production without Intervention (6)	Proportionate Difference (7)
1960/61	543,900	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961/62	598,276	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962/63	727,892	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963/64	932,328	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964/65	912,385	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965/66	1,159,594	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966/67	1,225,829	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967/68	1,298,739	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1968/69	1,416,550	1,518,982	-0.0674	1,694,165	-0.1639	1,751,582	-0.1913
1969/70	1,713,500	1,829,061	-0.0632	2,069,270	-0.1719	2,244,425	-0.2366
1970/71	1,938,160	1,973,476	-0.0179	2,276,485	-0.1486	2,508,854	-0.2275
1971/72	2,300,000	2,367,477	-0.0285	2,691,926	-0.1456	3,005,988	-0.2349
1972/73	1,315,000	1,362,882	-0.0351	1,568,007	-0.1614	1,679,208	-0.2169
1973/74	2,339,000	2,216,108	0.0555	2,472,957	-0.0542	2,513,525	-0.0694
1974/75	2,500,000	2,715,600	-0.0794	2,917,842	-0.1432	2,948,175	-0.1520
1975/76	2,863,168	2,917,846	-0.0187	2,983,486	-0.0403	3,018,417	-0.0514
1976/77	2,675,195	2,792,720	-0.0421	2,914,527	-0.0821	3,121,712	-0.1430
1977/78	1,676,518	1,707,726	-0.0183	1,798,960	-0.0681	1,868,300	-0.1027
1978/79	2,790,575	2,786,280	0.0015	2,941,366	-0.0513	3,129,580	-0.1083
1979/80	2,863,201	2,888,840	-0.0089	3,008,433	-0.0483	3,145,216	-0.0897
1980/81	2,997,882	3,040,635	-0.0141	3,134,659	-0.0436	3,289,756	-0.0887
1981/82	3,448,538	3,506,960	-0.0167	3,596,155	-0.0410	3,741,414	-0.0783
1982/83	3,002,304	3,085,706	-0.0270	3,170,528	-0.0531	3,318,352	-0.0952
1983/84	3,552,391	3,552,391	0.0000	3,667,954	-0.0315	3,742,345	-0.0508
1984/85	4,225,572	4,225,572	0.0000	4,373,451	-0.0338	4,588,712	-0.0791

Sources : Output data from Table A.13  
See text for sources and methods of calculation for other figures.

APPENDIX TABLE A.18

## SHORT-RUN EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF RUBBER

(Unit : Tons)

Year	Actual Production (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Production without Intervention (2)	Proportionate Difference (3)	Production without Intervention (4)	Proportionate Difference (5)	Production without Intervention (6)	Proportionate Difference (7)
1960	170,800	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	186,100	191,303	-0.0272	n.a.	n.a.	n.a.	n.a.
1962	195,400	201,508	-0.0303	n.a.	n.a.	n.a.	n.a.
1963	198,300	204,017	-0.0280	207,876	-0.0461	208,883	-0.0507
1964	210,600	217,241	-0.0306	220,720	-0.0459	223,068	-0.0559
1965	217,400	223,568	-0.0276	226,651	-0.0408	227,401	-0.0440
1966	218,100	224,659	-0.0292	228,471	-0.0454	228,959	-0.0474
1967	219,300	225,549	-0.0277	230,116	-0.0470	230,898	-0.0502
1968	257,800	264,344	-0.0248	268,752	-0.0408	270,113	-0.0456
1969	281,800	287,828	-0.0209	293,637	-0.0403	297,527	-0.0529
1970	287,200	297,575	-0.0349	305,060	-0.0585	310,260	-0.0743
1971	316,300	325,254	-0.0275	333,194	-0.0507	340,171	-0.0702
1972	336,900	344,523	-0.0221	354,524	-0.0497	359,516	-0.0629
1973	367,700	376,377	-0.0231	385,715	-0.0467	387,120	-0.0502
1974	382,100	396,723	-0.0369	403,822	-0.0538	404,855	-0.0562
1975	348,700	363,602	-0.0410	365,840	-0.0469	367,017	-0.0499
1976	393,000	407,537	-0.0357	413,010	-0.0485	421,970	-0.0687
1977	431,000	451,613	-0.0456	460,163	-0.0634	466,477	-0.0761
1978	467,000	491,150	-0.0492	502,603	-0.0708	516,045	-0.0950
1979	534,300	562,608	-0.0503	574,590	-0.0701	588,016	-0.0914
1980	465,200	492,083	-0.0546	502,176	-0.0736	518,607	-0.1030
1981	507,700	539,371	-0.0587	548,478	-0.0743	563,150	-0.0985
1982	576,000	600,649	-0.0410	611,606	-0.0582	630,472	-0.0864
1983	593,900	610,843	-0.0277	624,020	-0.0483	632,429	-0.0609
1984	617,200	642,111	-0.0388	657,006	-0.0606	678,392	-0.0902

Sources : Output data from Table A.13

See text for sources and methods of calculation for other figures.

APPENDIX TABLE A.19

## CUMULATIVE EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF RICE

(Unit : Tons)

Year	Actual Production (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Production without Intervention (2)	Proportionate Difference (3)	Production without Intervention (4)	Proportionate Difference (5)	Production without Intervention (6)	Proportionate Difference (7)
1960	7,873,140	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	9,111,499	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	9,509,565	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	9,882,705	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	10,650,699	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	10,976,792	14,328,975	-0.2339	n.a.	n.a.	n.a.	n.a.
1966	10,718,698	14,103,184	-0.2400	n.a.	n.a.	n.a.	n.a.
1967	13,895,361	17,017,570	-0.1835	17,954,719	-0.2261	18,083,273	-0.2316
1968	11,192,024	14,004,017	-0.2008	14,857,012	-0.2467	14,997,579	-0.2537
1969	12,033,958	15,148,783	-0.2056	16,057,021	-0.2505	16,343,042	-0.2637
1970	13,462,690	16,221,018	-0.1700	17,263,991	-0.2202	17,696,159	-0.2392
1971	13,856,000	16,126,948	-0.1408	17,077,431	-0.1886	17,636,782	-0.2144
1972	14,236,196	16,567,747	-0.1407	17,804,209	-0.2004	18,321,883	-0.2230
1973	12,412,674	14,629,871	-0.1516	15,844,718	-0.2166	16,153,899	-0.2316
1974	14,760,521	17,943,344	-0.1774	19,147,934	-0.2291	19,340,202	-0.2368
1975	13,818,788	17,789,838	-0.2232	18,568,443	-0.2558	18,703,167	-0.2612
1976	15,558,872	19,009,324	-0.1815	19,646,517	-0.2081	20,019,644	-0.2228
1977	15,482,101	17,791,488	-0.1298	18,401,771	-0.1587	18,760,298	-0.1747
1978	13,997,331	15,903,787	-0.1199	16,516,035	-0.1525	16,995,338	-0.1764
1979	17,039,587	19,342,432	-0.1191	19,995,064	-0.1478	20,549,439	-0.1708
1980	15,790,538	17,753,585	-0.1106	18,372,734	-0.1405	19,021,203	-0.1698
1981	17,368,094	19,428,822	-0.1061	20,119,736	-0.1368	20,795,991	-0.1648
1982	17,774,323	19,917,971	-0.1076	20,683,745	-0.1407	21,445,972	-0.1712
1983	16,878,516	18,360,030	-0.0807	19,118,198	-0.1171	19,662,924	-0.1416
1984	19,548,943	20,588,660	-0.0505	21,447,597	-0.0885	22,188,943	-0.1190

Sources : Output data from Table A.13.  
For methods and sources of data used see text.

APPENDIX TABLE A.20

## CUMULATIVE EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF MAIZE

(Unit : Tons)

Year	Actual Production (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Production without Intervention (2)	Proportionate Difference (3)	Production without Intervention (4)	Proportionate Difference (5)	Production without Intervention (6)	Proportionate Difference (7)
1960/61	543,900	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961/62	598,276	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962/63	727,892	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963/64	932,328	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964/65	912,385	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965/66	1,159,594	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966/67	1,225,829	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967/68	1,298,739	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1968/69	1,416,550	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1969/70	1,713,500	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1970/71	1,938,160	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1971/72	2,300,000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1972/73	1,315,000	1,394,843	-0.0572	1,814,024	-0.2751	2,001,093	-0.3429
1973/74	2,339,000	2,242,301	0.0431	2,730,111	-0.1433	2,824,236	-0.1718
1974/75	2,500,000	2,682,892	-0.0682	3,163,161	-0.2097	3,218,144	-0.2232
1975/76	2,863,168	2,978,665	-0.0388	3,240,233	-0.1164	3,283,342	-0.1280
1976/77	2,675,195	2,830,942	-0.0550	3,032,467	-0.1178	3,189,833	-0.1613
1977/78	1,676,518	1,759,444	-0.0471	1,907,552	-0.1211	2,007,220	-0.1648
1978/79	2,790,575	2,814,427	-0.0085	2,995,330	-0.0684	3,154,361	-0.1153
1979/80	2,863,201	2,895,904	-0.0113	3,060,688	-0.0645	3,206,455	-0.1071
1980/81	2,997,882	3,051,311	-0.0175	3,187,931	-0.0596	3,339,831	-0.1024
1981/82	3,448,538	3,524,286	-0.0215	3,693,187	-0.0662	3,848,105	-0.1038
1982/83	3,002,304	3,110,827	-0.0349	3,283,678	-0.0857	3,442,464	-0.1279
1983/84	3,552,391	3,588,583	-0.0101	3,769,669	-0.0576	3,876,129	-0.0835
1984/85	4,225,572	4,237,531	-0.0028	4,459,013	-0.0524	4,649,620	-0.0912

Sources : Output data from Table A.13  
For methods and sources of data used see text.

APPENDIX TABLE A.21  
 CUMULATIVE EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF RUBBER

## II. Cumulative

(Unit : Tons)

Year	Actual Production (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Production without Intervention (2)	Proportionate Difference (3)	Production without Intervention (4)	Proportionate Difference (5)	Production without Intervention (6)	Proportionate Difference (7)
1960	170,800	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	186,100	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	195,400	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	198,300	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	210,600	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	217,400	240,529	-0.0962	n.a.	n.a.	n.a.	n.a.
1966	218,100	242,160	-0.0994	n.a.	n.a.	n.a.	n.a.
1967	219,300	243,415	-0.0991	259,980	-0.1565	262,937	-0.1660
1968	257,800	282,449	-0.0873	299,934	-0.1405	303,150	-0.1496
1969	281,800	305,943	-0.0789	325,719	-0.1348	330,563	-0.1475
1970	287,200	315,483	-0.0897	338,846	-0.1524	346,617	-0.1714
1971	316,300	346,559	-0.0873	373,070	-0.1522	384,804	-0.1780
1972	336,900	367,692	-0.0837	400,559	-0.1589	414,195	-0.1866
1973	367,700	399,864	-0.0804	438,289	-0.1611	450,681	-0.1841
1974	382,100	421,652	-0.0938	462,740	-0.1743	472,842	-0.1919
1975	348,700	392,807	-0.1123	427,977	-0.1852	435,698	-0.1997
1976	393,000	441,385	-0.1096	472,968	-0.1691	483,405	-0.1870
1977	431,000	489,819	-0.1201	518,877	-0.1694	530,448	-0.1875
1978	467,000	537,884	-0.1318	566,796	-0.1761	585,383	-0.2022
1979	534,300	616,891	-0.1339	647,169	-0.1744	672,052	-0.2050
1980	465,200	556,376	-0.1639	589,730	-0.2112	621,878	-0.2519
1981	507,700	611,283	-0.1695	650,268	-0.2192	685,639	-0.2595
1982	576,000	680,342	-0.1534	725,441	-0.2060	767,646	-0.2497
1983	593,900	689,465	-0.1386	737,874	-0.1951	776,120	-0.2348
1984	617,200	711,093	-0.1320	764,123	-0.1923	808,255	-0.2364

Sources : Output data from Table A.13  
 For methods and sources of data used see text.

APPENDIX TABLE A.22

## SHORT-RUN EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF SUGAR

(Unit : Tons)

Year	Actual Production  (1)	A. Direct Effect		B. Total Effect (2)		C. Total Effect (2)	
		Production without Intervention	Proportionate Difference	Production without Intervention	Proportionate Difference	Production without Intervention	Proportionate Difference
		(2)	(3)	(4)	(5)	(6)	(7)
1960	428,968	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	462,852	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	342,582	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	271,244	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	407,033	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	436,364	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	385,241	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	329,280	212,912	0.5466	233,871	0.4080	237,724	0.3851
1968	204,631	132,686	0.5422	146,148	0.4002	149,116	0.3723
1969	378,320	278,082	0.3605	308,467	0.2265	321,899	0.1753
1970	438,795	362,476	0.2105	406,335	0.0799	434,418	0.0101
1971	566,384	193,516	1.9268	219,559	1.5796	241,348	1.3468
1972	509,599	217,227	1.3459	250,590	1.0336	274,817	0.8543
1973	818,100	429,814	0.9034	494,443	0.6546	527,581	0.5507
1974	1,087,076	656,394	0.6561	744,467	0.4602	770,585	0.4107
1975	1,153,556	989,306	0.1660	1,074,603	0.0735	1,093,217	0.0552
1976	1,642,520	1,579,464	0.0399	1,691,159	-0.0288	1,789,260	-0.0820
1977	2,244,123	1,887,241	0.1891	2,030,081	0.1054	2,177,868	0.0304
1978	1,628,944	1,082,916	0.5042	1,200,462	0.3569	1,347,127	0.2092
1979	1,768,205	862,193	1.0508	966,931	0.8287	1,086,026	0.6281
1980	1,103,093	519,192	1.1246	583,497	0.8905	678,998	0.6246
1981	1,707,415	848,309	1.0127	941,736	0.8131	1,092,409	0.5630
1982	2,597,200	1,308,326	0.9851	1,446,354	0.7957	1,701,624	0.5263
1983	2,099,037	917,536	1.2877	1,017,879	1.0622	1,150,408	0.8246
1984	2,052,775	759,507	1.7028	851,901	1.4096	981,712	1.0910

Sources : Column (1) : Table A.13, for the rest see text.

APPENDIX TABLE A.23

## CUMULATIVE EFFECT OF PRICE INTERVENTION ON THE OUTPUT OF SUGAR

(Unit : Tons)

Year	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)		
	Actual Production	Production without Intervention	Proportionate Difference	Production without Intervention	Proportionate Difference	Production without Intervention	Proportionate Difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1960	428,968	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	462,852	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	342,582	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	271,244	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	407,033	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	436,364	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	385,241	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	329,280	212,912	0.5466	236,618	0.3916	239,587	0.3744
1968	204,631	130,989	0.5622	148,264	0.3802	151,367	0.3519
1969	378,320	250,701	0.5091	294,779	0.2834	307,979	0.2284
1970	438,795	208,821	1.1013	256,046	0.7137	273,859	0.6023
1971	566,384	108,455	4.2223	138,147	3.0999	153,002	2.7018
1972	509,599	117,725	3.3287	156,543	2.2553	175,330	1.9065
1973	818,100	262,044	2.1220	360,337	1.2704	401,450	1.0379
1974	1,087,076	365,663	1.9729	513,549	1.1168	560,385	0.9399
1975	1,153,556	544,035	1.1204	739,668	0.5596	796,864	0.4476
1976	1,642,520	965,939	0.7004	1,273,973	0.2893	1,397,966	0.1749
1977	2,244,123	1,301,036	0.7249	1,687,597	0.3298	1,874,358	0.1973
1978	1,628,944	758,412	1.1478	1,003,206	0.6237	1,153,216	0.4125
1979	1,768,205	636,731	1.7770	846,431	1.0890	989,659	0.7867
1980	1,103,093	350,380	2.1483	465,426	1.3701	563,287	0.9583
1981	1,707,415	554,557	2.0789	737,711	1.3145	905,142	0.8864
1982	2,597,200	709,473	2.6607	956,447	1.7155	1,197,290	1.1692
1983	2,099,037	497,968	3.2152	677,865	2.0965	835,727	1.5116
1984	2,052,775	391,123	4.2484	537,513	2.8190	675,847	2.0373

Sources : See text.

