Trade Policy and the Structure of Incentives in Thai Agriculture

Peter Warr

ASEAN Economic Bulletin, Volume 25, Number 3, December 2008, pp. 249-270 (Article)

Published by Institute of Southeast Asian Studies
DOI: 10.1353/ase.0.0030

ASEAN Economic Bulletin Vol. 25, No. 3 (2008), pp. 249–70 ISSN 0217-4472 print / ISSN 1793-2831 electronic

DOI: 10.1355/ae25-3a

Trade Policy and the Structure of Incentives in Thai Agriculture

Peter Warr

As Thailand has industrialized, successive Thai governments have become increasingly interested in assisting agricultural producers and processors. But the export orientation of Thai agriculture has limited the scope for protection policy as a means of influencing domestic commodity prices. This paper uses comparisons between the prices of agricultural commodities in domestic and international markets as a means of studying the magnitudes of these interventions. Thailand is unusual in that except for the cases documented in this paper, assistance to rural people has primarily taken the form of direct transfers and subsidized loans, rather than interventions in agricultural commodity markets.

Keywords: Protection, price transmission, trade policy, rice, sugar.

I. Introduction and Summary

Thailand is a major net agricultural exporter and its agricultural trade policy is dominated by this fact. The list of agricultural exports includes many of the most important agricultural products produced and consumed within the country, including the staple food, rice, exports of which account for between 30 and 50 per cent of its total output, but also cassava, sugar, rubber and poultry products. The list of imported agricultural commodities is much shorter. Maize has been a net export in most years but was a net import for some years in the 1990s. Soybean was a net export for several decades, but since the early 1990s it has become a net import. Palm oil has fluctuated between a net import and a net export but has been a net export since the late 1990s.

Historically, Thailand's large agricultural surplus has led to a degree of policy complacency regarding the agricultural sector (World Bank 2000). Agricultural importing countries are typically concerned about food security and raising agricultural productivity to reduce import dependence. In Thailand, these matters have not been a significant concern, although stabilizing food prices for consumers has been a recurrent theme of agricultural pricing policy. Until the 1980s, agricultural exports were viewed as a source of revenue for the central government. Unlike manufacturing, traditional agriculture was not seen as a dynamic sector of the economy which could contribute to rapid growth. Because the price elasticity of supply of most agricultural products was very low, at least in the short run,

their production could be taxed heavily without producing a significant contraction of output.[1] Moreover, most agricultural producers were impoverished, poorly educated and politically unorganized. Each of these statements applied in particular to rice, so taxing agriculture, and especially rice, was politically attractive, and rice exports were indeed taxed until 1986.

With greatly increased incomes per person, rapid urbanization and the move to more democratic political institutions, policy has shifted away from taxing agriculture and towards a more neutral set of trade policies. This change has almost certainly owed more to politics — the political necessity of finding ways to attract the support of the huge rural electorate and the desire of the urban electorate for better economic conditions for the farm population — than to a desire to liberalize agricultural trade for the efficiency-based reasons that economists emphasize. But the move away from taxing agriculture has not progressed far in the direction of subsidizing it, for one key reason. The fact that so many of the important agricultural commodities are net exports has made subsidizing agriculture problematic, inhibiting what would otherwise have been strong political pressure to protect Thai farmers had the commodities they produced been net imports.

Thailand is an active member of the Cairns Group of agricultural exporting countries, but while its agricultural trade is relatively liberal, it cannot be described as a free-trading country with regard to agricultural commodities. Within Thailand, opposition to agricultural import liberalization is strong in the cases of soybeans, palm oil, rubber, rice and sugar. The measures employed include non-tariff instruments permitting a high degree of discretion on the part of government officials. The set of import controls includes import prohibitions, strict licensing arrangements, local content rules and requirements for special case-by-case approval of imports. The commodities for which these restrictions are applied include the five mentioned above and also onions, garlic, potatoes, pepper, tea, raw silk, maize, coconut products and coffee.

The inclusion of rice in this list of commodities subject to import restrictions may seem strange. Thailand is the world's largest exporter of rice and is undoubtedly one of the world's most efficient producers. Why should its rice industry require protection from imports? Imports of rice are in fact *prohibited* unless specifically approved by the Ministry of Commerce. The Ministry of Agriculture and Cooperatives vigorously opposes any liberalization commitments with regard to rice. The reasons apparently relate to the Ministry's wish to keep its options open with respect to rice policy in the event that market conditions should change unexpectedly. Sudden changes in the price of rice can have far-reaching political consequences. The domestic rice market operates almost entirely without government intervention, but the instruments for potential intervention are ever ready.

A lesser reason for the import controls on rice is that, as with most agricultural commodities, "rice" is in fact a highly differentiated commodity. Not all grades of rice are produced efficiently within Thailand and the government wishes to protect domestic producers from imports of grades of rice that are closer substitutes for local grades on the consumption side than they are on the production side. Lower grades of rice produced in Vietnam but not in Thailand are an important example.

Thailand's "general exclusion list", which applies to the ASEAN Free Trade Area (AFTA) agreements, includes several agricultural industries, including rice, sugar, palm oil (both crude and refined). Within Thai government circles, discussion of the problems of agricultural trade relates overwhelmingly to the treatment of Thai exports by others. Thailand's own agricultural import policy is a closed issue. Problems have been encountered with a number of trading partners with respect to environmental and sanitary/phytosanitary (SPS) issues concerning Thailand's agricultural exports. These problems have included the well-known dispute with the United States regarding shrimp (environmental issues) and with Australia regarding Thailand's exports of frozen, cooked chicken (SPS issues).

Within Thailand, poverty is heavily concentrated in rural areas and public opinion favours government support for the rural poor. Since the economic crisis of 1997–98, and especially during the government of Prime Minister Thaksin Shinawatra (2001–2006), a wide range of income support programmes, cash grants to villages and subsidized credit schemes was introduced. Support for these schemes was a significant component of the "populist" economic policy agenda of the Thaksin government. However, few if any of these schemes operated through the prices faced by agricultural producers. Since they were not linked directly to the production of agricultural commodities, it seems that they were not "distorting" in terms of resource allocation. The results of the present study will make it possible to check this point. It will be possible to assess whether the price incentives facing agricultural producers were indeed "distorted" relative to international prices during this period of populist government.

The following section of the paper briefly describes the changing structure of the Thai economy, especially concerning the agricultural sector. The core of the paper is the use of price comparisons to relate domestic and international prices of major agricultural commodities and fertilizer, and this is contained in the next section, which also relates this price comparison to tariff and non-tariff barriers for these same products. This analysis focuses on the question of whether relative prices for traded commodities at the wholesale level have differed from their relative border prices, adjusted for transport and handling costs. The next section extends this analysis to the farm level. The raw commodities produced by farmers generally do not enter international trade directly. These raw commodities are inputs into production of the processed commodities which are actually traded across national borders. For example, rice produced at the farm level (paddy) must be milled before it can be traded internationally. Rice milling, transport, packaging and storage are all costly activities and several steps in the marketing chain intervene between the farmer and the international market. This raises the controversial question of how protection of the processed commodities (such as milled rice), observed at the wholesale level, as captured by the price comparisons conducted in this paper, affects the prices actually received by farmers (such as paddy). We analyse this issue econometrically using Thai price data and derive from this the imputed rates of protection for farm-produced commodities. The final section concludes with a discussion of the future prospects for agricultural trade policy in Thailand.

II. Growth and Structural Change

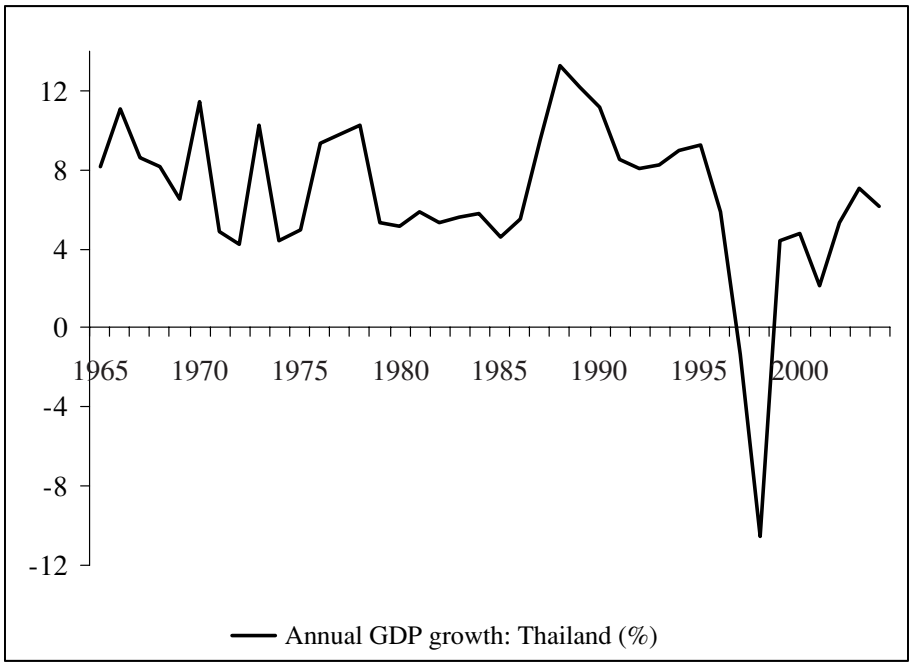
Over almost four decades, from 1968 to 2005, Thailand's economic output grew in real terms at an average annual rate of 6.5 per cent. The broad characteristics of this growth are summarized in Table 1 and Figure 1. For ease of comparison with

