Agricultural Protection in a Food Importing Country: Indonesia[#]

George Fane and Peter Warr[*]

Australian National University

George.Fane@anu.edu.au
Peter.Warr@anu.edu.au

January 2007

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 (almost) six decades since the country's Independence. 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, cited the (temporary) achievement of self-sufficiency in rice.[1] 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

[1] 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.

political economy explanation for the structure of agricultural protection and its changing pattern over the last three decades. The sixth section provides estimates of aggregate measures of protection for individual sectors and for agriculture as a whole. The final section concludes.

Our central hypotheses can be summarized as follows. First, variations in protection by sector have been driven by the government's wishes (a) to be self-sufficient in food, (b) to stabilize food prices at acceptable levels, and (c) to promote manufacturing. Food processing has been an important component of manufacturing and was even more important in the 1970s and 1980s than it is now. These aims led to taxes on unprocessed exports and subsidies to processing. Two import-competing industries producing processed agricultural commodities have been significantly protected – sugar and rice – and their rates of protection have increased in recent years. The rate of protection of the sugar industry is particularly high. Growers of rice have also received protection, but until about the year 2000 this occurred mainly through input subsidies to farm level production, rather than through protection of the processed product, milled rice. This can be explained in terms of our hypotheses both as the main element of food self-sufficiency and because rice prices affect manufacturing wages through the cost of living. Since 2000 the rice industry has become more highly protected, with imports banned.

The second hypothesis is that during the long period of the Soeharto government, in good fiscal times aims (a) to (c) above could be afforded, but in bad times they could not. So good fiscal times meant 'bad' trade policies, meaning more protection, and bad fiscal times meant 'good' policies, meaning less protection.

Third, accumulating evidence from around the world convinced policy makers in Indonesia and most other East Asian countries to rely more on markets and less on government intervention. This evidence was based on theoretical arguments, statistical studies and simple two-country comparisons, such as Thailand / Burma; West Germany / East Germany; Austria / Hungary; and South Korea / North Korea. The policy shift was also influenced by the collapse of the communist system and the victory of capitalism in the cold war. This third factor caused a long-term shift towards lower protection, world-wide. The outcome has been significantly lower levels of manufacturing protection from the mid-1980s onwards and much lower taxation of agricultural exports.

2

Fourth, following the democratic reforms that occurred in the wake of the Asian financial crisis of the late 1990s, agricultural protectionism has increased in Indonesia. Aggregate measures of protection indicate that these changes, along with reduced protection of manufacturing, caused the agricultural sector as a whole to switch from being a net taxed to a net subsidized sector, relative to manufacturing. But these aggregate measures mask the fact that the agricultural protection is concentrated in just two crucial industries – sugar and rice.

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 and Figure 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, far more rapid than in preceding decades. Indonesia also grew rapidly during this decade, but as the table shows, only marginally faster than during the two decades ('pre-boom') before it. Indonesia's growth had been sustained over several decades. 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 per cent 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 refer to the input-output tables, which are available for the years 1971, 1980, 1990 and 2000. The trends in output mirror changes in consumer preferences. 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 undiminished.

The input-output tables indicate that since 1971, production of paddy (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. 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. Between 1980 and 2000 the share of imported intermediate goods in total intermediate good use increased from only 3.8 to 10.2 percent.

In 1971, sales of paddy (unmilled rice, produced at the farm level) from farmers to intermediate users (rice millers) accounted for 56 percent of the total value of paddy output, implying that almost half of paddy output was milled by households themselves. By 2000 sales to intermediate users accounted for 98 percent of the total value of paddy output. Similar trends occurred in maize, rubber, sugarcane, palm oil, coffee and tea.

The central feature of Indonesia's agricultural trade is that while several of its staple foods are imported, none are net exports. The most important import-competing agricultural products include rice, sugar, maize and soybeans.[2] The major export-competing agricultural products are not staple foods, but they do include coffee, rubber, tobacco, tea, oil palm, copra, shrimps and spices. 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. Cassava is mainly non-traded,

---

[2] Over the 4 years immediately following the Asian financial crisis of 1997–1998 (1998–2001, inclusive), Indonesia's rice imports were 9 percent of its total consumption of rice and 18 percent of the world's total imports, making Indonesia the world's largest importer. But rice imports have been banned since 2002.

although there are exports of its derivatives, manioc and tapioca. Much of the livestock sector is also non-traded, although chickens are exported, while beef and dairy products compete with imports.

Some sectors have moved from one trade category to the other. The most important example is sugar, which was the most important export during the colonial era, but has become one of the most highly protected import-competing products in the post-Independence period. Another example is maize, which switched from a net export to a net import during the 1990s. Vegetables and fruits have become important net imports, as have soybeans (included in 'other food crops' in these tables).

Policy evolution

Indonesia obtained its independence from the Netherlands in 1949. The next two decades were chaotic. The post-Independence government of President Soekarno pursued a nationalistic, quasi-socialist economic policy that produced hyperinflation and economic stagnation. In 1966 Soekarno was displaced amid economic chaos 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, 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,

---

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

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. By the mid 1980s it had fallen 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. At first, trade policy became increasingly oriented towards import substitution and the system of import licensing was extended. But after this initial protectionist response to lower petroleum export revenues, 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 tariff cuts in 1985 the government 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 of Fane and Condon (1996), 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 percent of total value added in all traded industries in 1986 to 23 percent in 1995. This switch from NTBs to tariffs was somewhat 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 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. For centuries, Indonesia's major staple food crops have been net imports. 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, including outright export bans.

