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Reducing Support Using Aggregate Measures, Case Study

Thailand

Douglas H. Brooks

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Abstract

Thailand is the world's leading exporter of rice and a major exporter of other agricultural products. Government involvement in Thai rice markets has recently been characterized by a shift from net taxation to support, although at relatively low levels. Rice export taxes and input subsidies can be quantified using the producer subsidy equivalent (PSE), an aggregate measure of government intervention. Reducing government support, as measured by the PSE, could be accomplished by charging for irrigation or reimposing export taxation. The latter alternative would increase government intervention while lowering the PSE value.

Keywords: Thailand, aggregate measure of support, PSE, rice, trade liberalization

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Summary

Thailand is a developing country that is a major exporter of several agricultural commodities, especially rice, and plays an important role in world agricultural trade. As a net exporter and relatively free trader, Thailand is eager to see trade liberalization, particularly in the industrialized nations.

Thailand's main agricultural exports are rice, cassava, rubber, maize, and sugar. Due to the importance of rice in export earnings, employment, and diet, and limited information on other crops, this paper focuses on government intervention and liberalization in rice trade. Thailand's policies of export taxes and input subsidies have been quantified for their effects on rice production, consumption, and trade during the 5-year period 1982-86.

Until recently, the main policy affecting Thai rice has been export taxation. As the importance of the rice tax as a source of government revenue declined, national income rose, and world rice prices fell, the export taxes were phased out, being totally removed in 1986. As a result, input subsidies, principally free irrigation, dominated the policy effects so that the producer subsidy equivalent (PSE) for rice changed from negative to positive during the 1982-86 period. Higher per capita income made the implicit subsidy to consumers less important, while industrialization's demands for foreign exchange increased the need for export earnings.

If liberalization occurs only in the industrialized nations, or if developing countries are accorded special and differential treatment, or if adjustments are not required of countries with small PSE's (such as less than 10 percent), Thailand could continue its current policies and gain from the expected rise in world rice prices. If, however, the General Agreement on Tariffs and Trade (GATT) requires Thailand to reduce its current support of rice production by reducing government intervention, Thailand could do this by charging for irrigation. Since irrigation tends to be localized and applied mainly to the second (minor) crop, charging for irrigation could have important regional and equity consequences.

An interesting "liberalization" scenario is one in which Thailand is required to reduce its total net subsidy to rice through policies of its own choice. With Thailand's past history of increasing and decreasing rice export taxes, a likely response might be the reimposition of the export premium. This would reduce the **net** transfer by counteracting some of the implicit irrigation subsidy, but would **increase** government intervention in rice markets. A new rice export premium would raise government revenue and implicitly subsidize domestic consumption. If trade liberalization in the rest of the world results in sufficiently higher rice prices, Thai rice farmers could still come out ahead. While perhaps not in the spirit of reduced support, such a scenario could be politically popular in Thailand and consistent with historical precedents.

Reducing Support Using Aggregate Measures, Case Study

Thailand

Douglas H. Brooks

Introduction

Thailand is an important participant in international agricultural trade. Thailand, a major exporter of many agricultural products, accounted for 37 percent of total world rice exports, 7 percent each of both corn and sugar, 5 percent of poultry meat, 22 percent of natural rubber, and about 90 percent of cassava exports in 1986. Not surprisingly, international trade takes a significant portion of Thai agricultural production. The 1986 ratio of exports to production was more than 33 percent for rice, 67 percent for corn, over 80 percent for sugar and sorghum, and more than 95 percent for cassava and rubber.

As a rapidly developing country that is more than self-sufficient in food production and a relatively free trader, Thailand presents an unusual and interesting case study. Thailand is considered to have the potential to be the next newly industrialized economy (NIE) in Asia, following South Korea, Taiwan, Hong Kong, and Singapore. Its 1988 population was estimated at 55 million with a per capita gross domestic product (GDP) of just over US$1,000. The Thai economy is largely agricultural in terms of employment, production, and exports, although in recent years tourism and manufactured goods (primarily textiles and garments) have replaced rice as the leading foreign exchange earners.

Thailand's growing manufacturing sector takes advantage of the foreign exchange, labor, and raw materials provided by agriculture. While increased access to export markets for textiles and other manufactured products is of growing interest to Thailand, agriculture directly affects a much larger share of its population. Agriculture is also an area where the main competitors are industrialized nations with significantly higher per capita incomes. Consequently, Thailand may benefit in negotiations if developing countries are afforded special and differential treatment, as well as in a liberalized trading environment, where it has a comparative advantage based on climate and resource endowment.

In the current Uruguay round of multilateral negotiations on the General Agreement on Tariffs and Trade (GATT), proposals have called for agricultural trade liberalization. As a founding member of the Cairns Group of developing and free-trading nations

in the negotiations, Thailand expects to benefit from trade liberalization in agriculture. During the early 1980's, Thailand removed restrictions on its agricultural production and exports. This unilateral liberalization came about partly because of internal structural changes as agriculture's relative contribution to national income, employment, and government revenue declined. Thai policies also responded to changes in international markets and other countries' policies (particularly U.S. policies). However, trade liberalization in Thailand has involved the removal of export taxes, not the removal of subsidies as proposed for more industrialized countries.