APPENDIX TABLE A.24

## EFFECT OF PRICE INTERVENTION ON THE CONSUMPTION OF RICE

(Unit : Tons)

Year	Actual Consumption (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Consumption without Intervention (2)	Proportionate Difference (3)	Consumption without Intervention (4)	Proportionate Difference (5)	Consumption without Intervention (6)	Proportionate Difference (7)
1960	6,050,758	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	6,723,623	6,406,616	0.0495	n.a.	n.a.	n.a.	n.a.
1962	7,583,773	7,221,843	0.0501	n.a.	n.a.	n.a.	n.a.
1963	7,734,716	7,428,343	0.0412	7,345,297	0.0530	7,324,028	0.0561
1964	7,777,581	7,426,437	0.0473	7,355,979	0.0573	7,309,432	0.0640
1965	8,105,242	7,666,032	0.0573	7,603,285	0.0660	7,588,227	0.0681
1966	8,434,531	7,994,600	0.0550	7,914,301	0.0657	7,904,180	0.0671
1967	11,649,494	11,228,609	0.0375	11,094,373	0.0500	11,071,809	0.0522
1968	9,573,562	9,189,311	0.0418	9,098,579	0.0522	9,071,052	0.0554
1969	10,483,861	9,944,767	0.0542	9,826,245	0.0669	9,748,972	0.0754
1970	11,851,151	11,434,085	0.0365	11,264,927	0.0520	11,151,257	0.0628
1971	11,444,812	11,136,065	0.0277	10,976,072	0.0427	10,840,444	0.0558
1972	11,034,964	10,646,299	0.0365	10,465,085	0.0545	10,377,652	0.0633
1973	11,126,739	10,717,559	0.0382	10,561,128	0.0536	10,538,113	0.0559
1974	13,221,703	12,424,478	0.0642	12,292,961	0.0756	12,274,141	0.0772
1975	12,377,486	11,455,245	0.0805	11,413,142	0.0845	11,391,174	0.0866
1976	12,568,886	12,005,509	0.0469	11,909,792	0.0553	11,757,421	0.0690
1977	11,017,807	10,793,347	0.0208	10,672,568	0.0323	10,585,650	0.0408
1978	11,562,858	11,223,417	0.0302	11,069,267	0.0446	10,895,354	0.0613
1979	12,801,907	12,230,997	0.0467	12,077,328	0.0600	11,911,108	0.0748
1980	11,552,244	11,179,488	0.0333	11,044,131	0.0460	10,832,835	0.0664
1981	12,774,180	12,301,719	0.0384	12,195,511	0.0474	12,003,864	0.0642
1982	12,040,773	11,602,607	0.0378	11,493,208	0.0476	11,285,608	0.0669
1983	11,611,122	11,435,493	0.0154	11,295,791	0.0279	11,205,434	0.0362
1984	12,551,181	12,420,796	0.0105	12,255,597	0.0241	12,022,309	0.0440

Notes : The consumption without intervention (C1) is computed from actual consumption (CO) from

-E

$$C1 = CO * (PB/PD)$$

where PB is the border price  
 PD is the domestic price  
 E is the elasticity of demand

Sources : Elasticity : Table 5.2  
 Border Prices : Table 4.7 (Columns(1)-(3))

APPENDIX TABLE A.25

## EFFECT OF PRICE INTERVENTION ON THE CONSUMPTION OF MAIZE

(Unit : Tons)

Year	Actual Consumption (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Consumption without Intervention (2)	Proportionate Difference (3)	Consumption without Intervention (4)	Proportionate Difference (5)	Consumption without Intervention (6)	Proportionate Difference (7)
1960/61	24,969	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961/62	3,475	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962/63	5,816	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963/64	9,735	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964/65	16,295	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965/66	27,275	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966/67	45,652	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967/68	76,412	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1968/69	127,898	125,552	0.0187	121,971	0.0486	120,897	0.0579
1969/70	210,600	206,741	0.0187	199,636	0.0549	195,091	0.0795
1970/71	261,062	259,631	0.0055	248,586	0.0502	241,341	0.0817
1971/72	201,316	199,412	0.0095	191,170	0.0531	184,362	0.0920
1972/73	253,280	250,065	0.0129	237,852	0.0649	232,103	0.0912
1973/74	147,698	150,848	-0.0209	144,516	0.0220	143,599	0.0285
1974/75	530,672	512,039	0.0364	496,390	0.0691	494,177	0.0739
1975/76	521,468	516,728	0.0092	511,208	0.0201	508,343	0.0258
1976/77	532,815	520,433	0.0238	508,424	0.0480	489,683	0.0881
1977/78	367,465	363,216	0.0117	351,488	0.0455	343,204	0.0707
1978/79	617,166	617,874	-0.0011	593,447	0.0400	566,660	0.0891
1979/80	721,038	715,218	0.0081	689,324	0.0460	662,016	0.0892
1980/81	856,872	842,832	0.0167	813,413	0.0534	768,850	0.1145
1981/82	238,387	233,760	0.0198	227,010	0.0501	216,761	0.0998
1982/83	844,664	818,089	0.0325	792,612	0.0657	751,574	0.1239
1983/84	679,430	679,430	0.0000	654,522	0.0381	639,368	0.0627
1984/85	1,162,260	1,162,260	0.0000	1,116,541	0.0409	1,055,676	0.1010

Notes : The consumption without intervention (C1) is computed from actual consumption (CO) from

-E

$$C1 = CO + (PB/PD)$$

where PB is the border price  
 PD is the domestic price  
 E is the elasticity of demand

Sources : Elasticity : Table 5.2  
 Border Prices : Table 4.7 (Columns(4)-(6))

APPENDIX TABLE A.26

EFFECT OF PRICE INTERVENTION ON THE CONSUMPTION OF SUGAR

(Unit : Tons)

Year	Actual Consumption (1)	A. Direct Effect		B. Total Effect (1)		C. Total Effect (2)	
		Consumption without Intervention (2)	Proportionate Difference (3)	Consumption without Intervention (4)	Proportionate Difference (5)	Consumption without Intervention (6)	Proportionate Difference (7)
1960	423,245	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	461,315	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	299,563	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	218,421	636,552	-0.6569	585,079	-0.6267	572,492	-0.6185
1964	358,125	623,069	-0.4252	580,077	-0.3826	553,108	-0.3525
1965	352,530	536,773	-0.3432	504,685	-0.3015	497,237	-0.2910
1966	330,383	656,593	-0.4968	608,717	-0.4572	602,903	-0.4520
1967	314,267	546,031	-0.4245	498,935	-0.3701	491,374	-0.3604
1968	204,579	312,226	-0.3448	289,834	-0.2942	283,322	-0.2779
1969	362,218	664,361	-0.4548	607,227	-0.4035	572,315	-0.3671
1970	382,547	552,017	-0.3070	493,633	-0.2250	457,478	-0.1638
1971	391,813	627,037	-0.3751	562,545	-0.3035	512,458	-0.2354
1972	102,098	156,998	-0.3497	138,031	-0.2603	129,613	-0.2123
1973	542,695	682,676	-0.2050	611,396	-0.1124	601,474	-0.0977
1974	643,229	616,875	0.0427	569,554	0.1294	563,047	0.1424
1975	558,122	301,478	0.8513	293,267	0.9031	289,059	0.9308
1976	518,546	236,863	1.1892	223,061	1.3247	202,527	1.5604
1977	590,724	515,789	0.1453	474,043	0.2461	445,843	0.3250
1978	588,895	601,791	-0.0214	542,499	0.0855	481,745	0.2224
1979	578,387	740,029	-0.2184	673,079	-0.1407	606,633	-0.0466
1980	651,397	875,537	-0.2560	799,092	-0.1848	691,315	-0.0577
1981	588,776	876,364	-0.3282	812,759	-0.2756	721,721	-0.1842
1982	390,960	440,203	-0.1119	405,809	-0.0366	353,956	0.1045
1983	562,146	970,910	-0.4210	882,002	-0.3626	830,443	-0.3231
1984	810,816	1,983,930	-0.5913	1,789,411	-0.5469	1,549,211	-0.4766

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Notes : The consumption without intervention (C1) is computed from actual consumption (CO) from

$$C1 = CO * (PB/PD)^{-E}$$

where PB is the border price  
 PD is the domestic price  
 E is the elasticity of demand

Sources : Elasticity : Table 5.2  
 Border Prices : Table 4.7 (Columns(10)-(12))  
 Direct Price (Consumer) Wedge : Table 4.8 Column (7)  
 Total Price (Consumer) Wedge (1) : Table 4.8 Column (8)  
 Total Price (Consumer) Wedge (1) : Table 4.8 Column (9)

APPENDIX TABLE A.27

SHORT-RUN EFFECT OF RICE INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand tons  
Values in million baht or US \$)

Year	A. Direct Effect				B. Total Effect (1)				C. Total Effect (2)					
	Actual Export Quantity (1)	Notional Border Price (2)	Export Quantity without Intervention (3)	Notional Border Price without Intervention (In baht) (4)	Change in Notional Export Value (In US \$) (5)	Change in Real Export Value (In US \$) (6)	Export Quantity without Intervention (7)	Notional Border Price without Intervention (In baht) (8)	Change in Notional Export Value (In US \$) (9)	Change in Real Export Value (In US \$) (10)	Export Quantity without Intervention (11)	Notional Border Price without Intervention (In baht) (12)	Change in Notional Export Value (In US \$) (13)	Change in Real Export Value (In US \$) (14)
1960	1,822	1,264	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	2,388	1,471	6,233	1,279	1,912	128.21	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	1,978	1,388	3,880	1,331	2,116	161.43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	2,148	1,491	3,766	1,403	1,666	81.66	111.52	4,244	1,265	2,116	103.96	161.96	6,369	149.77
1964	2,073	1,407	4,808	1,337	1,908	92.26	124.65	5,233	1,311	2,298	111.18	130.21	5,322	167.26
1965	2,072	1,401	5,248	1,207	2,502	111.54	148.33	5,626	1,186	2,461	127.88	170.06	5,715	175.30
1966	2,288	1,738	4,481	1,483	2,637	127.88	164.83	4,923	1,469	3,123	131.66	195.29	4,980	199.14
1967	2,316	2,054	4,166	1,706	2,946	131.07	164.40	4,798	1,701	3,542	172.18	215.07	4,910	222.64
1968	1,550	1,915	3,887	1,390	2,639	107.40	129.29	4,000	1,380	2,728	132.19	159.13	4,852	158.18
1970	1,412	1,381	3,280	1,161	1,583	76.00	-81.97	4,018	1,106	3,228	105.66	177.38	4,957	133.47
1971	1,728	1,284	3,667	1,156	1,143	54.88	94.76	4,333	1,072	2,201	82.66	85.71	4,526	106.50
1972	3,203	1,556	4,832	1,412	1,413	87.03	138.27	3,386	1,332	2,658	127.38	127.38	4,052	147.26
1973	1,738	2,973	2,787	2,451	3,906	146.71	138.27	3,386	2,332	4,100	200.11	188.60	3,489	195.95
1974	1,539	4,463	4,665	3,422	6,406	415.61	352.87	4,994	3,328	9,238	401.11	408.71	5,067	284.90
1975	1,643	3,311	4,783	2,456	6,966	343.26	267.02	4,990	2,433	7,726	388.36	278.77	5,028	366.72
1976	2,790	2,451	5,048	2,326	3,813	187.39	137.76	5,419	2,285	4,453	160.93	160.93	6,023	197.85
1977	4,646	2,964	5,312	2,840	1,646	90.60	62.35	5,784	2,200	4,453	139.66	96.26	6,131	120.61
1978	2,436	3,670	3,560	3,337	2,964	145.25	92.17	4,978	3,222	4,238	209.96	134.47	4,714	181.26
1979	4,238	3,311	6,225	3,196	4,906	246.76	141.12	4,791	3,123	4,323	310.70	172.82	3,056	220.49
1980	4,396	4,607	5,698	4,317	4,202	206.21	106.76	5,976	4,226	5,738	281.13	142.42	4,102	392.38
1981	5,236	5,320	7,306	4,336	4,265	186.06	80.73	6,566	4,666	7,316	346.80	159.48	4,765	598.66
1982	5,267	3,593	5,877	3,516	4,265	20.68	29.70	4,375	3,468	5,339	127.06	101.06	4,315	322.63
1983	4,998	3,521	7,474	3,467	1,242	53.06	21.37	4,085	3,425	2,913	127.06	53.38	3,383	163.61
1984	4,998	3,521	7,474	3,467	1,242	53.06	21.37	4,085	3,399	2,823	120.62	48.99	3,311	216.89

Sources : Column (1) : Table A.13

Column (2) : Table 2.3 Column (7)

Column (3) : Column (1) plus difference between output effect (Table A.16 Column (2) minus Column (1)) and consumption effect (Table A.26, Column (2) minus Column (1))

Column (4) : Calculated from :

$$PE^* = PE^*(0/0^*) \cdot \frac{1}{E/P}$$

where PE is border price from column (2)

0\* is from column (3) and 0 from column (1)

EB is the elasticity of foreign demand from Column (4) Table 6.4

Column (5) : [Column (3) x Column (4)] - [Column (1) x Column (2)]

Column (6) : Column (5) divided by Column (1) of Table 6.3

Column (7) : Column (6) divided by US Consumer Price Index from IMF Financial Statistics.

Column (8) : Column (7) plus difference between output effect (Table A.16 Column (4) minus Column (1)) and consumption effect (Table A.26 Column (4) minus Column (1))

Column (9)-(12) : See as Columns (4) to (7) with column (8) replacing column (3)

Column (13) : Column (1) plus difference between output effect (Table A.16 Column (6) minus Column (1)) and consumption effect (Table A.26 Column (6) minus Column (1))

Column (14)-(17) : See as Columns (4) to (7) with column (13) replacing column (3)

APPENDIX TABLE A.28

## SHORT-RUN EFFECT OF RAIZE INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand tons  
Values in million baht or US \$)

Year	A. Direct Effect						B. Total Effect (1)				C. Total Effect (2)			
	Actual Export Quantity	Nominal Border Price	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1960	519	1,067	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	595	1,127	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	722	1,101	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	925	1,092	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	896	1,142	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	1,132	1,257	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	1,180	1,193	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	1,222	1,225	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1968	1,289	1,023	1,393	107	5.19	6.25	1,572	290	14.05	16.92	1,631	350	16.95	20.41
1969	1,503	1,135	1,622	136	6.53	7.46	1,670	416	20.04	22.90	2,049	620	29.89	34.12
1970	1,677	1,263	1,714	46	2.23	2.40	2,028	443	21.27	22.94	2,268	746	35.79	38.61
1971	2,099	1,267	2,168	69	4.13	4.30	2,501	501	24.04	24.90	2,822	901	43.27	44.77
1972	1,062	1,095	1,113	56	2.69	2.69	1,330	294	14.12	14.12	1,647	622	20.27	20.27
1973	2,191	1,976	2,065	-249	-12.16	-11.46	2,328	271	13.23	12.46	2,370	353	17.23	16.26
1974	1,949	2,623	2,204	614	30.35	25.78	2,421	1,186	58.98	49.77	2,434	1,271	62.80	53.35
1975	2,342	2,454	2,401	158	7.77	6.05	2,672	347	17.08	13.29	2,910	447	22.03	17.14
1976	2,142	2,292	2,272	298	14.63	10.76	2,406	605	29.71	21.84	2,632	1,122	55.16	40.55
1977	1,309	2,124	1,345	75	3.70	2.55	1,467	294	14.45	9.97	1,925	459	22.55	15.57
1978	2,173	2,163	2,168	-11	-0.53	-0.34	2,348	378	18.62	11.94	2,563	843	41.55	26.65
1979	2,142	2,765	2,174	87	4.28	2.47	2,319	489	24.05	13.87	2,483	943	46.34	26.72
1980	2,141	3,196	2,198	182	8.89	4.52	2,321	576	28.23	14.34	2,521	1,216	59.49	30.22
1981	3,210	3,263	3,273	204	9.43	4.34	3,369	816	23.78	10.94	3,925	1,020	47.04	21.45
1982	2,158	2,850	2,268	313	15.68	5.93	2,378	628	27.39	11.88	2,567	1,166	50.88	22.07
1983	2,873	3,129	2,873	0	0.00	0.00	3,013	640	19.17	8.85	3,183	720	31.39	13.19
1984	3,063	3,085	3,063	0	0.00	0.00	3,257	597	25.52	10.28	3,533	1,449	61.93	24.95

Sources : Column (1) : Table A.13  
Column (2) : Table 3.4 Column (5)  
Column (3) : Column (1) plus difference in output effect (Table A.17 Column (2) minus Column (1)) and consumption effect (Table A.25 Column (2) minus Column (1))  
Column (4) : Difference of Column (3) and Column (1) multiplied by Column (2)  
Column (5) : Column (4) divided by Column (1) of Table 4.5  
Column (6) : Column (5) deflated by US Consumer Price Index from IMF Financial Statistics.  
Column (7) : Column (1) plus difference in output effect (Table A.17 Column (4) minus Column (1)) and consumption effect (Table A.25 Column (4) minus (1))  
Column (8)-(10) : Same as Columns (4) to (6) except Column (7) replaces Column (5), Column (8) replaces (4), Column (9) replaces (5), and Column (10) replaces (6).  
Column (11) : Column (1) plus difference in output effect (Table A.17 Column (6) minus Column (1)) and consumption effect (Table A.25 Column (6) minus (1))  
Column (12)-(14) : Same as Columns (4) to (6) except Column (11) replaces Column (3), Column (12) replaces (4), Column (13) replaces (5), and Column (14) replaces (6).