In contrast, export crops have 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. Booth (1988, 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 contrast, during 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 soybeans have been protected from import competition by non-tariff barriers. These are discussed below, followed by the remainder of import-competing agriculture, which has been protected by tariffs and tariff surcharges Export-competing agriculture is discussed last.

Rice

The most important and most enduring non-tariff barriers have been those on rice and sugar. Figure 3 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 3 that the domestic wholesale price of rice has fluctuated much less than the border price and that 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 domestic supply. It is significant that this stabilization of domestic prices was achieved while keeping the trend value of domestic prices roughly in line with the trend of world prices. Average rates of protection in the output market for rice were very low.

This low rate of protection for rice is shown in Table 2, which summarizes nominal rates of protection for 8 major agricultural commodities (including rice) plus urea fertilizer. These estimates are based on comparisons of the annual average domestic wholesale prices of these commodities with their corresponding c,i.f. import prices or their f.o.b. export prices, whichever is relevant, the latter adjusted by estimates of the transport and handling costs incurred between the border and the wholesale level. The resulting annual estimates vary from year to year, partly because of fluctuations in international prices and because changes in these border prices are seldom transmitted immediately to domestic markets. Our interest is in broad changes over time, rather than year to year fluctuations.

---

[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.

Input markets were another matter. From the 1970s onwards, the Soeharto government used part of its new oil wealth to promote self-sufficiency in rice, 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 finance. 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, introduced with the explicit goal of rice self-sufficiency, farmers received agricultural extension services and subsidized 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 a fall in the real price of urea from the late 1970s to the early 1980s and a subsequent rise in the domestic wholesale price of urea relative both to the CPI and to the border price in the late 1980s and early 1990s. Exports of urea require special approval from the Ministry of Trade, under an export licencing scheme. The year to year determination of the magnitude of these licences is non-transparent, but the Ministry tends to place priority on ensuring that domestic supplies are stable at a price lower than world market prices and this results in the negative nominal rates of protection shown in Figure 4.

In the late 1980s, the strict policy of zero imports of rice was replaced by a policy of 'borrowing' rice from Vietnam in times 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 unable 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.

---

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

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 officially 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 newspaper reports that, 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 5 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 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 estimates make 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 have 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 Table 2..
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 of Fane and Warr (2007). Both the growth in protection of the 1970s and early 1980s and the reductions of the late 1980s and 1990s 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 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 Table 2 are the combined rates of tariffs plus tariff surcharges. 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

---

[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).

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.

Table 2 shows 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 average rate on the entire agriculture and food processing products category (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 traditional 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.

Table 3 shows 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. Producers of food crops have received input subsidies and food crops have also 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. 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 subsequently became a net import. The transition coincided with a movement from negative protection during the export phase to a small amount of positive protection since the early 1980s. The tariff on imports of processed maize in the form of pellets and flour is currently only 5 percent, but during the presidency of Megawati Sukarnoputri (2001 to 2004) the then Minister of Trade (Rini Suwandi), supported by BULOG, created import licences which restricted imports, raising average nominal rates of protection well above 5 percent. The rents created by this measure accrue to members of the maize importers association.

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. 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.

The Political Economy of Protection:
Do good times produce bad policies and vice versa?

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 the Bank's 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

14

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 dynamic derived from the 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. In Indonesia, a protectionist response also occurred briefly in response to the oil price declines of the early 1980s. But it did not last long because it did not address 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

15

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 phasing out 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 cannot 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 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 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 agricultural protection policy is to influence prices at the farm level. 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

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

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

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

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

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

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

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

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

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

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 $\hat{b}_i \leq 1$.

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. For each of these commodities, the estimated elasticity had the expected positive sign and was significantly different from zero, with the estimated equation performing well. Table 4 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 typically assume that the transmission elasticities are unity. But the Indonesian data reject that hypothesis as well. 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 Table 5, which may be compared with the cxorresponding estimates at the wholesale level summarized in Table 2, above. Because usable estimates 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.

Aggregate measures of agricultural protection

In this section we calculate aggregate measures of rates of protection using the information assembled from the preceding analysis and following, as much as possible, the methodology outlined in Anderson et al. (2006). 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 indicates some variation from one year to the next. Our interest is on broad trends, rather than these annual fluctuations.

First, Table 6 calculates the *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) *minus* the product of the cost share of fertilizer in production of the commodity concerned and the nominal rate of assistance to fertilizer. The calculations use the estimates of *nominal rates of protection* (nominal rates of assistance) for commodities at the farm level from Table 5 and the estimated nominal rate of protection for fertilizer at the wholesale level from Table

2. The nominal rate of assistance to fertilizer is negative in each year, meaning that fertilizer use is subsidized, although the rates of subsidy have declined over time. The direct rates of assistance therefore exceed the nominal rates for every commodity which uses fertilizer as an input.

The calculations of direct rates of assistance confirm that during the period 2000 to 2004, import-competing commodities rice and sugar were significantly protected, especially sugar. The rates of protection for these two commodities increased significantly compared with say a decade earlier. Other import-competing commodities, soybeans and maize, receive little or no assistance. Export commodities such as rubber, copra and coffee are either lightly taxed or untaxed today, having been significantly taxed two decades ago. Tea exports are still moderately taxed. For the subsequent discussion, it is notable that rates of export taxation, especially for copra, were highest in the late 1980s to mid-1990s.

Estimates of sector-wide and economy-wide rates of assistance are summarized in Table 7. Column (5) estimates the anti-trade bias among agricultural sectors as

$$ATB^A = (1 + DRA_M^A)/(1 + DRA_X^A), \qquad\qquad (7)$$

where DRA_M^A denotes the direct rate of assistance to imported agricultural products and DRA_X^A denotes the direct rate of assistance to exported agricultural products. An ATB greater than unity indicates that within agriculture import-competing products are more highly protected than exports. In Indonesia, the ATB within agriculture exceeds unity most years shown and is seemingly increasing, but it has not yet reached the levels of the first half of the 1990s.