Thailand does not currently have the budgetary resources to compete with U.S. or European Community (EC) farm program subsidies for international markets. The removal of subsidy policies in the United States and EC would allow Thailand to capture a larger share of the international market and, hence, benefit more fully from its comparative advantage in the production of rice and other agricultural commodities. Increased agricultural production and trade in Thailand has the potential to raise incomes and opportunities among the rural poor, but the distributional effects of trade liberalization in Thailand depend on the actual form of liberalization.

Farm Sector Trends

The expansion of land under cultivation throughout the 1960's and 1970's, spurred by increased investment in roads, use of tractors, and expansion and improvement of irrigation, greatly increased Thai agricultural production and exports. Economic growth throughout Asia has led to increased import substitution in some former markets for Thai rice and rising demand in markets for other commodities. Higher incomes in Asia have allowed consumers to include in their diets more vegetables and livestock and poultry products (thereby increasing demand for feed grains), while regional population growth and new markets maintain potential demand for traditional Thai commodity exports. Other products would no doubt be influenced by world agricultural trade liberalization. The greatest adjustment for Thailand, however, would be in the rice sector where government intervention has already been reduced.

Rice is the most important crop in Thailand for three reasons: It is grown by over 90 percent of Thai farmers and engages 55 percent of the total population in production, it is the country's staple food, contributing over 50 percent of the calories in the typical diet, and it is generally the leading agricultural export. In addition, Thailand is the world's leading exporter of rice, the world's single most important food grain in terms of caloric consumption. Consequently, I have focused on rice as the commodity of most interest in the Thai prospects for trade liberalization.

An Overview of Policy Intervention in Thai Rice

Thai rice policy has aimed at three sometimes conflicting objectives: To help farmers get higher prices, to ensure that domestic demand is fully satisfied at reasonable and stable prices, and to export the largest volume at the highest price possible. Emphasis has alternated between these goals, depending on world prices and domestic politics.

Rice export taxes have been used to generate government revenue, earn foreign exchange, and influence terms of trade. Following World War II, Thai policymakers counted on their country's monopolistic position in world rice trade to shift the tax burden to foreign consumers. The large-country effect in world markets was expected to more than offset the tax, benefiting Thai producers, consumers, and government budget (10, 13).[1]

The world rice market is thin (only 4 percent of production is traded) and subject to vagaries of weather since most production is rain-fed. These factors result in great variability in rice prices. Domestic price stabilization is often proclaimed as a goal of Thai rice policy although, as a major supplier, Thailand's domestic stabilization policies may have a destabilizing effect on world prices. Panayotou has noted that, in times of surplus rice and low prices on world markets before the 1985 U.S. farm bill (such as in 1983), Thai export taxes were lowered and exports promoted, putting additional downward pressure on world rice prices (10).

In recent decades, the United States and Thailand have competed for the position of leading rice exporter. In the early 1980's, increased rice production and generally stagnant domestic consumption allowed Thailand to expand rice exports from 2.7 million tons in 1980 to over 4.6 million tons in 1984 (fig. 1). This expansion was assisted by the price floor for rice in the 1981 U.S. farm bill. As Thai rice exports were growing, increased world production and generally flat demand depressed the prices received. As a result, 1985 prices were the lowest in three decades.

While the U.S. Food Security Act of 1985 set out to rebuild the U.S. rice market share, Thai rice policy aimed to shore up Thai farm prices. It set minimum export and mill prices, and required exporters to maintain minimum levels of stocks. When millers balked at paying above-market prices and paddy prices fell even further, the Thai Government abandoned its price support program. In early 1986, Thailand lifted the last of its restrictions on rice trade (12).

A gradual shift from taxation to support of agriculture typically accompanies growth in national income (1, 16). There is also a negative correlation across countries between rates of nominal