APPENDIX TABLE A.29

## SHORT-RUN EFFECT OF SUGAR INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand tons  
Values in million baht or US \$)

Year	A. Direct Effect						B. Total Effect (1)				C. Total Effect (2)			
	Actual Export Quantity	Nominal Border Price	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1960	6	1,398	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	2	1,952	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	43	1,161	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	53	2,648	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	89	3,222	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	84	1,184	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	55	1,651	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	15	2,176	-333	-757	-36.82	-46.18	-265	-609	-29.62	-37.16	-254	-584	-28.41	-35.64
1968	0	2,054	-180	-369	-17.87	-21.51	-144	-295	-14.30	-17.22	-134	-276	-13.36	-16.08
1969	16	2,369	-386	-953	-45.93	-52.43	-299	-746	-35.94	-41.03	-250	-631	-30.42	-36.73
1970	56	1,708	-190	-420	-20.15	-21.74	-87	-245	-11.77	-12.70	-23	-135	-6.50	-7.01
1971	175	2,182	-434	-1327	-63.71	-65.91	-343	-1129	-54.22	-56.10	-271	-973	-46.69	-48.31
1972	408	3,263	60	-1133	-54.39	-54.39	113	-962	-46.20	-46.20	145	-856	-41.08	-41.08
1973	275	4,306	-253	-2274	-111.00	-104.62	-117	-1689	-82.45	-77.70	-74	-1504	-73.40	-69.18
1974	444	8,762	40	-3543	-175.04	-148.70	175	-2356	-116.43	-98.90	208	-2071	-102.30	-86.91
1975	595	10,676	688	986	48.59	37.80	781	1985	97.77	76.06	804	2228	109.77	85.60
1976	1,124	6,069	1,343	1327	65.20	47.94	1,468	2089	102.43	75.45	1,587	2809	138.01	101.44
1977	1,453	4,647	1,371	-1310	-64.38	-44.44	1,556	-452	-22.23	-15.34	1,732	345	17.95	12.39
1978	1,040	3,818	481	-2134	-105.21	-67.48	658	-1459	-71.92	-46.15	865	-667	-32.88	-21.09
1979	1,190	4,025	122	-4297	-211.14	-121.75	294	-3606	-177.19	-102.17	479	-2839	-140.50	-81.01
1980	452	6,499	-356	-5231	-257.28	-130.70	-216	-4336	-212.67	-107.93	-12	-3015	-147.74	-75.05
1981	1,119	8,932	-28	-10242	-472.41	-217.38	129	-8839	-407.72	-187.61	371	-6680	-308.14	-141.79
1982	2,206	5,841	868	-7816	-341.02	-147.94	1,041	-6809	-297.07	-128.88	1,348	-5015	-218.81	-94.92
1983	1,537	4,037	-53	-6420	-279.97	-117.64	136	-5656	-246.65	-103.64	320	-4913	-214.24	-90.02
1984	1,242	4,194	-1224	-10344	-442.07	-178.09	-938	-9141	-390.65	-157.37	-567	-7589	-324.33	-130.66

Sources : Column (1) : Table A.13

Column (2) : Table 3.1 Column (1)

Column (3) : Column (1) plus difference in output effect (Table A.22 Column (2) minus Column (1))  
and consumption effect (Table A.26 Column (2) minus Column (1))

Column (4) : Difference of Column (3) and Column (1) multiplied by Column (2)

Column (5) : Column (4) divided by Column (1) of Table 4.5

Column (6) : Column (5) deflated by US Consumer Price Index from IMF Financial Statistics.

Column (7) : Column (1) plus difference in output effect (Table A.22 Column (4) minus Column (1))  
and consumption effect (Table A.26 Column (4) minus Column (1))Column (8)-(10) : Same as Columns (4) to (6) except Column (7) replaces Column (3),  
Column (8) replaces (4), Column (9) replaces (5), and Column (10) replaces (6).Column (11) : Column (1) plus difference in output effect (Table A.22 Column (6) minus Column (1))  
and consumption effect (Table A.26 Column (6) minus Column (1))Column (12)-(14) : Same as Columns (4) to (6) except Column (11) replaces Column (3),  
Column (12) replaces (4), Column (13) replaces (5), and Column (14) replaces (6).

APPENDIX TABLE A.30  
SHORT-RUN EFFECT OF RUBBER INTERVENTION ON FOREIGN EXCHANGE EARNINGS  
(Quantities in thousand tons  
Values in million baht or US \$)

Year	A. Direct Effect				B. Total Effect (1)				C. Total Effect (2)					
	Actual Export Quantity (1)	Monial Border Price (2)	Export Quantity without Intervention (3)	Change in Monial Export Value (in baht) (4)	Change in Real Export Value (in US \$) (5)	Change in Monial Export Value (in baht) (6)	Change in Real Export Value (in US \$) (7)	Export Quantity without Intervention (8)	Change in Monial Export Value (in baht) (9)	Change in Real Export Value (in US \$) (10)	Export Quantity without Intervention (11)	Change in Monial Export Value (in baht) (12)	Change in Real Export Value (in US \$) (13)	Change in Monial Export Value (in baht) (14)
1960	171	14,329	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	186	10,897	191	57	2.72	3.80	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	195	9,992	202	61	2.95	4.08	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	198	9,317	204	53	2.58	3.52	208	89	4.32	5.90	209	99	4.77	6.52
1964	211	8,419	217	57	2.77	3.75	221	87	4.22	5.71	223	107	5.20	7.03
1965	217	8,411	224	53	2.57	3.42	227	80	3.86	5.13	227	86	4.17	5.55
1966	218	8,317	225	55	2.65	3.41	228	86	4.18	5.39	229	90	4.38	5.65
1967	219	6,581	226	41	2.00	2.51	230	71	3.46	4.34	231	76	3.71	4.65
1968	258	6,326	264	41	2.01	2.41	269	69	3.36	4.04	270	78	3.71	4.54
1969	282	8,765	288	53	2.55	2.91	294	104	5.00	5.71	298	138	6.64	7.58
1970	287	7,288	298	75	3.59	3.87	305	129	4.18	6.67	310	166	7.98	8.61
1971	316	5,310	325	48	2.78	2.36	333	90	4.31	4.46	340	127	6.09	6.30
1972	337	5,014	345	38	1.83	1.83	355	88	4.24	4.24	360	113	5.44	5.44
1973	348	10,837	376	94	4.59	4.33	386	195	9.53	8.98	387	210	10.27	9.68
1974	382	15,003	397	190	9.39	7.98	404	282	13.96	11.86	405	296	14.62	12.42
1975	349	9,584	364	143	7.04	5.47	366	164	8.09	6.30	367	176	8.65	6.73
1976	393	13,310	408	193	9.51	6.99	413	266	13.09	9.62	422	386	18.95	13.93
1977	431	14,475	452	298	14.66	10.12	460	422	20.74	14.32	466	514	25.24	17.42
1978	467	17,285	491	417	20.38	13.20	503	615	30.35	19.46	516	848	41.80	26.81
1979	534	22,434	563	646	31.76	18.32	575	920	45.21	26.07	588	1,227	60.27	34.75
1980	445	26,309	492	707	34.65	17.60	502	973	47.66	24.21	519	1,405	68.84	34.97
1981	508	22,006	539	697	32.15	14.79	548	897	41.39	19.05	563	1,220	56.29	25.90
1982	576	16,558	601	408	17.81	7.73	612	590	25.72	11.16	630	902	39.35	17.07
1983	594	26,252	611	343	14.96	4.29	624	610	26.60	11.18	632	780	34.03	14.30
1984	617	21,095	642	526	22.46	9.05	657	840	35.89	14.46	678	1,291	55.16	22.72

Sources : Column (1) : Table A.13  
 Column (2) : Table 3.6 Column (4)  
 Column (3) : Column (1) plus the output effect (Table A.18 Column (2) minus Column (1))  
 (There is no Consumption effect for rubber)  
 Column (4) : Difference of Column (3) and Column (1) multiplied by Column (2)  
 Column (5) : Column (4) divided by Column (1) of Table 4.5  
 Column (6) : Column (5) deflated by US Consumer Price Index from IMF Financial Statistics.  
 Column (7) : Column (1) plus the output effect (Table A.18 Column (4) minus Column (1))  
 (There is no Consumption effect for rubber)  
 Column (8)-(10) : Same as Columns (4) to (6) except Column (7) replaces Column (3),  
 Column (8) replaces (4), Column (9) replaces (5), and Column (10) replaces (6).  
 Column (11) : Column (1) plus the output effect (Table A.18 Column (6) minus Column (1))  
 (There is no Consumption effect for rubber)  
 Column (12)-(14) : Same as Columns (4) to (6) except Column (11) replaces Column (3),  
 Column (12) replaces (4), Column (13) replaces (5), and Column (14) replaces (6).

APPENDIX TABLE A.31

## CUMULATIVE EFFECT OF RICE INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand tons  
Values in million baht or US \$)

Year	A. Direct Effect							B. Total Effect (1)					C. Total Effect (2)				
	Actual Export Quantity	Nominal Border Price	Export Quantity without Intervention	Nominal Border Price without Intervention	Change in Nominal Export Value	Change in Nominal Export Value	Change in Real Export Value	Export Quantity without Intervention	Nominal Border Price without Intervention	Change in Nominal Export Value	Change in Nominal Export Value	Change in Real Export Value	Export Quantity without Intervention	Nominal Border Price without Intervention	Change in Nominal Export Value	Change in Nominal Export Value	Change in Real Export Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1960	1,822	1,268	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	2,388	1,478	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	1,926	1,588	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	2,148	1,499	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	2,873	1,407	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	2,872	1,403	6,663	1,137	3,545	171.69	228.32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	2,284	1,756	6,109	1,373	4,376	212.22	273.63	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	2,246	2,056	5,789	1,623	4,776	232.18	291.22	6,860	1,535	6,052	294.20	369.02	7,011	1,567	6,227	302.75	379.74
1968	1,618	1,945	4,815	1,481	3,983	192.96	232.28	5,758	1,416	5,007	242.59	292.03	5,927	1,406	5,185	251.21	302.41
1969	1,550	1,735	5,204	1,296	4,026	194.01	221.48	6,231	1,239	5,001	241.02	275.14	6,594	1,222	5,336	257.17	293.58
1970	1,612	1,388	4,787	1,057	2,824	135.35	146.20	5,999	999	3,757	180.36	194.52	6,565	977	4,161	199.77	215.47
1971	2,411	1,284	4,991	1,070	2,246	102.82	111.55	6,101	1,018	3,114	149.51	154.69	6,796	991	3,638	174.63	180.68
1972	3,201	1,565	5,921	1,342	2,936	140.97	140.97	7,339	1,272	4,324	207.60	207.60	7,944	1,267	4,896	235.03	235.03
1973	1,286	2,973	3,912	2,251	4,985	243.27	229.28	5,284	2,088	7,211	351.93	331.69	5,614	2,057	7,727	377.13	355.44
1974	1,539	4,467	5,519	3,246	11,040	545.43	463.34	6,855	3,075	14,202	701.70	596.09	7,066	3,051	14,487	725.66	616.44
1975	1,441	3,314	6,335	2,289	9,724	479.00	372.63	7,155	2,220	11,111	547.34	425.80	7,312	2,208	11,371	560.16	435.77
1976	2,990	2,651	7,004	2,143	7,082	348.00	255.84	7,737	2,090	6,245	405.16	297.86	8,262	2,056	9,062	445.31	327.38
1977	4,464	2,966	6,998	2,651	5,309	260.90	180.08	7,729	2,586	8,744	331.62	228.76	8,175	2,550	7,602	373.58	257.85
1978	2,434	3,670	4,680	3,116	5,652	278.71	178.77	5,447	3,000	7,409	365.34	234.34	6,100	2,917	8,858	436.79	280.16
1979	4,238	3,516	7,111	3,089	7,069	347.35	200.29	7,918	3,007	8,911	437.91	252.50	8,638	2,942	10,519	516.90	298.05
1980	4,238	4,407	6,574	4,128	7,613	472.99	189.48	7,529	4,017	9,917	485.87	246.82	8,188	3,907	12,471	611.02	310.40
1981	4,594	5,320	7,127	4,767	9,535	439.79	202.36	7,924	4,642	12,346	569.68	282.04	8,792	4,523	15,329	707.04	325.34
1982	5,734	3,735	8,315	3,404	6,887	300.48	130.35	9,191	3,320	9,093	396.72	172.10	10,160	3,237	11,477	500.74	217.23
1983	5,267	3,593	6,925	3,355	6,309	187.93	78.97	7,822	3,255	6,534	284.96	119.73	8,457	3,192	8,069	351.90	147.86
1984	6,998	3,524	8,168	3,391	3,032	129.39	52.21	9,192	3,292	5,598	239.23	96.38	10,167	3,210	7,974	340.76	137.28

Sources : Column (1) : Table A.13

Column (2) : Table 2.3 Column (7)

Column (3) : Column (1) plus Difference between output effect (Table A.19 Column (2) minus Column (1))  
and consumption effect (Table A.24 Column (2) minus Column (1))

Column (4) : derived from :

$$PB^* = PB^0(0/0^*)^{1/EPD}$$

where PB is border price from column (2)

0\* is from column (3) and 0 from Column (1)

EPD is the elasticity of foreign demand from Column (4) Table 4.4

Column (5) : [Column (3) x Column (4)] - [Column (1) x Column (2)]

Column (6) : Column (5) divided by Column (1) of Table 4.5

Column (7) : Column (6) deflated by US Consumer Price Index from IMF Financial Statistics.

Column (8) : Column (1) minus difference between output effect (Table A.19 Column (4) minus Column (1))  
and consumption effect (Table A.24 Column (4) minus Column (1))

Column (9)-(12) : Same as Columns (4) to (7) with column (8) replacing column (3)

Column (13) : Column (1) plus difference between output effect (Table A.19 Column (6) minus Column (1))  
and consumption effect (Table A.24 Column (6) minus Column (1))

Column (14)-(17) : Same as Columns (4) to (7) with column (13) replacing column (3)

APPENDIX TABLE A.32

## CUMULATIVE EFFECT OF MAIZE INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand Tons  
Values in million baht or US \$)

Year	A. Direct Effect						B. Total Effect (1)				C. Total Effect (2)			
	Actual Export Price	Nominal Border Price	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)	Export Quantity without Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)	Export Quantity Intervention	Change in Nominal Export Value (in baht)	Change in Nominal Export Value (in US \$)	Change in Real Export Value (in US \$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1960	319	1,067	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	595	1,127	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	722	1,101	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	923	1,092	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	896	1,142	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	1,132	1,257	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	1,180	1,193	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	1,222	1,225	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1968	1,289	1,023	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1969	1,503	1,135	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1970	1,677	1,263	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1971	2,099	1,247	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1972	1,062	1,095	1,145	91	4.37	4.37	1,576	566	27.05	27.05	1,769	775	37.19	37.19
1973	2,191	1,976	2,091	-197	-9.63	-9.08	2,586	779	38.03	35.84	2,681	967	47.19	44.48
1974	1,969	2,623	2,171	329	26.11	22.18	2,667	1,829	90.37	76.77	2,724	1,979	97.78	83.07
1975	2,342	2,656	2,462	319	15.73	12.24	2,729	1,029	50.67	39.42	2,775	1,151	56.68	44.10
1976	2,142	2,292	2,311	385	18.96	13.92	2,524	875	42.99	31.61	2,700	1,279	62.83	46.19
1977	1,309	2,124	1,396	185	9.10	6.28	1,556	325	25.78	17.80	1,664	754	37.05	25.57
1978	2,173	2,143	2,197	90	2.47	1.98	2,402	494	24.37	15.63	2,568	896	44.20	28.35
1979	2,142	2,765	2,181	107	5.23	3.02	2,371	434	31.15	17.96	2,544	1,112	54.67	31.52
1980	2,141	3,196	2,208	216	10.57	5.37	2,375	746	36.57	18.58	2,571	1,374	67.34	34.21
1981	3,210	3,243	3,291	261	12.02	9.53	3,466	830	38.29	17.62	3,631	1,366	63.00	28.99
1982	2,158	2,850	2,293	385	16.80	7.29	2,491	950	41.47	17.99	2,691	1,520	66.32	28.77
1983	2,873	3,129	2,909	113	4.96	2.08	3,115	758	33.05	13.89	3,237	1,138	49.64	20.86
1984	3,063	3,043	3,073	37	1.58	0.64	3,342	861	36.80	14.83	3,594	1,637	69.95	28.18

Sources : Column (1) : Table A.13

Column (2) : Table 3.4 Column (5)

Column (3) : Column (1) plus difference in output effect (Table A.20 Column (2) minus Column (1))  
and consumption effect (Table A.25 Column (2) minus Column (1))

Column (4) : Difference of Column (3) and Column (1) multiplied by Column (2)

Column (5) : Column (4) divided by Column (1) of Table 4.5

Column (6) : Column (5) deflated by US Consumer Price Index from IMF Financial Statistics.

Column (7) : Column (1) plus difference in output effect (Table A.20 Column (4) minus Column (1))  
and consumption effect (Table A.25 Column (4) minus (1))Column (8)-(10) : Same as Columns (4) to (6) except Column (7) replaces Column (3),  
Column (8) replaces (4), Column (9) replaces (5), and Column (10) replaces (6).Column (11) : Column (1) plus difference in output effect (Table A.20 Column (6) minus Column (1))  
and consumption effect (Table A.25 Column (6) minus (1))Column (12)-(14) : Same as Columns (4) to (6) except Column (11) replaces Column (3),  
Column (12) replaces (4), Column (13) replaces (5), and Column (14) replaces (6).