Finally, the *total rate of assistance to agriculture* (column (6)) is calculated as the difference between the direct rate of assistance to total agriculture (column (1)) and the direct rate of assistance to manufacturing. The latter is estimated from effective rates of protection for manufacturing estimated by Fane and Condon (1996). These authors estimate the effective rate of protection for manufacturing, including oil and gas for 1987 and 1995 at 48 and 20 percent, respectively. They also project the corresponding effective rate for 2003, at 13 percent, based on the May 1995 tariff reduction package, which was to be implemented by 2003, and which was in fact largely implemented. For all years before 1987 we have used the 1987 values, even though some tariff reduction had occurred during the few years before 1987. For the years between 1987 and 1995 and between 1995 and 2003, we have

interpolated linearly. For 2004 we have used the 2003 value. 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 moved from being a net taxed sector to a net subsidized sector. This transition occurred shortly after the Asian crisis of 1997-99. The approximations described above undoubtedly *understate* rates of manufacturing protection prior to 1987. Although our estimates show negative values of the TRA for agriculture during this pre-1987 period, better estimates of manufacturing protection during this period would show *larger* negative numbers. Our rough estimates for manufacturing protection therefore introduce errors whose correction would reinforce, rather than undermine our broad conclusions.

Conclusions and prospects for future reform

Having been taxed relative to manufacturing throughout the post-Independence period, since around 2000 Indonesia's agricultural sector has been more heavily protected, overall, than manufacturing. The reversal occurred following the Asian crisis of the late 1990s. The switch took the form of: (a) increases in protection of the import-competing commodities sugar and rice; (b) declines in taxation of agricultural exports, especially rubber and copra; and (c) declines in manufacturing protection. The movement to a more democratic form of government has weakened the influence of Indonesia's 'technocrats', who have generally favored liberalized trade policies. Greater protection of some key agricultural commodities has been a consequence.

Protection of agriculture primarily takes the form of protection for the import-competing sugar and rice sectors. Other output sectors receive virtually no direct protection. Subsidies to fertilizer and other inputs have been an indirect source of protection to agriculture, but these rates of subsidy have declined. The political explanations for protection of the sugar and rice industries 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, closely linked with large-scale sugar plantations.

In contrast, Indonesia's farm-level production of rice (paddy) is dominated by small scale farm-level producers. The rice milling sector is much more concentrated and better organized, however, and this is relevant because imports compete with milled rice rather than the raw, unmilled product (paddy) produced by the farmer. The political power of rice millers has been an important source of support for protection of the rice industry. The enhanced political power of the Indonesian parliament since the upheavals induced by 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. Since 2000 imports of rice have officially been banned. In part, this policy has reflected the mistaken claim, advanced by supporters of rice industry protection, particulary the Ministry of Agriculture and *Bulog*, that restricting rice imports reduces poverty. A general equilibrium analysis presented in Warr (2005) demonstrates that the policy increases poverty significantly, within both rural and urban areas, because the poverty-increasing effects of increasing the consumer price of rice far exceed the poverty-reducing effects of increasing the producer price.

Trade liberalization in Indonesia's sugar and rice industries seems unlikely within the foreseeable future. Increased protectionism seems a more likely outcome and this could conceivably extend to industries other than sugar and rice.

References

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

Booth, Anne (1988), *Agricultural Development in Indonesia*, Sydney: Allen and Unwin.

Corden, W.M. *Trade Policy and Economic Welfare*. Oxford: Clarendon Press, 1974.

Corden, W. M. (1984) 'Booming Sector and Dutch Disease Economics: a Survey', *Oxford Economic Papers*, 36: 359-80.

Fane, George and Timothy Condon, (1996). "Trade Reform in Indonesia,1987-1995", *Bulletin of Indonesian Economic Studies*, 32: 33-54.

Fane, George and Peter Warr (2002). 'How Economic Growth Reduces Poverty: A General Equilibrium Analysis for Indonesia', in A. Shorrocks and R. Van der Hoeven (eds.), *Perspectives on Growth and Poverty*, New York: United Nations University Press, 217-34.

Fane, George and Peter Warr (2007). 'Distortions to Agricultural Incentives in Indonesia', Agricultural Distortions Research Project Working Paper xx, January 2007, World Bank, Washington, DC.

Hill, Hal (2000), *The Indonesian Economy*, (2nd ed.), Cambridge: Cambridge University Press.

Timmer. C. Peter (1996). 'Does BULOG Stabilize Rice Prices in Indonesia? Should it Try?', *Bulletin of Indonesian Economic Studie*s, vol. 32: 45-74.

Warr, Peter (1986). 'Indonesia's Other Dutch Disease: Economic Effects of the Petroleum Boom', in J.P. Neary and S. van Wijnbergen (eds) *Natural Resources and the Macroeconomy*, Oxford: Basil Blackwell, 288-320.

Warr, Peter (1992). 'Comparative Advantage and Protection in Indonesia', *Bulletin of Indonesian Economic Studies*, 28: 41-70.

Warr, Peter (2005) 'Food Policy and Poverty in Indonesia: A General Equilibrium Analysis', *Australian Journal of Agricultural and Resource Economics*, 49: 429-451.

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 using data from World Bank, *World Development Indicators*, various issues.

