Distortions to Agricultural Incentives

in Indonesia

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Introduction and summary

In Indonesia, agricultural trade policy is a politically charged subject. The staple food, rice, is a net import and this one commodity has been a central focus of Indonesian food policy throughout the post-Independence period. Self-sufficiency in rice, meaning the elimination of rice imports, has been a cherished goal of agricultural policy for all of this time. It is an emotive subject, closely linked in the public imagination to Indonesian nationalism. When asked his proudest single achievement, Soeharto, Indonesia's President for the 32 years from 1966 to 1998, is reported to have cited the achievement of near self-sufficiency in rice.[2] This paper documents the changing structure of agricultural protection in Indonesia and attempts to explain the forces that have driven it.

The following section describes the changing structure of the Indonesian economy, with emphasis on the agricultural sector. The next section provides an overview of government economic policy in the period since independence and the following section deals with government policies towards agriculture. The fifth section attempts to provide a political economy explanation for the structure of agricultural protection and its changing pattern over the last three decades. The sixth section concludes.

[2] Soeharto's New Order regime began in March 1966, even though Soekarno nominally remained president for a further year. The reported statement was made during Soeharto's visit to the Food and Agriculture Organization headquarters in Rome in 1985, at which time rice imports were temporarily zero.

Growth and structural change

From 1968 to 2005, Indonesia's gross domestic product (GDP) grew in real terms at an average annual rate of 6.3 percent. The broad characteristics of this growth are summarized in Table 1. For ease of comparison with other Asian economies, the table distinguishes between the 'pre-boom' period prior to 1987 and the following 'boom' decade, which preceded the Asian crisis of 1997-99. For many Asian countries, the pre-crisis decade of 1987 to 1996 was one of extraordinary growth. As the table shows, Indonesia's growth during this decade was rapid, but not significantly more so than that of the two decades ('pre-boom') before it. Output contracted during the 'crisis' years of 1997 to 1999 and during the subsequent 'recovery' period growth has averaged a moderate 4.6 percent.

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 56 percent of GDP in 1965. By 2004 this share had declined to 15.4 percent. Over the same period the GDP share of manufacturing rose from 12.6 to 43.7 and the share of services rose from 31.4 to 40.9 percent. For more detailed study of the changing composition of the agricultural sector it is convenient to use the input-output tables, which are available for the years 1971, 1980, 1990 and 2000. As incomes rise, the share of spending on starchy staples typically falls, while the share of spending on meat, fruit and vegetables typically rises. Indonesian experience fits this common pattern.

It must be recognized that output growth within agriculture was achieved with rapidly diminishing shares of the national supplies of labor and capital. Furthermore, while agriculture grew more slowly than other sectors during boom periods, during the crisis its growth rate declined less than other sectors. Indonesia's agricultural sector has played a 'shock absorber' role, and this was particularly important during the crisis years, when agricultural employment absorbed large numbers of people laid off from the urban centers. Although GDP grew much more slowly during the 'recovery' period from 2000 to 2005 than during the 'boom' decade, agricultural growth was only very slightly slower in the recovery period (3.7 percent per year) than in the boom decade (3.5 percent per year).

Table 2 summarizes the changing composition of value added in agriculture since 1971, using data from Indonesia's input-output tables. Paddy production (unmilled rice as

produced at the farm level) contracted from 46 to 31 percent of agricultural output, while the share of vegetables and fruit increased from 14 to 22 percent and the share of livestock rose from 0.6 percent to 5 percent. It is somewhat surprising that the shares of intermediate inputs used in agriculture actually contracted (Table 3). The reason is apparently that fertilizer and pesticide usage was subsidized from the late 1960s until the late 1980s under a program called *Bimas*, discussed below. When the subsidies were phased out, fertilizer and pesticide use contracted markedly, especially in rice production. Most intermediate goods used in Indonesian agriculture are domestically produced (Table 4). Between 1980 and 2000 the share of imported intermediate goods in total intermediate good use increased from only 3.8 to 10.2 percent.

Tables 4 and 5 summarize the changing pattern of sales of agricultural products. In 1971, sales of paddy to intermediate users (rice millers) accounted for 56 percent of total sales, implying that almost half of paddy output was milled by households themselves. By 2000 sales to intermediate users accounted for 98 percent of total sales of paddy. Similar trends occurred in maize, rubber, sugarcane, palm oil, coffee and tea. The international trading position of the major agricultural commodities can be seen by comparing Tables 6 and 7. Paddy is neither exported nor imported, but milled rice has historically been an important import item for Indonesia. Since 2002 imports have been officially banned, but some imports have still occurred. Maize has switched from a significant net export to a net import item. Vegetables and fruits have become important net imports, as have soybeans (included in 'other food crops' in these tables) and livestock, which means mainly beef, imported from Australia.

Policy evolution

Indonesia obtained its independence from the Netherlands in 1949. The next two decades were chaotic. The government of President Soekarno pursued a nationalistic, quasi-socialist economic policy that produced hyperinflation and economic stagnation. In 1966 Soekarno was displaced by one of his generals, Soeharto, whose regime, called the 'New Order', lasted

until the macroeconomic crisis of 1998.[3] Soeharto pursued more market-oriented economic policies than his predecessor. Upon assuming power amid the economic chaos of the mid-1960s, Soeharto speedily introduced a macroeconomic stabilization program and then began liberalizing Indonesia's trade and investment policies. In 1967 foreign investors were guaranteed the right to repatriate both capital and profit and from 1970 onwards the capital account was almost completely open. As we shall see below, trade policy under Soeharto's government was much less open. It was characterized by taxation of exports, especially non-food agricultural exports, and protection of imports, including some food imports.

In the wake of the commodity boom of 1972-73 and the oil price shocks of 1973-74 and 1979-80, trade policy became increasingly inward-looking. As Figure 3 shows, these external events tripled the ratio of Indonesia's export prices to its import prices. Between the early 1970s and the mid-1980s, the government taxed or banned some traditional exports, pursued self-sufficiency in rice, and used part of the burgeoning oil revenues to establish import-substituting manufacturing industries, which it then protected. In the early to mid-1980s several traditional export industries were subjected to quantitative trade restrictions. These included a ban on log exports, conferring very high rates of effective protection on the plywood manufacturing industry, for which raw timber is the principal input. Licensing systems were introduced for exports of vegetable oils, several spices, coffee and some grades of rubber. In the case of palm oil, domestic refiners were protected by a tax on exports and a requirement that growers supply these refiners with part of their output at low, controlled prices.

From 1982 onwards, the price of oil began to decline and in 1986-87 it fell from US$28 to $10 per barrel. Many oil-exporting countries, including Nigeria and Venezuela, were unable to adjust to these external changes without devastating domestic consequences, but Indonesia responded quickly by cutting public spending and devaluing its currency, partly to promote non-oil exports. In addition, a value added tax (VAT) was introduced between 1983 and 1986. On the other hand, trade policy became increasingly oriented towards import substitution and the system of import licensing was extended.

Trade policy was significantly liberalized from 1985 onwards. With the stated goal of promoting non-oil exports, the government introduced a series of reforms which reduced tariffs and non-tariff barriers (NTBs). Following the tariff cuts of 1985 the government

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[3]The beginning of the New Order period is usually placed at March 1966, even though Soekarno nominally remained president until March 1967.

transferred most customs functions from the Indonesian Customs Service to an international inspection company, SGS of Switzerland. The role of SGS was phased out by 1995. NTBs on imports were progressively relaxed from 1986 onwards and the system of providing exporters with duty-free inputs was extended.

According to the estimates in Table 8, the effective rate of protection in agriculture declined from 24 percent in 1987 to 14 percent in 1994, and that in manufacturing declined much further, from 86 percent to 29 percent over the same period. Since there was probably more 'water' in the tariffs in 1987 than in 1995, the true reductions in protection were probably somewhat smaller than these numbers indicate, but the decline was still substantial. In addition to the lowering of tariff rates, many NTBs were replaced by tariffs. The coverage of 'restrictive' NTBs declined from 44 of total value added in all traded industries in 1986 to 23 percent in 1995. This switch from NTBs to tariffs was much more extensive in manufacturing than in agriculture, where the coverage of NTBs declined from 67 to 48 percent. In the wake of the financial crisis of 1997–98, the government was obliged to allow free imports of both rice and sugar as a condition for borrowing from the IMF. However, with the ending of the IMF program, imports of rice and sugar have again been restricted by both tariffs and NTBs.

Agricultural protection by sector

Import-competing and export agriculture

The distinction between import-competing products and export products is not always entirely clear cut, but is nevertheless crucial to any discussion of Indonesian agricultural policies. Whereas import-competing production has generally been protected by government policies, export competing production has generally been taxed. The most important import-competing agricultural products are rice, sugar, maize and soy beans. The most important export-competing products are coffee, rubber, tobacco, tea, oil palm, copra, shrimps and spices. Cassava is mainly non-traded, although there are exports of its derivatives, manioc and tapioca. Much of the livestock sector is also mainly non-traded, although chickens are exported and beef and dairy products compete with imports. Some sectors have moved from

one category to another; the most important example of this is sugar, which was the most important export in the colonial period, but has become one of the most highly protected import-competing products in the post-independence period.

Both the Dutch colonial government and the government of Indonesia in the post-independence period generally tried to control the price of rice and other important food crops to balance the competing interests of domestic producers and consumers. Except when world prices of food crops have been unusually high, imports have been directly restricted, or subject to tariffs, or both. On the rare occasions when world prices have been so high that growers would have had an incentive to export food crops such as rice, they have usually been prevented from doing so by non-tax measures.

In contrast, export crops have always been seen by successive governments over the last two centuries as a useful source of revenue. Under the Cultivation System introduced by the Dutch in 1830, production of cash crops for export was stimulated by imposing taxes on villagers that could be most easily paid in kind by handing over crops that the Dutch East India Company then processed and exported. By far the most important of these exports was sugar; other important exports in the nineteenth century were coffee, tea, indigo and cinnamon (Furnivall p.137). Booth (1995 p.202) reports that in the late 1830s 40 percent of the total income of the Dutch government was derived from the Cultivation System in its Indonesian colonies.

In sharp contrast, in the post-independence period, the Indonesian government's revenue from export crops has been obtained by export taxes that have tended to depress both domestic production and exports of the relevant crops. The main reason for raising export revenue in this quite different way has presumably been the government's desire, in the period since independence, to promote the development of the manufacturing sector, of which food processing is an important part. Rice, sugar and soy beans have been protected from import competition by non-tariff barriers. These are discussed in the next three subsections. The remainder of import-competing agriculture has been protected by tariffs and tariff surcharges, which are discussed the fifth subsection. Export-competing agriculture is discussed in the sixth subsection.

Rice

The most important and the most enduring non-tariff barriers have been those on rice and sugar. Figure 4 shows estimates of domestic wholesale prices and border prices for rice.[4] All the price series in these charts are in rupiah per kilogram, divided by the GDP deflator, indexed at 2005 = 1. While there have been enormous nominal increases in rice and sugar prices since the early 1970s, the charts show that any trends in the real prices of these products have been relatively small.

It is clear from Figure 4 that the domestic wholesale price of rice has fluctuated much less than the border price and domestic prices have not differed greatly, on average, from the trend level of border prices. Price stabilization was achieved by giving the state logistics agency, Bulog (*Badan Urusan Logistik*), a monopoly over international trade in rice and directing it to build up buffer stocks to smooth out fluctuations in supply.

In the 1970s, the Soeharto government used part of its new oil wealth to promote self-sufficiency in rice, while keeping domestic prices roughly in line with the trend of world prices, by subsidising the adoption of high yielding varieties that had been made available by the 'Green Revolution'. These new varieties required greatly increased use of irrigation, fertilisers and pesticides, which the government helped to pay for. An important motivation for this policy was fear of a repetition of the riots precipitated by high food prices in 1965.

Under the Bimas program, which was introduced to bring about rice self-sufficiency, farmers received agricultural extension services and subsidised credit, seeds, fertilisers and pesticides. The government also paid for increasing and upgrading irrigation facilities. The resulting increase in the profitability of rice growing, together with some coercion of those farmers who were reluctant to extend the area of rice cultivated, led to a 17 percent increase in gross[5] harvested area in the decade to 1985. This increase in area, together with a 50 percent increase in average yields in the same period, allowed Bulog to reduce domestic rice prices relative to the CPI between the late 1970s and 1985 while gradually phasing out imports and then halting imports altogether in 1985.

Lower world oil prices and advice from the World Bank contributed to the reduction in agricultural input subsidies in the late 1980s and early 1990s. Figure 5 shows the fall in the real price of urea from the late 1970s to the early 1980s and the subsequent rise in the

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[4] The border price of rice in Figure 4 has been converted to make it as nearly comparable as possible to the wholesale price. The fob price was adjusted to the cif level by adding freight and insurance costs; the resulting cif price was then adjusted to the wholesale level by adding margins to allow for the estimated handling, warehousing and interest costs.