APPENDIX TABLE A.33

## CUMULATIVE EFFECT OF SUGAR INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand tons  
Values in million baht or US \$)

Year	A. Direct Effect						B. Total Effect (1)				C. Total Effect (2)			
	Actual	Nominal	Export Quantity	Change in	Change in	Change in	Export Quantity	Change in	Change in	Change in	Export Quantity	Change in	Change in	Change in
	Export	Border	without	Nominal	Nominal	Real	without	Nominal	Nominal	Real	without	Nominal	Nominal	Real
	Quantity	Price	Intervention	Export Value	Export Value	Export Value	Intervention	Export Value	Export Value	Export Value	Intervention	Export Value	Export Value	Export Value
	(1)	(2)	(3)	(in baht)	(in US \$)	(in US \$)	(7)	(in baht)	(in US \$)	(in US \$)	(11)	(in baht)	(in US \$)	(in US \$)
1960	6	1,398	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	2	1,952	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	43	1,161	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	53	2,648	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	49	3,222	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	84	1,184	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	55	1,651	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	15	2,176	-333	-757	-36.82	-46.18	-262	-603	-29.33	-36.79	-252	-580	-28.22	-35.39
1968	0	2,054	-181	-372	-18.04	-21.72	-142	-291	-14.09	-16.97	-132	-271	-13.14	-15.81
1969	16	2,369	-614	-1018	-49.06	-56.00	-312	-778	-37.50	-42.81	-264	-664	-32.01	-36.54
1970	56	1,708	-343	-682	-32.75	-35.33	-238	-502	-24.09	-25.99	-184	-410	-19.47	-21.21
1971	175	2,182	-519	-1513	-72.62	-75.13	-424	-1307	-62.75	-64.92	-359	-1165	-55.95	-57.88
1972	408	3,263	-39	-1458	-69.98	-69.98	19	-1269	-60.93	-60.93	46	-1180	-56.66	-56.66
1973	275	4,306	-421	-2997	-146.26	-137.85	-251	-2267	-110.63	-104.26	-200	-2047	-99.90	-94.16
1974	444	8,762	-251	-6090	-300.90	-255.62	-56	-4380	-216.39	-183.83	-3	-3912	-193.30	-164.21
1975	595	10,676	243	-3767	-185.58	-144.37	446	-1591	-78.38	-60.97	508	-936	-46.09	-35.85
1976	1,124	6,069	729	-2597	-117.77	-86.58	1,051	-443	-21.79	-16.02	1,195	434	21.31	15.67
1977	1,653	4,667	785	-4034	-198.24	-136.83	1,214	-2064	-100.44	-69.32	1,429	-1045	-51.35	-35.44
1978	1,010	3,818	157	-3373	-166.30	-106.47	661	-2212	-109.06	-69.95	671	-1407	-69.38	-44.50
1979	1,190	4,025	-103	-3204	-235.73	-147.46	173	-4091	-201.02	-115.91	383	-3247	-159.55	-92.00
1980	452	6,499	-525	-6348	-311.04	-158.01	-334	-5104	-250.06	-127.03	-128	-3767	-184.59	-93.77
1981	1,119	8,932	-322	-12865	-593.43	-273.06	-75	-10662	-491.77	-226.28	183	-8353	-385.29	-177.29
1982	2,206	5,841	269	-11314	-493.63	-214.15	551	-9671	-421.93	-183.04	643	-7961	-347.33	-150.68
1983	1,557	6,037	-473	-8113	-353.83	-148.47	-204	-7028	-306.51	-128.79	5	-4183	-269.64	-113.30
1984	1,242	4,194	-1593	-11890	-508.10	-204.49	-1252	-10460	-447.00	-180.07	-873	-8872	-379.15	-152.74

Sources : Column (1) : Table A.13

Column (2) : Table 3.1 Column (1)

Column (3) : Column (1) plus difference in output effect (Table A.23 Column (2) minus Column (1))  
and consumption effect (Table A.26 Column (2) minus Column (1))

Column (4) : Difference of Column (3) and Column (1) multiplied by Column (2)

Column (5) : Column (4) divided by Column (1) of Table 4.5

Column (6) : Column (5) deflated by US Consumer Price Index from IMF Financial Statistics.

Column (7) : Column (1) plus difference in output effect (Table A.23 Column (4) minus Column (1))  
and consumption effect (Table A.26 Column (4) minus Column (1))Column (8)-(10) : Same as Columns (4) to (6) except Column (7) replaces Column (3),  
Column (8) replaces (4), Column (9) replaces (5), and Column (10) replaces (6).Column (11) : Column (1) plus difference in output effect (Table A.23 Column (6) minus Column (1))  
and consumption effect (Table A.26 Column (6) minus Column (1))Column (12)-(14) : Same as Columns (4) to (6) except Column (11) replaces Column (3),  
Column (12) replaces (4), Column (13) replaces (5), and Column (14) replaces (6).

APPENDIX TABLE A.34

CUMULATIVE EFFECT OF RUBBER INTERVENTION ON FOREIGN EXCHANGE EARNINGS

(Quantities in thousand tons  
Values in million baht or US \$)

Year	Actual Export Quantity (1)	Nominal Export Border Price (2)	Export Quantity without Intervention (3)	A. Direct Effect			B. Total Effect (1)			C. Total Effect (2)				
				Change in Nominal Export Value (in baht) (4)	Change in Nominal Export Value (in US \$) (5)	Change in Real Export Value (in US \$) (6)	Change in Nominal Export Value (in baht) (7)	Change in Nominal Export Value (in US \$) (8)	Change in Real Export Value (in US \$) (9)	Change in Nominal Export Value (in baht) (10)	Change in Real Export Value (in US \$) (11)	Change in Nominal Export Value (in baht) (12)	Change in Real Export Value (in US \$) (13)	Change in Real Export Value (in US \$) (14)
1960	171	14,329	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	186	10,897	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	195	9,992	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	198	9,317	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	211	8,619	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	217	8,611	241	199	9.64	12.83	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	218	8,317	242	200	9.70	12.51	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	219	6,581	243	139	7.72	9.68	260	268	13.02	16.33	263	287	13.96	17.51
1968	238	6,326	282	136	7.55	9.09	300	267	12.91	15.55	303	287	13.90	16.73
1969	282	8,765	306	212	10.20	11.64	326	385	18.55	21.18	331	427	20.60	23.51
1970	287	7,208	315	204	9.79	10.56	339	372	17.87	19.28	347	428	20.56	22.18
1971	316	5,310	347	161	7.71	7.98	373	301	14.47	14.97	385	364	17.46	18.07
1972	337	5,014	368	154	7.41	7.41	401	319	15.32	15.32	414	388	18.60	18.60
1973	368	10,837	400	154	17.01	16.03	438	401	17.33	35.19	451	388	43.89	41.56
1974	382	13,003	422	144	25.41	16.03	463	463	37.33	44.01	473	473	58.30	49.52
1975	349	9,584	393	423	20.82	16.20	428	428	29.12	29.12	436	436	41.07	31.95
1976	393	13,310	441	444	31.65	23.26	473	473	1,064	38.45	483	483	59.13	43.47
1977	431	14,475	490	444	41.84	28.88	519	519	1,272	43.14	530	530	70.74	48.82
1978	467	17,285	538	831	60.42	38.75	567	567	1,725	54.36	585	585	100.90	64.72
1979	534	22,834	617	1,886	92.47	53.44	647	647	2,517	81.01	672	672	154.57	89.13
1980	465	26,309	556	2,399	117.53	59.70	590	590	3,276	81.55	622	622	201.96	102.60
1981	508	22,006	611	2,279	105.14	48.38	650	650	3,137	66.59	686	686	180.62	85.11
1982	576	16,538	680	1,728	75.38	32.70	725	725	2,474	46.84	768	768	138.45	60.06
1983	594	20,252	689	1,935	84.40	35.47	738	738	2,916	53.43	776	776	160.94	67.62
1984	617	21,095	711	1,981	84.64	34.10	764	764	3,099	53.36	808	808	172.24	69.39

Sources : Column (1) : Table A.13

Column (2) : Table 3.6 Column (4)

Column (3) : Column (1) plus the output effect for rubber

Column (4) : Difference of Column (3) and Column (1) multiplied by Column (2)

Column (5) : Column (4) divided by Column (1) of Table 4.5

Column (6) : Column (5) deflated by US Consumer Price Index from IMF Financial Statistics.

Column (7) : Column (1) plus the output effect (Table A.21 Column (4) minus Column (1))

Column (8) : Same as Column (4) to (6) except Column (7) replaces Column (3).

Column (9) : Same as Column (4) to (6) except Column (7) replaces Column (3).

Column (10) : Same as Column (4) to (6) except Column (7) replaces Column (3).

Column (11) : Same as Column (4) to (6) except Column (7) replaces Column (3).

Column (12)-(14) : Same as Columns (4) to (6) except Column (11) replaces Column (3).

Column (12) replaces (4), Column (13) replaces (5), and Column (14) replaces (6).

NOMINAL INSTANTANEOUS TRANSFERS FROM AGRICULTURE TO THE REST OF ECONOMY  
(By Commodities)

(million baht)

Year	A. Direct Effect					B. Total Effect (1)					C. Total Effect (2)				
	Rice (1)	Sugar (2)	Maize (3)	Rubber (4)	All Products (5)	Rice (6)	Sugar (7)	Maize (8)	Rubber (9)	All Products (10)	Rice (11)	Sugar (12)	Maize (13)	Rubber (14)	All Products (15)
1960	-4217.54	n.a.	n.a.	-401.81	-4619.35	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	-5598.23	n.a.	n.a.	-359.35	-5957.59	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	-5153.74	920.81	n.a.	-308.69	-4541.62	-6923.94	874.19	n.a.	-537.56	-6587.31	-7408.08	861.44	n.a.	-600.15	-7146.79
1963	-5655.16	195.26	n.a.	-317.30	-5777.20	-7118.40	124.32	n.a.	-499.75	-7493.82	-8159.26	73.86	n.a.	-629.53	-8714.93
1964	-6543.36	6.87	n.a.	-278.53	-6815.02	-7792.28	-102.40	n.a.	-429.79	-8324.48	-8106.55	-129.90	n.a.	-467.85	-8704.30
1965	-6488.39	769.07	n.a.	-301.63	-6020.95	-8069.88	716.00	n.a.	-493.88	-7847.75	-8280.02	708.95	n.a.	-519.42	-8090.49
1966	-5619.62	330.58	n.a.	-268.84	-5557.88	-7862.82	254.76	n.a.	-485.06	-8093.12	-8265.30	241.16	n.a.	-523.86	-8547.99
1967	-8845.58	73.45	-87.75	-182.02	-9041.90	-11482.22	7.34	-234.58	-315.23	-12024.69	-12331.75	-13.96	-281.89	-358.15	-12985.76
1968	-8279.50	189.15	-79.72	-175.01	-8345.08	-10723.84	141.95	-242.44	-358.13	-11182.46	-12472.05	108.20	-358.82	-489.09	-13211.77
1969	-5720.64	103.82	-31.80	-421.53	-6070.15	-8651.75	-20.57	-301.76	-764.41	-9738.49	-10864.88	-114.49	-505.59	-1023.29	-12508.25
1970	-3529.64	184.43	-67.73	-278.62	-3691.56	-6003.23	85.19	-391.82	-552.74	-6862.59	-8380.30	-10.17	-703.25	-816.16	-9909.88
1971	-4652.34	27.00	-104.07	-180.06	-4909.47	-7422.62	-165.52	-550.73	-441.69	-8580.57	-8927.60	-270.12	-793.38	-583.83	-10574.92
1972	-5975.20	-365.89	89.54	-185.94	-6437.50	-8879.38	-582.61	-98.23	-406.12	-9966.34	-9341.43	-617.09	-128.10	-441.15	-10527.77
1973	-13089.98	-905.52	-393.49	-598.25	-14987.24	-16091.28	-1191.95	-769.34	-922.29	-18974.86	-16545.73	-1235.32	-826.25	-971.35	-19578.65
1974	-21907.92	-4142.98	-118.01	-655.56	-26824.47	-23343.68	-4350.41	-260.79	-763.76	-28718.64	-24112.64	-4461.51	-337.26	-821.71	-29733.12
1975	-9910.73	-4680.31	-336.57	-378.11	-15305.72	-12063.19	-5259.08	-693.90	-535.16	-18551.33	-15841.51	-6275.01	-1321.15	-810.84	-24248.50
1976	-4291.17	-1367.30	-132.30	-719.17	-6509.93	-6967.77	-2014.18	-530.25	-1058.59	-10570.79	-9076.42	-2523.80	-843.76	-1325.99	-13769.97
1977	-6162.12	-162.68	7.14	-848.46	-7166.13	-9585.56	-940.07	-258.36	-1313.56	-12097.55	-14022.16	-1947.54	-602.43	-1916.30	-18488.43
1978	-8447.30	1129.03	-71.86	-955.01	-8345.15	-11415.16	769.72	-420.71	-1421.43	-12487.57	-15048.40	329.86	-847.76	-1992.43	-17558.73
1979	-6685.09	1301.88	-170.33	-1394.07	-6947.61	-9671.70	947.13	-565.05	-2002.26	-11291.89	-15075.57	305.25	-1279.24	-3102.72	-19152.28
1980	-7514.74	-80.10	-206.46	-1264.23	-9065.53	-10027.97	-327.77	-537.52	-1687.08	-12580.34	-14443.61	-762.92	-1119.18	-2430.01	-18755.71
1981	-8223.66	-536.50	-337.63	-730.48	-9828.27	-11247.32	-1035.51	-703.56	-1096.08	-14082.47	-16986.44	-1982.68	-1398.11	-1790.01	-22157.23
1982	-2591.96	1850.53	0.00	-422.98	-1164.41	-5119.10	1273.07	-325.75	-786.02	-4957.80	-6847.35	878.15	-548.52	-1034.30	-7552.02
1983	-1596.86	1429.54	-0.00	-706.13	-873.46	-4006.45	1092.84	-441.66	-1184.06	-4539.33	-7869.92	552.99	-1149.80	-1950.35	-10417.08
1984	-1339.45	1454.44	0.00	-624.05	-509.07	-4159.40	1102.04	-533.53	-1156.94	-4747.83	-7060.37	739.53	-1082.39	-1705.15	-9108.38

Source : See Text

APPENDIX TABLE A.36

NOMINAL SHORT-RUN TRANSFERS FROM AGRICULTURE TO THE REST OF ECONOMY  
(By Commodities)

260

(million baht)

Year	A. Direct Effect					B. Total Effect (1)					C. Total Effect (2)				
	Rice (1)	Sugar (2)	Maize (3)	Rubber (4)	All Products (5)	Rice (6)	Sugar (7)	Maize (8)	Rubber (9)	All Products (10)	Rice (11)	Sugar (12)	Maize (13)	Rubber (14)	All Products (15)
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	-6073.94	n.a.	n.a.	-362.65	-6436.59	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	-5585.33	n.a.	n.a.	-313.49	-5898.81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	-6030.41	n.a.	n.a.	-321.52	-6351.93	-7732.95	n.a.	n.a.	-511.24	-8244.20	-8906.64	n.a.	n.a.	-645.61	-9552.25
1964	-7029.73	n.a.	n.a.	-282.22	-7311.96	-8501.33	n.a.	n.a.	-439.02	-8940.35	-8936.29	n.a.	n.a.	-480.49	-9416.79
1965	-7060.80	n.a.	n.a.	-304.77	-7365.57	-8896.97	n.a.	n.a.	-502.50	-9399.47	-9157.57	n.a.	n.a.	-529.38	-9686.95
1966	-6080.15	n.a.	n.a.	-272.30	-6352.44	-8639.94	n.a.	n.a.	-495.52	-9135.46	-9100.17	n.a.	n.a.	-535.74	-9635.91
1967	-9316.57	60.47	n.a.	-184.18	-9500.75	-12307.21	6.27	n.a.	-322.23	-12623.17	-13257.38	-12.02	n.a.	-366.74	-13636.14
1968	-8757.34	155.90	-82.60	-176.73	-8860.78	-11503.12	121.67	-266.20	-364.71	-12012.37	-13436.31	93.52	-401.26	-499.37	-14243.42
1969	-6138.56	90.07	-32.87	-422.63	-6504.00	-9439.78	-18.67	-333.08	-774.14	-10565.68	-11986.81	-105.96	-583.91	-1043.27	-13719.96
1970	-3695.00	168.39	-68.35	-282.37	-3877.32	-6409.11	82.04	-426.01	-567.31	-7320.39	-9069.04	-10.12	-806.79	-845.00	-10730.95
1971	-4811.27	18.11	-105.60	-182.80	-5081.56	-7817.30	-114.85	-597.65	-453.98	-8983.78	-9552.95	-192.61	-915.14	-606.52	-11267.22
1972	-6235.91	-260.93	91.17	-187.59	-6593.26	-9464.10	-434.55	-107.68	-415.72	-10422.05	-10061.07	-474.93	-145.84	-454.83	-11136.67
1973	-13665.66	-690.63	-383.16	-603.09	-15342.53	-17093.38	-956.17	-791.37	-941.37	-19782.29	-17621.91	-1015.98	-857.08	-993.29	-20488.26
1974	-23488.00	-3322.29	-123.10	-662.81	-27596.20	-25338.83	-3664.86	-282.58	-779.19	-30065.46	-26220.46	-3812.05	-367.49	-839.40	-31239.39
1975	-10778.19	-4347.11	-339.78	-387.53	-15852.61	-13173.64	-5079.10	-708.48	-550.22	-19511.44	-17337.48	-6110.89	-1356.96	-835.04	-25640.37
1976	-4497.27	-1341.05	-135.21	-730.62	-6704.15	-7364.04	-2044.00	-553.97	-1082.79	-11044.80	-9724.47	-2636.54	-914.17	-1371.34	-14646.52
1977	-6286.10	-149.74	7.20	-864.87	-7293.51	-9887.12	-895.24	-267.80	-1351.87	-12402.03	-14581.01	-1918.79	-636.89	-1986.12	-19122.80
1978	-8684.44	939.81	-71.81	-983.08	-8799.53	-11890.40	668.49	-432.07	-1480.76	-13134.75	-15915.01	301.32	-899.25	-2104.46	-18617.40
1979	-6962.89	968.34	-171.09	-1427.16	-7592.80	-10190.79	732.53	-579.38	-2072.13	-12109.78	-16089.60	246.37	-1342.24	-3249.77	-20435.24
1980	-7725.85	-58.90	-207.93	-1299.66	-9292.35	-10418.30	-250.58	-549.78	-1752.63	-12971.29	-15260.51	-616.26	-1173.66	-2567.27	-19617.70
1981	-8490.21	-401.53	-340.49	-758.50	-9990.73	-11699.05	-803.33	-718.62	-1148.08	-14369.08	-17914.12	-1625.60	-1457.48	-1901.15	-22898.35
1982	-2674.55	1391.36	0.00	-435.65	-1718.84	-5325.55	991.01	-334.88	-817.16	-5486.57	-7237.63	726.75	-577.39	-1092.49	-8180.77
1983	-1617.41	1027.21	-0.00	-716.56	-1306.76	-4100.52	811.39	-448.84	-1214.70	-4952.67	-8110.21	428.03	-1180.54	-2014.65	-10877.37
1984	-1351.21	996.28	0.00	-636.65	-991.58	-4243.67	779.70	-542.87	-1194.27	-5201.11	-7322.97	546.60	-1128.90	-1789.70	-9694.98