TABLE 1
Thailand: Real Growth of GDP and Its Components, 1968–2005
(% per annum)

	Pre-boom 1968–86	*Boom 1987–96*	*Crisis 1997–99*	*Recovery 2000–2005*	*Whole period 1968–2005*
Total GDP	6.7	9.5	–2.5	5.1	6.5
Agriculture	4.5	2.6	0.1	3.6	3.5
Industry	8.5	12.8	–1.7	6.3	8.5
Services	6.8	9.0	–3.6	4.2	6.2

SOURCES: Bank of Thailand, data for 1951 to 1986; National Economic and Social Development Board, data from 1987.

FIGURE 1
Thailand: Annual Growth Rate of Real GDP, 1965–2005
(Per cent per year)

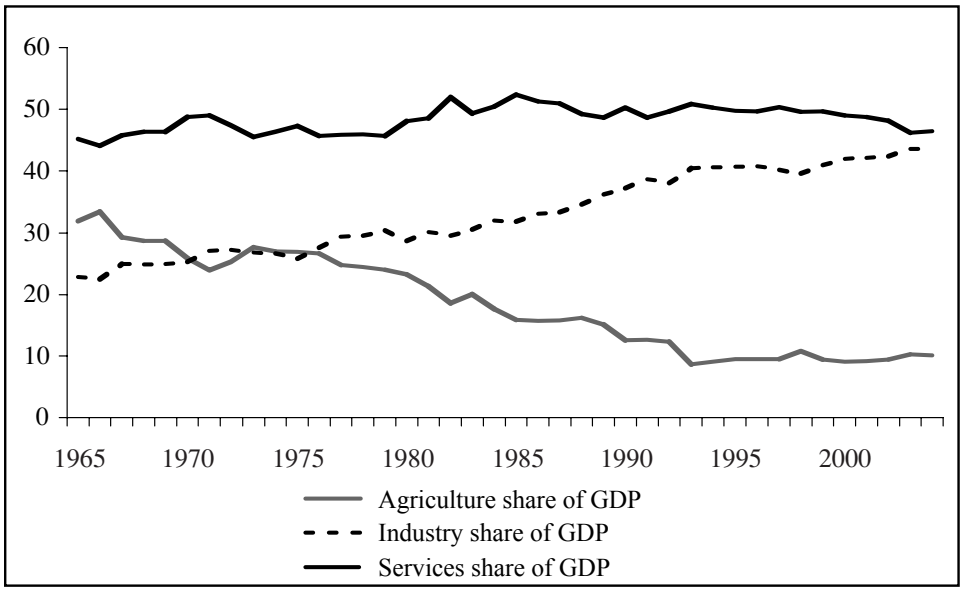


SOURCE: World Bank, *World Development Indicators*, various issues.

other Asian economies, the table distinguishes between the "pre-boom" period of two decades ending in 1986 and the following "boom" decade, which immediately preceded the Asian crisis of 1997–99. As the table shows, Thailand's growth rate during this boom decade was 9.5 per cent, the fastest in the world over this period and almost half as rapid again as during the preceding two decades, "pre-boom". Output contracted during the "crisis" years of 1997 to 1999 and during the subsequent "recovery" period growth has averaged a moderate 5.1 per cent.

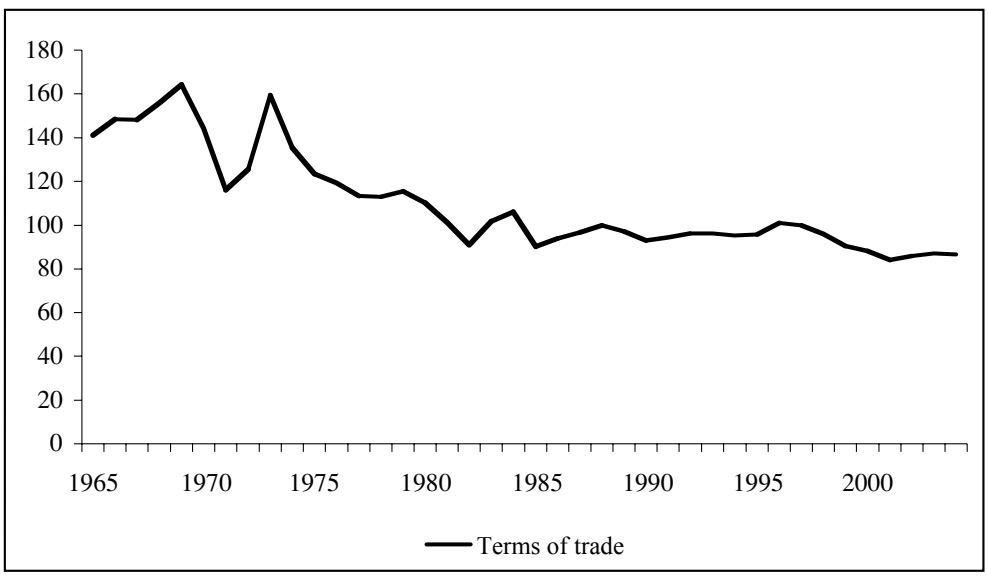
As is typical of rapidly growing economies, agricultural output grew more slowly than GDP, implying a declining share of agriculture in aggregate output (Figure 2). The agricultural sector accounted for 32 per cent of GDP in 1965. By 2004 this share had declined to 10 per cent. Over the same period the GDP share of industry rose from 23 to 43 per cent and the share of services remained almost constant, rising from 45 to 47 per cent. Declining terms of trade for Thailand's agricultural exports (Figure 3) explains part of this long-term contraction. For more detailed study of the changing composition of the agricultural sector it is convenient to use the input-output tables, which are available at five yearly intervals from 1975 to 2000. Over this period, value added in paddy production (unmilled rice as produced at the farm level) declined from 38 per cent to 26 per cent of total agricultural value added. Changes in the distribution of expenditures as incomes increased explain most of this change. As incomes rise, expenditure on starchy staples typically declines as a share of total expenditures. The share of maize and cassava similarly declined, but the shares of fruits, poultry, cattle and rubber increased.

FIGURE 2
Thailand: Sectoral Shares of GDP, 1965–2005
(Per cent)



SOURCE: World Bank, *World Development Indicators*, various issues.

FIGURE 3
Thailand: Terms of Trade, 1965–2005



SOURCE: Bank of Thailand.

The input-output tables indicate that for almost all major agricultural commodities, over the two and a half decades since 1975, the share of intermediate input use in the value of total output increased significantly. In paddy production, for example, this share increased from 14 to 30 per cent. For the entire agricultural sector, this cost share rose from 21 per cent to 37 per cent over the same period. Most intermediate goods used in Thai agriculture are domestically produced, but from 1975 to 2000 the share of imports in total intermediate input use increased from 10 to 17 per cent. In 1975, sales of agricultural products to intermediate users (millers and processors) accounted for 57 per cent of total sales, but by 2000 these sales had increased to 70 per cent. Most, but not all paddy is milled into edible rice commercially, rather than on-farm.

Thailand's major agricultural commodities are nearly all net exports, or at least their processed products are net exports. Paddy is neither exported nor imported, but milled rice has historically been an important export item, as has refined sugar. Cassava is similarly exported in the form of processed animal feeds. Rubber exports have become increasingly significant since the 1990s. Soybean has become an important net import and is used for processed foods and for animal feed. A full description of the trading position of the major agricultural commodities is provided in Warr and Kohpaiboon (2007).

III. The Changing Structure of Protection at the Wholesale Level

In their important study of agricultural price policy in Thailand up to the mid-1980s, Siamwalla and Setboonsarng (1989 and 1991) make the point that policies for the various agricultural commodities were determined individually, in response to political circumstances which varied among the commodities concerned, rather than as part of a single, integrated agricultural policy strategy. For this reason, they argue that it is best to consider the main commodities one at a time, which they do for the commodities rice, sugar, maize and rubber. The discussion which follows will also adopt this strategy, except that the range of agricultural commodities considered includes cassava, soybeans and palm oil, in addition to the four reviewed by Siamwalla and Setboonsarng, and our analysis also considers a major input, urea fertilizer. Following this commodity-specific review, we turn to the issue of what common themes, if any, can be found for Thai agricultural policy as a whole.