[17]"Gross" indicates that a hectare which is harvested twice in a year is counted as 2 hectares.

domestic wholesale price of urea relative both to the CPI and to the border price in the late 1980s and early 1990s.

In the late 1980s, the strict policy of zero imports of rice was replaced by a policy of 'borrowing' rice from Vietnam in terms of shortage and repaying the rice loans in times of surplus. These 'loans' were conducted in bilateral government-to-government deals in which Bulog acted for the Indonesian government. In the early 1990s, it gradually became apparent that Indonesia was not able to maintain rice self-sufficiency, even on average and over a period of years. To satisfy domestic demand at 'acceptable' prices, Bulog was forced to undertake substantial net imports.

When the Asian crisis forced Indonesia to borrow from the IMF in 1997, one of the loan conditions to which the government agreed was the removal of Bulog's monopoly on rice imports. Until 1999, there was also no import duty on rice but the IMF's aim of free trade in rice proved illusory because the financial crisis briefly converted rice into a potential export and the government banned exports to reduce pressure on domestic prices. Figure 4 shows that in 1998 border prices, converted to rupiah at the devalued exchange rate, were far above domestic prices. The reason for this was that the massive depreciation of the exchange rate between mid-1997 and mid-1998 initially outweighed the much more gradual rise in domestic prices. This episode clearly demonstrated that the government's policy has always been to stabilize food prices at 'acceptable' levels, rather than simply to protect growers.

The general increase in domestic prices in 1998-99 and the stabilization of the exchange rate after mid-1998 removed the incentive to export rice. Bulog's monopoly on imports was not immediately re-imposed, but a 20 percent tariff on rice imports was introduced in 1999. Problems with under-invoicing by importers resulted in this tariff being converted to a specific tariff at Rp 430/kg. In 2002, Bulog's monopoly over imports was restored and since 2004 imports have normally been banned, although Bulog has occasionally been issued with special import permits.

Sugar

The Indonesian sugar industry is dominated by the state-owned mills, mainly on Java, that were acquired by the nationalization of the formerly Dutch-owned sugar estates in 1957. Investment and technical progress in this sector has been extremely sluggish and the industry has languished behind protective barriers. The finished product of these antiquated factories, known as 'plantation white sugar', is not exactly comparable to either the refined or the raw

sugar traded on the world market. Plantation white contains more impurities—mainly molasses—than internationally traded raw sugar, but has already undergone some of the bleaching processes that separate refined from raw sugar in more technologically advanced sugar industries. Most firms in the food and beverage sectors cannot use plantation white sugar because of its relatively high level of impurities; their needs are mainly met by imports of raw sugar, although there is a small amount of raw sugar produced domestically.

As in the case of rice, the main motive behind government policy for sugar appears to be the desire to stabilize the domestic price at an 'acceptable' level. In addition, in the case of sugar, the government has tried to protect the sugar factories that it owns. This may explain why, at least since 1957, the sugar industry has been more tightly regulated than any other agricultural sector, with the government monopolising not only imports but also domestic marketing. Government ownership also helps to explain why, in the 1970s, farmers in traditional sugar growing areas were regularly forced to grow sugar to supply local factories, subject to threats that other crops would be burnt.

Figure 6 compares the border price of raw sugar (after allowing for margins between fob price and domestic wholesale prices) with the domestic wholesale price of plantation white sugar. The chart shows that for much of the period since 1970, domestic prices were about twice the border price, implying a nominal rate of protection (NRP) of about 100 percent. However, in 2006 this gap has been have been very greatly narrowed by the abrupt rise of world prices.

Our estimates of the NRP for sugar ignore two factors, the first of which makes our estimates tend to *understate* the true NRP, while the second goes in the opposite direction. The first factor is that our estimate makes no adjustment for the relatively low polarity (high level of impurities) of plantation white sugar. The offsetting factor is the neglect of the cost of bleaching to obtain plantation white sugar. Experts on the sugar industry suggested that the low polarity effect is probably more important than the effects of bleaching, but that the difference is small.

Import tariffs and tariff surcharges

Data on import taxes on agriculture and food processing since 1974 are provided in Tables 9, 10 and 11. These data are for relatively broad product groupings, defined using Harmonized System (HS) chapters. The more disaggregated data from which they are derived are reported in the Appendix tables. Tables 9 and 10 show the growth of protection during the 1970s and

early 1980s, followed by the reduction in protection in the late 1980s and 1990s. Both the growth in protection and the initial reductions were mainly achieved by changing the rates of import tariff surcharges (*bea masuk terbahan*), rather than the rates of the import tariff (*bea masuk*).[6] In terms of their economic effects, the surcharges were exactly equivalent to tariffs, but, unlike tariffs, the rates of the surcharges could be changed by administrative decree, without the need to amend the law. The rates of import duty shown in Tables 9, 10 and 11 are the combined rates of tariffs plus tariff surcharges. A comparison of Table 12 (tariff changes) with Table 13 (changes in tariff surcharges) shows that much of the growth of protection between 1974 and 1979 and almost all the much larger increases in the period 1979–85 was achieved by raising tariff surcharges, rather than tariffs. When protection was reduced between 1985 and 1989, about half of the reduction was achieved by largely eliminating tariff surcharges, which were negligible by 1989, but had been a very important part of total import duties in 1985. By 1994, tariff surcharges had been totally abolished and from 1994 onwards, there is no need to distinguish between tariffs and total import duties.

Tables 9, 10 and 11 show that the import duties on food processing have always been higher than those on agriculture: in every year, the average rate of import tax on food processing alone (HS chapters 15–24) is higher the corresponding rate on all agriculture and food processing products (chapters 1–24). Within the sectors defined here as making up agriculture (HS chapters 1–14), flowers, particularly orchids, and vegetables—have always been the most highly protected. These sectors could of course be classified as 'market gardening' and not part of agriculture at all.

Among the more traditionally agricultural sectors, livestock has always received relatively high protection from imports, and so have estate crops. However, whereas livestock is mainly import-competing (but also in part, non-traded), many estate crops are mainly export-competing. In these cases, of which coffee, tea and spices are important examples, there is a great deal of 'water' in the tariff—that is, the tariff overstates the extent to which the overall system of protection raises their domestic price. In the 1970s, the total rates of import tax on tea, coffee, vanilla, cinnamon, nutmeg and ginger were 70 percent and by 1985 this rate had increased to 100 percent. However, by 1989, the total import duty rates for all these products had been reduced to 30 percent and by the mid-1990s they had fallen to 5 percent.

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[6] The term 'tariff surcharge' is a misnomer in the sense that the base to which the rates of the tariff surcharge applied was the tariff, but the border value (cif) of the imports subject to the tariff surcharge. For example, in the case of live animals (other than pure bred) in 1985, the tariff was 30 percent and the tariff surcharge was 15 percent, giving a total rate of import duty of 45 percent of the border value (cif).

Tables 9, 10 and 11 show that the rates of import duty on food crops have generally been relatively low, at least in the period preceding 2000. However, these rates understate the extent of protection of food crops for two reasons. First, producers of food crops have received input subsidies; second, food crops have been protected by non-tariff barriers.

Soybeans

Until 1996, the government protected soybean growers by giving Bulog a monopoly on imports. Since 1996, soybean imports have been unrestricted and the tariff is currently zero. Figure 7 shows the domestic and border prices in rupiah/kilogram, deflated by the GDP deflator indexed at 2005 = 1.00.

The excess of domestic price of soybeans over the border price was reduced in 1988, when a local soybean crushing plant, operated by *PT Sarpindo Industri*, began to operate. However, Bulog prevented domestic prices of beans from falling as rapidly as world prices in the period 1988-94 and *Sarpindo* was protected by a local content scheme that required the domestic feedmills to source at least 20 percent of their total usage of soybean meal from local supplies—which meant *Sarpindo*, since it was the only local supplier of soybean meal. The high cost of feed inhibited the growth of the increasingly powerful poultry industry and in 1996 the local content scheme was abandoned and *Sarpindo* was allowed to go out of business.

Maize

From being a substantial net export in the 1970s, maize became a net import. The transition coincided with a movement from a negative rate of protection during its export phase to a positive rate, with a nominal rate of protection averaging around 20 per cent since the early 1980s (Figure 8).

Estate crops: rubber, copra, coffee and tea

Rubber, copra, coffee and tea are all produced by perennial plants and tend to be produced on large estates in Indonesia, except that copra is also produced by smallholders. All have been export crops and all have been taxed, but at varying rates. Export volumes of all these commodities have declined since the 1980s. High rates of export taxation are a significant part

of the explanation. Figures 9 to 12 show the calculations of the nominal rates of protection for each of these four commodities, respectively. For rubber, the rate of export tax has been low, but the data show high rates of export taxation for copra and tea. For coffee the rate of export taxation has declined from very high rates prior to the 1990s.

Political economy

Some key characteristics of Indonesia's political circumstances provide background to attempts to explain the changes in trade policy summarized above. First, among the Indonesian elite confidence was instilled by the economic successes achieved elsewhere in East and Southeast Asia from the 1970s onwards. There seemed no fundamental reason why Indonesia should not succeed also and this confidence meant that bold strategies could be contemplated. This confidence can be contrasted with the timidity and lack of confidence in the international trading system that characterized most of South Asia at the same time. Second, Soeharto's political authority within Indonesia was unchallenged until the very end of his regime. Even policies that were unpopular, at least initially, could be considered if Soeharto considered them necessary.

Observers of economic reform in Indonesia have coined the phrase 'Good times produce bad policy, bad times produce good policy', where 'good times' means favorable external conditions and 'good policies' means deregulation in general, and lower barriers to international trade and investment in particular. This summary does indeed describe much of Indonesia's history of economic reform. The oil price booms of the 1970s were followed by a series of trade restricting import-substitution policies aimed at protecting some at least of the traded goods industries that were potentially harmed by the 'Dutch disease' effects of the petroleum booms – the decline in the domestic competitiveness of traded goods industries due to a rise in the prices of non-traded goods and services relative to traded goods. Trade liberalization followed the adverse terms of trade effect of the decline in petroleum prices from the early 1980s onwards. But while the 'Good times - bad policy, bad times - good policy' summary *describes* the Indonesian experience, it does not provide an *explanation* for it. Why do good times produce bad policy, and why the converse?

Observers of policy formation under Soeharto reported the contest for Soeharto's attention between the technocrats on the one hand and the nationalists on the other (Hill 1996). At different times, either of these groups might have ascendancy, which meant that Soeharto was heeding their messages. The *technocrats*, many of whom were professional economists trained in the United States, favored a market-oriented economy, a strong emphasis on macroeconomic stability, and a relatively open trade policy. This group dominated the Ministry of Finance and the National Planning Agency (*Bappenas*) and had considerable influence on the Bank of Indonesia. The World Bank used its influence directly in support of the technocrats and it resources and technical expertise also assisted the technocrats to make their case in a convincing way.

The economic *nationalists* were more diverse. They included in particular the 'engineers', led by the Minister for Research and Technology, Dr B. J. Habibie, a German-trained engineer with a strong preference for 'crash-through' economic programs based on advanced technology. This group promoted large-scale, capital intensive projects in industries such as aeronautics, shipbuilding, steel, fertilizers and petrochemicals. To ensure the profitability of these projects, high rates of protection were advocated on 'infant industry' grounds. In addition to Dr Habibie's own department, this group was influential within the state-owned petroleum company, *Pertamina*. A second group of nationalists were the advocates of self-sufficiency in food in general and rice in particular. This group dominated the Ministry of Agriculture and the food logistics agency, *Bulog*. More general support for import-substitution based policies was concentrated in the Ministry of Industry.

During bad economic times, the technocrats tended to gain Soeharto's attention. During good times, he listened to the nationalists. The central reason was the dominant role of external shocks to the Indonesian economy, operating through petroleum prices. During the Soeharto period, petroleum was both a principal source of foreign exchange, through direct oil exports, and a major source of government revenue, through the royalties received by the government on those exports. Reduced oil prices implied both balance of payments and budgetary stresses. In addition, the majority of Indonesia's foreign debt was public debt. When the price of oil fell, the fiscal burden of debt servicing became more painful. This increased the influence of the World Bank, whose willingness to extend concessional loans to Indonesia was important directly and also as a signal to other potential foreign lenders. At such times the government needed these loans to 'balance' its budget. The only alternative was inflationary financing, the consequences of which had been experienced under Soeharto. Increased influence for the World Bank meant increased influence for the technocrats and the

policies they advocated. In addition, reduced oil prices meant reduced influence for *Pertamina* by reducing its contribution to government revenue. It also meant increased influence for the Ministry of Finance, whose tax reforms, designed by technocrats and like-minded foreign advisors, helped make up for lost oil revenues.