Source : See Text

APPENDIX TABLE A.37

NOMINAL LONG-RUN TRANSFERS FROM AGRICULTURE TO THE REST OF ECONOMY  
(By Commodities)

(million baht)

Year	A. Direct Effect					B. Total Effect (1)					C. Total Effect (2)				
	Rice (1)	Sugar (2)	Maize (3)	Rubber (4)	All Products (5)	Rice (6)	Sugar (7)	Maize (8)	Rubber (9)	All Products (10)	Rice (11)	Sugar (12)	Maize (13)	Rubber (14)	All Products (15)
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1963	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1964	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1965	-7479.13	n.a.	n.a.	-314.95	-7794.09	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1966	-6506.84	n.a.	n.a.	-281.53	-6788.36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1967	-9839.35	60.47	n.a.	-190.36	-9969.24	-13159.41	6.30	n.a.	-341.51	-13494.62	-14190.08	-12.06	n.a.	-390.41	-14592.56
1968	-9319.61	155.11	n.a.	-181.77	-9346.27	-12479.68	122.40	n.a.	-384.04	-12741.32	-14592.44	94.11	n.a.	-527.52	-15025.85
1969	-6460.99	86.31	n.a.	-433.50	-6808.17	-10097.94	-18.30	n.a.	-812.69	-10928.92	-12810.11	-103.85	n.a.	-1096.61	-14010.57
1970	-3891.23	136.10	n.a.	-288.01	-4043.14	-6850.76	67.45	n.a.	-593.66	-7376.96	-9697.93	-8.26	n.a.	-887.51	-10593.69
1971	-5033.59	16.09	n.a.	-186.80	-5204.30	-8285.48	-102.95	n.a.	-476.64	-8865.06	-10145.60	-171.54	n.a.	-640.79	-10957.93
1972	-6464.50	-225.21	92.26	-192.55	-6790.00	-9992.10	-380.79	-116.87	-440.26	-10930.02	-10681.89	-414.70	-161.52	-487.12	-11745.23
1973	-14259.07	-597.78	-385.36	-617.95	-15860.15	-18315.86	-858.48	-833.66	-1000.55	-21008.55	-19039.20	-920.75	-911.96	-1070.06	-21941.97
1974	-24269.93	-2768.28	-122.33	-680.19	-27840.73	-26813.01	-3202.80	-295.38	-833.20	-31144.39	-27853.30	-3380.70	-385.70	-907.23	-32526.94
1975	-11334.73	-3443.81	-343.35	-398.97	-15520.87	-14136.31	-4315.62	-739.59	-591.51	-19783.03	-18641.18	-5304.85	-1418.09	-905.17	-26269.29
1976	-4766.99	-1085.69	-136.15	-756.82	-6745.66	-7883.06	-1788.21	-565.66	-1156.25	-11393.18	-10377.54	-2335.92	-924.92	-1465.84	-15104.22
1977	-6621.71	-128.49	7.31	-897.11	-7640.00	-10489.40	-823.51	-276.16	-1432.79	-13021.86	-15506.69	-1787.09	-661.85	-2115.81	-20071.44
1978	-9022.57	827.35	-72.17	-1023.91	-9291.30	-12442.19	621.88	-436.14	-1567.84	-13824.28	-16659.96	281.69	-903.02	-2237.30	-19518.59
1979	-7136.83	885.34	-171.30	-1497.96	-7920.74	-10510.47	700.26	-584.53	-2208.12	-12602.87	-16628.22	238.05	-1355.92	-3493.84	-21239.93
1980	-7981.85	-52.77	-208.30	-1381.90	-9624.82	-10847.89	-233.04	-554.56	-1904.46	-13539.95	-15921.15	-576.25	-1183.01	-2826.93	-20507.34
1981	-8711.53	-355.37	-341.34	-808.09	-10216.33	-12138.28	-741.46	-728.51	-1254.74	-14863.00	-18662.72	-1516.87	-1479.11	-2111.67	-23770.37
1982	-2748.26	1178.02	0.00	-466.98	-2037.23	-5538.06	870.94	-341.01	-898.83	-5906.96	-7554.58	641.49	-588.73	-1220.94	-8722.76
1983	-1666.95	884.34	-0.00	-770.34	-1552.94	-4272.27	722.88	-455.16	-1340.29	-5344.84	-8519.06	386.58	-1202.19	-2270.93	-11605.60
1984	-1375.07	865.78	0.00	-677.70	-1187.00	-4361.39	695.31	-548.27	-1306.39	-5520.75	-7537.11	491.50	-1136.70	-1986.73	-10169.04

Source : See Text.

APPENDIX TABLE A.38

REAL INSTANTANEOUS TRANSFERS FROM AGRICULTURE TO THE REST OF THE ECONOMY  
(BY COMMODITIES)

(million baht, deflated by rural CPI, 1972=100)

Year	A. Direct Effect					B. Total Effect (1)						C. Total Effect (2)					
	Rice (1)	Sugar (2)	Maize (3)	Rubber (4)	All Products (5)	Rice (6)	Sugar (7)	Maize (8)	Rubber (9)	Other Traded (10)	All Products (11)	Rice (12)	Sugar (13)	Maize (14)	Rubber (15)	Other Traded (16)	All Products (17)
1960	-3601.32	n.a.	n.a.	-250.77	-3852.09	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	-4705.01	n.a.	n.a.	-224.82	-4929.83	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	-4326.52	942.59	n.a.	-201.74	-3585.67	-5635.43	908.12	n.a.	-370.97	-248.23	-5346.50	-5838.81	902.77	n.a.	-397.26	-294.72	-5628.03
1963	-4778.10	237.78	n.a.	-207.94	-4748.26	-5960.58	180.45	n.a.	-355.38	-223.91	-6359.42	-6403.83	158.96	n.a.	-410.65	-327.85	-6983.36
1964	-5545.80	94.15	n.a.	-157.72	-5609.36	-6621.59	0.03	n.a.	-288.01	-247.14	-7156.71	-6760.94	-12.16	n.a.	-304.88	-287.38	-7365.36
1965	-3542.09	800.82	n.a.	-186.59	-4927.86	-6799.58	758.63	n.a.	-339.46	-319.48	-6699.89	-6893.73	755.47	n.a.	-350.90	-347.81	-6836.97
1966	-4738.83	360.34	n.a.	-183.94	-4562.43	-6437.37	302.94	n.a.	-347.66	-431.46	-6913.55	-6616.24	296.89	n.a.	-364.90	-486.15	-7170.40
1967	-7330.34	111.44	-3.37	-105.48	-7327.74	-9386.53	59.89	-117.87	-209.35	-303.11	-9956.98	-9753.87	50.68	-138.33	-227.91	-365.49	-10434.92
1968	-7056.41	212.76	1.71	-83.38	-6925.32	-8888.92	177.38	-120.29	-220.66	-432.99	-9485.47	-9641.17	162.85	-170.36	-277.02	-638.02	-10563.71
1969	-4825.22	141.82	50.67	-316.79	-4949.52	-6906.03	53.52	-140.98	-560.20	-475.75	-8029.43	-7851.93	13.37	-228.09	-670.85	-722.49	-9459.99
1970	-2785.98	214.26	29.70	-196.21	-2738.22	-4541.30	143.84	-200.28	-390.73	-524.68	-5513.14	-5538.97	103.82	-330.99	-501.29	-876.00	-7143.44
1971	-3949.47	75.85	9.25	-113.68	-3978.05	-5833.89	-55.11	-294.58	-291.65	-884.94	-7360.16	-6479.93	-100.01	-398.74	-352.66	-1180.84	-8512.18
1972	-5074.86	-298.71	147.75	-117.68	-5343.50	-7132.26	-452.23	14.73	-273.67	-934.11	-8777.54	-7342.47	-467.92	1.14	-289.60	-1020.42	-9119.28
1973	-11503.78	-754.14	-194.85	-427.00	-12879.76	-13873.37	-980.28	-491.60	-682.83	-861.25	-16889.33	-14087.69	-1000.73	-518.43	-705.97	-927.40	-17240.23
1974	-19160.26	-3746.02	155.23	-448.49	-23199.53	-21005.00	-4012.53	-28.22	-587.52	-245.62	-25878.89	-21374.68	-4065.94	-64.98	-615.38	-307.00	-26427.98
1975	-8549.29	-4314.25	-110.55	-278.77	-13252.86	-10599.98	-4865.64	-450.99	-428.40	-436.59	-16781.60	-12354.82	-5337.49	-742.31	-556.44	-993.32	-19984.38
1976	-3648.78	-1212.04	-36.79	-637.70	-5535.32	-5990.91	-1778.09	-385.01	-934.71	-673.76	-9762.49	-7060.16	-2036.51	-543.99	-1070.31	-1076.23	-11787.19
1977	-5249.47	44.57	77.91	-724.47	-5851.46	-8213.40	-628.48	-151.95	-1127.14	-810.89	-10931.85	-10337.78	-1110.89	-316.70	-1415.75	-1618.32	-14799.45
1978	-7442.35	1250.70	46.26	-797.08	-6942.46	-10150.14	922.88	-272.01	-1222.63	-791.08	-11512.99	-11903.50	710.60	-478.11	-1498.18	-1523.22	-14692.41
1979	-5887.57	1396.61	-64.92	-1231.66	-5787.53	-8520.70	1083.84	-412.93	-1767.87	-811.47	-10429.13	-11203.81	765.14	-767.54	-2314.27	-1906.71	-15427.18
1980	-6660.00	4.13	-93.87	-1120.42	-7870.15	-8875.69	-214.22	-385.74	-1493.21	-1038.01	-12006.87	-11193.00	-442.58	-690.99	-1883.09	-1984.19	-16193.85
1981	-7276.92	-380.25	-223.06	-616.01	-8496.23	-9869.79	-808.17	-536.85	-929.52	-872.32	-13016.65	-12884.77	-1305.75	-901.72	-1294.06	-1741.61	-18127.92
1982	-2311.47	1914.62	36.16	-382.68	-743.37	-4458.47	1424.02	-240.59	-691.12	-719.49	-4685.64	-5458.61	1195.49	-369.51	-834.79	-1051.34	-6518.76
1983	-1419.30	1454.35	32.55	-670.91	-603.32	-3536.22	1158.55	-355.47	-1090.79	-966.70	-4790.63	-5813.28	840.37	-772.83	-1542.43	-1979.06	-9267.23
1984	-1187.51	1473.42	28.75	-595.34	-280.68	-3710.66	1158.12	-448.63	-1072.14	-788.79	-4862.10	-5542.66	929.19	-795.24	-1418.34	-1314.29	-8141.35

Source : See Text

APPENDIX TABLE A.39

REAL SHORT-RUN TRANSFERS FROM AGRICULTURE TO THE REST OF THE ECONOMY  
(BY COMMODITIES)

(million baht, deflated by rural CPI, 1972=100)

Year	A. Direct Effect					B. Total Effect (1)						C. Total Effect (2)					
	Rice (1)	Sugar (2)	Maize (3)	Rubber (4)	All Products (5)	Rice (6)	Sugar (7)	Maize (8)	Rubber (9)	Other Traded (10)	All Products (11)	Rice (12)	Sugar (13)	Maize (14)	Rubber (15)	Other Traded (16)	All Products (17)
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	-5155.32	n.a.	n.a.	-229.57	-5384.89	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	-4738.30	n.a.	n.a.	-206.34	-4944.64	n.a.	n.a.	n.a.	n.a.	-248.23	-248.23	n.a.	n.a.	n.a.	n.a.	-294.72	-294.72
1963	-5134.76	n.a.	n.a.	-212.29	-5347.05	-6538.00	n.a.	n.a.	-366.72	-223.91	-7128.62	-7086.27	n.a.	n.a.	-425.99	-327.85	-7840.10
1964	-6004.63	n.a.	n.a.	-161.86	-6166.49	-7286.64	n.a.	n.a.	-297.69	-247.14	-7831.47	-7532.47	n.a.	n.a.	-317.76	-287.38	-8137.61
1965	-6084.43	n.a.	n.a.	-190.65	-6275.08	-7573.07	n.a.	n.a.	-349.28	-319.48	-8241.83	-7709.88	n.a.	n.a.	-362.01	-347.81	-8419.70
1966	-5180.30	n.a.	n.a.	-187.81	-5368.11	-7167.40	n.a.	n.a.	-358.49	-431.46	-7957.35	-7393.57	n.a.	n.a.	-377.04	-486.15	-8256.76
1967	-7778.00	99.11	n.a.	-107.94	-7885.94	-10159.48	58.89	n.a.	-216.64	-303.11	-10620.34	-10609.46	52.47	n.a.	-236.67	-365.49	-11159.14
1968	-7509.13	181.26	-1.02	-85.48	-7414.38	-9612.58	158.54	-142.35	-227.72	-432.99	-10257.10	-10506.01	149.69	-208.42	-287.49	-638.02	-11490.25
1969	-5226.26	128.62	49.64	-321.12	-5369.12	-7639.24	55.28	-170.12	-575.14	-475.75	-8804.96	-8850.08	20.97	-297.78	-696.25	-722.49	-10545.63
1970	-2944.97	198.84	29.11	-201.05	-2918.06	-4919.93	140.90	-232.18	-406.76	-524.68	-5942.64	-6146.69	103.86	-422.35	-530.20	-876.00	-7871.37
1971	-4102.20	67.31	7.78	-116.13	-4143.24	-6198.40	-8.31	-337.91	-302.54	-884.94	-7732.10	-7036.60	-31.02	-507.13	-372.27	-1180.84	-9127.86
1972	-5325.04	-197.99	149.31	-119.70	-5493.42	-7676.41	-314.45	5.93	-283.55	-934.11	-9202.59	-8006.02	-336.85	-15.22	-303.26	-1020.42	-9681.77
1973	-12051.25	-549.78	-185.02	-433.71	-13219.76	-14812.63	-759.29	-512.25	-704.01	-861.25	-17649.42	-15090.02	-796.45	-547.14	-729.86	-927.40	-18090.88
1974	-20646.11	-2974.26	150.45	-460.29	-23930.22	-22901.94	-3360.73	-48.94	-608.16	-245.62	-27165.38	-23362.96	-3453.31	-93.50	-638.45	-307.00	-27855.23
1975	-9378.91	-3995.58	-113.62	-286.50	-13774.62	-11661.71	-4693.56	-464.93	-440.97	-436.59	-17697.77	-13710.33	-5188.79	-774.77	-575.74	-993.32	-21242.94
1976	-3850.01	-1186.42	-39.63	-650.69	-5726.75	-6374.23	-1806.94	-407.96	-960.78	-673.76	-10223.67	-7667.39	-2142.14	-609.97	-1116.10	-1076.23	-12611.83
1977	-5369.42	57.08	77.98	-744.10	-5978.45	-8501.80	-585.60	-160.97	-1169.64	-810.89	-11228.90	-10839.26	-1085.09	-347.62	-1486.53	-1618.32	-15376.81
1978	-7670.56	1068.59	46.31	-820.84	-7376.50	-10605.13	825.96	-282.90	-1274.50	-791.08	-12127.65	-12688.30	684.76	-524.74	-1592.93	-1523.22	-15644.43
1979	-6157.44	1072.59	-65.67	-1267.53	-6418.05	-9020.48	877.23	-426.73	-1840.56	-811.47	-11222.00	-12109.81	712.53	-823.83	-2453.62	-1906.71	-16581.43
1980	-6864.84	24.70	-95.30	-1155.86	-8091.30	-9251.65	-139.87	-397.55	-1557.79	-1038.01	-12384.87	-11935.54	-309.28	-740.51	-2009.88	-1984.19	-16979.40
1981	-7535.58	-249.28	-225.83	-638.12	-8648.80	-10303.73	-585.13	-551.31	-971.80	-872.32	-13284.30	-13719.01	-984.64	-955.11	-1381.97	-1741.61	-18782.35
1982	-2393.03	1461.19	36.16	-391.62	-1287.30	-4659.46	1149.43	-249.48	-714.77	-719.49	-5193.76	-5828.58	1051.96	-396.88	-881.15	-1051.34	-7105.99
1983	-1439.66	1055.62	32.55	-680.89	-1032.39	-3628.30	883.05	-362.50	-1120.18	-966.70	-5194.63	-6034.64	725.25	-801.15	-1600.71	-1979.06	-9690.30
1984	-1199.19	1018.44	28.75	-607.84	-759.84	-3793.40	841.62	-457.80	-1108.77	-788.79	-5307.13	-5790.85	746.85	-839.20	-1498.23	-1314.29	-8695.71

Source : See Text

APPENDIX TABLE A.40

REAL CUMULATIVE TRANSFERS FROM AGRICULTURE TO THE REST OF THE ECONOMY  
(BY COMMODITIES)

(million baht, deflated by rural CPI, 1972=100)