The structure of the discussion for each commodity is first to relate domestic and border prices on a comparable basis. This analysis is conducted at the wholesale level, meaning that the "domestic price" means the domestic wholesale price. All of the price data used in this analysis are presented in the Appendix tables to Warr and Kohpaiboon (2007). We then use these data to calculate nominal rates of protection (NRPs) for each commodity. Table 2 summarizes the price data used in these NRP calculations and the formula used. In the calculation of the nominal rates of protection, the border prices are amended by the transport and handling costs involved in getting imports from the *cif* level to the domestic wholesale level and in getting exports from the domestic wholesale level to the *fob* level. These transport and handling costs are summarized in the Appendix to Warr and Kohpaiboon (2007). This adjustment is required to obtain prices comparable with domestic wholesale prices. The border prices adjusted by transport and handling costs are then interpreted as indications of what the domestic wholesale prices would be in the absence of protection. The resulting estimates of nominal rates of protection at the wholesale level for six major commodities and fertilizer are presented in Table 3. The following discussion summarizes these results.

III.1 Rice

From the end of World War II to 1986, Thailand taxed its exports of rice. There were four individual instruments of export taxation, each with different legal foundations, each under the control of different parts of the bureaucracy, and

TABLE 2
Thailand: Calculation of Nominal Rates of Protection

Commodity	*Domestic price*	*Border price*
Rice	Domestic price	Export price
Maize	Domestic price	Export price
Cassava	Domestic price	Export price
Sugar	Grower price	Export price
Rubber	Domestic price	Export price
Soybean	Domestic price	Export price (up to 1991) Import price (after 1991)
Palm oil	Domestic price: (average of crude and refined)	Import price (1995 to 1996); Export price (1997 to 2004)
Fertilizer (urea)	Wholesale price	Import price

NOTE: NRP is calculated as NRP = $100(P^D - P^B)/ P^B$, where P^D denotes the domestic price and P^B denotes the border price.

each generating revenues that went to different destinations within the government. Siamwalla and Setboonsarng describe these differences and estimate that their combined effect was a rate of export taxation of around 40 per cent from the late 1950s to the early 1970s. The rate increased to around 60 per cent during the commodity price boom of 1972–74, but subsequently diminished quickly to about 20 per cent. There was a further peak of about 40 per cent, at the time of the second OPEC oil price shock in 1979–80, and then a steady decline until all four forms of tax were suspended in 1986. Rice exports have remained untaxed for the two decades since then.[2]

The implications of these events for actual prices are summarized in Figure 4. As with each similar figure to be presented below for other agricultural commodities, the figure compares domestic wholesale prices with border prices for commodities of comparable quality. Since rice is a net export, "border price" in the diagram means the export price, adjusted for transport and handling costs between the wholesale and export level. The NRP calculations that emerge are similar to those that would be inferred from the rates of taxation described above, except that the NRPs after 1986 are not zero, but have declined from around –11 per cent in the late 1980s to around –3 per cent two decades later, in 2005. It is possible that the transport and handling costs between the wholesale and *fob* locations are not fully accounted for in the data used for these calculations and that the statistical error involved has declined over the twenty years concerned. But it is also possible that "unofficial" taxes have been levied on Thai rice exports, at steadily declining rates, over the past two decades. Notwithstanding this minor puzzle, the data shown in Figure 4 and Table 3 support the view that Thailand's rice exports are currently neither protected nor subsidized to any significant extent.

III.2 Maize

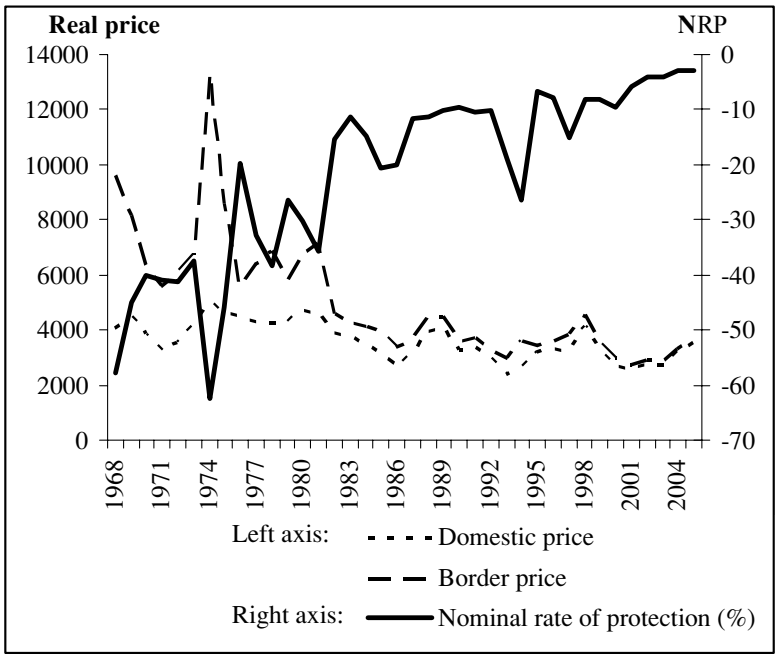
Maize was a net export for Thailand until the 1990s. In 1992 and again from 1995 to 2000, imports dominated, but maize has subsequently reverted to a net export. Between 1965 and 1981 the government intervened in the maize export market in an effort to preserve Thailand's exports to Japan and Taiwan, China, primarily for use as animal feed. For both of these markets, season-long stability of supply was required. The Thai government guaranteed stability of supplies to these two markets and to ensure fulfillment of these assurances, the government imposed quota

TABLE 3
Thailand: Nominal Rate of Assistance at Wholesale Level, by Commodity, 1970–2005

Year	*Rice*	*Maize*	*Cassava*	*Soybean*	*Sugar*	*Rubber*	*Fertilizer*
1970	–40.1	–0.2	–8.6	–19.9	63.6	–4.0	8.5
1971	–41.0	–1.1	–16.9	–19.9	45.8	5.1	8.5
1972	–41.2	9.0	–23.2	–19.9	8.3	12.1	8.5
1973	–37.6	–7.4	–17.3	–19.9	–0.7	–6.1	8.5
1974	–62.5	0.0	–14.0	–19.9	–35.6	–22.9	8.5
1975	–45.9	–4.1	–12.8	–19.9	–36.8	–9.0	8.5
1976	–19.8	–0.8	–10.2	–19.9	–5.6	–14.7	8.5
1977	–32.9	2.9	–15.6	–19.9	3.0	–14.9	8.5
1978	–38.4	0.2	–11.6	–19.9	12.9	–16.2	8.5
1979	–26.3	–2.1	5.9	–19.9	19.0	–19.2	8.5
1980	–30.1	–3.0	–4.7	–19.9	35.9	–24.6	8.5
1981	–35.6	–6.4	–22.0	–19.9	35.7	–30.2	8.5
1982	–15.5	2.6	–10.1	–19.9	14.6	–14.9	8.5
1983	–11.3	2.6	0.9	–19.9	47.9	–7.9	8.5
1984	–14.7	2.6	–25.1	–19.9	66.6	–18.9	8.5
1985	–20.8	–1.3	–20.3	–27.1	98.3	–11.2	27.0
1986	–20.1	–10.8	–1.4	–20.9	86.3	–8.2	14.4
1987	–11.7	–2.5	–17.0	–13.2	83.7	–11.4	27.4
1988	–11.3	0.8	–14.4	–5.2	90.7	–9.2	18.0
1989	–10.2	–1.0	–15.8	–10.0	50.2	–8.5	21.7
1990	–9.7	1.3	–9.8	–47.4	59.4	–2.1	24.9
1991	–10.4	0.1	–13.6	–15.6	92.0	–4.3	16.2
1992	–10.2	–13.3	–9.5	47.0	85.0	–0.9	8.6
1993	–19.0	4.6	–13.9	31.7	79.5	–6.3	18.0
1994	–26.3	0.9	–2.2	37.2	61.9	–1.4	9.8
1995	–6.6	10.1	1.3	31.1	47.8	–0.2	8.2
1996	–7.7	–10.7	–8.6	33.3	73.9	6.6	4.2
1997	–15.2	–42.8	–18.2	9.3	66.8	–8.8	4.1
1998	–8.3	–4.8	–4.1	25.3	33.2	3.1	19.3
1999	–8.2	–8.5	–4.4	52.3	55.6	–4.9	20.4
2000	–9.5	2.8	–10.9	48.9	50.7	–1.7	9.1
2001	–5.7	–0.9	–6.2	39.5	37.2	2.8	5.8
2002	–4.1	0.0	4.4	44.8	59.8	6.5	12.7
2003	–4.0	–0.1	–2.1	36.4	46.0	5.5	–2.5
2004	–2.8	0.9	–2.9	29.1	44.6	–1.3	2.6
2005	–2.9	–3.6	–2.9	24.9	39.1	1.5	1.3

SOURCE: Author's calculations.