In other countries, a deterioration in the terms of trade might be met by exchange controls, import licensing and other import-substitution policies. But in Indonesia, this would not have addressed the simultaneous fiscal problem. An example of the tax reforms which emerged from this dynamic was the introduction of a value-added tax (VAT) in 1986 and the simultaneous reduction in import duties. An import duty (tariff) is equivalent to both a tax on consumption and a subsidy on production, set at the same *ad valorem* rate. The tariff raises positive net revenue because for an import commodity the volume of consumption exceeds that of production. A value-added tax is a tax on consumption alone and it can raise the same amount of revenue as a tariff, but at a lower rate of tax, because it does not expend revenue on subsidizing production. Similarly, the switch from non-tariff barriers (NTBs) to tariffs generates revenue. NTBs can be thought of as privately levied tariffs, making no contribution to government revenue. A final example was the abolition of the *Bimas* scheme designed to help rice growers achieve self-sufficiency. The budgetary cost of the fertilizer and pesticide subsidies and subsidized lending of *Bimas* became serious with the fiscal deterioration of the 1980s.

During times of reduced petroleum prices, such as the early to mid-1980s, illiberal trade policies were unaffordable in fiscal terms and this reinforced the argument that trade liberalization would promote improved foreign exchange earnings from non-oil exports. The technocrats then held sway. In contrast, during the euphoria of the 1970s, induced by high petroleum revenues, the import-substitution schemes advocated by the nationalists seemed affordable and were politically attractive. At such times, the nationalists captured Soeharto's attention.

The Asian financial crisis of 1997–98 was the worst of times and produced the best of policies, given that 'best' is being used here to mean more closely in conformity with the laissez-faire advice of neo-classical economists. The Asian crisis also provides the clearest illustration of the causal link between bad times and laissez-faire policies: the reforms that the government introduced in the wake of the crisis were explicitly adopted as conditions for borrowing from the IMF, when all other sources of external lending had dried up.

Following Soeharto's political demise in 1998 and the subsequent move to a much more democratic form of government, the president no longer holds absolute authority and

policy determination is therefore no longer simply a contest between the technocrats and nationalists to influence the president. The parliament, a token institution under Soeharto, now has teeth and the president can not ignore its will. Populist economic nationalism has tended to dominate the parliament and this has reduced, but not eliminated, the influence of the technocrats. In addition, the conspicuous reluctance of the major industrialized countries to reduce protection for their own agricultural sectors has also weakened the influence of those technocrats who argue against Indonesian restrictions on trade. The increased protection of the rice and sugar sectors that followed the ending of the IMF program was a direct consequence of these political changes. Movement towards rice self-sufficiency and protection of rice and sugar farmers are both politically attractive in Indonesia and in the public imagination both are strongly associated with the national interest. Protection for the rice industry is supported by all major political parties. With democracy, both rice and sugar farmers therefore receive more protection from imports than they did under Soeharto.

Imputed protection at the farm level

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

Theory

One of the intentions of protection policy is to influence prices at the farm level and in any case the farm level effects of agricultural protection policy 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, whereas the commodities which enter international trade are the processed or partially processed versions of these 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

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

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

$$p_{it}^{F} = a_{i} + b_{i} p_{it}^{W} + u_{it},\qquad\qquad\qquad(2)$$

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

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

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

$T_{it}^W < 0$, $\hat{T}^F \le T_{it}^W$ as $\hat{b}_i \ge 1$ and $\hat{T}^F \ge T_{it}^W$ as $\hat{b}_i \le 1$.

Econometric application

The purpose of the econometric analysis is to estimate the parameter $\hat{b}_i$ for each commodity.
Details of the econometric analysis are provided in a statistical appendix, available upon
request. Here the results will be summarized. 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 Indonesia: 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). The data extended from 1976 to 2001. The seven commodities for
which these data were available were: rice, maize, soybeans, sugar, rubber, coffee and tea.

We first test each of the series (each deflated by the GDP deflator) for the existence of
a unit root. For rice, the null hypothesis of a unit root was rejected for all three price series
(recalling that they are real, not nominal, price series, using the GDP deflator) at the 10 per
cent level of significance. The price series were thus considered stationary. For other
commodities the results were more mixed. For maize, the null hypothesis of a unit root could
not be rejected for farm level prices (LFP), but was strongly rejected for the other two price
series. For soybeans, the null hypothesis of a unit root could not be rejected for the wholesale
price series (LWP) but was rejected at the 10 per cent level for the other two series. For
sugar, the null hypothesis of a unit root could not be rejected for any of the three series,
expecially the farm level price series (LFP). For rubber, coffee and tea the results were
similar. The null hypothesis of a unit root marginally failed to be rejected for the farm level
price series (LFP), but was rejected for the other two series.

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, although it is
recognized that the test has low power when the number of data points is small, as in this
case. 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 the cases of maize, sugar, rubber, coffee and tea. It marginally failed to

be rejected for rice and soybeans. These results roughly support the validity of using the OLS framework to estimate the transmission elasticity from LWP to LFP, treating LWP as exogenous.

Usable estimates were produced for five commodities: rice, soybeans, sugar, rubber and tea. The estimated elasticity had the expected positive sign and was significantly different from zero, with the estimated equation performing well. Table 16 summarizes the estimates. For maize and coffee, the estimated elasticity was not significantly different from zero and the estimated equation performed poorly. It is often asserted that middlemen prevent commodity price changes at the wholesale level, resulting from protection or from international price movements, from being transmitted to farmers. This hypothesis is rejected by the Indonesian data, at least for the five commodities mentioned above. The transmission elasticities are not zero. Economists often assume that the transmission elasticities are unity. But the estimated values are generally less than unity, lying between 0.2 and 0.8. The lower values are obtained in the case of perennial crops rubber and tea, which have high processing costs. The other values all exceed 0.5. It is likely that the true transmission elasticities change over time, but the limited data available for this exercise made it necessary to assume that the true values are constant.

Estimation of protection at farm level

Given the estimated value of the transmission elastity, 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. These are shown in Figures 13 to 19. Because usable estimated of the transmission elasticity could not be obtained for three commodities – maize, coffee and copra – the estimated values for rice, tea and rubber, respectively, were used instead, as proxies for the true elasticities for these commodities. Because the transmission elasticities lie 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.

Conclusions and prospects for future reform

In Indonesia, protection of agriculture takes the form of protection for the sugar and rice sectors. Other sectors receive virtually no protection and it is therefore important to distinguish between protection in these two agricultural industries and the rest of Indonesian agriculture. The political explanations for protection of sugar and rice are quite different. Protection of the sugar industry is a consequence of the political power of the highly concentrated sugar refining industry, including the state-owned component of this industry, associated with its close link with large-scale sugar plantations.

In contrast with sugar, Indonesia's farm-level production of rice (paddy) is dominated by small scale producers. The enhanced political power of the Indonesian Parliament since the upheavals which followed the Asian crisis, together with the economic nationalism that dominates the membership of the Parliament, have strengthened the support for protection of the rice industry. In part, this has reflected the mistaken claim, advanced by supporters of rice industry protection, that restricting rice imports reduces poverty. A general equilibrium analysis presented in Warr (2005) shows that the policy increases poverty because the poverty-increasing effects of increasing the consumer price of rice far exceed the poverty-reducing effects of increasing the producer price. The political power of rice millers has also been an important source of support for protection of the rice industry, in that imports compete directly with milled rice.

Trade liberalization in Indonesia's sugar and paddy industries is not likely within the foreseeable future. Increased protection seems a more likely outcome and this could extend to industries other than sugar and rice. The movement to a more democratic form of government has weakened the influence of Indonesia's 'technocrats', who have generally favored liberalized trade policies. The argument of this paper has been that 'good' economic policies, meaning more liberal trade policies and less regulation, are more likely in response to 'bad' economic circumstances. If Indonesia's economic recovery continues, as is surely to be hoped, the pressures for protection of the agricultural sector can be expected to increase.

Table 1. Indonesia: Real growth of GDP and its components (percent per annum)

	Pre-boom 1968-1986	Boom 1987-1996	Crisis 1997-1999	Recovery 2000-2005	Whole period 1968-2005
Total GDP	7.4	7.7	-2.5	4.6	6.3
Agriculture	4.4	3.4	0.6	3.5	3.7
Industry, including mining	10.6	9.8	-2.3	4.2	8.5
Services	7.8	7.9	-4.0	5.7	6.6

Source: Author's calculations from World Bank, *World Development Indicators*, various issues.

Table 2. Sector value added / Agriculture value added (percent)

Sector	1971	1980	1990	2000
Paddy	46.1	38.0	37.5	30.8
Maize	3.1	3.7	4.1	5.9
Root crops	7.2	6.8	7.6	8.9
Vegetables and fruits	14.1	14.5	21.7	21.8
Other food crops	3.3	4.4	6.4	3.9
Rubber	5.5	5.2	2.0	5.5
Sugarcane	2.2	2.4	2.1	2.5
Coconut	5.2	4.3	3.3	3.7
Palm oil	2.9	2.1	2.4	2.3
Tobacco	2.5	1.7	0.7	0.3
Coffee	2.6	4.3	1.5	0.9
Tea	1.4	1.9	0.5	0.3
Cloves	1.4	3.0	1.6	0.9
Other agriculture	1.8	1.7	3.5	7.3
Livestock	0.6	6.0	5.0	4.9
Total	100	100	100	100

Source:
Central Bureau of Statistics, Input-Output Tables of Indonesia, Jakarta, 1971, 1980, 1990 and 2000.

Table 3. Sector intermediate inputs / sector output (percent)

Sector	1971	1980	1990	2000
Paddy	39.8	28.6	11.8	16.4
Maize	7.4	11.8	14.3	14.8
Root crops	26.9	14.0	5.1	6.0
Vegetables and fruits	5.7	5.9	7.3	8.4
Other food crops	12.9	11.3	14.4	16.0
Rubber	57.9	50.4	28.1	28.9
Sugarcane	37.7	35.6	25.3	24.5
Coconut	4.4	5.2	9.0	17.7
Palm oil	54.0	43.0	26.7	32.9
Tobacco	57.2	35.4	42.4	46.7
Coffee	35.7	26.2	33.0	32.4
Tea	47.3	11.3	11.5	14.1
Cloves	4.9	7.0	12.1	14.9
Other agriculture	8.6	7.2	10.3	23.1
Livestock	8.3	9.7	25.7	29.5
Total Agriculture	34.2	23.3	13.3	17.0

Source:
Central Bureau of Statistics, Input-Output Tables of Indonesia, Jakarta, 1971, 1980, 1990 and 2000.

Table 4. Imported intermediate input / total intermediate inputs (percent)

Sector	1980	1990	2000
Paddy	2.4	3.3	10.1
Maize	9.6	3.4	8.9
Root crops	2.1	4.0	5.1
Vegetables and fruits	8.4	8.2	6.4
Other food crops	3.9	4.4	17.2
Rubber	3.7	33.5	14.6
Sugarcane	42.1	5.2	9.3
Coconut	3.8	11.0	12.6
Palm oil	5.8	1.2	12.1
Tobacco	10.6	0.5	23.2
Coffee	1.5	0.7	11.4
Tea	8.3	0.8	17.7
Cloves	8.1	9.1	22.8
Other agriculture	8.8	0.9	8.3
Livestock	7.6	5.7	5.7
Total Agriculture	3.8	5.7	10.2

Source:
Central Bureau of Statistics, *Input-Output Tables of Indonesia*, Jakarta, 1971, 1980, 1990 and 2000.

Note: Data for 1971 are not available because the input-output tables did not distinguish between imported and domestically sourced intermediate inputs until 1980.

Table 5. Sales to intermediate users / total sales (percent)

Sector	1971	1980	1990	2000
Paddy [a]	56.3	70.9	99.9	97.5
Maize	12.2	14.1	35.1	52.7
Root crops	24.8	17.2	11.1	20.3
Vegetables and fruits	10.1	6.9	7.8	11.3
Other food crops	56.6	58.0	43.6	67.8
Rubber	42.5	38.2	92.5	99.3
Sugarcane	75.5	74.5	98.7	98.1
Coconut	68.1	52.2	35.5	55.6
Palm oil	46.6	26.1	70.3	99.7
Tobacco	53.1	78.6	87.9	87.5
Coffee	46.3	19.7	54.1	93.4
Tea	33.3	22.5	58.7	86.6
Cloves	99.8	95.6	96.7	93.5
Other agriculture	50.9	66.2	31.9	73.0
Livestock	79.2	88.9	90.2	82.0
Total Agriculture [b]	49.0	52.1	61.0	66.1
Milled rice [c]	3.6	6.8	7.8	11.4

Notes:

[a] The input-output tables classify unmilled rice (paddy) as an output of the agricultural sector and milled rice as an output of the manufacturing sector.
[b] Milled rice excluded.
[c] Data for 1980 refer to milled cereal.