Year	A. Direct Effect					B. Total Effect (1)						C. Total Effect (2)					
	Rice (1)	Sugar (2)	Maize (3)	Rubber (4)	All Products (5)	Rice (6)	Sugar (7)	Maize (8)	Rubber (9)	Other Traded (10)	All Products (11)	Rice (12)	Sugar (13)	Maize (14)	Rubber (15)	Other Traded (16)	All Products (17)
1960	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1961	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1962	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-248.23	-248.23	n.a.	n.a.	n.a.	n.a.	-294.72	-294.72
1963	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-223.91	-223.91	n.a.	n.a.	n.a.	n.a.	-327.85	-327.85
1964	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-247.14	-247.14	n.a.	n.a.	n.a.	n.a.	-287.38	-287.38
1965	-6480.80	n.a.	n.a.	-201.79	-6682.59	n.a.	n.a.	n.a.	n.a.	-319.48	-319.48	n.a.	n.a.	n.a.	n.a.	-347.81	-347.81
1966	-5589.32	n.a.	n.a.	-198.15	-5787.47	n.a.	n.a.	n.a.	n.a.	-431.46	-431.46	n.a.	n.a.	n.a.	n.a.	-486.15	-486.15
1967	-8274.88	99.11	n.a.	-114.99	-8290.76	-10957.92	58.92	n.a.	-236.75	-303.11	-11438.86	-11471.59	52.43	n.a.	-260.85	-365.49	-12045.50
1968	-8041.84	180.52	n.a.	-91.30	-7952.63	-10519.42	159.22	n.a.	-247.84	-432.99	-11041.03	-11542.93	150.22	n.a.	-315.60	-638.02	-12346.32
1969	-5535.66	125.02	n.a.	-334.12	-5744.76	-8251.60	55.63	n.a.	-613.62	-475.75	-9287.34	-9582.54	22.84	n.a.	-749.62	-722.49	-11031.80
1970	-3133.64	167.80	n.a.	-209.40	-3175.24	-5331.92	127.29	n.a.	-437.09	-524.68	-6166.40	-6701.59	105.51	n.a.	-575.78	-876.00	-8047.86
1971	-4315.85	65.36	n.a.	-121.95	-4372.44	-6630.78	2.68	n.a.	-328.26	-884.94	-7841.30	-7564.17	-12.26	n.a.	-408.94	-1180.84	-9166.21
1972	-3544.39	-163.71	150.36	-125.84	-5683.58	-8167.78	-264.42	-2.62	-309.37	-934.11	-9678.30	-8578.45	-281.31	-29.68	-336.26	-1020.42	-10246.13
1973	-12615.57	-461.48	-187.12	-451.88	-13716.05	-15958.44	-667.72	-551.88	-765.81	-861.25	-18805.11	-16410.06	-707.75	-598.26	-808.05	-927.40	-19451.53
1974	-21381.41	-2453.30	151.17	-480.40	-24163.93	-24303.56	-2921.41	-61.11	-664.14	-245.62	-28195.84	-24903.21	-3046.43	-110.68	-707.41	-307.00	-29074.73
1975	-9911.17	-3131.69	-117.04	-301.64	-13461.55	-12582.16	-3963.57	-494.68	-486.56	-436.59	-17963.56	-14891.62	-4458.43	-830.15	-648.09	-993.32	-21821.61
1976	-4113.38	-937.08	-40.55	-680.93	-5771.94	-6876.30	-1559.50	-419.24	-1038.90	-673.76	-10567.72	-8279.32	-1860.46	-620.03	-1213.21	-1076.23	-13049.26
1977	-5694.09	77.64	78.08	-780.48	-6318.85	-9077.80	-517.00	-168.97	-1255.21	-810.89	-11829.87	-11669.90	-966.91	-370.02	-1614.14	-1618.32	-16239.29
1978	-7995.97	960.37	45.97	-866.83	-7856.47	-11133.40	781.34	-286.79	-1368.03	-791.08	-12797.96	-13362.92	666.98	-528.15	-1726.87	-1523.22	-16474.18
1979	-6326.42	991.96	-65.87	-1336.33	-6736.66	-9328.27	846.16	-431.69	-1971.49	-811.47	-11696.76	-12591.05	705.10	-836.05	-2671.63	-1906.71	-17300.34
1980	-7113.23	30.65	-95.65	-1240.63	-8418.87	-9665.43	-122.97	-402.15	-1710.70	-1038.01	-12939.26	-12536.04	-272.91	-749.01	-2255.05	-1984.19	-17797.20
1981	-7750.34	-204.49	-226.66	-688.32	-8869.80	-10725.67	-525.70	-560.82	-1077.35	-872.32	-13761.86	-14392.22	-886.86	-974.56	-1576.15	-1741.61	-19571.41
1982	-2465.81	1250.52	36.16	-420.51	-1599.66	-4866.35	1032.54	-255.45	-790.38	-719.49	-5599.13	-6129.05	971.13	-407.63	-997.91	-1051.34	-7614.78
1983	-1488.76	914.03	32.55	-727.21	-1269.40	-3796.42	796.41	-368.69	-1231.27	-966.70	-5566.67	-6411.28	687.07	-821.10	-1818.06	-1979.06	-10342.42
1984	-1222.88	888.84	28.75	-642.47	-947.77	-3908.98	758.76	-463.10	-1207.35	-788.79	-5609.46	-5993.22	694.78	-846.57	-1667.77	-1314.29	-9127.07

Source : See Text.

APPENDIX TABLE A.41

RURAL CONSUMER PRICE INDICES  
WITH AND WITHOUT PRICE  
INTERVENTION

(1972 actual=100)

Year	Actual Rural CPI	Rural CPI with Direct Effect of Intervention Removed	Rural CPI with Total Effect (1) of Intervention Removed	Rural CPI with Total Effect (2) of Intervention Removed
1960	78.44	82.44	n.a	n.a
1961	80.50	85.04	n.a	n.a
1962	83.79	87.82	89.62	90.82
1963	83.73	88.09	89.11	91.69
1964	85.07	90.18	90.70	91.49
1965	85.46	90.20	91.39	91.89
1966	88.43	92.25	94.14	94.98
1967	93.41	98.27	99.70	101.05
1968	93.58	98.77	100.77	104.34
1969	95.27	99.28	102.39	107.08
1970	96.79	100.67	103.76	109.70
1971	98.74	102.75	106.91	110.92
1972	100.00	104.21	107.45	108.45
1973	114.04	119.91	121.67	122.44
1974	143.09	152.16	150.50	151.69
1975	146.78	153.48	153.52	161.99
1976	151.51	155.17	156.62	161.69
1977	163.86	169.37	171.33	182.60
1978	192.30	199.82	200.86	212.35
1979	214.32	220.62	222.61	239.88
1980	252.75	260.49	262.41	278.06
1981	289.11	297.93	300.96	321.49
1982	295.84	299.59	303.88	312.08
1983	305.75	308.51	312.36	331.90
1984	314.33	316.53	320.14	332.59

Sources : Price data are from series used to calculate Bangkok CPI Business Economics Department, Ministry of Commerce. Yearly weights are interpolated expenditure shares from Household Expenditure Surveys 1963/64, Socioeconomic Surveys 1975/76 and 1980/81.

TABLE A.42

DIRECT EFFECT OF GOVERNMENT INTERVENTION ON NOMINAL INCOME 1980/81 (Absolute Change)

(Baht per Capita per Year)

Household Group	Agriculture				Farm Operating Cost			Farm		Off-Farm Income			Total		
	Rice	Sugarcane	Rubber	Maize	Traded		Non-traded	Wages	Income	Traded		Non-traded	Wages	Income	
										Rice	Non-Rice				
<b>A. Instantaneous</b>															
<b>Rural :</b>															
Rice Rich	-3806.77	-6.91	-20.46	13.12	103.08	944.24	39.80	151.31	104.34	-3069.56	27.21	1023.58	-0.14	143.52	-1875.39
Rice Medium	-804.42	3.90	-9.71	11.14	22.59	115.36	36.02	115.56	64.73	-877.70	-1.39	134.59	-2.98	18.35	-709.15
Rice Poor	-188.42	0.02	-0.88	0.37	11.85	15.89	26.06	112.06	36.02	-335.42	1.74	1.05	-1.61	-11.78	-346.05
Non-Rice Rich	-1613.72	-725.91	-641.26	-50.79	110.55	293.92	-92.33	-405.79	-99.65	-2029.56	-27.40	114.73	-2.77	124.00	-1820.98
Non-Rice Medium	-540.27	-17.18	-97.44	7.22	20.60	61.93	-0.83	62.08	19.07	-650.64	15.43	66.91	-66.54	12.72	-620.11
Non-Rice Poor	15.55	254.74	-24.27	-28.45	-43.58	-94.98	51.79	197.06	42.60	-213.53	-0.78	-19.42	46.78	-55.80	-244.76
Non-Farm Rich	-152.70	-5.79	-6.31	-0.96	-1.10	3.41	-4.72	-9.80	-5.94	-143.87	19.99	-133.26	0.29	-162.45	-418.49
Non-Farm Medium	-105.15	-0.19	-3.03	-0.24	5.21	-15.26	-5.32	-11.63	-3.25	-101.75	-25.73	-58.57	-85.25	-4.98	-276.28
Non-Farm Poor	18.38	0.00	-1.23	0.21	-10.63	5.35	17.80	29.62	-13.33	-48.66	-4.31	-86.37	80.70	-151.95	-212.61
<b>Urban :</b>															
Rich	2021.41	-1.79	-4.36	135.74	0.00	0.01	-0.01	0.01	0.00	2150.98	0.00	0.00	0.00	0.01	2151.01
Medium	-24.21	-0.10	-5.93	-0.07	-0.53	1.80	-0.37	0.86	-0.96	-26.58	-1.42	4.90	0.00	-18.55	-43.64
Poor	-12.63	0.00	12.78	-0.02	7.06	-10.91	2.70	0.24	6.01	-12.63	3.96	-102.90	6.00	20.22	-91.33
<b>B. Short-Run</b>															
<b>Rural :</b>															
Rice Rich	-3727.41	14.22	-26.11	6.25	98.28	900.02	-51.84	-189.49	28.09	-2321.71	26.13	972.76	0.01	115.94	-1406.87
Rice Medium	-834.76	5.78	-12.21	10.07	20.64	133.23	-2.25	-6.00	39.71	-722.94	-1.41	150.49	-2.64	16.79	-565.73
Rice Poor	-223.72	-0.76	-2.38	0.23	12.24	14.14	11.12	47.33	22.80	-281.09	1.76	1.29	-1.16	-10.89	-290.09
Non-Rice Rich	-1567.65	1089.83	-857.17	-61.91	117.73	321.38	54.63	253.83	71.20	-1337.54	-32.03	207.50	-2.22	63.97	-1100.31
Non-Rice Medium	-529.09	77.68	-105.65	2.67	17.31	48.28	-10.02	23.80	27.76	-535.53	17.60	77.88	-54.56	14.75	-479.85
Non-Rice Poor	5.59	79.85	-9.96	-32.15	-40.83	-84.78	-4.69	-29.30	11.93	-64.34	-0.86	-75.09	37.96	-42.45	-144.78
Non-Farm Rich	-147.40	31.27	-7.41	-1.04	-0.43	-6.71	-5.44	-13.13	-4.74	-108.52	20.68	-101.47	-0.58	-90.75	-280.62
Non-Farm Medium	-89.58	-11.07	-3.60	-0.26	1.01	-2.13	-5.24	-14.22	-1.22	-88.25	-19.74	-3.17	-61.59	-14.05	-186.81
Non-Farm Poor	-8.33	0.00	-1.73	0.04	-2.34	5.54	11.32	19.61	6.57	-44.32	-9.23	-73.08	52.24	-93.96	-168.40
<b>Urban :</b>															
Rich	2021.75	7.07	-5.33	135.73	0.00	0.00	0.08	0.52	0.67	2157.95	0.00	0.00	0.00	0.00	2157.96
Medium	-21.12	0.40	-6.75	-0.08	-0.32	0.64	-0.47	-0.12	-0.96	-25.67	-0.62	3.06	0.00	-6.81	-30.04
Poor	-30.30	0.00	12.78	-0.05	3.72	-4.07	0.03	-11.83	2.70	-8.77	1.79	-52.15	0.00	0.34	-58.79
<b>C. Long-Run</b>															
<b>Rural :</b>															
Rice Rich	-4417.48	17.93	-34.77	9.88	106.82	946.01	-144.48	-478.39	-24.26	-2724.68	27.56	1038.62	-0.01	96.78	-1359.74
Rice Medium	-924.73	7.43	-20.74	10.51	21.31	128.64	-25.71	-80.60	22.83	-754.34	-1.29	150.05	-2.73	10.24	-598.06
Rice Poor	-268.11	-0.35	-2.39	-0.41	14.61	12.22	6.63	25.32	19.81	-298.26	1.70	16.95	-1.46	-18.81	-299.89
Non-Rice Rich	-1722.21	1531.80	-1242.77	-46.88	190.86	340.99	36.79	246.09	74.22	-1305.39	-26.67	335.67	-2.25	19.18	-981.63
Non-Rice Medium	-603.44	94.05	-159.47	5.09	12.38	105.92	-18.56	-21.78	1.18	-511.46	18.34	90.82	-63.32	13.73	-451.89
Non-Rice Poor	-18.89	142.76	26.67	-38.38	-47.63	-76.49	-10.13	-23.95	18.01	0.82	-1.49	-60.44	46.90	-52.72	-86.92
Non-Farm Rich	-171.73	34.91	-10.49	-1.07	-0.58	-6.64	-7.75	-20.79	-7.19	-120.17	21.39	-93.19	-0.52	-79.39	-271.87
Non-Farm Medium	-114.61	-6.68	-5.10	-0.26	0.88	-0.99	-9.44	-21.66	-4.64	-94.50	-18.60	13.76	-76.85	2.53	-175.63
Non-Farm Poor	12.73	0.00	-2.60	-0.01	-1.22	5.26	15.80	22.22	12.16	-35.99	-10.94	-82.98	79.91	-144.03	-154.61
<b>Urban :</b>															
Rich	2016.44	10.10	-7.63	135.73	0.00	0.00	-0.18	-0.38	0.33	2156.87	0.00	0.00	0.00	0.00	2156.87
Medium	-27.11	0.56	-6.80	-0.08	-0.35	0.67	-1.29	-2.61	-1.96	-29.23	-0.53	4.54	0.00	-5.89	-31.10
Poor	-19.96	0.00	12.78	-0.06	3.65	-4.14	1.64	-9.84	4.33	-3.83	1.50	-56.48	0.00	1.37	-57.41

Source : See Text.

TABLE A.43

## TOTAL EFFECT(I) OF GOVERNMENT INTERVENTIONS ON NOMINAL INCOME 1980/81 (Absolute Change)

(Baht per Capita per Year)

Household Group	Rice	Sugarcane	Rubber	Maize	Other Agriculture		Farm Operating Cost		Farm		Off-farm Income		Total Income		
					Traded	Non-traded	Traded	Non-traded	Wages	Income	Traded non-traded	Wages			
														Rice	Non-Rice
<b>A. Instantaneous</b>															
<b>Rural :</b>															
Rice Rich	-5097.01	-8.09	-22.92	-4.89	15.47	1149.19	-38.93	138.89	105.88	-4174.30	24.82	1217.97	-0.26	151.72	-2780.03
Rice Medium	-1023.27	3.22	-15.07	7.82	-1.48	93.81	39.90	147.75	84.06	-1206.91	-2.82	151.70	-3.65	26.72	-1034.95
Rice Poor	-288.59	-0.03	-2.13	-0.25	-4.92	20.77	17.84	136.04	40.03	-469.14	1.72	-7.08	-2.38	-18.49	-495.38
Non-Rice Rich	-2023.24	-1046.28	-874.34	-134.02	-129.49	502.25	-145.75	-368.08	-104.50	-3086.90	-41.88	267.91	-3.47	144.70	-2719.63
Non-Rice Medium	-695.79	13.01	-120.45	-18.69	-79.56	47.64	-12.52	70.63	17.62	-934.57	10.78	63.10	-73.83	21.33	-913.19
Non-Rice Poor	-17.11	251.79	-20.51	-42.76	-44.92	-125.60	29.10	207.19	59.91	-298.61	-3.16	-35.42	44.87	-71.05	-363.37
Non-Farm Rich	-209.47	-12.12	-9.16	-2.57	-10.60	-10.68	-10.44	-18.88	-9.19	-216.19	-87.14	-338.57	-16.31	-315.35	-973.54
Non-Farm Medium	-138.73	-0.34	-3.93	-0.31	-10.24	-15.86	-8.40	-14.73	-5.00	-144.59	-28.38	-145.75	-66.62	-148.56	-533.88
Non-Farm Poor	27.45	0.00	-1.46	-0.18	-4.30	0.00	14.49	38.87	16.93	-40.74	6.49	-124.29	53.46	-214.69	-319.76
<b>Urban :</b>															
Rich	2015.22	-3.46	-5.81	135.67	-16.76	0.00	-0.46	0.00	0.00	2125.29	-34.25	0.00	0.00	0.00	2091.07
Medium	-31.24	-0.20	-7.33	-0.17	-11.29	1.41	-1.55	0.40	-1.16	-46.52	-24.26	-1.57	0.00	-28.85	-101.18
Poor	-18.68	0.00	12.78	-0.07	-3.69	-7.91	1.61	8.18	7.02	-34.34	-1.38	-128.85	0.00	-9.46	-174.02
<b>B. Short-Run</b>															
<b>Rural :</b>															
Rice Rich	-5188.30	12.65	-30.11	-20.08	20.67	1076.80	-169.65	-312.02	12.47	-3659.39	23.81	1161.42	-0.15	108.59	-2365.72
Rice Medium	-1152.39	4.76	-19.45	6.90	-6.18	109.62	-16.29	-20.88	46.37	-1066.17	-2.73	150.99	-3.30	22.83	-898.39
Rice Poor	-322.55	-1.08	-3.18	-3.64	-4.80	21.48	1.00	77.49	28.48	-420.83	1.72	5.47	-2.05	-19.88	-435.56
Non-Rice Rich	-2044.65	843.88	-1216.43	-189.18	-157.23	454.88	2.14	194.95	38.08	-2563.97	-44.07	296.13	-3.13	111.04	-2203.98
Non-Rice Medium	-722.13	28.66	-145.60	-29.46	-73.12	75.51	-34.57	-8.91	2.07	-829.91	12.17	63.67	-68.94	-2.93	-805.93
Non-Rice Poor	-29.25	79.44	20.73	-56.99	-45.70	-142.39	-34.20	-19.29	38.37	-162.34	-3.58	-94.28	45.48	-64.73	-279.45
Non-Farm Rich	-206.21	12.12	-11.13	-3.19	-10.38	-10.08	-12.33	-24.46	-8.60	-183.57	-85.55	-330.04	-15.63	-297.64	-912.41
Non-Farm Medium	-146.62	0.50	-4.83	-0.40	-10.82	-14.34	-13.28	-26.81	-7.59	-134.12	-31.92	-117.24	-69.39	-131.71	-484.38
Non-Farm Poor	29.16	0.00	-2.03	-0.43	-2.54	7.36	14.68	35.76	16.43	-35.33	14.32	-123.75	71.25	-236.93	-312.44
<b>Urban :</b>															
Rich	2014.49	5.19	-7.25	135.67	-16.76	0.00	-0.55	-0.18	0.45	2131.62	-34.25	0.00	0.00	0.00	2097.40
Medium	-31.93	0.28	-8.62	-0.22	-11.20	1.47	-2.24	-2.08	-1.81	-44.10	-24.08	-1.01	0.00	-27.54	-96.72
Poor	-20.18	0.00	12.78	-0.12	-4.55	-8.34	1.10	3.10	6.22	-30.78	-1.81	-124.67	0.00	-6.94	-164.19
<b>C. Long-Run</b>															
<b>Rural :</b>															
Rice Rich	-6117.48	15.68	-40.06	-15.69	28.29	1195.28	-321.62	-709.34	-69.58	-3833.67	27.49	1280.85	-0.14	91.47	-2433.99
Rice Medium	-1312.08	6.00	-31.56	5.43	0.77	127.88	-37.99	-108.05	34.73	-1092.49	-2.72	175.35	-3.57	0.97	-922.47
Rice Poor	-415.20	-0.77	-4.91	-2.39	-2.12	20.54	-15.30	26.32	18.20	-434.17	1.64	5.02	-2.59	-30.48	-460.59
Non-Rice Rich	-2358.20	1187.41	-1822.48	-188.79	-40.27	718.99	-46.90	161.25	-27.90	-2589.91	-37.06	505.32	-3.13	64.04	-2056.73
Non-Rice Medium	-796.80	63.64	-165.31	-30.15	-67.51	81.15	-47.07	-53.19	-10.85	-805.02	12.09	114.73	-76.34	-25.37	-783.91
Non-Rice Poor	-58.40	108.73	50.63	-58.62	-59.95	-145.06	-47.34	-42.98	27.48	-163.12	-3.75	-105.79	49.97	-79.16	-241.67
Non-Farm Rich	-204.91	31.38	-15.86	-3.41	-10.63	-9.99	-17.17	-35.90	-14.42	-196.04	-84.09	-317.52	-16.14	-283.29	-897.06
Non-Farm Medium	-162.15	-10.44	-7.11	-0.45	-10.61	-13.96	-16.08	-37.54	-7.65	-146.75	-32.11	-109.10	-73.06	-126.37	-487.36
Non-Farm Poor	23.09	0.00	-3.18	-0.53	-2.47	7.90	13.79	32.17	15.98	-37.11	13.92	-125.76	65.24	-289.51	-373.23
<b>Urban :</b>															
Rich	2009.24	7.49	-10.67	135.66	-16.76	0.00	-1.15	-2.25	-0.37	2128.74	-34.25	0.00	0.00	0.00	2094.52
Medium	-37.52	0.42	-11.70	-0.24	-11.20	1.47	-3.13	-4.70	-2.88	-46.07	-24.08	-1.01	0.00	-27.54	-100.69
Poor	-28.34	0.00	12.78	-0.14	-4.55	-8.34	0.69	-0.76	5.56	-34.03	-1.81	-124.67	0.00	-6.94	-167.43