FIGURE 4
Thailand: Price comparison and NRP at wholesale level — Rice



NOTE: Nominal rate of protection is calculated as 100*(Domestic price–Border price)/Border price.
SOURCE: Author's calculations.

restrictions on exports to markets other than these two countries. The effect of this policy was an increase in the price volatility passed on to the domestic producer and somewhat reduced average earnings. As countries closer to Thailand, including Malaysia and Singapore, developed their own livestock industries, the need to preserve the Japanese and Taiwan markets was seen as being less crucial and by 1981 the export controls were removed. The data shown in Table 3 indicate roughly zero protection for the maize industry, and it is interesting that this outcome does not seem to have depended in any systematic way on whether maize was a net import or a net export.

III.3 Cassava

Thailand's cassava exports developed for the supply of animal feed to European and some Asian markets, including Taiwan. The quota restrictions of the EU led to rents attached to export quotas from Thailand, which in turn led to corruption in the allocation of these quotas. The rents associated with the quotas are analogous to a privately collected export tax, resulting in the export price exceeding the domestic price by amounts averaging around 10 per cent (Table 3).

III.4 Soybeans

Soybeans were a net export for Thailand from 1960 until 1988. They became a net import from 1992 onwards. During the export period, the exports were taxed, but from 1995 onwards, the trade regime shifted nominally towards tariff quotas. Within the quota volume of imports, soybeans could be imported at low or zero tariffs. Beyond the quota the applied tariff was set at the maximum amount permitted by Thailand's WTO obligations, which varied between 80 and 90 per

cent. The transition of soybeans from a net export to net import (1992) coincided with a shift from negative nominal rates of protection (around –20 per cent) to positive rates of 30 to 40 per cent.

III.5 Sugar

In many, perhaps most, countries of the world, the sugar industry receives unusually favourable treatment. Thailand is no exception. Sugar was an import item until the late 1950s, but has since has been a net export for over four decades. Nevertheless, it receives protection in the form of a "home price scheme". This type of scheme involves taxing consumers and using the proceeds to subsidize exports. A scheme of this kind was practised in the Australian sugar and dairy industries in the 1950s and 1960s. Reportedly, a Thai economics student at an Australian university learned about the scheme in the 1960s and imported the ideas on return home. The scheme has subsequently been applied to the Thai sugar industry, long after it was abandoned in Australia.

A home price scheme drives up the domestic consumer and producer prices. It subsidizes the producer at the expense of the consumer. To make the scheme work, leakage from the export market to the more profitable home consumption market has to be prevented. In most industries, this is difficult. Re-importing for domestic consumption must also be restricted, and as Corden (1971, p. 17) points out, this can be achieved by a sufficiently restrictive tariff. From the point of view of the finance ministry, an attraction is that the scheme is self-financing. But as a protectionist device, a limitation of the scheme is that the capacity of the consumption tax to subsidize exports is reduced if the volume of exports becomes a large share of total output (exports plus domestic consumption). This has been an issue in the case of the Thai sugar industry.

Siamwalla and Setboonsarng attribute the political power of the Thai sugar industry to technological changes within the sugar milling industry which required large mills and precise scheduling of sugar deliveries to these mills. Sugar milling is a highly capital-intensive business, and during the sugar processing season it is essential that the processing plants be fully utilized. In Thailand, sugar growers and millers are highly organized. The two groups have bickered over prices, but they have been able to combine their efforts to lobby the government for intervention on their behalf, something other agricultural export industries in Thailand have been unable to achieve. The technological changes mentioned above also helped restrict leakage from the export market to home consumption, because the mills were large and few in number.

Figure 5 shows that the consumer price of sugar has been stabilized by the scheme, relative to the export price. The peak export prices of the early 1970s were not transmitted to consumers or producers and at this time the NRP for sugar was negative. But for most of the duration of the scheme, consumer and producer prices have been well above export prices. Since the mid 1980s the NRPs have averaged over 60 per cent. Even though it is exported, sugar is by far the most heavily protected of Thailand's agricultural industries, with the possible exception of its small and inefficient dairy industry.

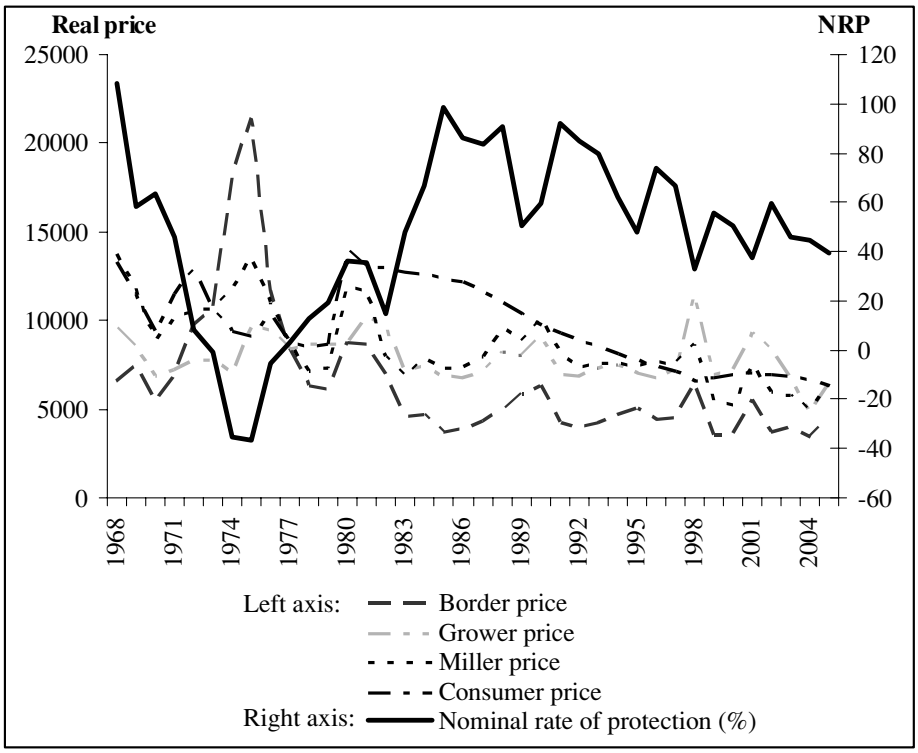
III.6 Palm Oil

Thailand's palm oil industry has fluctuated between a net import and a net export. Although the industry has been net export since 1998, a system of import quotas remains in place. Price data for palm oil, which can support the price comparisons conducted in this paper, are available only from 1995 onwards and palm oil is therefore not included in Table 3. The nominal rate of protection for palm oil, measured at the wholesale level, has exceeded 50 per cent since the late 1990s. In this respect, the case of palm oil resembles sugar. It is a net export which is nevertheless protected, reflecting the political lobbying power of its capital intensive processing sector.

III.7 Rubber

Rubber is a net export for Thailand and the Thai rubber industry has been subject to an export tax. The manner of calculating the tax meant that the