Table 2. Indonesia: Nominal Rate of Assistance at Wholesale Level, by Commodity, 1970 to 2004

Year	Rice	Sugar	Soybean	Maize	Rubber	Copra	Coffee	Tea	Fertilizer (smoothed)
1970	0.0	0.1	0.3	-41.9	-4.3	-36.1	-54.8	-23.4	-67.9
1971	0.0	103.7	-3.8	-46.7	-9.3	-8.2	-59.7	-17.7	-67.9
1972	0.0	36.6	-8.8	-11.0	-6.1	2.6	-65.8	-21.7	-67.9
1973	0.0	79.0	-45.4	-49.0	-2.2	-6.9	-30.7	-17.0	-67.9
1974	0.0	21.0	-10.4	-53.0	-10.8	-26.5	-40.9	-32.8	-67.9
1975	-36.7	1.0	31.9	-8.1	-9.5	-13.7	-39.1	-14.4	-67.9
1976	14.8	47.1	33.1	21.9	-3.6	20.9	-28.4	1.9	-50.5
1977	13.8	123.8	27.5	28.1	-2.3	30.8	-36.7	4.1	-47.0
1978	-14.2	137.3	31.8	23.9	-3.2	19.1	-36.6	84.0	-45.9
1979	-8.7	60.3	21.6	9.3	1.0	-36.9	-43.6	41.7	-48.8
1980	-21.6	-7.9	31.2	8.5	-1.2	-11.8	-45.2	0.2	-48.0
1981	-23.9	89.2	39.9	10.8	-6.0	18.1	-43.0	14.4	-54.6
1982	30.3	238.8	46.0	39.8	3.4	14.8	-41.9	-4.5	-57.5
1983	4.4	148.2	22.2	6.1	-24.3	-40.3	-63.5	-48.9	-60.0
1984	9.5	283.5	20.7	4.9	-17.6	-54.0	-65.7	-59.0	-61.6
1985	17.6	385.2	36.3	21.8	-7.7	-38.3	-57.2	-35.4	-60.3
1986	14.5	188.9	37.9	27.8	-9.9	-5.4	-45.0	-23.0	-53.4
1987	-11.9	117.9	29.1	39.7	3.0	-42.9	-15.2	-47.7	-51.6
1988	-19.4	56.9	11.4	-13.7	3.2	-50.5	-32.2	-39.9	-51.9
1989	-24.6	34.9	17.6	-9.8	2.4	-82.9	-47.0	-50.0	-44.6
1990	-16.0	51.0	31.7	25.1	2.7	-74.8	-36.6	-59.1	-39.4
1991	-21.1	114.7	35.8	31.6	4.8	-77.2	-27.1	-49.1	-40.2
1992	-10.2	119.7	37.9	20.8	4.0	-78.6	-24.3	-52.2	-34.3
1993	-2.4	101.3	32.3	29.7	9.2	-75.6	-16.3	-46.1	-21.7
1994	-7.6	61.3	35.9	33.7	10.0	-80.6	-21.4	-36.9	-19.9
1995	-12.9	55.3	33.4	27.4	12.1	-78.1	-21.6	-40.0	-22.1
1996	-9.8	264.9	21.6	19.0	9.8	-78.7	4.1	-61.1	-22.7
1997	-3.6	207.9	15.1	32.0	4.1	-37.2	-1.1	-66.7	-23.5
1998	-42.9	106.9	-11.2	-0.9	3.6	-55.1	-29.3	-69.1	-37.0
1999	11.4	245.7	33.6	22.6	24.2	-29.8	-6.7	-54.5	-28.4
2000	14.0	173.5	-1.6	-7.9	6.4	-23.8	7.7	-60.0	-25.6
2001	16.0	203.7	6.6	-19.0	11.5	-23.9	-2.7	-57.8	-22.3
2002	29.1	270.9	6.7	-1.6	-8.2	-25.2	-9.6	-50.3	-19.7
2003	33.4	397.0	5.0	33.9	-14.8	-15.9	-9.5	-41.3	-14.3
2004	8.2	307.6	-4.4	8.8	-22.5	-15.9	-8.4	-49.4	-28.7

Source: Authors' calculations.

Table 3. Indonesia: Total taxes on imports (percent), 1974–2006

	1974	1979	1985	1989	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Livestock	34	42	58	23	23	15	13	12	4	4	4	4	4	4	4	4	4
Flowers, vegetables	45	60	73	29	27	17	16	13	8	8	8	8	8	8	8	9	9
Food crops	2	18	25	8	7	4	4	3	3	6	6	6	6	6	9	8	8
Estate crops	47	53	72	24	19	14	14	12	5	5	5	5	5	5	5	5	5
Gums, wood	0	25	35	10	10	5	3	3	3	3	3	3	3	3	3	3	3
Processed food	47	65	75	34	23	19	16	15	8	8	8	8	9	9	9	9	10
Agriculture and food processing	37	51	66	26	20	16	14	13	6	6	6	6	6	6	7	7	7

Note: The HS chapters corresponding to the above categories are: Livestock (Chapters 1–5); Flowers, vegetables (Chapters 6,7); Food crops (Chapters 10,11); Estate crops (Chapters 8,9,12); Gums, wood (Chapters 13,14); Processed food (Chapters 15–24); Agriculture and food processing (Chaps. 1–24).

Source: Authors' calculations.

Table 4. 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.

