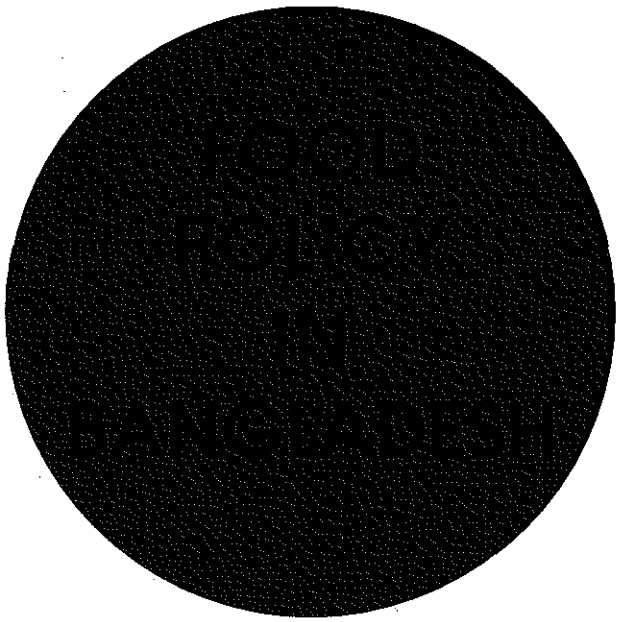

WORKING PAPER NO. 8

THE IMPACT OF TRADE AND EXCHANGE RATE POLICIES ON ECONOMIC INCENTIVES IN BANGLADESH AGRICULTURE

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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CONTENTS

TABLES

FIGURES

FOREWORD

In early 1989, the International Food Policy Research Institute entered into a contract with the U.S. Agency for International Development (USAID), Dhaka (under contract No. 388-0027-C-00-9026-00), to conduct research on food policies and to extend technical assistance to the Ministry of Food, Government of Bangladesh. The Bangladesh Food Policy Project is the basis for a tripartite collaboration between IFPRI, the Government of Bangladesh, and USAID, Dhaka. This project consists of four subprojects and a large number of well-defined research topics. The subprojects together constitute a comprehensive approach for addressing the food policy problems in Bangladesh. They include the following studies: a price stabilization framework encompassing public and private marketing, evaluation of the effects of targeted distribution of foodgrains on consumption and nutrition, diversification of agriculture as a source of sustained growth of production, and capacity-building in food policy analysis.

This research on Bangladesh's exchange rate was an input required for the study on comparative advantage of agricultural products. The analysis of comparative advantage was the centerpiece of the agricultural diversification study. Even though the exchange rate study was conducted specifically for project purposes, the information will be useful for various other purposes in Bangladesh.

Raisuddin Ahmed

Series Editor and Project Director
Bangladesh Food Policy Project

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1. INTRODUCTION

HISTORICAL EVOLUTION OF THE POLICIES

At its inception, Bangladesh faced a serious foreign and domestic resource imbalance. To overcome the foreign exchange crisis and to promote rapid industrialization, the country opted to pursue a strategy that placed heavy emphasis on saving foreign exchange. Taxation of imports provided a convenient way of generating large revenues for the public exchequer on the one hand while protecting domestic industries on the other. Levies on imports, therefore, were used as the main instrument for mobilizing domestic resources to ease the fiscal deficit.

The strategy of restricting exports and imports and providing heavy protection to domestic industries to promote overall development of the economy fitted well with the nationalist aspirations of successive political regimes until the early 1980s. Import substitution, therefore, became the cornerstone of the country's development strategy and has remained so until the recent spate of policy reforms. An excessively high and complex structure of import tariffs, pervasive import controls, export taxes (on jute until the late 1970s), export restrictions, and fixed and multiple exchange rates characterized the external trade regime. The import control regime and the exchange rate policy permitted the government to maintain an overvalued exchange rate well into the 1980s. This imposed an implicit tax on exports and offset some of the protection provided to import-competing industries. The earnings from exports were channeled into the modern industrial sector through import of capital goods at lower tariff rates complemented by subsidized interest rates. The total industrial sector comprised barely 7 percent of gross domestic product (GDP) at the country's inception and presently claims only a 10 percent share of GDP.

Owing to protracted balance of payments difficulties, a poor overall resource balance, persistently large fiscal deficits, and a highly unsatisfactory overall economic performance, the government initiated major policy reforms in the early 1980s within the policy framework of the Extended Fund Facility and structural adjustment lending of the International Monetary Fund and the World Bank. The policy reforms, which spanned the entire decade of the 1980s and are continuing, included removal of quantitative restrictions on imports, phased reduction of tariffs, a flexible exchange rate policy, and withdrawal of subsidies from agricultural inputs such as fertilizer and irrigation equipment. The major objectives of the policy reforms have been neutralizing incentives between import-substituting and export-promoting activities and improving productive and allocative efficiency in the economy to accelerate the pace of overall economic growth.