FIGURE 5
Thailand: Price comparison and NRP at wholesale level — Sugar



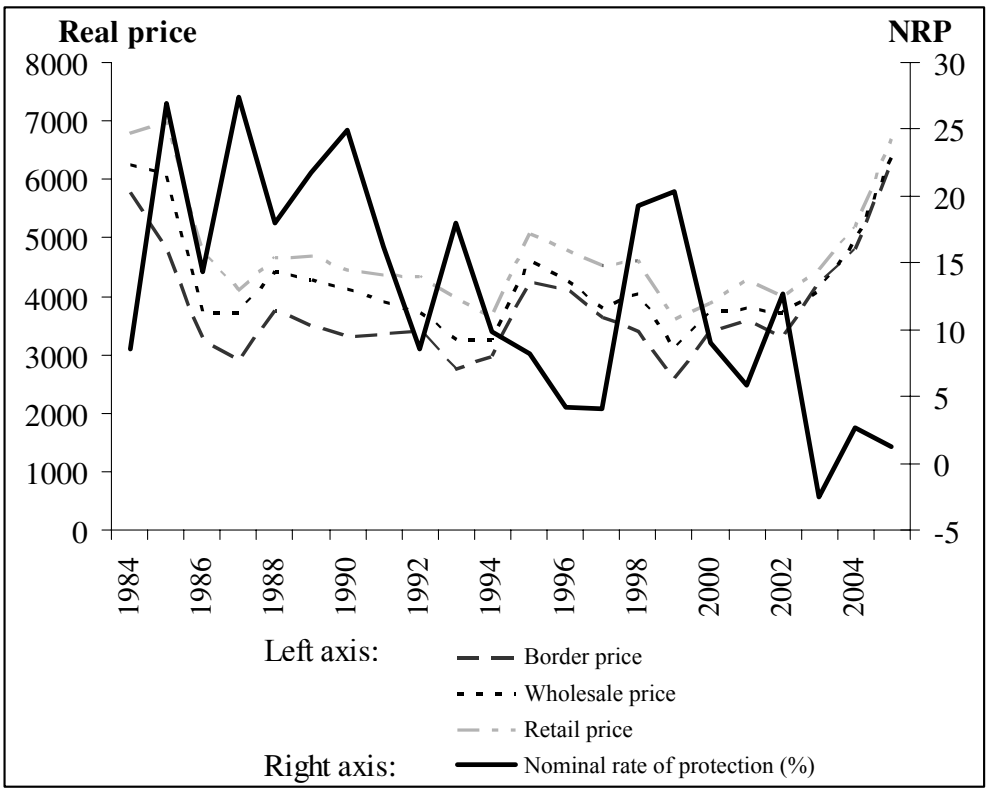
NOTE: Nominal rate of protection is calculated as 100*(Domestic price–Border price)/Border price.
SOURCE: Author's calculations.

rate drifted upwards with inflation. Due to the inflation of the 1970s, by the early 1980s the rate of export tax had reached 26 per cent. Pressure from Members of Parliament from the rubber growing areas of the south of Thailand led to the revision of the system of calculation and a return to the lower rates of taxation of the 1960s. Table 3 confirms that since 1990 the nominal rate of protection on rubber has been roughly zero.

III.8 Fertilizer

Thailand imports urea for use as fertilizer and urea imports have been subjected to declining rates of tariff protection. Of course, taxation of imports of this agricultural input implies disprotection for the agricultural industries which use it. The decline in tariff rates began in the early 1990s. By the early 2000s the tariff rates were negligible. These policy changes are confirmed by the price comparisons reported in Table 3. Nominal rates of protection have declined steadily and are currently close to zero. This treatment of fertilizer in Thailand — steadily declining rates of taxation — contrasts with several neighbouring countries, where fertilizer use has tended to be subsidized as part of a general programme of agricultural subsidization.

FIGURE 6
Thailand: Price comparison and NRP at wholesale level — Fertilizer



NOTE: Nominal rate of protection is calculated as 100*(Domestic price–Border price)/Border price.
SOURCE: Author's calculations.

IV. Imputed Protection at the Farm Level

So far, my discussion of protection has related to the effects that policy interventions have at the wholesale market level. In this section, I extend the analysis to consider the way protection (or its opposite) at the wholesale level produces price effects at the farm level.

IV.1 Theory

One of the intentions of agricultural protection policy is to influence prices at the farm level and these farm level effects are always a matter of policy concern. But the goods produced directly by farmers seldom enter international trade themselves. The raw commodities produced by farmers are generally non-traded. The commodities that enter international trade are the processed or partially processed versions of these non-traded raw products. Between the non-traded raw product produced by the farmer and the traded processed commodity which enters international trade, there may be several steps of transport, storage, milling, processing and re-packaging.

The significance of this point is that protection policy operates directly on the goods which actually enter international trade, either exported or imported, not the raw commodities produced by farmers. Protection at the farm level is therefore a derived effect. It depends on the extent to which

policies applied to trade in processed agricultural goods induce changes in their prices which are then transmitted to the prices actually faced by farmers. The question thus arises as to what extent price changes at the wholesale level, induced by protection policy, affect the prices actually received by farmers for the raw products they sell.

We construct a simple econometric model to investigate this issue. We shall use the notational convention that upper case Roman letters (like X) will denote the values of variables in their levels and lower case Roman letters (like x) will denote their natural logarithms. Thus $x = \ln X$. Protection at the wholesale level is defined as

$$P_{it}^{W} = P_{it}^{*}(1 + T_{it}^{W}), \tag{1}$$

where P_{it}^{W} denotes the level of the wholesale price of commodity i at time t, P_{it}^{*} is the corresponding border price, expressed in the domestic currency and adjusted for handling costs in getting the commodity from the *cif* level to the domestic wholesale level, in the case of an import, and for the cost of getting it from the wholesale level to the *fob* level in the case of an export. The nominal rate of protection at the wholesale level is given by T_{it}^{W}. In this discussion, both the border price and the nominal rate of protection are treated as exogenous variables. The border price is determined by world markets and the country concerned is presumed to be a price taker. The nominal rate of protection is determined by the government's protection policy.

The farm gate price of the raw material is denoted by P_{it}^{F} and its logarithm, p_{it}^{F}, is related to the logarithm of the wholesale price by

$$p_{it}^{F} = a_i + b_i p_{it}^{W} + u_{it}, \tag{2}$$

where a_i and b_i are coefficients and u_{it} is a random error term. The coefficient b_i is the "pass-through" or "transmission" elasticity. The estimated values of the coefficients a_i and b_i are denoted $\hat{a}_i$ and $\hat{b}_i$, respectively. The econometric estimation of these parameters is discussed below.

The estimated coefficients are used as follows. We estimate the logarithm of the farm price that would obtain *in the absence of any protection* as

$$\hat{p}_{it}^{F*} = \hat{a}_i + \hat{b}_i p_{it}^{W*}, \tag{3}$$

where p_{it}^{W*} is the estimated value of the wholesale price that would obtain in the absence of protection, $p_{it}^{W*} = \ln P_{it}^{W*}$. This is then compared with the estimated value of the wholesale price *in the presence of protection*

$$\hat{p}_{it}^{F} = \hat{a}_i + \hat{b}_i p_{it}^{W}. \tag{4}$$

Denoting the anti-logs of $\hat{p}_{it}^{F}$ and $\hat{p}_{it}^{F*}$ by $\hat{P}_{it}^{F}$ and $\hat{P}_{it}^{F*}$, respectively, the nominal rate of protection at the farm level is then estimated as

$$\hat{T}_{it}^{F} = (\hat{P}_{it}^{F} - \hat{P}_{it}^{F*}) / \hat{P}_{it}^{F}. \tag{5}$$

It is important to observe that the value of the protection-inclusive farm level price used in these calculations is the level estimated from the econometric model (equation (4)) rather than the actual price given by the raw data. The reason is that our intention is to use the model to estimate the *change* in the farm gate price caused by protection at the wholesale level. Thus both the protection-inclusive and the protection-exclusive prices used in (5) are their predicted values, obtained from the model.

The implied nominal rate of protection at the farm level can be related to the nominal rate of protection at the wholesale level, as follows. Substituting $\hat{P}_{it}^{F} = \hat{A}_i (P_{it}^{W})^{\hat{b}_i}$ and

$\hat{P}_{it}^{F*} = \hat{A}_i (P_{it}^{W*})^{\hat{b}_i}$ into equation (5), where $\hat{A}_i$ is the anti-log of $\hat{a}_i$, rearranging, and using equation (1), we obtain the simple expression

$$\hat{T}_{it}^{F} = (1 + T_{it}^{W})^{\hat{b}_i} - 1. \qquad (6)$$

Obviously, if $T_{it}^{W} = 0$, then $\hat{T}_{it}^{F} = 0$, regardless of the value of $\hat{b}_i$. Similarly, if $\hat{b}_i = 0$, then $\hat{T}_{it}^{F} = 0$, regardless of the value of T_{it}^{W}. Also, if $\hat{b}_i = 1$, then $\hat{T}_{it}^{F} = T_{it}^{W}$. It can readily be seen that when $T_{it}^{W} > 0$, $\hat{T}^{F} \geq T_{it}^{W}$ as $\hat{b}_i \geq 1$ and $\hat{T}^{F} \leq T_{it}^{W}$ as $\hat{b}_i \leq 1$. When $T_{it}^{W} < 0$, $\hat{T}^{F} \leq T_{it}^{W}$ as $\hat{b}_i \geq 1$ and $\hat{T}^{F} \geq T_{it}^{W}$ as $\hat{b}_i \leq 1$.

IV.2 Econometric Application

The objective of the econometric analysis is to estimate the parameter $\hat{b}_i$ for each commodity. Here, the results will be summarized briefly. For each commodity we conduct the analysis using time series price data with each variable expressed in logarithms and each deflated by the GDP deflator for Thailand: the farm gate price (LFP), the wholesale price (LWP), and the log of the international price, adjusted by the nominal exchange rate and transport and handling costs (LIP).