Source:
Central Bureau of Statistics, *Input-Output Tables of Indonesia*, Jakarta, 1971, 1980, 1990 and 2000.

Table 6. Indonesia: Sales to export users / total sales (percent)

Sector	1971	1980	1990	2000
Paddy[a]	0.0	0.0	0.0	0.0
Maize	11.4	0.3	1.8	0.3
Root crops	4.7	3.7	0.7	0.3
Vegetables and fruits	0.1	0.2	0.2	0.3
Other food crops	4.3	0.3	1.9	0.4
Rubber	57.5	58.4	6.5	0.6
Sugarcane	0.0	0.0	0.0	0.0
Coconut	6.6	1.2	0.3	1.5
Palm oil	2.3	33.5	29.5	0.2
Tobacco	7.4	12.3	7.6	0.0
Coffee	21.5	58.7	13.7	0.0
Tea	24.5	18.5	32.5	0.0
Cloves	0.0	0.0	0.1	3.0
Other agriculture	40.5	15.9	26.7	21.2
Livestock	1.2	0.0	1.8	2.1
Total Agriculture	7.5	9.3	2.8	2.6
Milled rice[a]	0.0	0.8	0.02	0.01

Source:
Central Bureau of Statistics, *Input-Output Tables of Indonesia*, Jakarta, 1971, 1980, 1990 and 2000.

Notes:
[a] The input-output tables classify unmilled rice (paddy) as an output of the agricultural sector and milled rice as an output of the manufacturing sector.

Table 7. Indonesia: Imports / total usage (percent)

Sector	1971	1980	1990	2000
Paddy	0.0	0.0	0.0	0.0
Maize	0.0	1.1	0.2	11.3
Root crops	0.0	0.1	0.0	0.1
Vegetables and fruits	0.6	1.1	0.9	4.9
Other food crops	0.0	22.7	18.1	47.7
Rubber	0.1	0.0	0.1	0.7
Sugarcane	0.0	0.0	0.0	0.0
Coconut	0.0	0.0	0.0	0.1
Palm oil	0.0	0.0	0.1	0.2
Tobacco	1.6	7.3	15.6	0.0
Coffee	0.0	0.0	0.0	0.0
Tea	0.0	0.0	3.9	0.0
Cloves	47.4	12.7	0.0	24.5
Other agriculture	24.1	43.8	1.4	30.3
Livestock	0.0	0.5	0.9	8.4
Total Agriculture	1.3	2.8	2.0	8.7
Milled rice	13.5	12.5	0.2	3.9

Notes:
[a] The input-output tables classify unmilled rice (paddy) as an output of the agricultural sector and milled rice as an output of the manufacturing sector.

Source:
Central Bureau of Statistics, Input-Output Tables of Indonesia, Jakarta, 1971, 1980, 1990 and 2000.

Table 8. Indonesia: Effective rates of protection (percent), 1987-2003[a]

Sectors	1987	1995	2003
Agriculture	24	12	9
Manufacturing (excluding oil & gas)	86	24	16
Manufacturing (including oil & gas)	48	20	13
All tradable sectors	18	8	4
Anti-trade bias[b]	52	28	20

Source: Fane (1996).

Notes:
[a] Estimates for 1987 and 1995 are from Fane and Condon (1995). They measure ERPs just before the reform package of December 1987 and just after the reform package of May 1995. The estimates for 2003 apply the same methodology, using the tariff cuts announced in the May 1995 package to be implemented by 2003.
[b] The anti-trade bias (ATB) is defined by: $1 + ATB = (1 + g^m)/(1 + g^e)$, where g^m and g^e denote, respectively, the average ERPs in all import-competing and all export-competing sectors.

Table 9. Indonesia: Total taxes on imports (percent), 1974–94

	1974	1979	1985	1989	1994
Livestock (Chapters 1–5)	34	42	58	23	23
Flowers, vegetables (Chapters 6,7)	45	60	73	29	27
Food crops (Chapters 10,11)	2	18	25	8	7
Estate crops (Chapters 8,9,12)	47	53	72	24	19
Gums, wood (Chapters 13,14)	0	25	35	10	10
Processed food (Chapters 15–24)	47	65	75	34	23
Agriculture & food proc. (Chaps. 1–24)	37	51	66	26	20

Table 10. Indonesia: Total taxes on imports (percent), 1995–2000

	1995	1996	1997	1998	1999	2000
Livestock (Chapters 1–5)	15	13	12	4	4	4
Flowers, vegetables (Chapters 6,7)	17	16	13	8	8	8
Food crops (Chapters 10,11)	4	4	3	3	6	6
Estate crops (Chapters 8,9,12)	14	14	12	5	5	5
Gums, wood (Chapters 13,14)	5	3	3	3	3	3
Processed food (Chapters 15–24)	19	16	15	8	8	8
Agriculture & food proc. (Chaps. 1–24)	16	14	13	6	6	6

Table 11. Indonesia: Total taxes on imports (percent), 2001–2006

	2001	2002	2003	2004	2005	2006
Livestock (Chapters 1–5)	4	4	4	4	4	4
Flowers, vegetables (Chapters 6,7)	8	8	8	8	9	9
Food crops (Chapters 10,11)	6	6	6	9	8	8
Estate crops (Chapters 8,9,12)	5	5	5	5	5	5
Gums, wood (Chapters 13,14)	3	3	3	3	3	3
Processed food (Chapters 15–24)	8	9	9	9	9	10
Agriculture & food proc. (Chaps. 1–24)	6	6	6	7	7	7

Table 12. Indonesia: Increases (percentage points) in tariffs ('*bea masuk*'), 1974–94

	1974–79	1979–85	1985–89	1989–94
Livestock (Chapters 1–5)	1	0	-13	0
Flowers, vegetables (Chapters 6,7)	0	0	-17	-1
Food crops (Chapters 10,11)	16	0	-9	-1
Estate crops (Chapters 8,9,12)	5	0	-30	-2
Gums, wood (Chapters 13,14)	25	0	-15	0
Processed food (Chapters 15–24)	4	-1	-20	-7
Agriculture & food proc. (Chaps. 1–24)	9	0	–21	–4

Table 13. Indonesia: Increases (percentage points) in tariff surcharges ('*bea masuk terbahan*'), 1974–94

	1974–79	1979–85	1985–89	1989–94
Livestock (Chapters 1–5)	7	16	-22	0
Flowers, vegetables (Chapters 6,7)	15	13	-27	-1
Food crops (Chapters 10,11)	0	8	-8	0
Estate crops (Chapters 8,9,12)	1	20	-18	-2
Gums, wood (Chapters 13,14)	0	10	-10	0
Processed food (Chapters 15–24)	13	11	-21	-4
Agriculture & food proc. (Chaps. 1–24)	6	15	–19	–2

Table 14. Indonesia: Increases (percentage points) in total import taxes, 1974–94

	1974–79	1979–85	1985–89	1989–94
Livestock (Chapters 1–5)	7	16	-35	0
Flowers, vegetables (Chapters 6,7)	15	13	-44	-2
Food crops (Chapters 10,11)	16	7	-17	-1
Estate crops (Chapters 8,9,12)	6	20	-49	-5
Gums, wood (Chapters 13,14)	25	10	-25	0
Processed food (Chapters 15–24)	18	10	-41	-11
Agriculture & food proc. (Chaps. 1–24)	15	14	–40	–7

Table 15. Indonesia: Increases (percentage points) in total import taxes, 1994–2006

	1994–1995	1995–1997	1997–1998	1998–2006	1994–2006
Livestock (Chapters 1–5)	7	16	-35	0	7
Flowers, vegetables (Chapters 6,7)	15	13	-44	-2	15
Food crops (Chapters 10,11)	16	7	-17	-1	16
Estate crops (Chapters 8,9,12)	6	20	-49	-5	6
Gums, wood (Chapters 13,14)	25	10	-25	0	25
Processed food (Chapters 15–24)	18	10	-41	-11	18
Agriculture & food proc. (Chaps. 1–24)	-4	-3	-7	1	-13

Table 16. Indonesia: Estimates of Transmission Elasticities from Wholesale to Farm Prices

Commodity	Estimated elasticity	(t-statistic)
Rice	0.7345	(5.24)
Soybeans	0.5294	(3.17)
Sugar	0.6128	(2.29)
Rubber	0.4365	(2.60)
Tea	0.2607	(2.65)

Source:
Author's calculations, using data and methodology discussed in the text. Estimates shown relate to the parameter b_i in equation (2).

Note:
t-statistics are shown in parthentheses.

Figure 1. Indonesia: Annual Growth Rate of Real GDP, 1965 to 2005 (percent per annum)
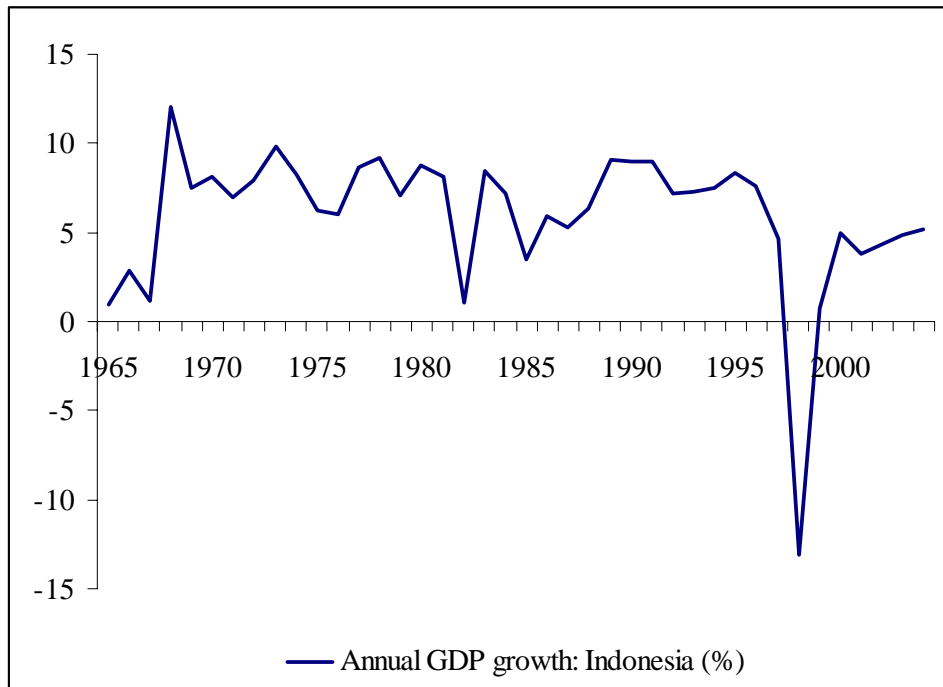
Sour ce:
World Bank, *World Development Indicators*, various issues.

Figure 2. Indonesia: Share of Agriculture, Industry and Services in GDP, 1965 to 2005 (percent)
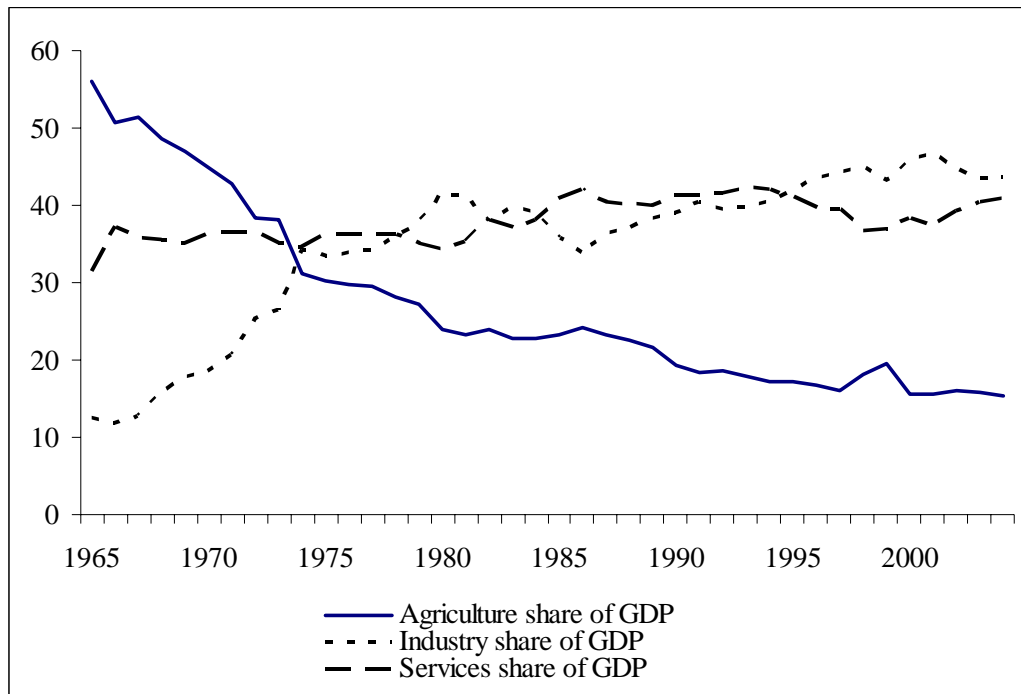
Source:
World Bank, *World Development Indicators*, various issues.