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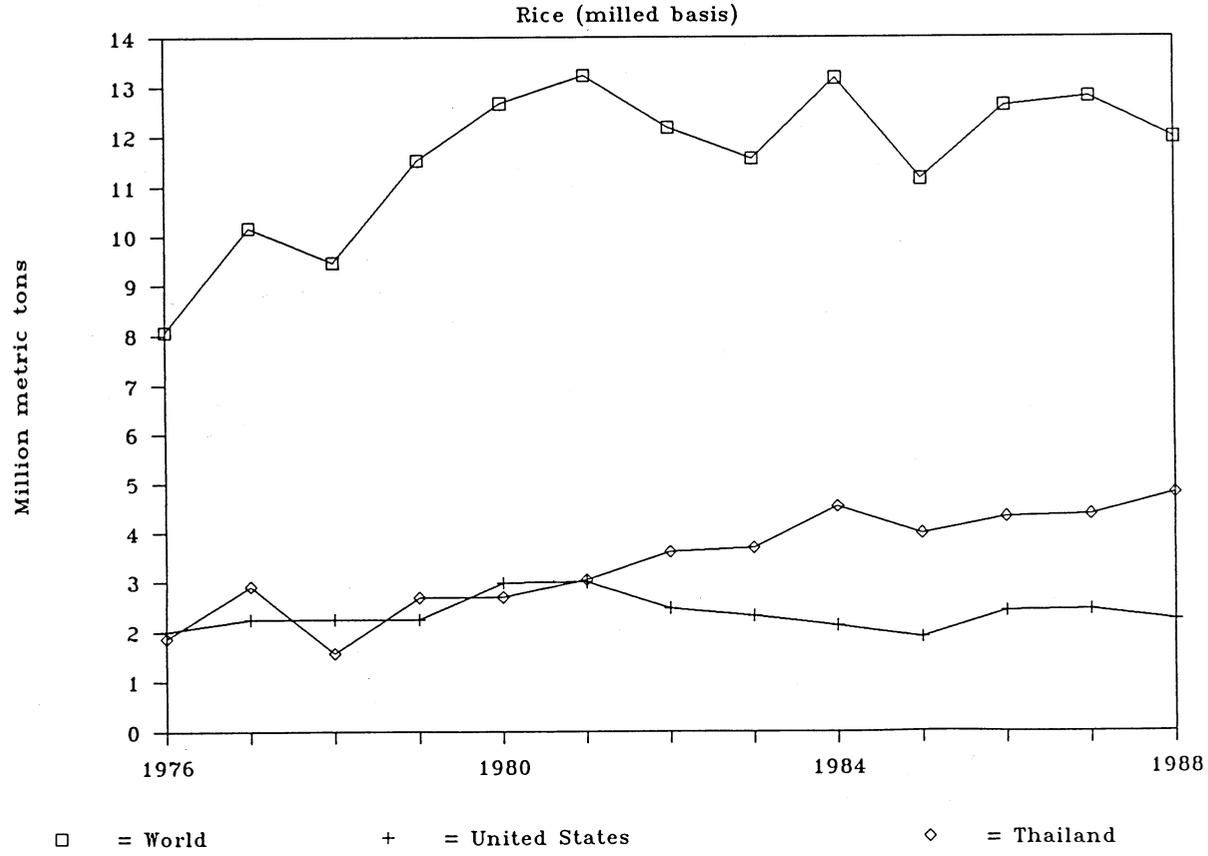
[1]Underscored numbers in parentheses refer to literature cited in the References section.

Figure 1--World, U.S., and Thai exports



protection and comparative advantage in food production, which is demonstrated by Thailand's situation (14, 20). With strong agricultural comparative advantage and rapidly rising income, the recent phasing out of rice export taxation may represent a fundamental transition toward government support of Thai rice and agriculture in general, rather than simply a response to recent market conditions (5).

Increased competition resulting from the 1985 U.S. farm bill has yet to have a noticeable effect on Thai rice export volume. Unusually large Brazilian purchases in 1986 and Iranian and Bangladeshi demand in 1987 offered ready markets for Thai rice. Drought reduced 1987 production in much of Asia, including Thailand, but Thai exports in 1988 reached a record 4.8 million tons. However, prices and farm incomes have been lower than might be expected in the absence of U.S. marketing loans. Fears of increased competition in a thinly traded market remain, and reduction of U.S. intervention in rice markets would be welcomed by Thailand.

Measuring Intervention in Thai Rice Markets

One aggregate measure of farm protection useful for analyzing government intervention and monitoring trade liberalization is

the subsidy equivalent. Producer and consumer subsidy equivalents (PSE's and CSE's) estimate the subsidies (or taxes) necessary to compensate producers and consumers for the removal of government policies (15). Subsidy equivalents attempt to measure effects of policies that directly and indirectly influence the production and prices of particular commodities, by assessing the "wedge" driven between domestic and world reference prices or the budget costs due to particular policies.

There are four basic types of policies that significantly influenced Thai rice markets during the 1982-86 period. Two policies directly affected rice prices and two affected inputs to rice production. Export taxes, as mentioned above, have been phased down from being a substantial negative influence on production in 1982, to a nonexistent influence in 1986. Rediscount facilities subsidize short-term commercial loans to rice exporters with the subsidy effectively passed back to the producer. On the input side, fertilizer subsidies play a role, but one that has been declining over time. Government provision of irrigation has been the most important form of subsidization to rice production. Thai rice policies are described in more detail below with their quantitative effects and subsidy equivalents summarized in tables 1 and 2.