We first test each of the series for the existence of a unit root. The null hypothesis of a unit root was rejected for all price series (recalling that they are real, not nominal, price series, using the GDP deflator) for all commodities except soybeans. However, in the case of soybeans the two price series where the null hypothesis of a unit root could not be rejected, the series were not cointegrated. For all commodities except soybeans, the price series were thus considered stationary.

Ordinary least squares (OLS) estimates of equation (2) were first produced. In most cases, autocorrelation was a problem and an AR(1) correction term was included to eliminate it, which it did effectively. The OLS estimates assume that LFP is endogenous and LWP is exogenous. These assumptions were tested using Hausman's endogeneity test. In the case of each commodity, the null hypothesis that LWP was (weakly) exogenous to LFP failed to be rejected, confirming the validity of the OLS estimates. Reverse Hausman's tests were also conducted and the null hypothesis that LFP was exogenous to LWP was rejected in every case. These results support the validity of using the OLS framework to estimate the transmission elasticity from LWP to LFP, treating LWP as exogenous. For completeness, instrumental variable estimates were produced for each commodity, using LIP as the instrument for LWP. The resulting estimates of $\hat{b}_i$ differed from the OLS estimates (some larger, some smaller) but only slightly.

Table 4 summarizes the estimates for each of the commodities included in Table 3.[3] All of the OLS estimates of the transmission elasticity were significantly different from zero with the expected positive signs. This is an important point. It is often asserted that middlemen prevent commodity price changes at the wholesale level, whether resulting from protection or from international price movements, from being transmitted to farmers. This hypothesis is strongly rejected by the Thai data. The transmission elasticities are *not* zero. Economists often assume that the transmission elasticities are unity. But this hypothesis is also rejected for most commodities. This was done by imposing the restriction that the elasticity was zero and testing this restriction with an F-test. The restriction was rejected in almost all cases. The estimated values are generally significantly less than unity, most lying between 0.7 and 0.9. In one case (sugar) the estimate is somewhat lower (0.53) and in another (cassava) the estimated value slightly exceeds unity, but is not significantly different from unity.[4] It is likely that the true transmission elasticities change over

TABLE 4
Thailand: Estimates of Transmission Elasticities from Wholesale to Farm Prices

Commodity	*Estimated elasticity*	*(t-statistic)*
Rice	0.7587	(7.30)
Maize	0.8089	(14.38)
Cassava	1.0695	(8.20)
Soybeans	0.8003	(11.23)
Sugar	0.5309	(3.93)
Rubber	0.8981	(19.97)
Fertilizer	0.8889	(17.70)

NOTE: t-statistics are shown in parentheses.
SOURCE: Author's calculations, using data and methodology discussed in the text. Estimates shown relate to the parameter b_i in equation (2).

time, but the limited data available for this exercise made it necessary to assume that the true values remain constant.

IV.3 Estimation of Protection at Farm Level

Given the estimated value of the transmission elasticity, equation (6) was used together with the estimated nominal rates of protection at the wholesale level, discussed above, to produce estimates of imputed NRPs at the farm level for each commodity. These are shown in Table 5. Because the estimated values of the transmission elasticity are (except for cassava) between zero and unity, the imputed nominal rates of protection at the farm level are somewhat lower in absolute value than the nominal rates at the wholesale level, but (because of the assumption of constant transmission elasticities) they track the pattern of the wholesale level results closely.

The imputed nominal rates of assistance at the farm level are negative in all years for rice, in most years for maize, cassava and rubber. For these commodities, the absolute magnitudes of these negative rates have declined over time. For soybeans, the nominal rate was negative until soybeans became a net import in the early 1990s, since when soybeans has been significantly protected. Sugar has been a highly protected commodity since 1980.

V. Aggregate Measures of Agricultural Protection

In this section aggregate measures of rates of protection are presented, using the information assembled from the preceding analysis, and broadly following the methodology outlined in Anderson et al. (2008). The annual calculations reported in this section fluctuate somewhat from year to year. International and domestic price changes from year to year alter the protective effects of all instruments of protection except *ad valorem* tariffs. In addition, the time taken for domestic prices to adjust to international price changes means that annual data on price differences produce some spurious variation from one year to the next. Our interest is on broad trends, rather than these annual fluctuations.

Table 6 uses the above information to calculate *direct rates of assistance* at the farm level, taking account of assistance to fertilizer inputs. The direct rate of assistance to a particular commodity is calculated as its nominal rate of protection (synonymous with nominal rate of assistance) at the farm level *minus* the product of the cost share of fertilizer in production of the commodity concerned and the nominal rate of assistance to fertilizer. The nominal rate of assistance to fertilizer is negative in every year but one, meaning that fertilizer use is taxed in every year but one, although the rates of taxation have declined since the mid-1980s. The direct rates of assistance are therefore below the nominal rates at the farm level for every commodity using fertilizer as an input.

Finally, the direct rate of assistance for total agriculture, import agriculture and export agriculture are calculated and compared with

TABLE 5
Thailand: Nominal Rate of Assistance at Farm Level, by Commodity, 1970–2005

Year	*Rice*	*Maize*	*Cassava*	*Soybean*	*Sugar*	*Rubber*
1970	–23.9	–0.1	–9.1	–16.3	34.8	–4.2
1971	–27.5	–0.9	–24.3	–16.3	32.0	5.7
1972	–20.7	7.2	–31.5	–16.3	13.9	11.6
1973	–19.9	–6.0	–38.4	–16.3	6.4	–4.6
1974	–50.7	0.0	–6.9	–16.3	–15.2	–7.6
1975	–38.2	–3.3	0.8	–16.3	–9.2	2.4
1976	–19.3	–0.6	1.5	–16.3	–0.8	–2.1
1977	–25.2	2.4	–8.7	–16.3	–0.5	–9.9
1978	–29.7	0.2	–11.5	–16.3	4.0	–13.0
1979	–22.9	–1.7	20.5	–16.3	–0.5	–17.2
1980	–23.7	–2.4	–0.7	–16.3	7.4	–20.1
1981	–27.9	–5.2	–20.1	–16.3	22.7	–26.8
1982	–14.6	2.1	–5.9	–16.3	2.9	–13.4
1983	–7.8	2.1	8.4	–16.3	9.1	–7.6
1984	–10.4	2.1	–19.5	–16.3	30.0	–17.8
1985	–16.5	–1.0	–25.1	–22.4	45.8	–11.0
1986	–16.5	–8.8	2.5	–17.1	43.7	–9.3
1987	–6.7	–2.0	–16.9	–10.7	43.1	–12.5
1988	–6.9	0.7	–16.9	–4.1	46.2	–12.0
1989	–13.5	–0.8	–9.5	–8.1	25.6	–10.6
1990	–10.1	1.1	–6.6	–40.2	28.8	–1.0
1991	–11.5	0.1	–13.0	–12.7	37.9	–5.2
1992	–8.9	–10.9	–10.5	36.1	46.7	–1.1
1993	–17.0	3.7	–13.5	24.6	40.5	–6.1
1994	–22.3	0.8	2.4	28.8	30.9	–1.3
1995	–8.3	8.1	4.1	24.2	22.6	–1.3
1996	–1.1	–8.7	–17.9	25.9	38.1	2.2
1997	–15.9	–36.4	–19.7	7.4	37.8	–3.1
1998	–12.5	–3.9	–7.4	19.8	17.7	7.1
1999	–8.0	–6.9	–18.6	40.0	5.3	–2.2
2000	–11.6	2.2	–12.4	37.5	17.8	1.1
2001	–7.9	–0.7	–6.7	30.5	8.7	2.9
2002	–3.7	0.0	–3.2	34.5	14.4	7.1
2003	–4.0	0.0	–13.8	28.2	8.1	2.2
2004	–5.8	0.7	–9.5	22.7	18.3	–5.3
2005	–1.7	–2.9	–9.5	19.5	33.1	–4.9

NOTE: See text for explanation of estimation of NRP at the farm level. The nominal rate of assistance and nominal rate of protection are synonymous.
SOURCE: Author's calculations.