Source : See Text.

TABLE A.44

TOTAL EFFECT(2) OF GOVERNMENT INTERVENTIONS ON NOMINAL INCOME 1980/81 (Absolute Change)

(Bant per Capita per Year)

Household Group	Rice	Sugarcane	Rubber	Maize	Other Agriculture		Farm Operating Cost		Farm Income	Off-Farm Income			Total Income		
					Traded	Non-traded	Traded	Non-traded		Traded	Non-traded	Wages			
					Rice		Non-Rice								
<b>A. Instantaneous</b>															
<b>Rural :</b>															
Rice Rich	-7308.49	-10.50	-26.97	-40.24	-73.49	1366.12	-116.15	171.76	129.59	-6279.21	20.31	1472.59	-0.51	185.03	-4597.78
Rice Medium	-1524.90	1.95	-23.97	4.94	-64.62	115.14	20.15	172.81	109.62	-1792.24	-4.67	161.81	-4.83	31.44	-1608.47
Rice Poor	-422.09	-0.15	-4.53	-3.38	-37.95	8.97	7.48	186.33	43.24	-696.28	1.17	-15.91	-3.97	-31.75	-746.76
Non-Rice Rich	-3176.68	-1565.32	-1370.19	-258.43	-548.93	975.83	-239.58	-268.76	-118.41	-5317.07	-77.17	589.41	-4.97	154.88	-4654.92
Non-Rice Medium	-834.19	-3.30	-141.61	-63.49	-223.16	-56.47	-29.63	50.57	28.21	-1376.76	-3.73	-1.98	-91.04	42.37	-1431.14
Non-Rice Poor	-62.68	267.51	8.21	-82.60	-96.78	-190.92	-19.86	217.66	65.16	-423.50	7.43	-65.69	47.79	-92.39	-526.38
Non-Farm Rich	-317.60	-24.21	-14.28	-5.45	-89.97	-16.91	-43.85	-67.20	-20.96	-337.32	-243.71	-354.76	-18.79	-690.27	-1844.84
Non-Farm Medium	-201.90	-0.66	-3.68	-0.32	22.74	-27.43	2.27	13.70	0.19	-232.70	-65.68	-329.35	-66.71	-281.53	-975.99
Non-Farm Poor	32.89	8.80	-1.79	-0.98	-10.71	4.75	12.47	40.26	17.36	-46.70	15.78	-257.90	17.79	-243.15	-314.19
<b>Urban :</b>															
Rich	2003.39	-6.62	-8.37	135.59	-46.20	0.01	-1.26	0.01	0.00	2079.84	-94.40	0.00	0.00	0.01	1984.66
Medium	-48.65	-0.41	-10.13	-0.37	-62.07	20.35	2.40	-18.75	8.65	-93.59	-70.16	-26.68	8.00	-49.43	-259.89
Poor	-7.28	0.00	12.78	-0.06	146.04	-101.05	-30.11	124.41	-43.33	-0.48	0.10	-257.64	0.00	-145.95	-423.96
<b>B. Short-Run</b>															
<b>Rural :</b>															
Rice Rich	-7765.75	1.84	-43.06	-85.45	-69.91	1393.65	-365.60	-496.30	-7.53	-5697.66	21.45	1493.20	-0.40	114.17	-4069.24
Rice Medium	-1712.26	3.32	-27.76	10.86	-62.43	122.95	-50.31	-40.99	66.68	-1638.94	-4.64	169.67	-4.67	23.51	-1435.87
Rice Poor	-489.12	0.08	-6.50	-6.60	-37.71	8.55	-20.82	107.46	26.52	-644.57	1.12	-9.84	-3.91	-39.05	-694.24
Non-Rice Rich	-3187.62	366.31	-1802.11	-429.01	-471.17	1124.26	-135.00	199.04	2.18	-4465.63	-77.45	783.66	-4.31	121.48	-3442.22
Non-Rice Medium	-912.09	-156.97	-127.06	-68.75	-197.80	-24.85	-98.86	-188.76	-3.53	-1199.94	0.20	12.76	-89.17	2.65	-1273.45
Non-Rice Poor	-75.91	258.75	21.34	-94.25	-112.47	-175.05	-34.24	175.34	44.81	-366.79	6.94	-64.42	47.40	-106.94	-483.64
Non-Farm Rich	-335.80	-0.23	-17.64	-7.03	-89.42	-15.58	-49.28	-83.27	-22.65	-310.66	-239.78	-541.60	-18.34	-642.90	-1753.26
Non-Farm Medium	-216.86	0.14	-7.15	-0.32	22.65	-24.50	-3.93	-1.26	-3.31	-221.01	-65.53	-299.07	-79.66	-239.11	-904.40
Non-Farm Poor	30.48	0.00	-2.65	-1.59	-10.34	3.11	10.90	34.03	16.40	-42.30	17.39	-214.39	45.06	-332.32	-526.54
<b>Urban :</b>															
Rich	2000.33	1.46	-10.76	135.54	-46.19	0.00	-1.83	-1.67	-0.05	2083.92	-94.40	0.00	0.00	0.00	1989.55
Medium	-51.32	0.06	-12.17	-0.49	-60.71	19.58	1.19	-22.91	7.70	-91.04	-67.68	-17.76	0.00	-56.16	-232.63
Poor	-15.25	0.00	12.78	-0.20	142.94	-102.18	-33.80	118.88	-47.38	-0.30	-4.48	-229.70	0.00	-129.34	-363.80
<b>C. Long-Run</b>															
<b>Rural :</b>															
Rice Rich	-8825.93	6.74	-55.94	-73.87	-52.27	1505.22	-534.45	-963.99	-87.60	-5910.23	25.87	1630.72	-0.40	87.51	-4166.32
Rice Medium	-1897.08	6.23	-44.64	9.18	-52.94	149.43	-100.17	-137.28	43.36	-1635.97	-4.60	166.48	-5.09	-3.00	-1442.20
Rice Poor	-580.55	0.14	-7.44	-6.32	-37.89	10.56	-39.36	59.91	15.73	-657.87	0.98	-1.08	-4.82	-33.90	-716.70
Non-Rice Rich	-3656.53	732.23	-2427.68	-486.06	-355.46	1347.41	-221.17	65.85	-117.30	-4575.56	-76.78	1064.95	-4.41	81.24	-3570.53
Non-Rice Medium	-961.52	61.17	-201.66	-29.80	-195.53	11.86	-68.05	-66.24	-1.49	-1202.87	3.73	68.75	-94.48	-42.34	-1267.24
Non-Rice Poor	-93.72	41.59	40.41	-107.37	-111.86	-194.77	-112.88	-70.51	17.02	-264.66	7.29	-126.64	45.94	-126.54	-464.61
Non-Farm Rich	-393.31	7.07	-24.31	-7.27	-89.29	-14.95	-55.59	-101.11	-28.16	-337.30	-237.49	-524.95	-19.20	-616.96	-1735.89
Non-Farm Medium	-245.39	0.38	-12.10	-0.54	23.36	-22.92	-9.54	-12.67	-5.56	-232.75	-63.62	-267.72	-106.50	-228.80	-893.36
Non-Farm Poor	32.20	0.00	-0.62	-1.76	-10.94	2.37	11.28	32.13	16.41	-38.54	15.36	-230.14	64.78	-396.57	-555.13
<b>Urban :</b>															
Rich	1993.42	3.92	-15.36	135.53	-46.19	0.00	-2.76	-4.39	-1.19	2079.66	-94.40	0.00	0.00	0.00	1985.30
Medium	-55.02	0.20	-16.38	-0.51	-60.71	19.58	-0.17	-26.34	6.24	-96.58	-67.68	-17.76	0.00	-56.16	-238.19
Poor	-23.82	0.00	12.78	-0.22	142.94	-102.10	-33.54	115.02	-48.05	-3.83	-4.48	-229.70	0.00	-129.34	-367.33

Source : See Text.

TABLE A.45

## EFFECT ON CONSUMER PRICE INDICES OF AGRICULTURAL PRICE INTERVENTION

(Indices Actual = 1)

Types of Effects	Rural Rice			Rural Non-Rice			Rural Non-Fare			Urban		
	Rich	Medium	Poor	Rich	Medium	Poor	Rich	Medium	Poor	Rich	Medium	Poor
<b>A. Direct Effects :</b>												
Instantaneous	1.0620	1.0819	1.0893	1.0460	1.0648	1.0772	1.0252	1.0454	1.0689	1.0151	1.0239	1.0302
Short-Run	1.0487	1.0643	1.0701	1.0360	1.0508	1.0606	1.0198	1.0356	1.0540	1.0118	1.0187	1.0236
Long-Run	1.0487	1.0643	1.0701	1.0360	1.0508	1.0606	1.0198	1.0356	1.0540	1.0118	1.0187	1.0236
<b>B. Total Effects(1) :</b>												
Instantaneous	1.1032	1.1265	1.1347	1.0843	1.1070	1.1218	1.0585	1.0827	1.1089	1.0398	1.0494	1.0560
Short-Run	1.0886	1.1073	1.1137	1.0734	1.0918	1.1036	1.0525	1.0720	1.0926	1.0362	1.0436	1.0489
Long-Run	1.0886	1.1073	1.1137	1.0734	1.0918	1.1036	1.0525	1.0720	1.0926	1.0362	1.0436	1.0489
<b>C. Total Effects(2) :</b>												
Instantaneous	1.1783	1.2087	1.2185	1.1536	1.1842	1.2035	1.1181	1.1503	1.1823	1.0840	1.0952	1.1028
Short-Run	1.1614	1.1863	1.1941	1.1410	1.1664	1.1824	1.1112	1.1378	1.1633	1.0798	1.0885	1.0944
Long-Run	1.1614	1.1863	1.1941	1.1410	1.1664	1.1824	1.1112	1.1378	1.1633	1.0798	1.0885	1.0944

Source : See Text.

TABLE A.46

## DIRECT EFFECT OF GOVERNMENT INTERVENTIONS ON REAL INCOME (Absolute Change)

(Bant per Capita per Year)

Household Group	Rice	Sugarcane	Rubber	Maize	Other Agriculture		Farm Operating Cost			Farm	Off-Farm Income		Total Income			
					Traded	Non-traded	Traded	Non-traded	Wages	Income	Traded	Non-traded		Wages		
															Rice	Non-Rice
<b>A. Instantaneous</b>																
<b>Rural :</b>																
Rice Rich	-2955.93	-5.07	-16.37	26.81	146.92	1171.01	80.58	303.75	172.01	-2189.19	31.64	1315.54	0.05	151.56	-660.40	
Rice Medium	-460.00	4.40	-5.56	16.12	57.80	193.45	51.60	186.66	85.59	-518.35	-0.49	329.19	-2.51	57.80	-134.29	
Rice Poor	-49.36	0.86	0.09	2.40	32.16	51.74	34.16	147.11	42.85	-187.06	1.99	105.20	-1.04	11.43	-69.50	
Non-Rice Rich	-1421.50	-600.92	-552.11	-13.52	229.11	624.32	-66.47	-210.36	-39.07	-1418.80	-20.96	430.32	-2.35	177.76	-854.01	
Non-Rice Medium	-432.37	-3.69	-64.90	29.59	75.88	189.35	11.40	126.87	37.21	-384.81	20.81	211.15	-61.98	59.02	-158.60	
Non-Rice Poor	59.03	254.85	-0.45	-13.00	1.82	-29.00	69.24	249.34	65.33	-119.97	1.02	64.94	48.13	-26.13	-32.02	
Non-Farm Rich	-142.71	-4.62	-5.75	-0.65	0.85	15.98	-3.69	-1.60	-3.20	-128.50	33.48	141.40	1.29	126.54	174.22	
Non-Farm Medium	-91.25	-0.12	-2.54	-0.14	10.73	-4.73	-2.63	-0.43	-0.97	-87.32	-11.47	104.92	-73.82	121.03	53.34	
Non-Farm Poor	26.66	0.00	-0.86	0.46	-6.32	12.86	18.76	36.45	14.52	-36.92	7.08	6.42	89.52	-59.33	6.76	
<b>Urban :</b>																
Rich	1992.00	-1.53	-4.11	133.73	2.85	2.68	0.07	2.61	0.81	2122.18	5.82	192.16	0.00	205.83	2526.01	
Medium	-22.58	-0.08	-5.58	-0.04	2.16	4.13	-0.07	3.71	-0.13	-25.51	4.29	94.52	0.00	70.63	143.93	
Poor	-9.54	0.00	12.78	0.01	13.32	-7.37	3.34	8.37	6.88	-9.36	7.07	-45.55	0.00	54.10	6.27	
<b>B. Short-Run</b>																
<b>Rural :</b>																
Rice Rich	-3054.70	14.70	-22.44	17.45	133.35	1082.35	-15.17	-52.49	85.42	-1847.26	29.70	1267.22	0.15	147.46	-462.73	
Rice Medium	-558.40	4.06	-8.75	14.11	48.86	175.69	12.50	58.08	57.87	-451.10	-0.69	290.10	-2.28	48.44	-115.55	
Rice Poor	-109.79	-0.68	-1.50	1.93	28.45	42.91	18.57	79.59	29.13	-166.06	1.96	84.52	-0.74	7.61	-72.71	
Non-Rice Rich	-1417.06	1125.62	-779.05	-32.01	211.35	582.03	69.99	385.62	113.22	-878.04	-26.77	454.15	-1.90	108.62	-343.93	
Non-Rice Medium	-443.88	83.81	-79.39	20.67	61.40	150.20	8.15	77.14	41.76	-331.42	21.14	190.48	-51.51	51.45	-119.86	
Non-Rice Poor	40.82	90.76	1.83	-19.62	-4.95	-32.77	12.45	25.31	31.80	3.19	0.58	-4.66	39.54	-19.56	19.09	
Non-Farm Rich	-139.63	31.47	-6.95	-0.79	1.10	3.40	-4.61	-6.59	-2.60	-97.70	31.31	114.57	0.23	135.82	-184.25	
Non-Farm Medium	-79.11	-10.64	-3.19	-0.18	5.52	5.75	-3.12	-5.26	0.52	-77.29	-8.65	124.37	-53.36	86.03	71.10	
Non-Farm Poor	-0.38	0.00	-1.41	0.25	0.66	11.50	12.41	25.56	7.86	-35.21	0.06	1.31	60.71	-23.31	3.76	
<b>Urban :</b>																
Rich	1998.71	7.17	-5.12	134.15	2.24	2.10	0.14	2.56	1.30	2135.25	4.57	150.89	0.00	161.62	2452.34	
Medium	-19.90	0.41	-6.46	-0.06	1.79	2.51	-0.23	2.14	-0.31	-23.31	3.84	73.43	0.00	62.97	116.92	
Poor	-27.46	0.00	12.78	-0.03	8.73	-1.44	0.59	-5.14	3.46	-6.29	4.29	-8.14	0.00	27.49	17.36	
<b>C. Long-Run</b>																
<b>Rural :</b>																
Rice Rich	-3712.75	18.24	-30.70	20.91	141.50	1126.20	-103.51	-327.98	35.50	-2040.82	31.06	1270.03	0.13	131.10	-608.50	
Rice Medium	-699.31	7.61	-16.76	14.33	49.49	190.17	-9.55	-12.01	42.61	-474.96	-0.58	289.69	-2.37	42.30	-145.93	
Rice Poor	-151.74	-0.29	-1.51	1.33	30.67	41.12	16.24	59.02	26.33	-182.11	1.90	99.16	-1.02	0.21	-81.87	
Non-Rice Rich	-1566.24	1552.22	-1151.24	-17.50	281.94	600.96	52.77	378.15	114.14	-847.00	-23.72	577.86	-1.93	65.39	-229.38	
Non-Rice Medium	-514.64	99.39	-130.61	22.97	56.71	205.06	-8.00	33.76	16.46	-308.52	21.84	202.80	-59.85	50.48	-93.25	
Non-Rice Poor	17.74	150.83	36.37	-25.50	-11.36	-24.95	7.32	30.35	37.53	64.63	-0.01	-9.71	47.97	-29.24	73.64	
Non-Farm Rich	-163.48	35.04	-9.97	-0.82	0.95	3.27	-6.88	-14.11	-5.00	-109.12	32.01	122.69	0.29	146.96	192.83	
Non-Farm Medium	-103.47	-4.40	-4.64	-0.18	5.40	6.85	-7.17	-12.46	-2.79	-83.32	-7.35	140.74	-70.02	102.04	81.89	
Non-Farm Poor	19.60	0.00	-2.24	0.20	1.72	11.26	16.66	28.03	13.14	-27.30	-1.54	-7.88	86.96	-70.19	-20.54	
<b>Urban :</b>																
Rich	1995.44	10.17	-7.40	134.15	2.24	2.10	-0.12	1.67	0.96	2134.18	4.57	150.89	0.00	161.62	2451.26	
Medium	-25.78	0.57	-8.47	-0.06	1.76	2.52	-1.04	-0.31	-1.31	-26.81	3.93	74.88	0.00	63.87	115.88	
Poor	-17.36	0.00	12.78	-0.04	8.66	-1.51	2.17	-3.20	5.06	-1.46	4.01	-12.37	0.00	28.50	18.70	