Table 1--Calculation of producer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986
Production:						
Paddy	Million tons	17.77	16.88	19.55	19.91	20.26
Milled rice	Million tons	11.73	11.14	12.90	13.14	13.37
Producer price:						
Paddy	US$/ton	125.04	127.70	117.81	85.61	87.49
Milled rice	US$/ton	189.45	193.48	178.50	129.71	132.56
Producer value	Million US$	2,221.96	2,155.19	2,303.07	1,704.07	1,772.55
Effects of government intervention:						
Export taxes	Million US$	-400.10	-334.12	-185.82	-163.80	0
Rediscount facilities	Million US$	20.02	18.54	20.24	18.77	15.99
Fertilizer subsidy	Million US$	7.55	5.30	4.05	1.51	.57
Irrigation subsidy	Million US$	71.96	72.16	75.12	74.79	76.11
Net policy transfers	Million US$	-300.57	-238.12	-86.41	-68.73	92.67
Producer subsidy equivalents:						
PSE per unit value	Percent	-13.53	-11.05	-3.75	-4.03	5.23
PSE per unit quantity--						
Paddy	US$/ton	-16.91	-14.11	-4.42	-3.45	4.57
Milled rice	US$/ton	-25.63	-21.38	-6.70	-5.23	6.93

Table 2--Calculation of consumer subsidy equivalents

Item	Unit	1982	1983	1984	1985	1986
Consumption 1/	Million tons	8.00	8.10	8.75	8.75	8.50
Consumer price 2/	US$/ton	237.04	238.61	205.55	169.74	163.09
Total consumer cost	Million US$	1,896.35	1,932.73	1,798.56	1,485.24	1,386.23
Policy transfers to consumers	Million US$	259.26	229.49	112.29	96.59	-10.16
Consumer subsidy equivalents:						
CSE per unit value	Percent	13.67	11.87	6.24	6.50	-.73
CSE per unit quantity	US$/ton	32.41	28.33	12.83	11.04	-1.20

1/ Supplies for domestic consumption include food, industrial use, feed, seed and waste, in terms of milled rice.

2/ Bangkok wholesale price for 5 percent grade white rice.

Rice Export Taxes and Rediscount Facilities

Export taxes took three forms in the 1980's (table 3) (3, 19). A specific tax (the rice premium) was levied by the Ministry of Commerce in the 1950's. Its rate varied over time with policy objectives and world prices. For 1982 and 1983, it was 400 baht per metric ton (for white rice 5 percent). It was reduced to 200 baht per metric ton for 1984 and 1985.[2] As its importance as a source of government revenue declined over time and policy emphasis shifted to export promotion in response to falling prices, it was ended in January 1986.

An ad valorem export duty was used to raise revenue for the Ministry of Finance. The rate was 5 percent from 1955 until 1984, when it was reduced to 2.5 percent, and in October 1985 it was lifted entirely. The export duty reduction followed the decline in world rice prices and was intended to help insulate Thai farmers from the price drop.

A rice reserve requirement that exporters sell rice to the Ministry of Commerce at below-market rates for subsidized sale to consumers was eliminated in May 1982 after prices had fallen dramatically from their 1981 peak. In 1985, as prices fell further, exporters were required to maintain stocks in proportion to exports. Fears of U.S. Food Security Act consequences led to removal of the stocking requirements together with the last of the export taxes in January 1986.

[2]Exchange rates are presented in table 3.

Table 3--Thailand: Rice export taxes

Item	Unit	1982	1983	1984	1985	1986
Rice exports	Metric tons	3,784,143	3,476,480	4,615,803	4,062,240	4,523,597
	Million baht	22,510	20,157	25,932	22,524	20,315
Total export premium	Million baht	1,513.66	1,390.59	923.161	812.448	0
Total ad valorem tax	Million baht	1,125.50	1,007.85	648.3	563.1	0
Reserve requirement	Million baht	330	0	0	0	0
Exchange rate	Baht/US$	23.000	23.000	23.639	27.159	26.299
Total export taxes	Million US$	129.09	104.28	66.48	50.65	0
Per unit export tax	US$/ton	34.11	30.00	14.40	12.47	0
Effect on producer value	Million US$	-400.10	-334.12	-185.82	-163.80	0

Short-term export packing and restocking credits were provided through commercial banks and then rediscounted at the Bank of Thailand through its export-refinancing facilities. The U.S. Department of Commerce concluded, in its countervailing duty determination on rice from Thailand, that these rediscount facilities of promissory notes constituted a grant (or subsidy) to rice exporters (7).

Export taxes and subsidies affect the quantity exported and, conversely, the quantity available for domestic consumption. With efficient price transmission from export to wholesale markets, taxation of exports increases domestic supply and effectively subsidizes domestic consumption. It is assumed that the effect of export taxes and rediscount facilities affect prices of total production and consumption at the same rate as exports. The consumer subsidy effect of the export taxes (or tax effect of the rediscount facility) is calculated accordingly and the resulting CSE is shown in table 2. The per-unit CSE declined from 1982-86 as export taxes were removed and world prices fell.