Figure 3. Indonesia: Terms of Trade, 1965 to 2004 (2000 = 100)
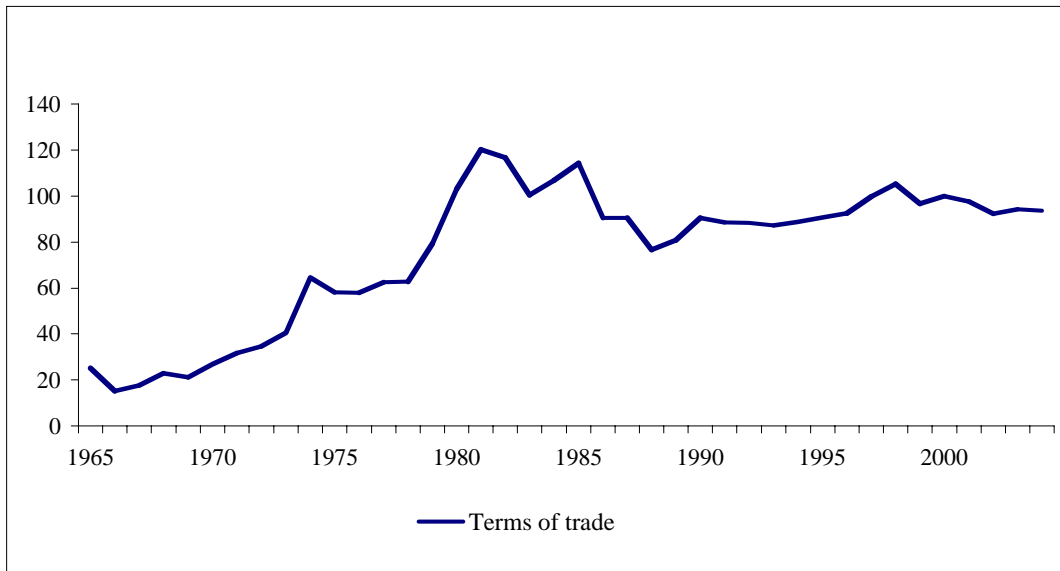
Source: World Bank, *World Development Indicators*, various issues.

Note: The terms of trade are here calculated as the ratio of average unit value of exports (value relative to volume) to the average unit value of imports.

Figure 4. Indonesia: Border and domestic prices of rice (Rp/kg), relative to the GDP deflator (2005=1)
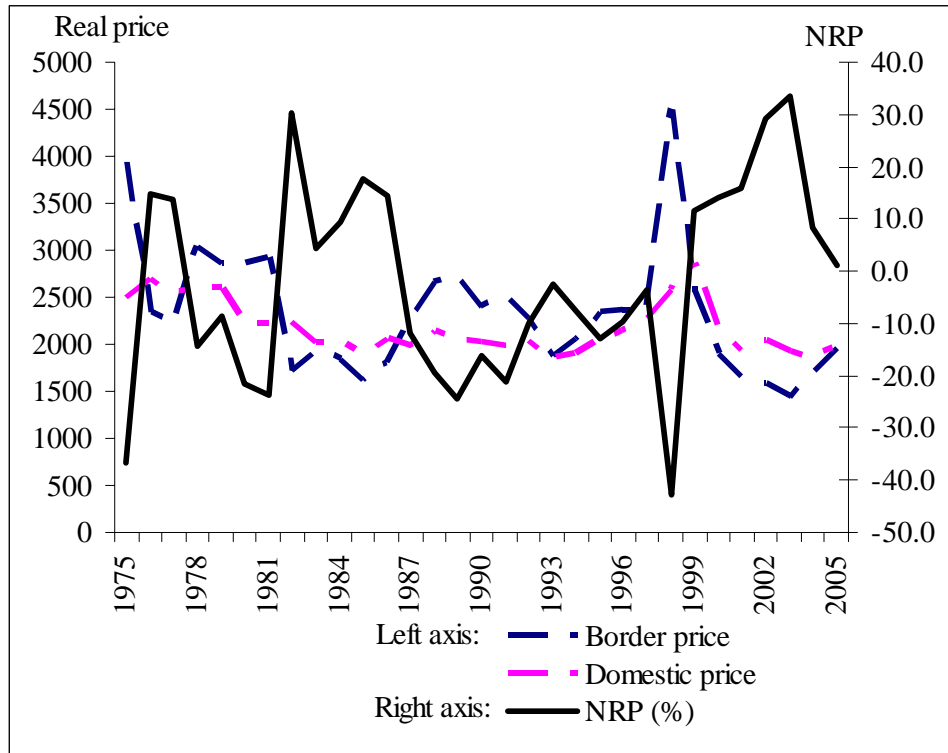
Figure 5. Indonesia: Border and domestic prices of urea fertiliser (Rp/kg), relative to the GDP deflator (2005=1)
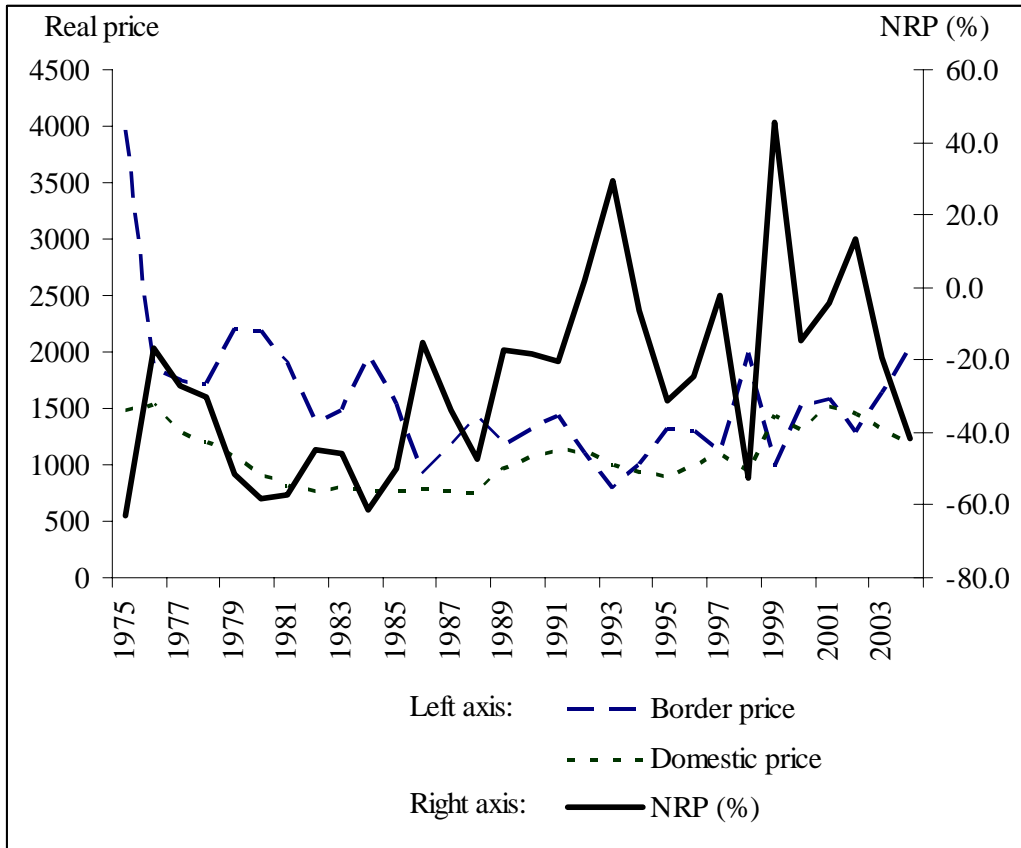
Figure 6. Indonesia: Border and domestic prices of sugar relative to the GDP deflator (2005=1)
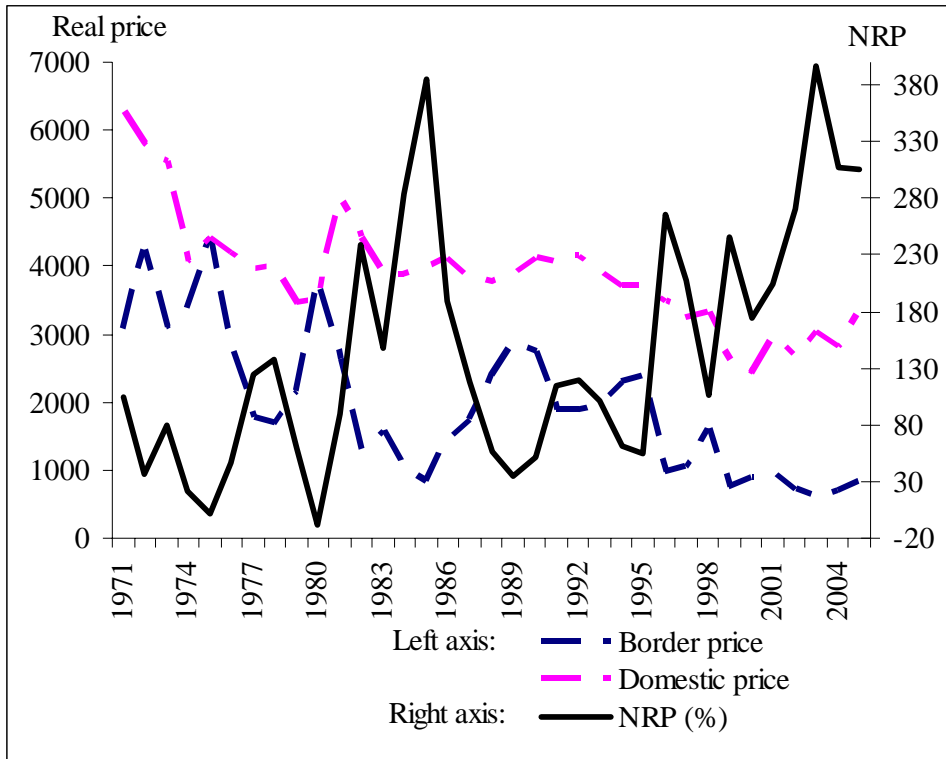
Figure 7. Indonesia: Border and domestic prices of soybeans relative to the GDP deflator (2005=1)
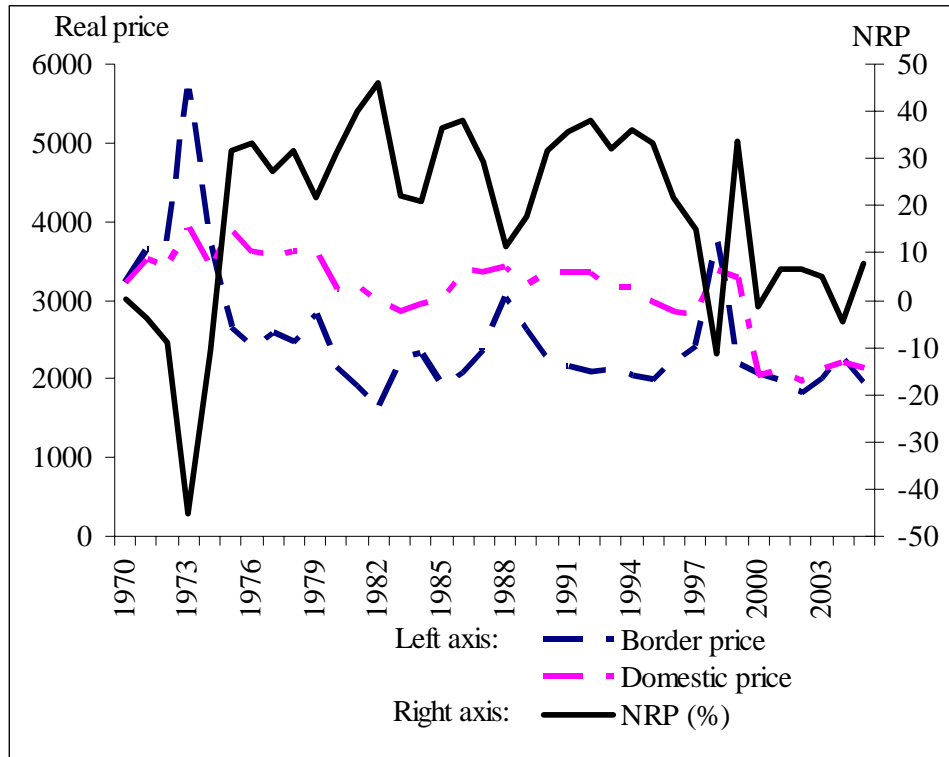
Figure 8. Indonesia: Border and domestic prices of maize relative to the GDP deflator (2005=1)
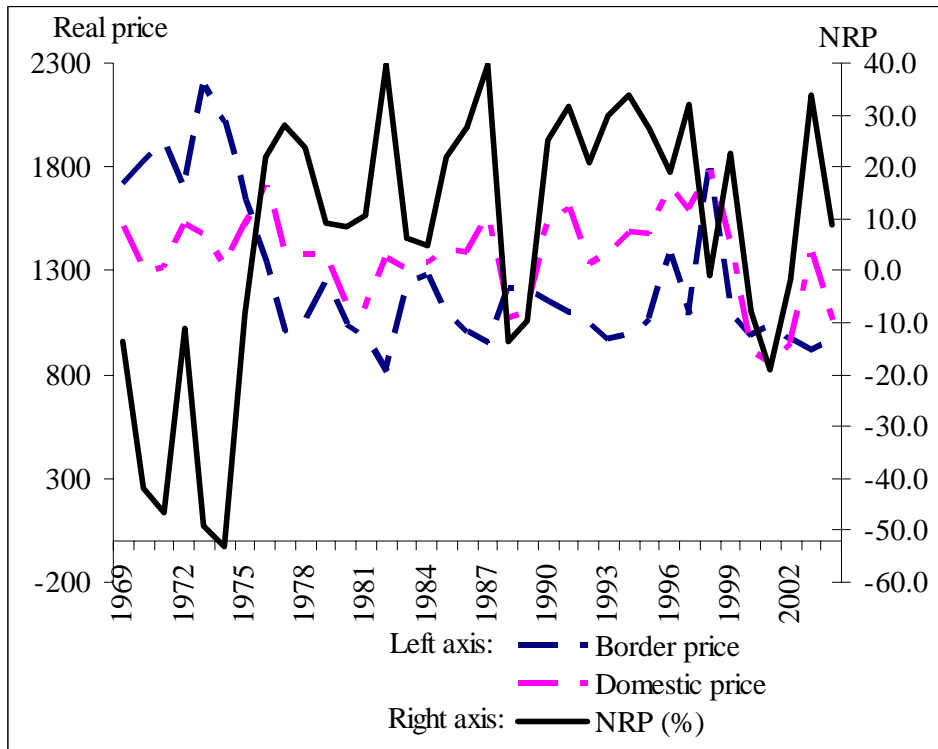
Figure 9. Indonesia: Border and domestic prices of rubber relative to the GDP deflator (2005=1)
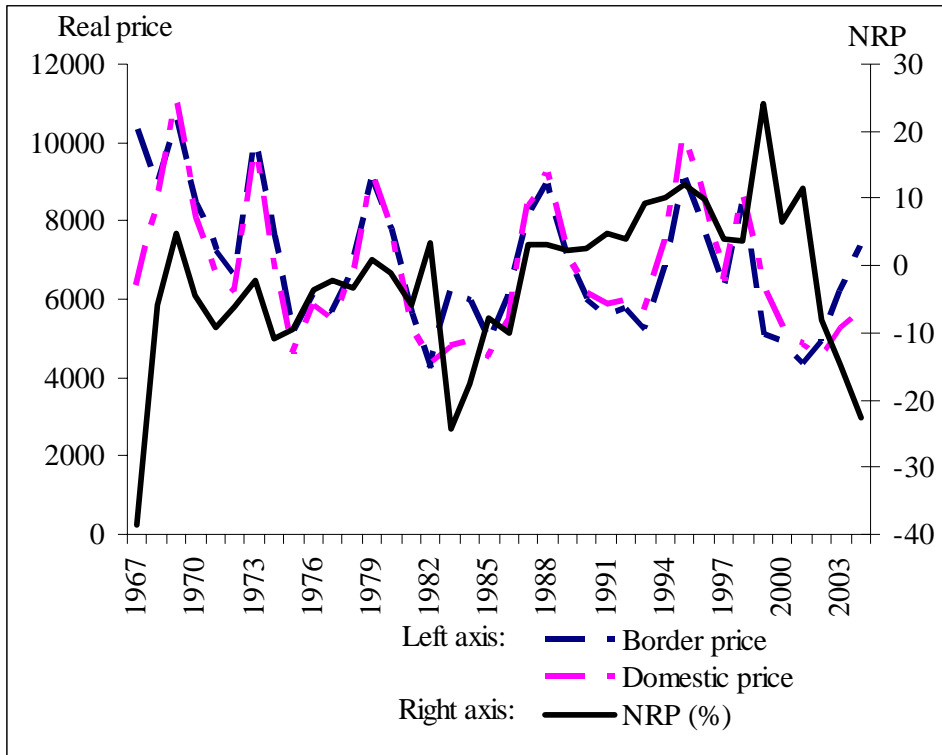
Figure 10. Indonesia: Border and domestic prices of copra relative to the GDP deflator (2005=1)
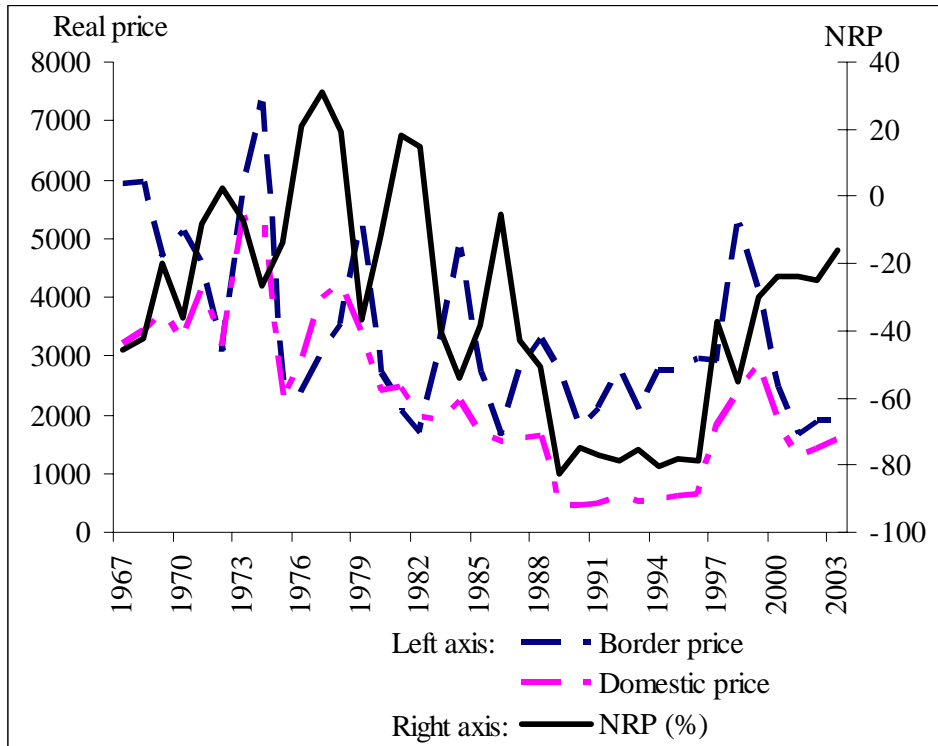
Figure 11. Indonesia: Border and domestic prices of coffee relative to the GDP deflator (2005=1)
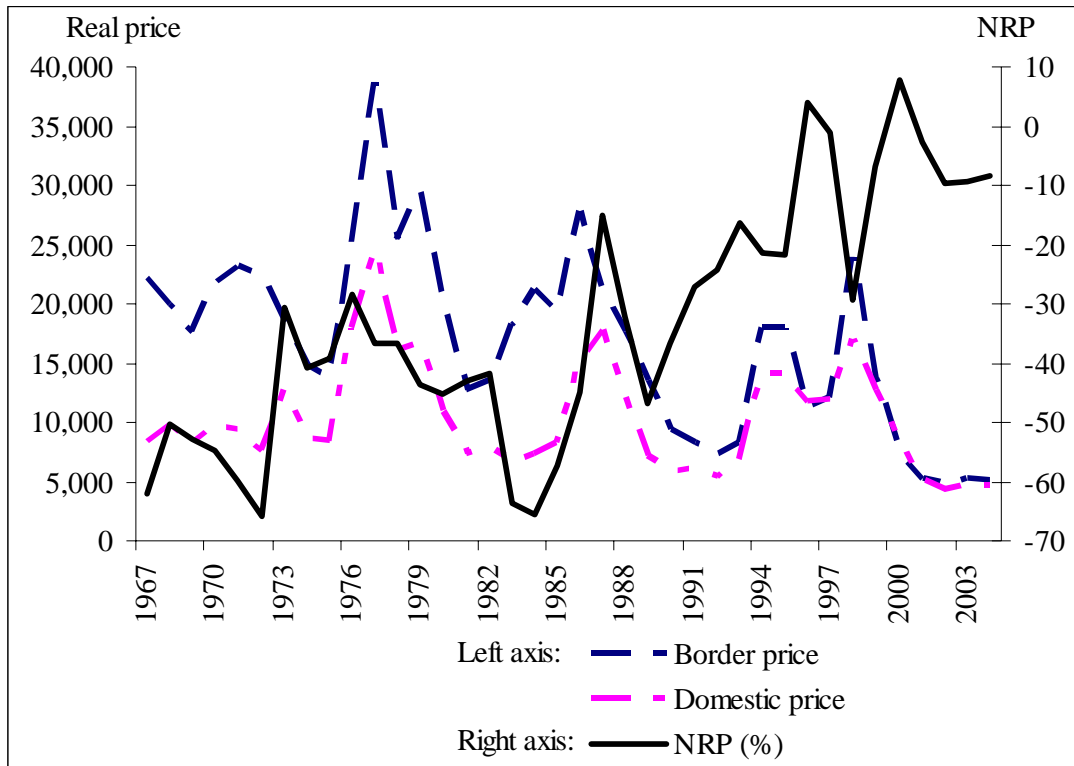
Figure 12. Indonesia: Border and domestic prices of tea relative to the GDP deflator (2005=1)