Restrictionist trade and exchange rate policies can have large indirect effects on agricultural production, investment, growth, employment, and income distribution through their impact on producer incentives relative to other sectors of the economy. Agricultural pricing policies, for example, price support policies, constitute direct intervention and are more commonly focused on when the impact of economic incentives on agricultural production is being assessed. Commodity-specific trade policies such as import tariffs, export taxes, and quantitative restrictions on exports and imports of rice, oilseeds, and so forth, also have direct effects. The economy-wide trade and exchange rate policies, however, affect agriculture indirectly. The main indirect effects represent exchange rate misalignment deriving from macroeconomic policies. When present, such misalignment reduces the real income of exporters and import-competing producers of agricultural commodities; protects the industrial sector at the expense of agriculture, which raises the prices of inputs and consumer goods to farmers; and changes the relative prices of traded goods to nontraded goods, that is, appreciation of the real exchange rate that not only affects the trade balance and the domestic resource balance but also results in additional taxation of the agriculture sector. The effects of these indirect policies on the agriculture sector can be far greater than is commonly realized, since many agricultural commodities are actually or potentially tradable goods.

Table 1.1 shows Bangladesh's trading status for selected agricultural commodities in two periods since 1977/78. Data for these commodities are not available beyond 1987/88. Wheat, mustard seed, edible oil, sugar, fruits, cotton, and tobacco are importables. Tea, vegetables, and jute fiber are exportables. The trading status of rice, which is by far the most important agricultural commodity, as well as pulses and potatoes is ambiguous. Bangladesh is self-sufficient in these commodities, but their trading status may change from year to year in response to weather-induced shifts in production.

POLICY BIAS AGAINST AGRICULTURE

The policy bias against agriculture has long historical roots. In the classical model and some of its more modern variants (for details, see Lewis 1956), the "squeeze" on agriculture provides the economic surplus used to develop the modern industrial sector. Direct or implicit taxation, procurement prices that are kept below market prices, food subsidies to the urban sector, and the like are examples of such intentional discrimination against agriculture. In Bangladesh, however, the discrimination appears to have been unintended--a consequence of well-meant policies to insulate agricultural producers against price fluctuations in the world market and a development strategy that emphasized saving foreign exchange through import substitution. Weak representation of the interests of the rural population within the major political parties and the predominance of commercial and industrial

Table 1.1--Production, import, export, and trade share of selected commodities

Commodities	1977/78 to 1979/80					1985/86 to 1987/88				
	Production	Import	Export	Import[a] Ratio	Export[b] Ratio	Production	Import	Export	Import[a] Ratio	Export[b] Ratio
		(Tk 1,000)					(Tk 1,000)			
Cereals										
Rice	32,616,973	907,865	19	0.0278	0.0000	80,114,893	1,661,812	0	0.0207	0.0000
Wheat	1,383,215	2,686,203	0	1.9420	0.0000	5,295,609	6,755,519	0	1.2757	0.0000
Pulses										
Lentils	565,200	2,087	0	0.0037	0.0000	1,660,346	86,884	0	0.0523	0.0000
Gram	260,271	0	128	0.0000	0.0005	777,196	8,030	139	0.0103	0.0002
Oilseeds										
Mustard	765,412	171,784	2,551	0.2244	0.0033	2,241,311	603,254	0	0.2692	0.0000
Linseed	33,909	0	0	0.0000	0.0000	284,979	0	0	0.0000	0.0000
Tobacco & beverages										
Tea	643,320	26	590,985	0.0000	0.9186	1,425,637	6	1,056,456	0.0000	0.7410
Tobacco	409,733	20,338	32	0.0496	0.0001	519,334	83,207	21,150	0.1602	0.0407
Vegetables & fruits										
Potato	1,945,616	13,665	64	0.0070	0.0000	4,442,449	614	3,983	0.0001	0.0009
Vegetables	818,411	0	17,87[c]	0.0000	0.0022	1,996,435	0	43,401	0.0000	0.0468
Fruits	228,800	88,733	60	0.3878	0.0003	711,600	377,100	3,769	0.5299	0.0053
Fibers										
Jute	3,716,791	0	1,951,294	0.0000	0.5250	22,195,359	0	3,135,051	0.0000	0.1412
Cotton	1,472	1,254,149	2,067	851.7979	1.4044	336,677	1,639,257	3,075	4.8689	0.0091
Others										
Sugar	1,002,047	169,614	4,884	0.1693	0.0049	243,515	878,564	0	0.3581	0.0000
Edible oil	311,237	3,329,952	0	10.6910	0.0000	947,240[d]	4,357,515	0	4.6000	0.0000