TABLE 6
Thailand: Direct Rate of Assistance at Farm Level, by Commodity, 1970–2005

Year	*Rice*	*Maize*	*Cassava*	*Soybean*	*Sugar*	*Rubber*
1970	–24.9	–2.5	–10.1	–17.3	33.0	–5.0
1971	–28.4	–3.2	–25.3	–17.3	30.1	4.9
1972	–21.6	4.9	–32.6	–17.4	12.1	10.9
1973	–20.7	–8.2	–39.5	–17.5	4.6	–5.3
1974	–51.7	–2.2	–8.0	–17.5	–17.0	–8.3
1975	–39.0	–5.4	–0.4	–17.6	–11.0	1.7
1976	–19.9	–2.7	0.2	–17.6	–2.6	–2.8
1977	–25.8	0.4	–10.1	–17.7	–2.4	–10.6
1978	–30.3	–1.8	–12.9	–17.7	2.1	–13.7
1979	–23.3	–3.6	19.1	–17.8	–2.3	–18.0
1980	–24.1	–4.3	–2.2	–17.8	5.6	–20.8
1981	–28.4	–7.1	–21.6	–17.8	20.9	–27.6
1982	–15.0	0.2	–7.4	–17.8	1.2	–14.1
1983	–8.2	0.1	7.0	–17.8	7.5	–8.4
1984	–10.8	0.1	–20.8	–17.8	28.5	–18.7
1985	–19.5	–7.5	–29.3	–27.3	40.9	–13.8
1986	–17.8	–12.2	0.2	–19.6	41.0	–10.8
1987	–9.7	–8.5	–21.3	–15.5	38.0	–15.3
1988	–8.6	–3.6	–19.7	–7.2	42.8	–13.8
1989	–15.8	–6.0	–13.0	–11.7	21.4	–12.8
1990	–12.9	–4.8	–10.6	–44.3	23.9	–3.5
1991	–13.0	–3.6	–15.6	–15.5	34.8	–6.8
1992	–9.4	–12.8	–12.0	34.6	45.1	–1.9
1993	–19.0	–0.1	–16.6	21.1	37.1	–7.6
1994	–23.2	–1.3	0.6	26.8	29.2	–2.1
1995	–8.7	6.5	2.6	22.4	21.1	–1.9
1996	–0.9	–9.5	–18.7	25.0	37.3	1.8
1997	–15.9	–37.1	–20.4	6.6	37.1	–3.6
1998	–14.9	–7.1	–10.6	16.5	14.5	4.1
1999	–10.7	–10.2	–22.0	36.8	1.9	–5.9
2000	–12.4	0.9	–13.9	36.2	16.3	–0.8
2001	–8.1	–1.5	–7.6	29.8	7.8	1.5
2002	–5.2	–1.7	–5.1	33.0	12.4	3.7
2003	–2.7	0.3	–13.4	28.4	8.5	2.9
2004	–5.5	0.4	–9.9	22.5	17.9	–6.1
2005	–1.2	–3.0	–9.7	19.4	32.9	–5.4

NOTE: Direct Rate of Assistance (DRA) means the nominal rate of assistance at the farm level for that industry (Table 5) minus the product of the cost share of fertilizer for that industry and the nominal rate of assistance to fertilizer (Table 3).
SOURCE: Author's calculations.

earlier estimates of rates of assistance for manufacturing. These earlier estimates for Thai manufacturing are presented in Table 7 and the comparison is summarized in Table 8. The *total rate of assistance to agriculture* (TRA) (column (5)) is calculated as the difference between the direct rate of assistance to total agriculture (column (1)) and the direct rate of assistance to manufacturing (column (4)). The latter is derived from nominal rates of protection for manufacturing estimated from earlier empirical studies of protection in Thai manufacturing.[5] The resulting series on direct rates of assistance to Thai manufacturing is very approximate, but the overall conclusion is robust. The estimated TRA for agriculture is negative in every year, but has declined in absolute value from roughly –40 per cent in the 1980s to roughly –10 per cent since 2000.

As noted above, the objective of this discussion is to identify broad trends over time in the structure of protection, and not year-to-year changes. Our estimates show that agriculture has remained a net taxed sector, relative to manufacturing, throughout the three and a half decades covered by our data. But the rate of net taxation has declined dramatically. The transition from high to low rates of net taxation occurred in the mid-1990s.

VI. Conclusions and Prospects for Future Reform

As Thailand has industrialized, successive Thai governments have become increasingly interested in intervening on behalf of agricultural producers and processors. But the fact that Thailand is a major agricultural exporter has limited the scope for protection policy as a means of influencing domestic commodity prices. This paper has used comparisons between the prices of agricultural commodities in domestic markets and international markets as a means of studying the magnitudes of these interventions.

Over time, the direct taxation of agricultural exports has been gradually eliminated. This has

TABLE 7
Thailand: Nominal Rates of Protection in Manufacturing, 1980–2003

Nominal rates of protection (NRP) (per cent)	*1980*	*1985*	*2003*
Agro-processing	34.4	30.9	20.3
Textile products	41.0	27.8	18.6
Leather and Footwear products	54.1	26.8	18.5
Wood products	31.6	28.2	13.5
Paper and pulp	24.0	17.8	10.5
Chemical and petroleum products	32.8	21.4	8.4
Rubber products	29.1	26.8	23.2
Other non-metal products	36.7	23.0	10.0
Metal products	25.2	16.6	10.7
Machinery	22.4	14.3	6.2
Consumer goods and motor vehicles	31.2	19.7	10.6
Total Manufacturing	32.9	23.8	15.4

SOURCE: NRP estimates for 1980 are from Akrasanee and Ajanant (1986), those for 1985 are from World Bank (1988) and those for 2003 are from Athukorala, Jongwanich and Kohpaiboon (2004). See also Kohpaiboon (2004).

TABLE 8
Thailand: Direct and Total Rates of Agricultural Assistance, 1970–2005

Year	Direct Rates of Assistance				Total rate of assistance to agriculture (5)
	Total agriculture (1)	Import agriculture (2)	Export agriculture (3)	Manu-facturing (4)	
1970	–4.9	n.a.	–4.9	26.3	–31.2
1971	–6.9	n.a.	–6.9	26.3	–33.2
1972	–7.5	n.a.	–7.5	26.3	–33.8
1973	–14.7	n.a.	–14.7	26.3	–41.0
1974	–17.5	n.a.	–17.5	26.3	–43.8
1975	–11.9	n.a.	–11.9	26.3	–38.2
1976	–7.6	n.a.	–7.6	26.3	–33.9
1977	–11.3	n.a.	–11.3	26.3	–37.6
1978	–12.7	n.a.	–12.7	26.3	–39.0
1979	–8.0	n.a.	–8.0	26.3	–34.3
1980	–11.1	n.a.	–11.1	26.3	–37.4
1981	–14.4	n.a.	–14.4	20.7	–35.1
1982	–9.3	n.a.	–9.3	20.3	–29.6
1983	–3.7	n.a.	–3.7	19.9	–23.6
1984	–7.6	n.a.	–7.6	19.5	–27.1
1985	–10.5	n.a.	–10.5	19.1	–29.6
1986	–4.1	n.a.	–4.1	18.8	–22.9
1987	–6.2	n.a.	–6.2	18.8	–25.0
1988	–2.5	n.a.	–2.5	18.8	–21.3
1989	–6.8	–11.7	–5.9	18.8	–25.6
1990	–8.7	–44.3	–1.9	18.8	–27.5
1991	–3.7	n.a.	–3.7	18.3	–22.0
1992	7.0	12.7	4.5	17.8	–10.8
1993	1.7	21.1	–2.1	17.3	–15.6
1994	4.5	26.8	0.0	16.8	–12.3
1995	6.5	15.1	2.7	16.3	–9.8
1996	5.7	8.9	4.3	15.8	–10.1
1997	–5.3	–14.3	–1.4	15.3	–20.6
1998	0.3	4.9	–1.7	14.8	–14.5
1999	–2.4	13.3	–9.0	14.3	–16.7
2000	3.4	18.1	–2.7	13.8	–10.4
2001	2.8	29.8	–1.5	13.3	–10.5
2002	5.3	33.0	1.0	12.8	–7.5
2003	3.2	28.4	–0.5	12.3	–9.3
2004	1.9	22.5	–1.0	12.3	–10.4
2005	4.3	6.5	3.5	12.3	–8.0

SOURCE: Author's calculations.

been important in the case of rice, where the high rates of export taxation prior to the mid-1980s have been abolished. Rubber exports, taxed prior to 1990, have been untaxed since then. Cassava exports have continued to be taxed to a minor extent by the system of export quotas. Fertilizer is a major input into agricultural production and taxes on fertilizer imports have been steadily eliminated since the early 1990s. Maize exports have been consistently untaxed, as have exports of chicken, a commodity not covered by the analysis of this paper due to lack of suitable price data. Most of this is a story of eliminating the price distortions which formerly acted against agricultural export industries.