Table 5. Indonesia: Nominal Rate of Assistance at Farm Level, by Commodity, 1970 to 2004

Year	Rice	Sugar	Soybean	Maize	Rubber	Copra	Coffee	Tea
1970	10.6	21.1	-1.9	-9.0	-4.2	-17.7	-18.7	-4.9
1971	10.6	21.1	-1.9	-22.7	-4.2	-3.7	-21.1	-4.9
1972	10.6	21.1	-7.7	-24.6	4.7	1.1	-24.4	-22.3
1973	10.6	11.3	-23.9	-7.4	9.8	-3.1	-9.1	-29.5
1974	10.6	6.7	-13.0	-25.4	-14.2	-12.6	-12.8	-31.8
1975	10.6	-8.9	22.9	-26.8	-2.3	-6.2	-12.1	-18.0
1976	10.6	15.3	24.9	-5.6	7.7	8.6	-8.3	-15.7
1977	14.6	51.4	26.4	19.8	-11.2	12.4	-11.2	-13.4
1978	-7.9	27.1	32.0	27.4	-40.9	7.9	-11.2	13.0
1979	-0.1	-5.1	37.1	22.2	-39.7	-18.2	-13.9	-3.9
1980	-17.3	-9.9	29.4	7.4	-42.3	-5.3	-14.5	-0.4
1981	-14.2	14.9	45.9	6.7	-36.3	7.5	-13.6	13.0
1982	24.6	45.8	73.1	8.8	-27.9	6.2	-13.2	5.6
1983	2.9	18.1	37.2	45.2	-29.3	-20.2	-23.1	-13.7
1984	1.8	53.4	39.9	4.8	-18.5	-28.7	-24.3	-14.0
1985	8.1	76.2	26.1	3.8	-21.9	-19.0	-19.9	-0.6
1986	1.5	27.3	33.0	19.8	-37.5	-2.4	-14.4	-0.7
1987	-9.7	9.0	9.3	27.1	-46.4	-21.7	-4.2	-15.1
1988	-14.4	-11.3	-4.5	44.9	-30.2	-26.4	-9.6	-7.9
1989	-17.4	-18.1	-1.8	-9.0	-23.8	-53.8	-15.2	-6.4
1990	-13.5	-15.9	16.6	-6.6	-30.7	-45.2	-11.2	-11.1
1991	-19.6	7.3	14.2	23.6	-36.0	-47.6	-7.9	-4.9
1992	-10.5	7.6	11.1	32.2	-39.4	-49.0	-7.0	-6.1
1993	-5.6	-2.7	14.1	18.7	-40.6	-46.0	-4.5	-7.0
1994	-7.4	-10.7	17.2	29.6	-42.2	-51.1	-6.1	4.3
1995	-14.2	-10.1	26.0	35.3	-35.3	-48.4	-6.2	4.3
1996	-17.2	44.9	16.8	26.5	-24.9	-49.1	1.1	-15.1
1997	-9.1	36.3	13.4	16.8	52.1	-18.4	-0.3	-24.9
1998	-37.9	8.5	-3.4	32.8	51.0	-29.5	-8.6	-26.4
1999	0.8	159.5	21.7	-0.6	117.9	-14.3	-1.8	-18.6
2000	12.6	113.5	-1.2	20.7	51.3	-11.2	2.0	-21.2
2001	19.1	151.3	-7.3	-5.4	34.4	-11.2	-0.7	-20.1
2002	20.7	123.3	3.5	-9.0	-3.7	-11.9	-2.6	-16.6
2003	23.6	167.2	2.6	-22.7	-6.8	-7.3	-2.6	-12.9
2004	6.0	136.6	-2.4	-24.6	-10.5	-7.3	-2.3	-16.2

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: Authors' calculations.

Table 6. Indonesia: Direct Rate of Assistance at Farm Level, by Commodity, 1970 to 2004

Year	Rice	Sugar	Soybean	Maize	Rubber	Copra	Coffee	Tea
1970	22.0	31.5	1.7	-7.2	12.0	-16.6	-8.5	9.5
1971	22.0	31.8	1.7	-20.5	12.3	-2.4	-10.9	8.5
1972	21.9	32.2	-4.0	-22.2	21.5	2.5	-14.2	-9.9
1973	21.9	22.7	-20.1	-4.8	27.0	-1.7	1.0	-18.0
1974	21.9	18.5	-9.1	-22.5	3.2	-11.1	-2.7	-21.4
1975	21.8	3.1	26.9	-23.6	15.5	-4.7	-2.0	-8.6
1976	18.8	24.3	27.8	-3.1	20.9	9.9	-1.0	-9.6
1977	22.1	60.0	29.2	22.4	1.3	13.6	-4.4	-8.4
1978	-0.6	35.8	34.8	30.1	-28.5	9.1	-4.5	17.2
1979	7.6	4.3	40.1	25.2	-26.3	-16.8	-6.8	-0.1
1980	-9.7	-0.5	32.4	10.6	-28.9	-3.9	-7.5	2.6
1981	-6.0	25.5	49.5	10.5	-21.5	9.3	-5.3	16.5
1982	32.8	56.9	77.1	12.9	-12.9	8.2	-3.9	9.3
1983	11.0	29.5	41.6	49.7	-14.1	-17.9	-13.0	-9.7
1984	9.6	64.9	44.6	9.6	-3.5	-26.2	-13.4	-9.8
1985	15.3	87.3	31.0	8.7	-7.7	-16.3	-8.7	3.6
1986	7.4	37.0	37.4	24.3	-25.4	0.2	-4.2	3.2
1987	-4.4	18.2	13.8	31.6	-35.2	-19.1	6.1	-11.3
1988	-9.4	-2.2	0.2	49.6	-19.4	-23.6	1.1	-4.0
1989	-13.5	-10.3	2.4	-4.8	-14.9	-51.2	-5.6	-3.0
1990	-10.4	-9.1	20.5	-2.8	-23.2	-42.8	-2.4	-8.0
1991	-16.3	14.1	18.1	27.5	-28.4	-44.9	1.0	-1.7
1992	-7.7	13.3	14.5	35.5	-33.0	-46.6	0.5	-3.4
1993	-3.8	0.9	16.3	20.7	-36.6	-44.4	0.2	-5.2
1994	-5.6	-7.4	19.2	31.4	-38.5	-49.6	-1.9	5.9
1995	-12.2	-6.6	28.2	37.4	-31.3	-46.6	-1.5	6.2
1996	-15.1	48.5	19.0	28.6	-20.8	-47.1	5.8	-13.2
1997	-6.9	39.9	15.7	18.9	56.3	-16.2	4.5	-23.0
1998	-34.3	14.2	0.2	36.1	57.6	-25.8	-1.2	-23.3
1999	3.6	163.8	24.4	2.0	123.0	-11.4	3.9	-16.1
2000	15.2	117.3	1.3	23.0	55.7	-8.4	7.0	-19.1
2001	21.4	154.6	-5.1	-3.4	38.3	-8.7	3.6	-18.2
2002	22.7	126.1	5.4	0.6	-0.3	-9.6	1.2	-14.9
2003	25.1	169.2	4.0	25.2	-4.3	-5.6	0.1	-11.7
2004	9.1	140.6	0.4	8.9	-5.7	-3.7	3.1	-13.7