Sources: Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: BBS, 1974 to 1991); Bangladesh Bureau of Statistics, Foreign Trade Statistics (Dhaka: BBS, 1976/77 to 1987/88); World Bank, Bangladesh: Economic Trends and Development Administration, vol. 2, Statistical Appendix (Washington, D.C.: World Bank, 1984); World Bank, Bangladesh: Managing the Adjustment Process--An Appraisal, Report No. 8344-BD (Washington, D.C.: World Bank, 1990); and official contact at Export Promotion Bureau, Dhaka.

[a] Import ratio = import/production.

[b] Export ratio = export/production.

[c] Since the marketing spread between farmgate price and export price (f.o.b. Dhaka) is very large (see Table 5.3) average export values reflect approximate valuation at export parity prices at farmgate. Without this correction the export-production ratio in value terms would be misleading.

[d] BBS data on edible oil production are not consistent with data on domestic edible oilseed production plus imports. The data on edible oil production was therefore made consistent with edible oilseed production. The milling conversion factor used was 1 kilogram of oilseeds = .333 kilograms of oil. The discrepancy was negligible from 1977/78 to 1979/80 but was large from 1985/86 to 1987/88.

vested interests not only sustained the excessively protected economic regime but also shaped the political economy of Bangladesh in a manner that permitted the policy regime to continue to discriminate against agriculture for nearly two decades.

Agriculture continues to remain the most important sector in Bangladesh. Although its share of total GDP had declined to around 40 percent in 1990/91, it still employs 55 percent of the total labor force. By far the largest number of absolutely poor people are still located in this sector. Strong real growth of the agriculture sector is crucial for overall economic growth, employment, alleviation of poverty, and the consequently much-needed expansion of the "thin" domestic market. Though agricultural commodities contribute little directly to export earnings, the indirect contribution through jute goods, leather, and frozen fish cannot be denied. Direct and indirect agricultural exports presently compose around 52 percent of total exports. To the extent that trade and exchange rate policies discriminated against exports, these also discriminated against agriculture. Direct intervention in agricultural output markets (for example, price supports) has not been particularly significant in Bangladesh compared with other South Asian countries. By contrast, intervention in input markets through subsidies to fertilizers, irrigation, and the like was substantial until the mid-1980s. Public investment in flood control and drainage programs also provided large direct government allocations to agriculture.

This study investigates the magnitude of direct and indirect effects of sectoral pricing policies and the indirect effects of economy-wide trade and exchange rate policies on agricultural commodities in Bangladesh. Since input subsidies have been a major form of intervention in agriculture, the incentives are analyzed in terms of output prices and value added. Chapter 2 discusses the agricultural prices policies in Bangladesh; Chapter 3 examines the effects of trade and commercial policies on the manufacturing and agriculture sectors; Chapter 4 presents the analysis of exchange rate policies; Chapter 5 discusses the economic incentives of selected policies on various traded and nontraded agricultural products; and Chapter 6 draws some conclusions.

2. AGRICULTURAL PRICING POLICIES IN BANGLADESH

FOODGRAINS

Up to the early 1980s, that is, during Bangladesh's first decade, the government designed its foodgrain pricing policy to provide low, stable prices to consumers. Procurement prices were below market prices in four out of seven years until 1979/80, interregional movement of foodgrains was restricted, and urban consumers were supplied with the "wage good" at subsidized prices through an elaborate rationing system. Input subsidies such as fertilizer and irrigation were provided to compensate producers for the low output prices (Ministry of Agriculture 1989). Subsidies on consumer food prices and agricultural inputs, however, began to impose a significant burden on budgetary resources of the government by the end of the 1970s. The government therefore has undertaken various price policy reforms since the early 1980s under the aegis of structural adjustment policies. Food subsidies were withdrawn from the urban rationing system and targeted to specific groups such as the rural poor through a rural (palli) rationing system. Unexpected and large foodgrain price swings are countered through open market sales in specific urban areas (which could, in principle, reduce the fiscal cost of food subsidies), and agricultural input subsidies have been withdrawn. The import, management, and distribution of fertilizer and irrigation equipment have been privatized, and the output price policy was changed to reflect "incentive" prices rather than procurement prices.

An interministerial committee sets a uniform procurement price for a particular crop season for the entire country based on estimates of average costs of production plus a 15 percent markup. If the procurement price is realized, producers with average or below-average costs of production receive a minimum 15 percent return over costs. The government's definition of "incentive" price, however, is average cost of production plus a 10 percent markup.