Source : See Text.

TABLE A.47

TOTAL EFFECT(1) OF GOVERNMENT INTERVENTIONS ON REAL INCOME (Absolute Change)

(Bant per Capita per Year)

Household Group	Rice	Sugarcane	Rubber	Maize	Other Agriculture		Farm Operating Cost			Farm	Off-Farm Income		Total		
					Traded	Non-traded	Traded	Non-traded	Wages	Income	Traded	Non-traded	Wages	Income	
A. Instantaneous															
Rural :															
Rice Rich	-3612.80	-5.03	-15.83	18.73	93.92	1493.43	33.79	384.35	214.18	-2660.11	32.14	1667.68	0.05	211.91	-748.31
Rice Medium	-488.14	4.03	-8.31	15.59	53.49	212.15	62.59	249.65	112.85	-636.51	-1.32	411.20	-2.87	84.46	-145.03
Rice Poor	-75.29	-0.03	-0.57	2.88	26.49	72.12	30.54	183.96	49.45	-238.38	2.09	144.74	-1.47	15.93	-77.10
Non-Rice Rich	-1651.46	-800.33	-698.52	-61.63	98.85	1070.41	-95.87	-25.38	3.02	-1924.55	-29.37	814.16	-2.67	238.17	-904.25
Non-Rice Medium	-509.23	31.53	-66.49	19.37	18.01	251.76	8.06	172.80	46.60	-487.70	18.51	289.78	-65.87	94.10	-151.18
Non-Rice Poor	52.29	255.28	3.04	-17.81	23.70	-22.35	58.00	285.27	92.45	-144.86	-0.17	94.08	47.12	-24.45	-28.29
Non-Farm Rich	-183.87	-9.14	-7.75	-1.78	-5.68	18.37	-7.80	0.08	-2.84	-179.38	-50.87	290.62	-13.13	343.19	390.43
Non-Farm Medium	-111.72	-0.20	-3.00	-0.13	0.64	2.70	-3.44	5.21	-0.85	-115.93	-3.09	148.48	-47.94	84.05	65.58
Non-Farm Poor	39.17	0.00	-0.88	0.25	1.64	19.19	16.27	48.37	18.38	-23.63	22.79	23.66	69.57	-67.42	24.97
Urban :															
Rich	1939.80	-2.72	-5.12	130.49	-8.77	6.90	-0.24	6.72	2.09	2031.99	-17.92	495.61	0.01	530.85	3060.56
Medium	-27.63	-0.15	-6.56	-0.11	-5.37	6.13	-0.90	6.17	0.51	-39.49	-11.70	179.12	0.00	151.15	279.88
Poor	-12.77	0.00	12.78	-0.02	8.20	-1.66	2.82	22.48	8.55	-27.28	4.53	-23.68	0.00	53.44	7.02
B. Short-Run															
Rural :															
Rice Rich	-3889.42	13.62	-23.35	1.71	88.51	1382.23	-95.73	-61.74	114.31	-2383.76	30.26	1557.33	0.11	164.48	-631.58
Rice Medium	-678.26	5.31	-13.19	13.69	41.69	210.17	8.73	83.36	74.86	-587.76	-1.45	374.91	-2.66	73.01	-143.96
Rice Poor	-135.63	-0.92	-1.73	-0.60	22.21	65.57	13.64	124.69	37.76	-227.29	2.84	134.77	-1.30	9.87	-81.91
Non-Rice Rich	-1716.02	931.06	-1038.31	-121.70	45.60	939.47	35.92	458.02	122.95	-1576.87	-32.91	774.90	-2.45	195.60	-641.72
Non-Rice Medium	-557.76	43.44	-96.59	4.53	11.14	250.42	-14.83	86.57	28.57	-450.31	18.78	278.96	-62.44	62.36	-152.64
Non-Rice Poor	31.90	98.64	37.22	-34.08	13.71	-51.53	-3.27	69.49	48.53	-42.19	-0.96	23.22	47.37	-25.03	2.41
Non-Farm Rich	-183.24	13.60	-9.75	-2.44	-5.95	16.14	-9.85	-7.05	-2.89	-151.94	-52.86	238.03	-12.79	296.49	316.94
Non-Farm Medium	-124.21	0.57	-3.95	-0.24	-1.21	1.88	-8.59	-8.47	-3.77	-109.63	-9.45	139.51	-52.78	71.66	39.31
Non-Farm Poor	39.13	0.00	-1.48	-0.04	2.44	17.07	16.20	44.23	17.73	-21.02	27.72	3.90	83.65	-109.76	-15.51
Urban :															
Rich	1945.65	5.56	-6.57	130.94	-9.46	6.30	-0.35	5.96	2.34	2064.46	-19.34	452.56	0.01	484.74	2982.45
Medium	-28.69	0.31	-7.88	-0.17	-5.95	5.66	-1.63	3.15	-0.30	-37.96	-12.93	159.52	0.00	132.34	240.98
Poor	-14.92	0.00	12.78	-0.07	5.93	-2.83	2.19	15.89	7.60	-24.75	3.40	-32.54	0.00	48.16	-5.72
C. Long-Run															
Rural :															
Rice Rich	-4742.97	16.40	-32.49	5.74	95.51	1491.06	-235.33	-426.72	38.94	-2543.86	33.64	1667.04	0.12	148.75	-694.30
Rice Medium	-822.47	6.43	-24.13	12.36	47.97	226.66	-10.87	4.64	64.35	-611.53	-1.44	396.91	-2.91	53.27	-165.70
Rice Poor	-218.82	-0.64	-3.29	0.52	24.61	64.73	-0.99	78.74	28.53	-239.26	1.96	134.36	-1.76	0.35	-104.38
Non-Rice Rich	-2008.13	1251.09	-1602.92	-121.34	154.56	1204.14	-9.77	426.63	61.48	-1601.04	-26.38	973.51	-2.45	151.81	-504.54
Non-Rice Medium	-626.16	75.48	-114.64	3.90	16.28	255.59	-26.28	46.01	16.73	-431.18	18.70	307.41	-69.21	51.25	-122.42
Non-Rice Poor	5.49	125.18	64.31	-35.55	0.80	-53.95	-15.18	48.02	58.66	11.47	-1.11	12.79	51.44	-38.11	36.46
Non-Farm Rich	-229.51	31.90	-14.25	-2.65	-6.19	16.23	-14.45	-17.92	-6.42	-163.79	-51.47	249.93	-13.28	310.12	331.53
Non-Farm Medium	-136.83	-9.64	-6.08	-0.28	-1.02	2.23	-11.20	-18.48	-3.83	-121.41	-9.63	147.11	-56.21	76.64	36.51
Non-Farm Poor	33.58	0.00	-2.53	-0.13	2.50	17.56	15.39	40.94	17.32	-22.65	27.36	2.06	78.15	-156.06	-71.14
Urban :															
Rich	1940.58	7.78	-9.87	130.93	-9.46	6.30	-0.93	3.96	1.55	2061.68	-19.34	452.56	0.01	484.74	2979.67
Medium	-34.05	0.44	-10.83	-0.19	-5.95	5.66	-2.48	0.64	-1.32	-41.76	-12.93	159.52	0.00	132.34	237.17
Poor	-22.70	0.00	12.78	-0.09	5.93	-2.83	1.80	12.21	6.97	-27.84	3.40	-32.54	0.00	48.16	-8.61

TABLE A.4B

## TOTAL EFFECT(2) OF GOVERNMENT INTERVENTIONS ON REAL INCOME (Absolute Change)

(YANT per Capita per Year)

Household Group	Crops				Other Agriculture		Farm Operating Cost			Farm	Off-Farm Income		Total		
	Rice	Sugarcane	Rubber	Maize	Traded	Non-traded	Traded	Non-traded	Wages	Income	Traded	Non-traded	Income		
											Rice	Non-Rice			
<b>A. Instantaneous</b>															
<b>Rural :</b>															
Rice Rich	-4572.22	-5.19	-14.88	3.33	66.74	1890.29	13.21	565.97	301.24	-3510.57	32.83	2161.72	0.03	280.78	-1035.20
Rice Medium	-615.86	3.44	-12.04	19.03	30.76	293.34	58.43	325.09	149.46	-814.54	-2.05	558.89	-3.43	119.36	-141.76
Rice Poor	-76.01	-0.03	-1.75	1.91	15.42	88.64	28.52	249.69	56.89	-307.03	1.82	214.97	-2.31	22.61	-69.95
Non-Rice Rich	-2385.99	-1074.73	-1002.87	-117.81	-101.80	1886.36	-141.61	305.27	67.69	-3028.28	-51.04	1482.65	-3.40	313.70	-1286.37
Non-Rice Medium	-512.48	28.87	-51.30	4.72	-63.84	287.86	6.14	218.07	73.20	-588.97	10.97	372.86	-75.56	156.19	-124.51
Non-Rice Poor	53.14	270.29	40.03	-36.99	18.88	-19.04	33.43	337.32	114.96	-162.89	10.29	141.15	50.80	-16.20	23.14
Non-Farm Rich	-257.23	-17.24	-11.04	-3.63	-72.19	39.31	-34.56	-25.84	-7.58	-254.14	-157.82	671.25	-12.45	608.62	855.47
Non-Farm Medium	-147.44	-0.37	-3.86	-0.01	37.05	5.83	9.36	44.10	6.61	-172.17	-17.55	197.92	-34.75	133.73	107.16
Non-Farm Poor	49.78	0.00	-0.83	-0.19	-0.39	22.81	15.58	54.97	19.58	-18.92	39.93	-5.03	48.59	-7.56	57.01
<b>Urban :</b>															
Rich	1851.67	-4.88	-6.77	125.12	-27.75	13.96	-0.76	15.60	4.23	1934.27	-56.70	1002.99	0.01	1074.32	3954.92
Medium	-40.47	-0.30	-8.47	-0.25	-46.72	27.42	3.27	-6.43	10.89	-76.52	-42.97	309.35	0.00	266.45	456.50
Poor	2.04	0.00	12.78	0.03	152.98	-81.39	-25.02	138.70	-35.96	8.77	10.33	-60.85	0.00	-40.85	-82.37
<b>B. Short-Run</b>															
<b>Rural :</b>															
Rice Rich	-5190.31	5.00	-29.73	-39.34	58.48	1871.02	-212.19	-45.16	169.10	-3236.84	32.79	2122.96	0.00	208.80	-872.21
Rice Medium	-856.08	6.13	-16.32	21.24	23.97	283.79	-4.43	131.08	109.66	-773.81	-2.26	529.57	-5.42	104.72	-145.21
Rice Poor	-164.56	8.15	-3.66	-1.28	10.62	80.82	2.85	177.71	41.61	-300.18	1.72	198.43	-2.41	11.41	-91.03
Non-Rice Rich	-2432.57	582.84	-1407.89	-277.45	-65.87	1950.83	-57.02	673.89	159.96	-2447.02	-53.17	1588.32	-2.93	272.98	-641.60
Non-Rice Medium	-605.91	-105.38	-46.49	-5.44	-36.26	287.14	-56.17	-0.98	42.26	-502.63	13.12	354.45	-75.20	112.71	-97.54
Non-Rice Poor	31.76	262.64	48.34	-50.86	-4.56	-20.74	16.58	291.18	93.37	-137.85	9.62	124.03	50.38	-35.22	10.95
Non-Farm Rich	-276.78	3.97	-14.23	-5.15	-72.63	37.54	-40.61	-42.44	-9.80	-234.53	-158.80	618.54	-12.38	582.86	795.70
Non-Farm Medium	-164.56	0.31	-5.29	-0.21	35.93	5.98	3.39	28.73	3.06	-166.31	-20.93	186.07	-48.46	140.72	91.08
Non-Farm Poor	46.81	0.00	-1.65	-0.78	-1.00	19.79	13.95	48.30	18.55	-17.62	39.16	9.77	69.28	-105.27	-4.67
<b>Urban :</b>															
Rich	1855.82	2.32	-9.05	125.55	-28.59	13.31	-1.31	11.42	3.99	1945.45	-58.43	956.86	0.01	1024.90	3868.82
Medium	-43.45	0.13	-10.45	-0.37	-46.46	26.25	2.10	-11.05	9.87	-75.28	-42.44	295.87	0.00	257.18	435.33
Poor	-5.94	0.00	12.78	-0.10	149.63	-83.81	-28.04	132.59	-40.20	8.25	5.40	-49.93	0.00	-16.69	-52.95
<b>C. Long-Run</b>															
<b>Rural :</b>															
Rice Rich	-6103.19	9.22	-40.82	-29.20	73.67	1967.09	-357.58	-446.15	100.15	-3419.87	36.59	2241.37	0.08	185.84	-955.97
Rice Medium	-1011.88	6.89	-30.55	19.83	31.97	306.11	-46.46	49.91	98.00	-771.31	-2.23	543.74	-3.78	62.37	-151.22
Rice Poor	-241.13	0.20	-4.45	-1.05	10.47	82.51	-12.68	137.68	32.57	-311.32	1.60	205.76	-3.17	-1.03	-108.17
Non-Rice Rich	-2865.29	903.55	-1956.16	-327.45	33.54	2146.40	-132.54	557.16	55.25	-2543.37	-52.58	1782.46	-3.02	237.71	-578.79
Non-Rice Medium	-665.43	81.63	-110.45	28.64	-35.00	317.24	-29.76	102.34	44.01	-505.14	16.15	402.45	-79.79	74.12	-92.21
Non-Rice Poor	16.70	78.97	64.47	-61.95	-4.05	-39.11	-49.93	83.25	69.87	-51.47	9.92	71.41	48.97	-51.78	27.04
Non-Farm Rich	-328.54	10.54	-20.23	-5.36	-72.51	38.11	-46.29	-58.54	-14.76	-258.50	-156.74	633.52	-13.16	606.20	811.34
Non-Farm Medium	-189.64	0.32	-9.64	-0.23	36.55	7.37	-1.54	18.70	1.07	-176.61	-19.25	213.63	-66.78	149.78	160.78
Non-Farm Poor	48.29	0.00	0.09	-0.93	-1.51	19.15	14.28	46.66	18.56	-14.39	37.41	-3.77	66.25	-180.50	-55.03
<b>Urban :</b>															
Rich	1849.42	4.80	-13.31	125.54	-28.59	13.21	-2.17	8.90	2.93	1941.51	-58.43	956.86	0.01	1024.90	3864.89
Medium	-50.52	0.26	-14.32	-0.39	-46.46	26.25	0.85	-14.20	8.53	-80.37	-42.44	295.87	0.00	257.18	430.23
Poor	-13.77	0.00	12.78	-0.12	149.63	-83.81	-28.53	129.06	-40.82	5.03	5.40	-49.93	0.00	-16.69	-56.17

Source : See Text.

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