Input Subsidies

Thailand procures and distributes subsidized fertilizer to some rice farmers through the Marketing Organisation for Farmers. The fertilizer subsidy is small, and fertilizer use on rice is very low in Thailand, limited mostly to the small, irrigated, second crop, and to low application rates per hectare. Consequently, the fertilizer subsidy has had little effect on fertilizer use and rice yields, the general level of fertilizer prices, or the income of more than a small number of large, well-off farmers (19).

Of the indirect subsidies provided to rice producers, irrigation benefits are by far the largest. Irrigation water is provided at no charge to rice producers. About 30 percent of the area planted to rice is irrigated. An operations and maintenance charge of US$25 per hectare has been suggested in a World Bank study of irrigation in Thailand. The World Bank also credits the expansion of irrigated rice area with over 75 percent of the increase in total agricultural output and 85-90 percent of the increase in rice production in recent decades (19).

Several policies affecting rice have not been measured here. Publicly funded extension and research services exist in Thailand, as in most countries, but data are insufficient to allocate the benefits to individual crops. The reserve requirement reintroduced in 1985 only requires exporters to maintain certain stocks. Exporters are no longer required to sell stocks to the government. The effects of this stocking requirement on rice prices are probably small and are difficult, if not impossible, to measure. The latest incarnation of a rice price stabilization program was introduced in 1986, but generally acknowledged to affect too small a fraction of traded rice to be effective that year.

Macroeconomic policies, with the possible exception of interest rate and credit policies, had little effect on agriculture during the period under study. Protection given the industrial sector may have slightly biased the terms of trade between agriculture and industry against the farmers (13). Inflation was low and minimum wage legislation ineffective. The baht was pegged to the dollar until being devalued by 14 percent in 1984 and set relatively free. The effects of skewed exchange rates are difficult to quantify and are not agriculture-specific, but the overvalued baht in the early 1980's represented an additional tax on rice exports at that time.

The availability of public forestland for agricultural expansion, even when illegal, has played an important role in the growth of Thai agriculture. Most of the increase in production over the last 30 years can be attributed to agricultural land expansion, since use of fertilizer and high-yielding varieties in Thailand remain among the lowest in Asia. The existence of additional land at little or no private cost has lowered the opportunity costs (in terms of alternative crops) of policies supporting rice production. Continued extensive growth in rice production without additional irrigation is limited, and in recent years most of the expansion in agricultural land has been in other crops. Increasing concerns about the environmental consequences of deforestation also serve to limit future expansion.

Net Effect of Thai Rice Policies

The removal of export taxes has been the main Thai policy change affecting rice production and consumption in recent years. The net effect of government intervention in Thai rice markets has gradually shifted from positive to negative (subsidy to tax) for

consumers, and from negative to positive (tax to subsidy) for producers during 1982-86 (fig. 2). The export taxes were phased out, being totally removed in 1986, as the importance of the rice tax to government revenue declined, national income rose and world rice prices fell. The input subsidies, principally free irrigation, then dominated the policy effects (fig. 3). Higher per capita income made the implicit subsidy to consumers less important while industrialization's demands for foreign exchange increased the need for export earnings from rice. Whether these changes represent a short-term response to declining world prices or are indicative of a longer-term shift in policy focus as the country develops should become clear in the next few years.

The level of intervention, as indicated by rice PSE's and CSE's and preliminary research on other commodities, is still far lower than in most other countries. If removal of government intervention in agricultural markets is the goal of multilateral negotiations, adjustments in world markets could have a major impact on Thai agriculture and, consequently, the Thai economy. Thailand will be subject to relatively small aggregate adjustments from its own policy changes, although distributional effects could have important social and political consequences.

New Policies

A wide range of policies were enacted in 1987 to maintain domestic prices at a level beneficial to farmers and to compete in world markets (4). Policies to increase demand for paddy included subsidized credit to rice merchants, programs to purchase paddy at slightly above-market rates by the Interior Ministry, the Army and the Commerce Ministry, and the Marketing Organisation for Farmers program to accept paddy at slightly higher than market value for repayment of fertilizer debts. A paddy pledging scheme, in which farmers may mortgage stocks in their own barns, was also introduced to influence prices through managing the supply of rice. The scheme is based on the conventional view that rice prices fall at the harvest peak and farmers sell most of their rice at a time of the cycle when prices are at their lowest.

Thailand's 10-year rice plan, announced in 1986, aims to allow all farmers to own their own land and be out of debt. The plan consists of three stages, including a short-term stage directed at enabling farmers to receive higher prices for their paddy. This goal has (so far) been met, in large measure due to the 1987 drought and flooding in much of Asia. The second stage involves ensuring that there are enough rice barns to accommodate good harvests, thus increasing the bargaining power of farmers who would no longer have to sell their paddy just after harvest when prices are low. The third stage is to enable farmers to have their own land to plow. While inequity of landownership has not been a major problem in Thailand, agriculture's infringement on national forests and ecologically sensitive areas has raised increasing environmental concern and heightened awareness of landownership issues.