Four commodities depart from this general story of liberalized agricultural markets. Soybean was an export prior to 1992 and has been a net import since then, with imports subject to quota restrictions. The change from net export to net import coincided with a switch from negative to positive nominal rates of protection. Since the early 1990s the domestic soybean industry has received a nominal rate of protection of between 30 and 40 per cent. Sugar is an export commodity for Thailand but the domestic sugar industry is protected by a "home price" system which taxes domestic consumers and transfers the revenue to producers. Nominal rates of protection have averaged over 60 per cent. The political power of the highly capital intensive sugar milling industry is the explanation for this pattern of protection. The case of palm oil is qualitatively similar to sugar, but the rates of protection are somewhat lower. Finally, Thailand's small dairy industry is protected from competition from imported milk powder. It is not been possible to obtain the data required to quantify this protection for the purposes of this paper, but informed sources report that the rate of protection is comparable with sugar. The prospects for further trade liberalization in Thailand are not encouraging, unless this occurs through bilateral preferential trading arrangements such as the scheme proposed with the United States.[6]

Almost all of Thailand's poor people reside in rural areas and most of these people are directly involved in agricultural production (Warr 2004). The Thai public is generally supportive of finding ways to alleviate rural poverty, provided the mechanisms chosen do not threaten the dominant social and political position of the urban Thai elite. Thai governments have responded to this sentiment through interventions on behalf of rural people. But Thailand is unusual in that, except for the cases discussed above, these interventions have seldom taken the form of intervening in agricultural commodity markets. The unusual export orientation of Thai agriculture must be an important explanation for this outcome. Instead, cash transfers to village organizations, subsidized loan schemes not linked to agricultural production and a generally good system of public infrastructure in rural areas have been the main instruments of intervention.

Unfortunately, the transfers and loans have not been directed in any systematic way at raising the productivity of rural people or at assisting them to find better economic opportunities outside agriculture. Their long-term contribution to alleviating rural poverty will probably be small. The chronic problem of low educational attainment in rural areas has not been properly addressed (Khoman 1993). The inadequacy of both the quantity and quality of education received by the majority of rural Thais dooms most to lives at the bottom of the economic and social ladder, even when they subsequently migrate to the cities.

NOTES

This paper has benefited from the assistance with price data of Archanun Kohpaiboon of Thammasat University, Bangkok, and from the excellent research assistance of Arief Ramayandi of the University of Padjajaran, Bandung, Indonesia. Helpful comments were also received from Kym Anderson of the University of Adelaide and from Ammar Siamwalla, Chalongphob Sussangkarn and Wisarn Pupphavesa of Thailand Development Research Institute; Isra Sarntisart of Chulalongkorn University; and Nipon Poapongsakorn, Prayong Netayarak and Somboon Siriprachai of Thammasat University. The helpful suggestions of an anonymous referee are also gratefully acknowledged. The author accepts responsibility for all defects.

1. For example, a study from the Thailand Development Research Institute (Isvilanda and Poapongsakorn 1995) estimated that a 25 per cent increase in the price of rice would induce only a 2.3 per cent increase in rice production, consisting mainly of a 1.3 per cent increase in yield and implying an output supply elasticity with respect to price of just under 0.1.
2. A general equilibrium analysis of the economic effects of Thailand's export tax, including its distributional effects, is provided in Warr (2001). A subsequent discussion, though not within a general equilibrium framework, is contained in Choeun, Godo, and Hayami (2006).
3. Estimation for palm oil was not possible, due to insufficient data points.
4. There is no theoretical reason to suppose that the true value of the transmission elasticity is necessarily below unity. For example, if all margins between the farm level and wholesale level remained constant in nominal terms as the wholesale price changed, the percentage change in the derived farm level price would necessarily exceed the percentage change in the wholesale price. The transmission elasticity would therefore exceed unity.
5. Estimates of manufacturing protection prior to 1980 — were not available, and the 1980 rate has been used for earlier years in these calculations. Rates of manufacturing protection for years between 1980 and 1985 and between 1985 and 2003 were estimated by linear interpolation.
6. A bilateral trading arrangement with the United States was under negotiation prior to February 2006 but as of November 2006 the negotiations remain suspended pending the holding of new elections in Thailand. Elections are currently scheduled for late 2007. The protection of Thailand's soybeans industry would be an important issue in these negotiations.

REFERENCES

Akrasanee, N. and J. Ajanant. "Thailand Manufacturing Industry Protection and Empirical Studies". In *The Political Economy of Manufacturing Protection: Experiences of ASEAN and Australia*, edited by C. Findlay and R. Garnaut, pp. 51–70. Sydney: Allen and Unwin, 1986.

Anderson, Kym et al. "Methodology for Measuring Distortions to Agricultural Incentives". Development Research Group, World Bank, Washington, D.C. Available at the Working Papers page of <www.worldbank.org/agdistortions>. 2008.

Athukorala, P., J. Jongwanich and A. Kohpaiboon. "Tariff Reform and the Structure of Protection in Thailand". Unpublished report for World Bank, Bangkok, 2004.

Barker, R., and R. W. Herdt. *The Rice Economy of Asia*. Washington, D.C.: Resources for the Future, 1985.

Choeun, Hong, Yoshihisa Godo, and Yujiro Hayami. "The Economics and Politics of Rice Export Taxation in Thailand: A Historical Simulation Analysis, 1950–1985". *Journal of Asian Economics* 17 (2006): 103–25.

Corden, W. M. *The Theory of Protection*. Oxford: Clarendon Press, 1971.

———. *Trade Policy and Economic Welfare*. Oxford: Clarendon Press, 1974.

Ingram, J. C. *Economic Change in Thailand, 1850–1970*. Stanford: Stanford University Press, 1971.

Khoman, Sirilaksana. "Education Policy". In *The Thai Economy in Transition*, edited by Peter Warr, pp. 325–54. Cambridge: Cambridge University Press, 1993.

Kohpaiboon, A. *Multinational Enterprises and Industrial Transformation: Evidence from Thailand*. Cheltenham: Edward Elgar, 2006.

Krueger. A. O., M. Schiff, and A. Valdés. "Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economy Wide Policies". *World Bank Economic Review* 2 (1988): 255–71.

Meenaphant, S. "An Economic Analysis of Thailand's Rice Trade". Ph.D. dissertation, Rice University, Texas, 1981.

Pinthong C. "A Price Analysis of the Thai Rice Marketing System". Ph.D. dissertation, Stanford University, California, 1977.

———. "Distribution of Benefit of Government Rice Procurement Policy in Thailand" [in Thai]. *Thammasat University Journal* 13 (1984): 166–87.
Roumasset, J. and S. Setboonsarng. "Second-Best Agricultural Policy: Getting the Price of Thai Rice Right". *Journal of Development Economics* 28 (1988): 323–40.
Siamwalla, A. and S. Setboonsarng. "Thailand". In *The Political Economy of Agricultural Pricing Policy: Vol. 2, Asia*, edited by A. O. Krueger, M. Schiff, and A. Valdés, pp. 236–80. Baltimore: Johns Hopkins University Press, 1991.
———. *Trade, Exchange Rate, and Agricultural Pricing Policies in Thailand*. Washington, D.C.: World Bank, 1989.
Siamwalla, A., S. Setboonsarng, and D. Patamasiriwat. "Agriculture". In *The Thai Economy in Transition*, edited by P. G. Warr, pp. 81–117. Cambridge: Cambridge University Press, 1993.
Somporn Isvilanonda and Nipon Poapongsakorn. "Rice Supply and Demand in Thailand: The Future Outlook". Thailand Development Research Institute, Bangkok, January 1995.
Warr, Peter. "Thailand's Post-crisis Trade Policies: The 1999 WTO Trade Policy Review". *The World Economy* 23 (2000): 1215–36.
———. "Welfare Effects of an Export Tax: Thailand's Rice Premium". *American Journal of Agricultural Economics* 83 (2001): 903–20.
———. "Globalization, Growth and Poverty Reduction in Thailand". *ASEAN Economic Bulletin* 21 (2004): 1–18.
———. "Long-Term Economic Performance in Thailand". *ASEAN Economic Bulletin* 24 (2007): 1–26.
Warr, Peter and Frances Wollmer. "Testing the Small Country Assumption: Thailand's Rice Exports". *Journal of the Asia Pacific Economy* 2 (1997): 133–43.
Warr, Peter, and Archanun Kohpaiboon. "Distortions to Agricultural Incentives in Thailand". Agricultural Distortions Research Project Working Paper xx, January 2007, World Bank, Washington, D.C. Available at <http://rspas.anu.edu.au/economics/prc/publications.php> and the Working Papers page of <www.worldbank.org/agdistortions>.
World Bank. *Thailand: Building on the Recent Success*. Country Economic Memorandum, World Bank, Washington, D.C., 1988.
———. "Beyond the Crisis: A Strategy for Renewing Rural Development in Thailand". Rural Development and Natural Resources Sector Unit, East Asia and Pacific Region, World Bank, Washington, D.C., 2000.
Wong, C. M. "A Model for Evaluating the Effects of Thai Government Taxation of Rice Exports on Trade and Welfare". *American Journal of Agricultural Economics* 60 (1978): 65–73.

Peter Warr is the John Crawford Professor of Agricultural Economics and founding Director of the Poverty Research Centre in the Division of Economics, Research School of Pacific and Asian Studies at the Australian National University.