Real price   NRP

Left axis: — ▪ Border price
             — ▪ Domestic price
Right axis: —— NRP (%)
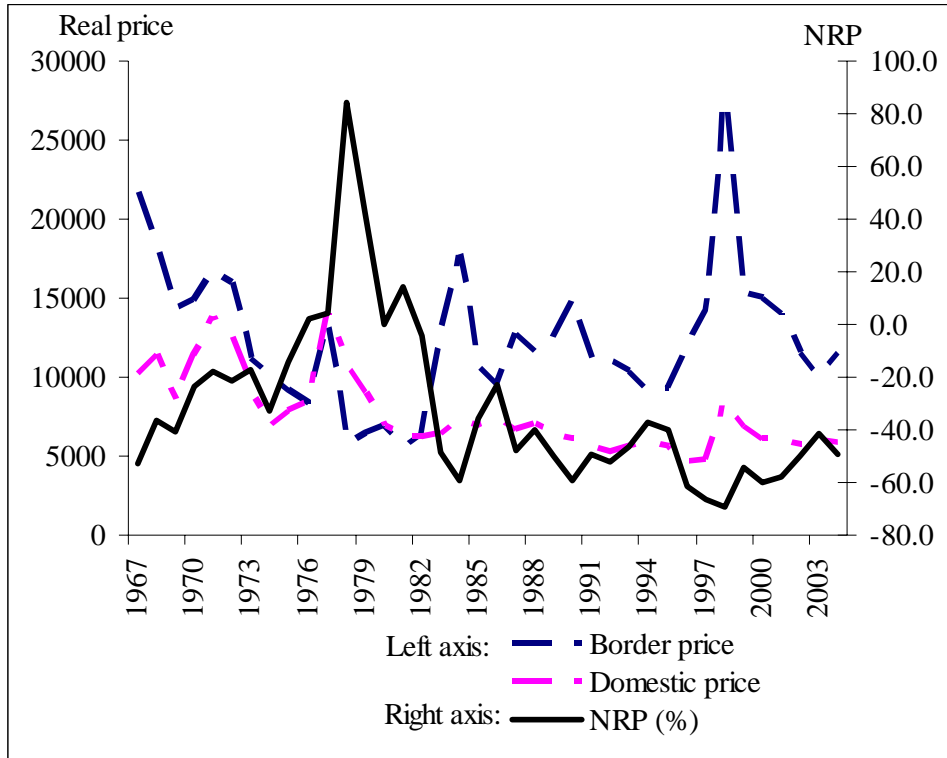
Figure 13. Indonesia: Estimation of imputed NRP at farm level - Rice