Figure 2--Thai rice PSE's and CSE's

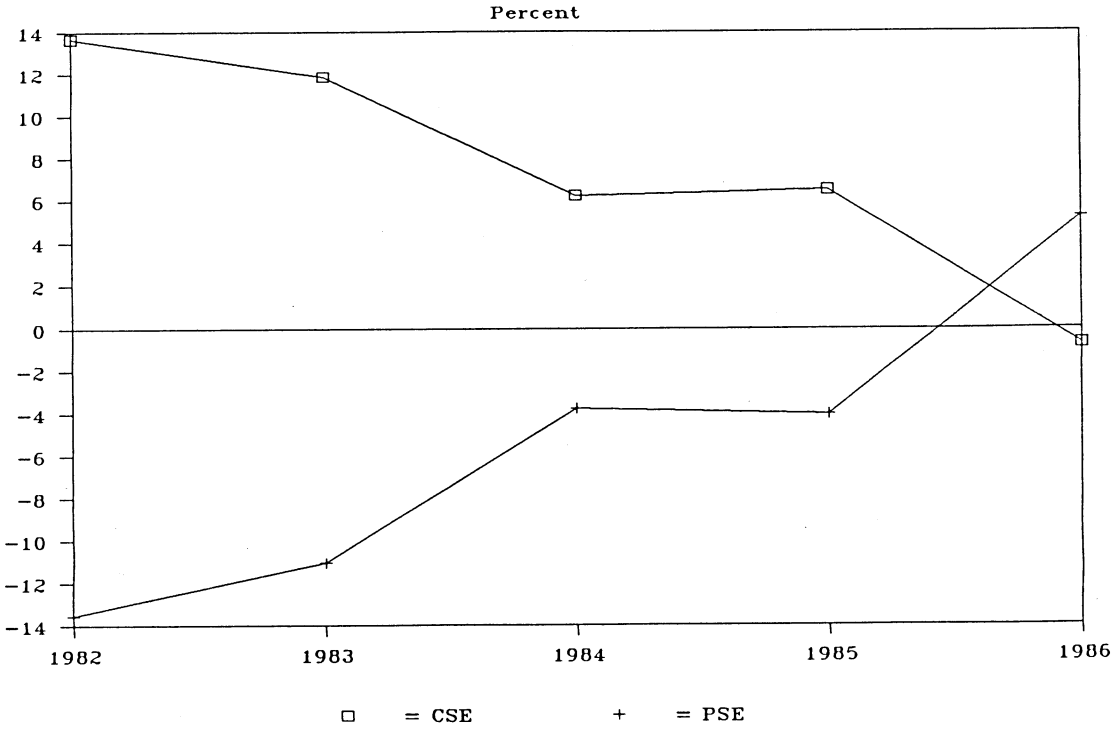
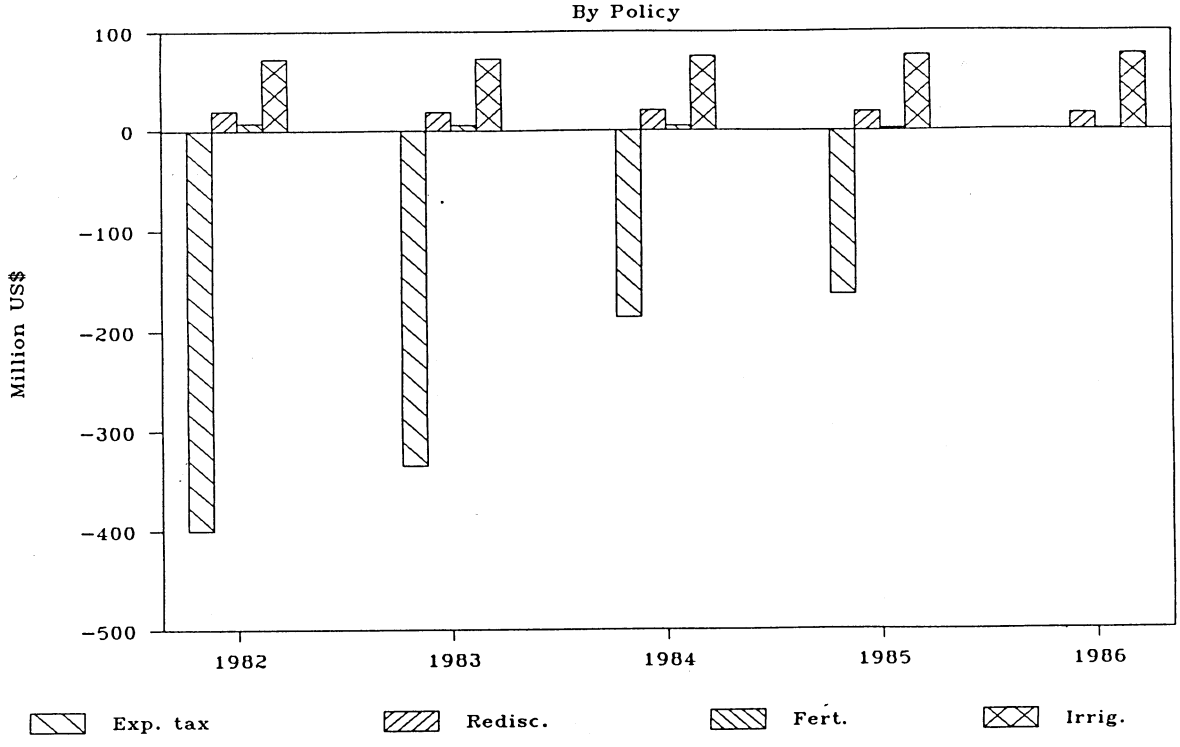