Note: DRA means the nominal rate of assistance at the farm level for that industry (Table 16) minus the product of the cost share of fertilizer for that industry and the nominal rate of assistance to fertilizer (Table 15).
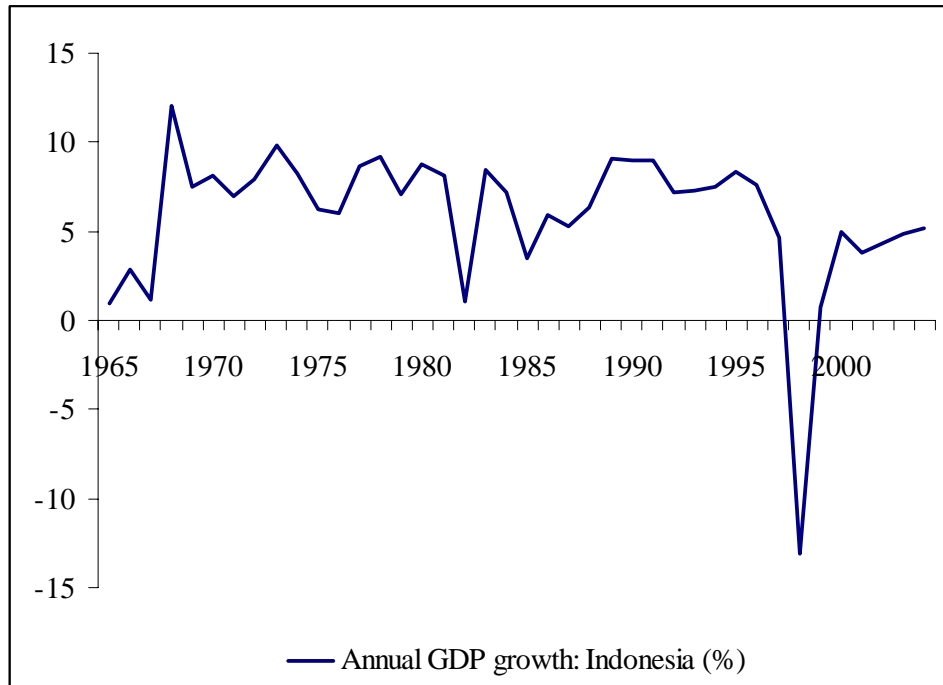*Source*: Authors' calculations.

Table 7. Indonesia: Aggregate Direct and Total Rates of Agricultural Assistance and Anti-trade Bias, 1970 to 2004

| Year	Direct Rates of Assistance				Anti-trade bias within agriculture	Total rate of assistance to agriculture
	Total agriculture	Import agriculture	Export agriculture	Manu-facturing		
	(1)	(2)	(3)	(4)	(5)	(6)
1970	15.1	19.6	-2.0	48.0	-20.3	-32.9
1971	15.3	18.7	2.6	48.0	5.5	-32.7
1972	15.3	18.1	5.1	48.0	3.1	-32.7
1973	15.3	17.5	7.6	48.0	2.1	-32.7
1974	11.8	16.7	-5.2	48.0	-4.2	-36.2
1975	14.8	18.4	2.6	48.0	5.3	-33.2
1976	16.1	18.2	9.0	48.0	1.9	-31.9
1977	19.3	24.5	2.5	48.0	7.3	-28.7
1978	3.4	6.3	-6.2	48.0	-1.4	-44.6
1979	5.1	11.6	-15.4	48.0	-0.9	-42.9
1980	-6.0	-3.9	-12.4	48.0	0.3	-54.0
1981	0.7	2.1	-3.9	48.0	-1.1	-47.3
1982	28.2	36.8	-1.8	48.0	-50.2	-19.8
1983	11.2	18.0	-14.5	48.0	-1.4	-36.8
1984	10.0	15.9	-13.9	48.0	-1.3	-38.0
1985	14.3	19.8	-9.7	48.0	-2.4	-33.7
1986	9.7	13.5	-8.5	48.0	-1.9	-38.3
1987	-1.4	1.7	-17.3	48.0	-0.2	-49.4
1988	-4.9	-3.1	-15.1	44.5	0.2	-49.4
1989	-13.0	-10.7	-27.2	41.0	0.4	-54.0
1990	-8.4	-5.7	-26.8	37.5	0.2	-45.9
1991	-9.7	-6.9	-28.5	34.0	0.2	-43.7
1992	-4.4	0.0	-31.3	30.5	0.0	-34.9
1993	-3.7	1.2	-32.4	27.0	-0.1	-30.7
1994	-4.7	0.9	-35.5	23.5	-0.1	-28.2
1995	-6.8	-2.1	-31.7	20.0	0.0	-26.8
1996	-7.2	-3.2	-27.4	19.1	0.1	-26.4
1997	4.3	1.0	20.3	18.3	0.1	-13.9
1998	-12.7	-19.4	18.0	17.4	-1.0	-30.0
1999	22.8	14.5	58.9	16.5	0.3	6.3
2000	22.1	21.0	26.6	15.6	0.8	6.5
2001	22.5	23.7	17.6	14.8	1.3	7.7
2002	18.6	24.5	-3.8	13.9	-9.2	4.7
2003	24.8	32.8	-4.7	13.0	-9.2	11.8
2004	12.3	17.2	-4.7	13.0	-4.8	-0.7