Left axis: — — Actual farm level price
— · — Predicted price - with protection
- - - - Predicted price - without protection
Right axis: —— Imputed nominal rate of protection (%)
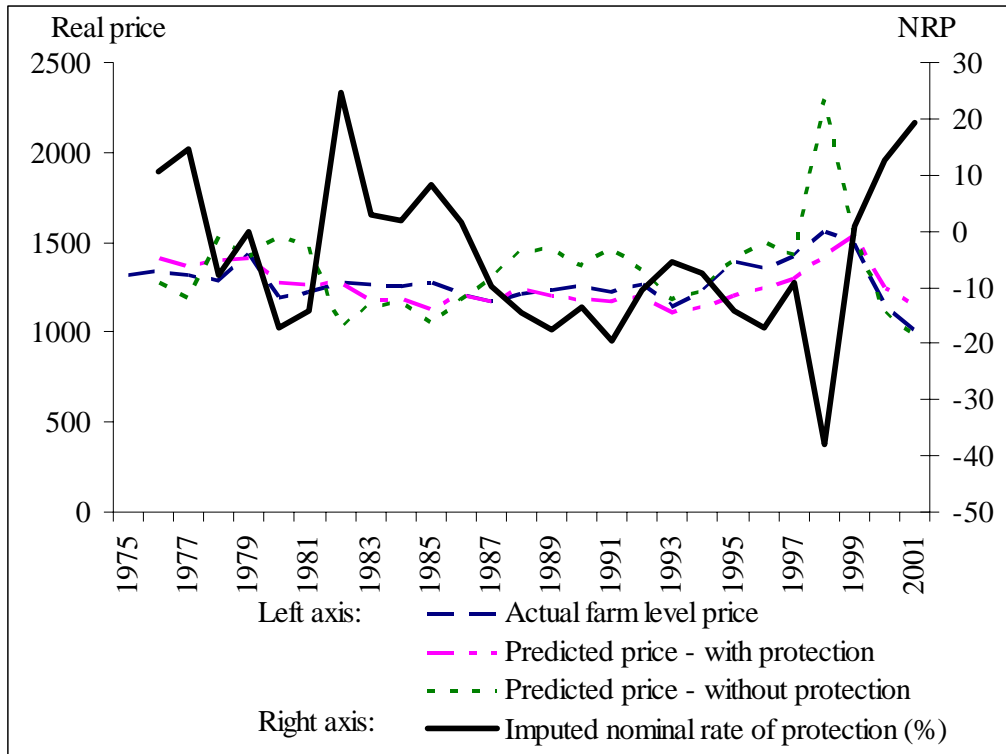
Figure 14. Indonesia: Estimation of imputed NRP at farm level – Soybeans

Left axis:
— — Actual farm level price
— · — Predicted price - with protection
- - - · Predicted price - without protection

Right axis:
——— Imputed nominal rate of protection (%)
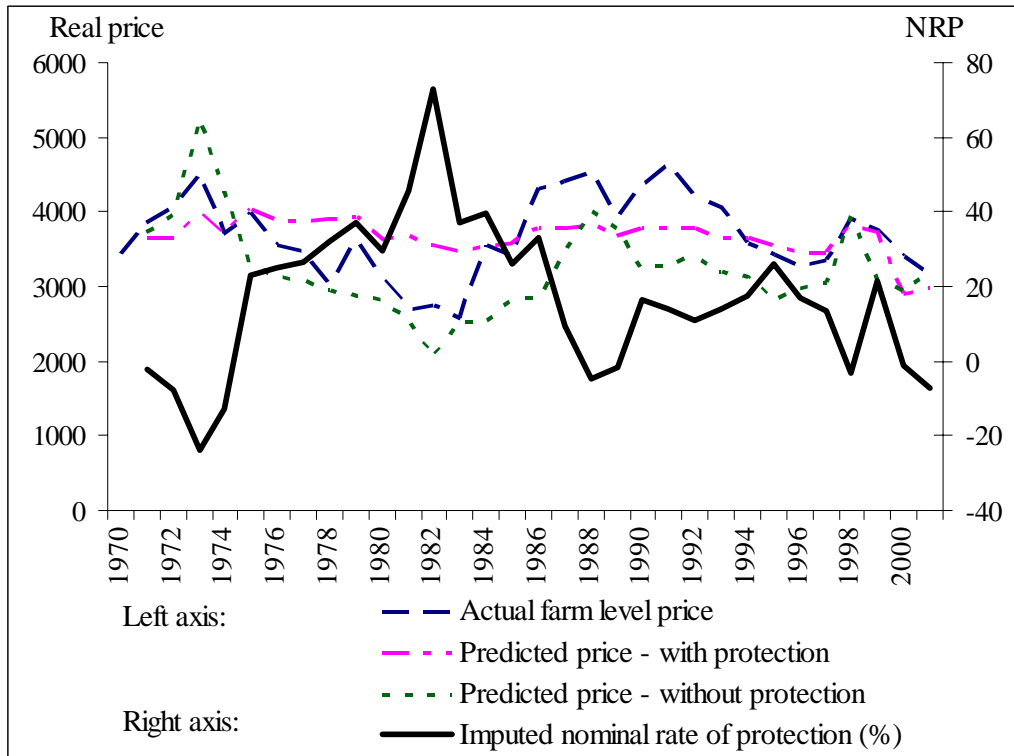
Figure 15. Indonesia: Estimation of imputed NRP at farm level - Maize
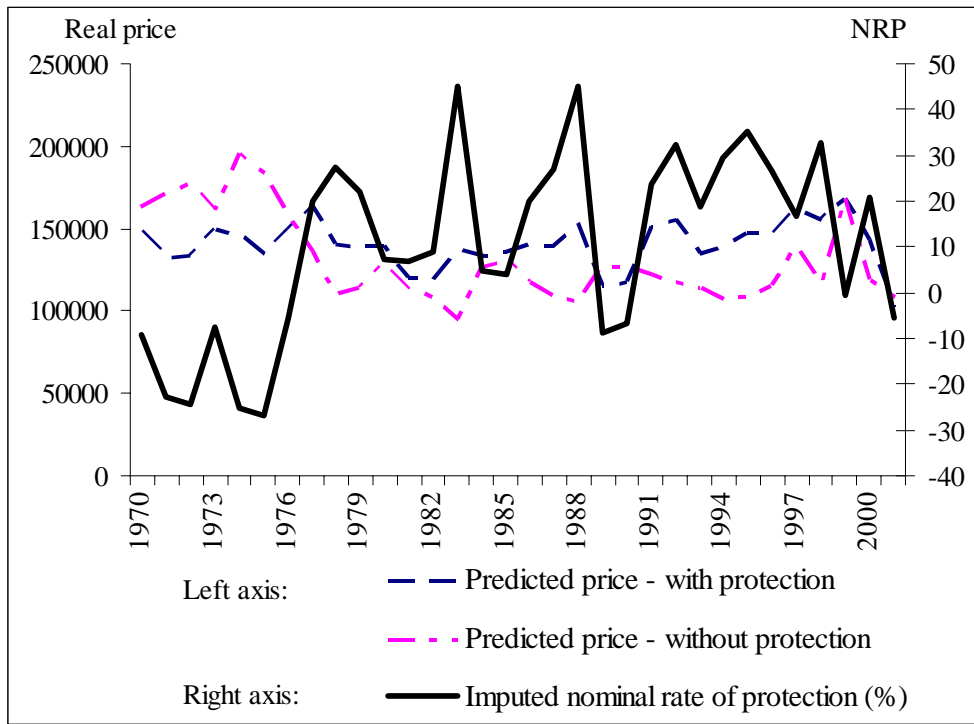
Figure 16. Indonesia: Estimation of imputed NRP at farm level - Rubber

Real price — NRP

Left axis:
- – – Actual farm level price
- – · Predicted price - with protection
- · · · · Predicted price - without protection

Right axis:
- —— Imputed nominal rate of protection (%)
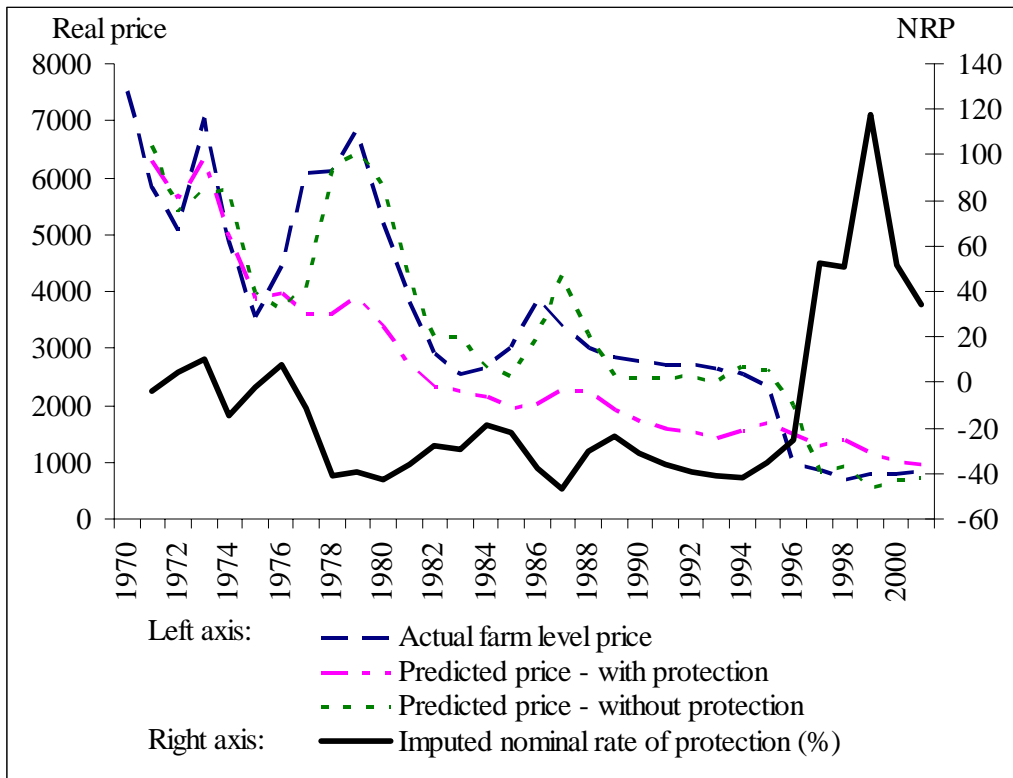
Figure 17. Indonesia: Estimation of imputed NRP at farm level – Copra
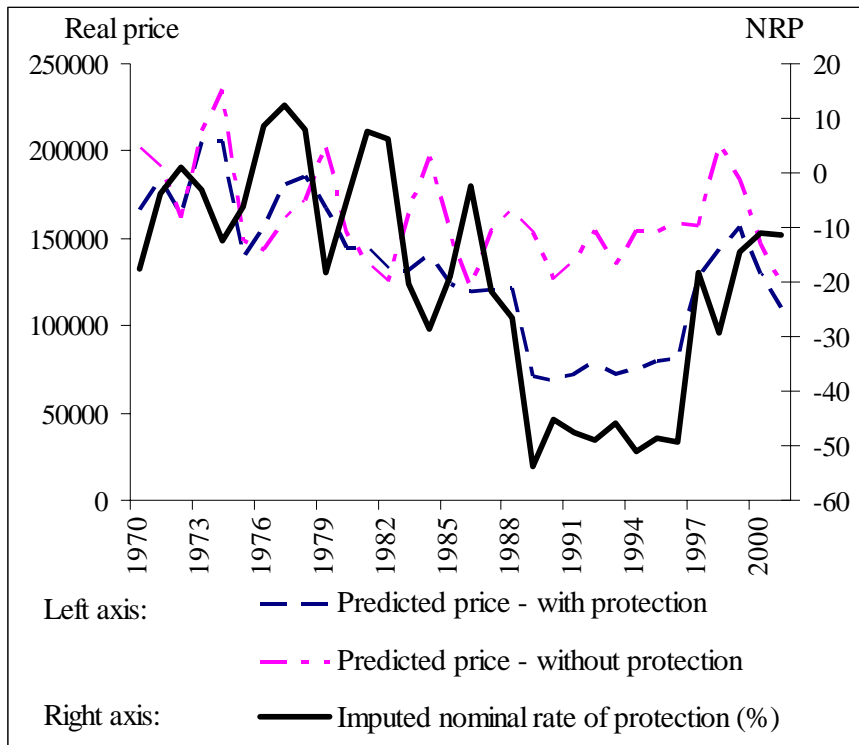
Figure 18. Indonesia: Estimation of imputed NRP at farm level – Sugar

Real price / NRP

Left axis:
- – – Actual farm level price
- – · – Predicted price - with protection
- · · · · Predicted price - without protection