Figure 3--Distribution of Thai rice PSE



Reducing Support Using Aggregate Measures

Government intervention in Thai agriculture, while small by international standards, still could be subject to the type of proportional liberalization based on reducing some aggregate measure of support, as is now being discussed in the GATT framework. The distributional consequences of agricultural trade liberalization are likely to be more dramatic in developing countries, such as Thailand, than in more developed countries. The proportion of population involved in agriculture, the percentage of average household income spent on food, and the share of the typical diet made up by a single crop are much higher in Thailand than in industrialized countries. Changes in government intervention can be expected to have strong and varying effects on a wide segment of the Thai population.

Liberalization Scenarios

The concept of reduction in support is focused on the types of government intervention more common in industrialized countries. Negotiated liberalization may occur only in the industrialized nations. Developing countries may be accorded special and differential treatment in the GATT to assist in their overall economic development. Adjustments may not be required of countries with small PSE's (less than 10 percent, for example), as a concession to the imprecision of such aggregate measures. In any of these cases, Thailand could continue its current policies and gain from the expected rise in world rice prices. Alternatively, offering to put domestic policies on the negotiating table may help in getting developed competitors to reduce producer subsidies.

To reduce its current support to rice producers under the auspices of GATT, Thailand could begin charging for irrigation. Irrigation tends to be localized among the larger, wealthier farmers of the country's Central Plain and Lower North regions, and applied mainly to the second (minor) crop, which uses more inputs. Irrigation water is used relatively inefficiently in Thailand, since it is provided at no cost to farmers. Charging for irrigation would alter the income distribution, benefiting poorer farmers and other regions of the country relative to the current recipients (possibly at a high political cost), and improve the efficiency of other resource allocations. However, establishing full-cost pricing of irrigation water and effectively collecting payments may prove difficult, particularly as the irrigation water is frequently viewed as a byproduct of electricity generation.

Another possible scenario, especially if the negotiated agreement calls for reducing aggregate support through each country's own choice of policy adjustments, may be the reimposition of export taxes. Considering the history of increasing and decreasing rice export taxes, a likely response in Thailand would be the reimposition of the export premium. This would reduce the **net** transfer by counteracting some of the implicit irrigation

subsidy, although it would **increase** government intervention in rice markets.

A new rice export premium would raise government revenue and indirectly subsidize domestic consumption. If trade liberalization in the rest of the world results in sufficiently higher rice prices, Thai rice farmers could still benefit from the liberalization. Poorer farmers who consume all of or more than the rice they produce, as well as urban consumers, would be the prime beneficiaries if the subsidy is countered by reimposition of the export tax.

Table 4 shows one possible set of events in which Thailand reduces the total net subsidy to producers by 50 percent through reimposition of a rice export premium, using 1986 as the base period. Amounts shown in table 4 assume, for the sake of illustration, that export quantities and world prices remain unchanged. While perhaps not in the spirit of reduced intervention, as frequently discussed in the GATT negotiations, it does yield reduced positive support. Such a scenario could be politically acceptable in Thailand and consistent with historical precedents.

Alternative Approaches

A single-country partial equilibrium analysis is likely to miss major consequences of trade liberalization on other sectors and factor markets. Other studies, which do not use the PSE concept, focus less on the possible paths to trade liberalization, but place their results in a broader context (10, 11, 14).

Table 4--50 percent reduction in the 1986 total net subsidy to producers

Item	Unit	Amount
Total net subsidy	Million US$	92.67
Per unit net subsidy	US$/ton	6.93
Export premium total for 50-percent cut	Million US$	46.34
Export tax as percentage of 1986 value	Percent	2.61
Per unit export tax	US$/ton	10.24
Revised producer price	US$/ton	129.10

It is probable that the quantity exported would be affected by a major shock to world markets, such as trade liberalization, but predicting the Thai supply and export response is difficult and depends on the time period given for adjustment to occur. Tyers and Anderson have examined global liberalization of rice trade in a partial equilibrium simulation model incorporating other grains, livestock, and sugar (14). Rice is found to have relatively minor interactions with these other commodities, but liberalization of rice trade has important consequences for major rice producing and consuming countries.