Source: Authors' calculations.

**Figure 1. Indonesia: Annual Growth Rate of Real GDP, 1965 to 2005 (percent per annum)**

Source: Data from World Bank, *World Development Indicators*, various issues.

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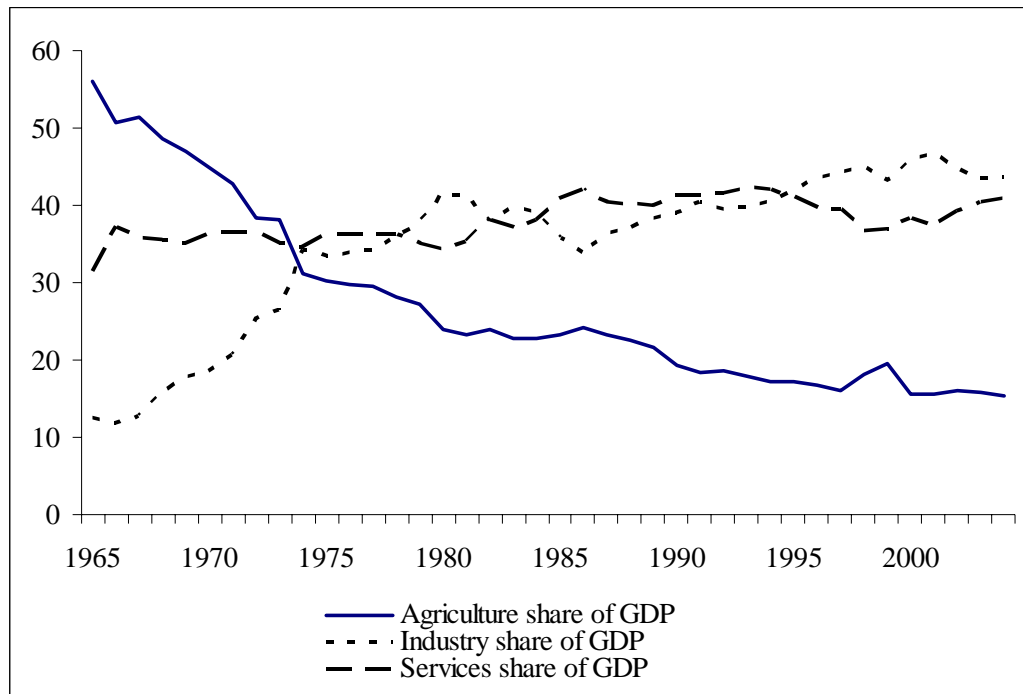
:
Source: Authors' calculations, using data from World Bank, *World Development Indicators*, various issues.