Right axis:
- —— Imputed nominal rate of protection (%)
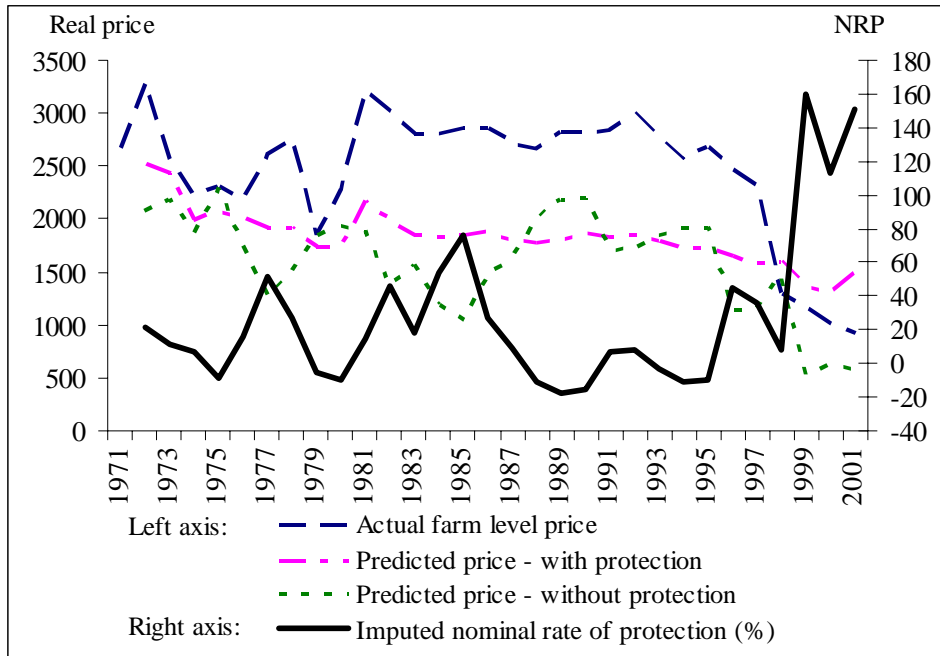
Figure 19. Indonesia: Estimation of imputed NRP at farm level - Tea

Real price ... NRP

Left axis:
— — Actual farm level price
— · — Predicted price - with protection
······ Predicted price - without protection

Right axis:
—— Imputed nominal rate of protection (%)
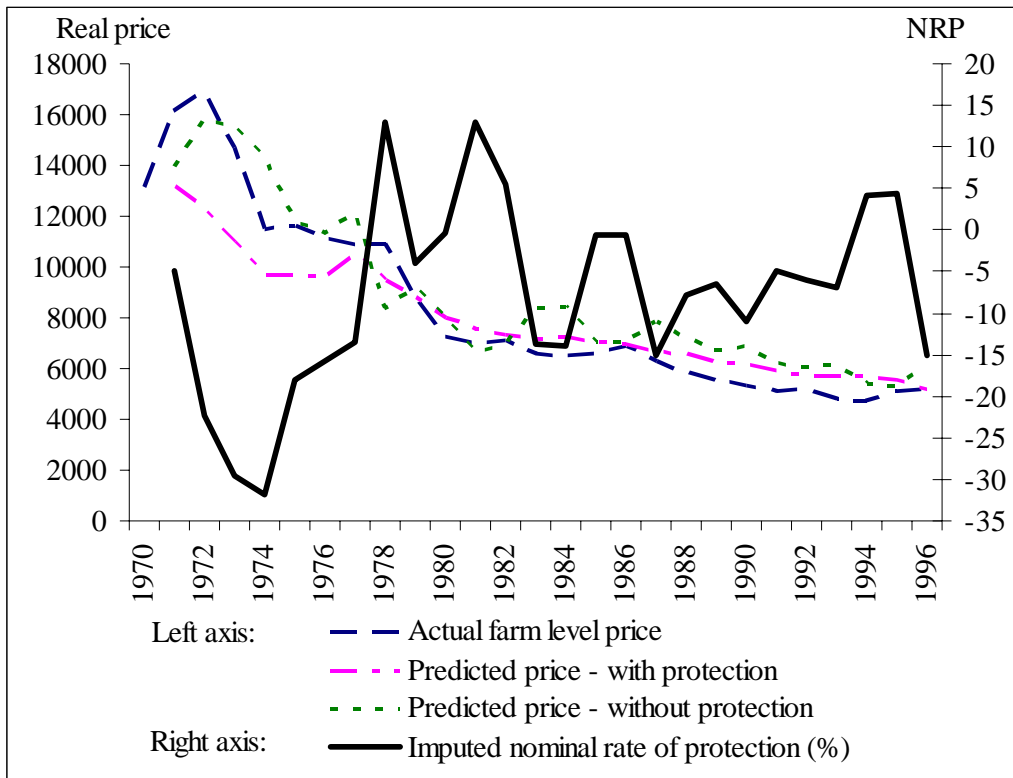
Appendix Table A1. Total taxes on imports (percent), 1974–94

		1974	1979	1985	1989	1994
01	Live animals	40	30	45	15	15
02	Meat and poultry	40	70	70	30	30
03	Fish	40	40	70	30	30
04	Milk and eggs	32	49	73	28	28
05	Offal	20	20	30	10	10
06	Flowers	30	60	60	30	30
07	Vegetables	60	60	86	28	24
08	Nuts and fruits	60	60	90	30	24
9	Coffee, tea, spices	70	73	94	24	24
10	Milled rice, other un-milled cereals	5	6	6	4	4
11	Other products of milling	0	30	45	13	11
12	Oil seeds and misc. grains	10	25	33	18	10
13	Gums, saps etc.	0	30	40	10	10
14	Wood	0	20	30	10	10
15	Edible fats and oils	2	39	59	21	16
16	Processed meat	72	130	130	60	33
17	Sugar	54	69	75	14	14
18	Cocoa	60	75	70	50	18
19	Prepared cereals	44	60	70	36	23
20	Prepared vegetables, fruit	50	60	80	33	28
21	Miscellaneous edible products	40	55	66	26	29
22	Beverages	73	77	81	50	37
23	Residues of food processing	30	30	35	11	9
24	Tobacco	45	50	83	38	23
	Average, Chapters 1–24	37	51	66	26	20

Appendix Table A2. Total taxes on imports (percent), 1995–2000

		1995	1996	1997	1998	1999	2000
01	Live animals	6	6	4	3	3	3
02	Meat and poultry	23	19	19	5	5	5
03	Fish	20	17	14	5	5	5
04	Milk and eggs	21	17	17	5	5	5
05	Offal	5	5	5	4	4	4
06	Flowers	16	15	12	11	11	11
07	Vegetables	18	18	15	5	5	5
08	Nuts and fruits	16	16	15	5	5	5
09	Coffee, tea, spices	21	21	17	5	5	5
10	Milled rice, other un-milled cereals	2	2	2	2	6	7
11	Other products of milling	5	5	5	4	5	5
12	Oil seeds and misc. grains	4	5	4	4	4	4
13	Gums, saps etc.	5	5	5	5	5	5
14	Wood	5	2	2	2	2	2
15	Edible fats and oils	10	9	7	5	5	5
16	Processed meat	25	20	20	5	5	5
17	Sugar	11	10	8	4	9	9
18	Cocoa	13	13	9	5	5	5
19	Prepared cereals	23	19	19	5	5	5
20	Prepared vegetables, fruit	28	22	22	5	5	5
21	Miscellaneous edible products	20	18	16	7	7	7
22	Beverages	35	35	35	33	33	33
23	Residues of food processing	4	4	4	4	1	1
24	Tobacco	18	16	13	10	10	10
	Average, HS Chapters 1–24	16	14	13	6	6	6

Appendix Table A3. Total taxes on imports (percent), 2001–2006

		2001	2002	2003	2004	2005	2006
01	Live animals	3	3	3	2	2	2
02	Meat and poultry	5	5	5	5	5	5
03	Fish	5	5	5	5	5	5
04	Milk and eggs	5	5	5	5	5	5
05	Offal	4	4	4	4	4	4
06	Flowers	11	11	11	11	13	12
07	Vegetables	5	5	5	5	5	5
08	Nuts and fruits	5	5	5	5	6	6
9	Coffee, tea, spices	5	5	5	5	5	5
10	Milled rice, other un-milled cereals	7	7	7	12	10	11
11	Other products of milling	5	5	5	5	5	5
12	Oil seeds and misc. grains	4	4	4	4	4	4
13	Gums, saps etc.	5	5	5	5	5	5
14	Wood	2	2	2	2	2	2
15	Edible fats and oils	5	5	5	5	5	5
16	Processed meat	5	5	5	5	5	6
17	Sugar	9	12	12	12	10	8
18	Cocoa	5	5	5	5	5	12
19	Prepared cereals	5	5	5	5	5	6
20	Prepared vegetables, fruit	5	5	5	5	5	6
21	Miscellaneous edible products	7	7	7	10	10	10
22	Beverages	33	33	33	33	33	34
23	Residues of food processing	1	1	1	1	1	2
24	Tobacco	10	10	10	11	11	11
	Average, HS Chapters 1–24	6	6	6	7	7	7

Appendix Table A4. Increases (percentage points) in tariffs ('bea masuk'), 1974–94

		1974–79	1979–85	1985–89	1989–94
01	Live animals	-10	0	-15	0
02	Meat and poultry	0	0	-10	0
03	Fish	0	0	-10	0
04	Milk and eggs	14	0	-18	0
05	Offal	0	0	-10	0
06	Flowers	0	0	0	0
07	Vegetables	0	0	-34	-3
08	Nuts and fruits	0	0	-30	-6
9	Coffee, tea, spices	0	0	-46	0
10	Milled rice, other un-milled cereals	2	-1	-1	0
11	Other products of milling	30	0	-18	-2
12	Oil seeds and misc. grains	15	0	-14	-1
13	Gums, saps etc.	30	0	-20	0
14	Wood	20	0	-10	0
15	Edible fats and oils	37	0	-24	0
16	Processed meat	-2	0	-15	-22
17	Sugar	6	0	-46	0
18	Cocoa	0	0	-10	-32
19	Prepared cereals	6	-6	-13	-9
20	Prepared vegetables, fruit	0	0	-20	-2
21	Miscellaneous edible products	0	0	-14	3
22	Beverages	-3	0	-14	-7
23	Residues of food processing	0	0	-21	0
24	Tobacco	0	0	-23	0
	Average, Chapters 1–24	9	0	–21	–4

Appendix Table A5. Increases (percentage points) in tariff surcharges ('bea masuk terbahan'), 1974–94

		1974–79	1979–85	1985–89	1989–94
01	Live animals	0	15	-15	0
02	Meat and poultry	30	0	-30	0
03	Fish	0	30	-30	0
04	Milk and eggs	3	24	-27	0
05	Offal	0	10	-10	0
06	Flowers	30	0	-30	0
07	Vegetables	0	26	-25	-2
08	Nuts and fruits	0	30	-30	0
9	Coffee, tea, spices	3	21	-24	0
10	Milled rice, other un-milled cereals	0	0	-1	-1
11	Other products of milling	0	15	-15	0
12	Oil seeds and misc. grains	0	8	-2	-7
13	Gums, saps etc.	0	10	-10	0
14	Wood	0	10	-10	0
15	Edible fats and oils	0	20	-15	-5
16	Processed meat	60	0	-55	-5
17	Sugar	9	6	-15	0
18	Cocoa	15	-5	-10	0
19	Prepared cereals	10	16	-21	-5
20	Prepared vegetables, fruit	10	20	-27	-3
21	Miscellaneous edible products	15	11	-26	0
22	Beverages	7	4	-16	-6
23	Residues of food processing	0	5	-3	-3
24	Tobacco	5	33	-23	-15
	Average, Chapters 1–24	6	15	–19	–2

Appendix Table A6. Increases (percentage points) in total import taxes, 1994–2006

		1994–1995	1995–1997	1997–1998	1998–2006	1994–2006
01	Live animals	-9	-3	-1	-1	-13
02	Meat and poultry	-7	-4	-14	0	-25
03	Fish	-10	-6	-9	0	-25
04	Milk and eggs	-7	-4	-12	0	-23
05	Offal	-5	-1	0	0	-6
06	Flowers	-14	-4	-1	2	-18
07	Vegetables	-6	-3	-10	0	-19
08	Nuts and fruits	-8	-1	-10	1	-18
9	Coffee, tea, spices	-3	-4	-12	0	-19
10	Milled rice, other un-milled cereals	-1	0	0	9	8
11	Other products of milling	-6	0	0	1	-6
12	Oil seeds and misc. grains	-6	0	0	0	-6
13	Gums, saps etc.	-5	0	0	0	-5
14	Wood	-5	-3	0	0	-8
15	Edible fats and oils	-6	-3	-2	0	-11
16	Processed meat	-8	-5	-15	1	-27
17	Sugar	-3	-3	-4	4	-6
18	Cocoa	-5	-4	-4	7	-6
19	Prepared cereals	1	-5	-14	1	-17
20	Prepared vegetables, fruit	-1	-6	-17	1	-23
21	Miscellaneous edible products	-8	-4	-9	3	-18
22	Beverages	-2	-1	-2	1	-3
23	Residues of food processing	-5	0	0	-2	-7
24	Tobacco	-4	-5	-3	0	-12
	Average, Chapters 1–24	-4	-3	-7	1	-13