The Tyers and Anderson model indicated that domestic Thai producer and consumer rice prices would have been 5-percent higher in 1985 under global free rice trade and the Thai share of global exports would be reduced from 35 percent to 17 percent. The global volume traded would have been 110-percent greater, however, with China taking over as the leading exporter, India becoming a major exporter, and Japan accounting for more than a third of all rice imports.

Whether recent Thai policies have been responses to temporary commodity market developments or part of a more fundamental transition may become apparent with liberalization of policies in industrial countries. Trade liberalization by industrial economies can be expected to sharply increase Thai rice exports because it will probably reduce U.S. exports and would sharply increase Japan's imports (11, 14). The temptation to tax Thai rice exports to raise government revenue and subsidize urban consumption will then be strong.

Policies affecting additional commodities that account for more of Thai agriculture and exports must be measured to determine if the shift from taxation to support in rice is indicative of the transition common in countries where incomes rise. Wong estimated the shortrun cross-price elasticity between rice and other crops to be -0.28 and the longrun cross-price elasticity to be -0.63, indicating that past taxation of rice exports may have been responsible for diversification into alternative crops (18). Therefore, changes in government intervention in rice markets may have consequences for other crops.

Within rice markets, it may be necessary to distinguish between different types and grades of rice. In Thailand, production of glutinous rice is almost entirely for domestic consumption. Some markets for Thai rice are interested only in parboiled rice. African buyers frequently prefer lower quality (15- or 25-percent brokens) shipments while Iran (the largest buyer of Thai rice in 1987) seeks higher quality. The Japanese market appears to be almost entirely for Japonica rice, which is not currently grown in any substantial quantities in Thailand. There is little available information on substitution possibilities within rice markets, although this could have important implications for changing trade patterns following liberalization.

Reducing government intervention in agriculture requires making difficult decisions. Adjustment costs of changing cropping

patterns in response to altered relative prices, which may involve more farmers leaving agriculture and migrating to the cities, must be considered. Removing policies that subsidize production and exports may redistribute wealth and income and meet strong political opposition once the consequences become apparent. Other interest groups will oppose the removal of policies that tax exports to subsidize consumption. Welfare costs of lobbying for and administering changes in policies and infrastructure need to be evaluated. Effects on government revenue and debt service capabilities must also be examined. Alternative paths to liberalized trade and the concessions Thailand may have to make in negotiations require serious consideration. The current examination of rice has provided some important points for discussion, but further analysis is needed.

Conclusions

Rice policies in Thailand are aimed at sustaining profitable producer prices while keeping consumer prices reasonable and stable, and maintaining or increasing the Thai share of world exports. These goals are interrelated and world market changes often determine the balance of actual domestic policies. As the United States has attempted to regain its former world rice market share, Thailand has responded by lifting taxes on rice exports. Reduced taxes, rather than increased subsidies, have led the transition from taxation to positive support to the production and marketing of paddy.

Thailand has encouraged other economies, particularly the United States and the European Community, also to reduce government intervention in agriculture. Trade liberalization, by reducing aggregate support as proposed by the United States or the Cairns Group, of which Thailand is an active member, could restore or increase Thailand's comparative advantage in rice production and trade, with significant benefits to economic development in Thailand. However, reducing an aggregate measure of support does not necessarily mean reduced government intervention in agricultural markets, and multilateral negotiations may yield unintended results.

An important point remains for negotiators to decide concerning the use of aggregate measures of support. It remains unclear if negotiators, when assessing a country's net support position, will allow policies with negative effects to offset policies with positive effects in calculating PSE's or similar aggregate measures for individual commodities, or if they will allow commodities with negative PSE's to offset commodities with positive PSE's. Thailand could reduce its aggregate support to rice production by increasing taxes rather than reducing government intervention, but such an approach may be unacceptable to negotiators from other countries. It is also unclear whether a requirement to reduce irrigation subsidies and allow full transmission of all world price changes to producers and consumers would be acceptable in Thailand.

The recent rapid growth of the Thai economy in a relatively free structure, together with its unilateral liberalization of rice markets, has made Thailand a useful case study for considering similar conditions worldwide. Thailand is undergoing the transition from an agricultural to an industrial economy, and agricultural production policies have changed from net taxation to support. The study of rice in Thailand can point out differences in goals, policies, and possibilities of both agricultural economies in earlier stages of development and industrial economies in the later stages. While both agricultural and industrial economies can gain from liberalization in world agricultural markets, the nature and enforcement of such liberalization pose difficult questions.

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UNITED STATES DEPARTMENT OF AGRICULTURE
ECONOMIC RESEARCH SERVICE
1301 NEW YORK AVENUE, NW.
WASHINGTON, DC 20005-4788