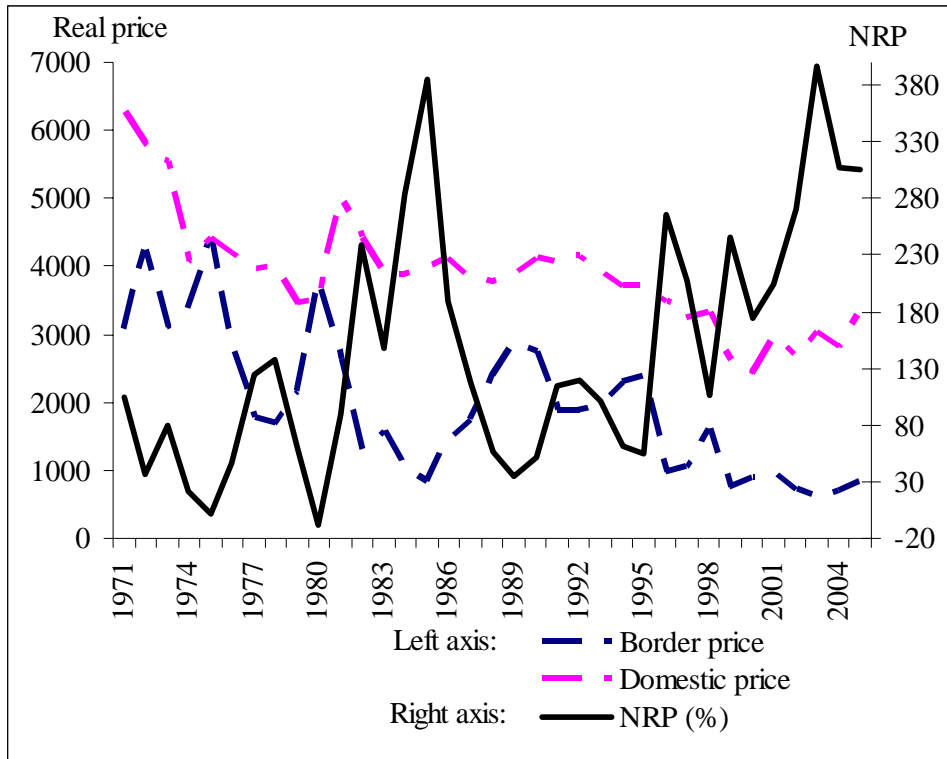**Figure 3. Indonesia: Border and domestic prices of rice (Rp/kg), relative to the GDP deflator (2005=1)**
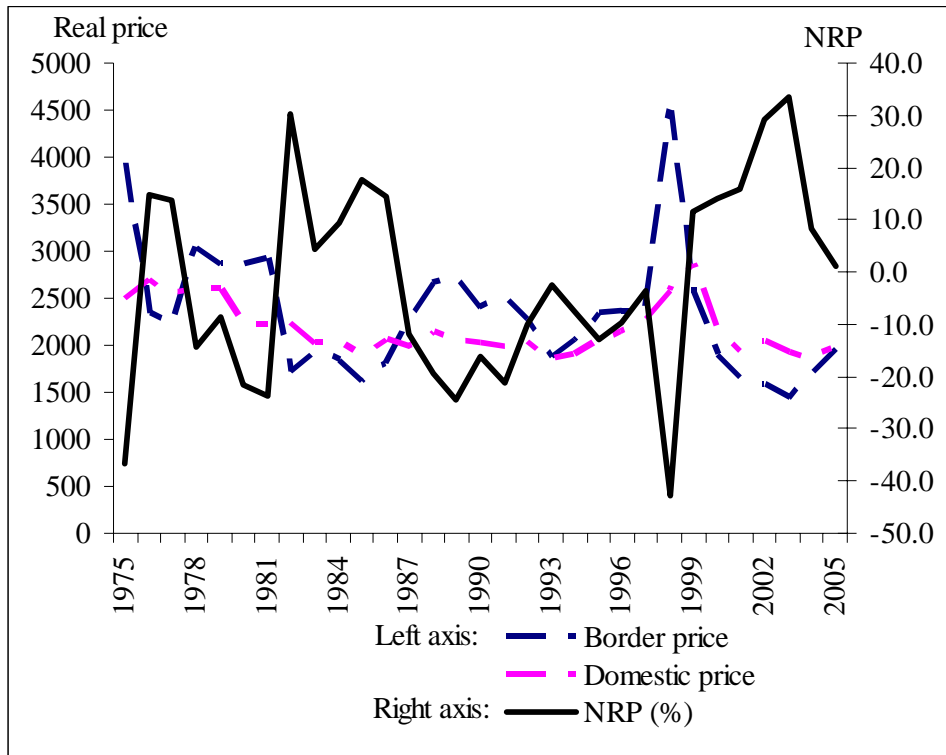
Source: Authors' calculations.

Figure 4. Indonesia: Border and domestic prices of urea fertiliser (Rp/kg), relative to the GDP deflator (2005=1)
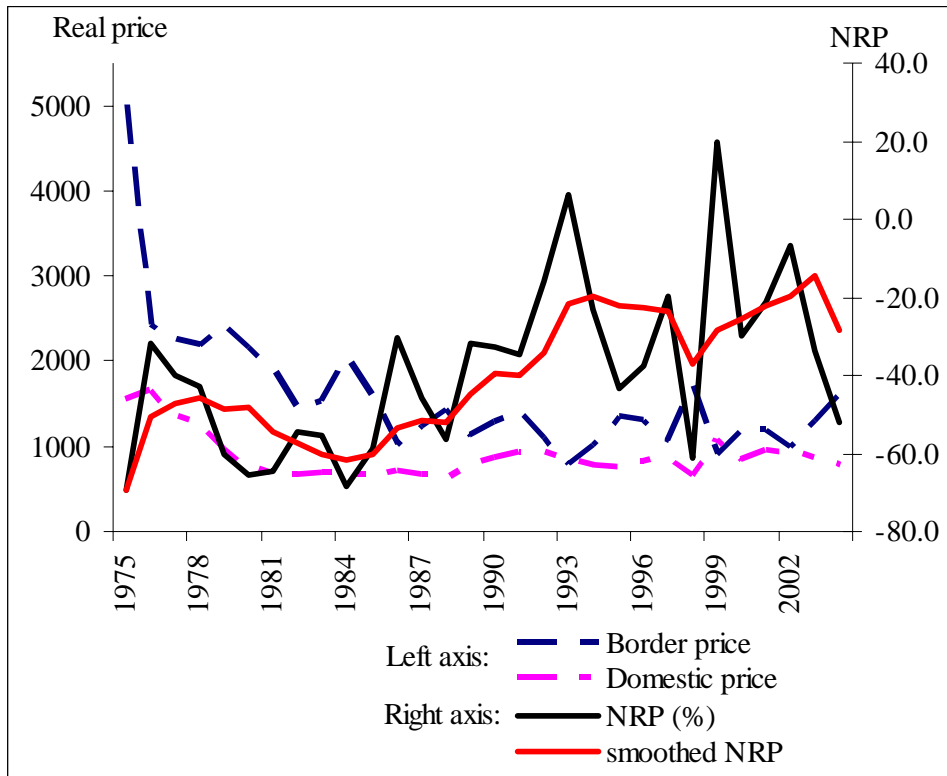
Source: Authors' calculations.

Figure 5. Indonesia: Border and domestic prices of sugar relative to the GDP deflator (2005=1)

Source: Authors' calculations.