Procurement prices have been announced in all years for the major rice crop, aman (Table 2.1). For boro, the dry-season modern variety rice, it has been announced since the 1982/83 crop year. Procurement prices of wheat have been announced since 1975/76. Procurement prices are announced several weeks before initiation of the program. Procured quantities have, however, been very small, no more then 2.5 percent of domestic net production of rice, which amounts to about 7 percent of the marketed surplus. Wheat growers' prices have been lower than procurement price in 8 of the 16 years for which data were available (Table 2.1). Though government procurement has not influenced the determination of market prices of rice and wheat significantly, it is likely that the

Table 2.1--Procurement prices and farmgate prices of rice, wheat, and sugarcane

Year	Rice (Medium)		Paddy (Aman)		Wheat		Sugarcane	
	Procurement	Wholesale	Procurement	Farmgate	Procurement	Farmgate	Procurement	Farmgate
	(taka/metric ton)							
1973/74	1,945.92	2,831.00	1,203.65	1,688.90	n.a.	2,079.63	160.75	160.43
1974/75	3,215.07	5,779.00	1,982.63	2,964.43	n.a.	3,804.94	214.34	319.87
1975/76	3,215.07	3,382.00	1,982.63	1,921.27	1,929.04	1,546.19	267.92	279.51
1976/77	3,215.07	3,023.00	1,982.63	1,965.46	1,982.63	2,148.52	267.92	281.48
1977/78	3,590.17	3,877.00	2,250.55	2,131.79	2,143.38	2,197.73	281.32	297.23
1978/79	3,643.75	4,216.00	2,304.14	2,880.77	2,304.14	2,216.43	334.90	337.58
1979/80	4,420.73	5,657.00	2,813.19	2,939.82	2,813.19	2,783.34	334.90	374.98
1980/81	4,554.69	4,770.00	2,947.15	2,854.20	2,947.15	2,999.86	401.88	409.43
1981/82	5,090.10	6,060.00	3,322.20	3,336.46	3,322.20	3,643.53	455.50	444.86
1982/83	5,626.00	6,700.00	3,616.90	3,608.10	3,616.90	4,018.52	455.50	444.86
1982/84	6,028.20	7,450.00	3,858.10	4,359.05	3,858.10	3,914.19	455.50	455.69
1984/85	6,617.70	8,250.00	4,420.30	4,042.14	4,340.00	4,160.24	535.80	522.61
1985/86	6,832.00	6,620.00	4,554.70	4,456.49	4,554.70	4,551.70	643.00	656.47
1986/87	7,100.00	9,160.00	4,688.60	5,255.66	4,032.60	5,216.26	669.80	672.21
1987/88	8,251.00	9,970.00	5,358.00	4,844.00	5,358.00	5,201.00	669.80	683.00
1988/89	8,664.60	9,810.00	5,626.40	5,608.64	5,626.40	5,717.59	736.70	767.33
1989/90	9,071.20	9,920.00	5,894.80	5,487.83	5,894.30	6,177.72	964.50	1,080.72
1990/91	9,900.00	10,550.00	6,430.00	5,579.09	6,430.15	6,162.00	n.a.	920.00

Source: Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: BBS, various years).

Note: n.a. means not available.

growers' prices would have been lower than observed market prices in the absence of public procurement.

JUTE

The government has implemented a "minimum price support" policy intended to be remunerative to producers of jute, and minimum export prices for jute have also been in force. The jute industry was entirely in the public sector until the early 1980s; approximately half of the mills are now in the private sector. The Bangladesh Jute Corporation (BJC) and the Bangladesh Jute Mills Corporation (BJMC) procure raw jute through purchasing centers across the country at minimum prices announced a few weeks prior to procurement--typically from August to October, immediately following the harvest in July and August. The minimum price policy was discontinued in 1990/91 but was quickly reimposed on exports.

SUGARCANE

The sugar industry is entirely state owned. Sugar mills procure sugarcane at prices set by the government. Only 30 percent of the production of around 7 million tons of sugarcane is used by the industry; most of the remainder is consumed by the domestic gur, or molasses, industry. A small quantity is directly consumed as sugarcane juice by consumers. Procurement prices were below growers' prices in 12 out of 18 years. Thus, the market price is determined largely by domestic supply and demand at the growers' level.

COTTON AND TOBACCO

Cotton and tobacco are minor crops in Bangladesh. Minimum prices are announced by the government but do not appear to be effective. A significant part of the textile industry is still state-owned; the tobacco industry, however, is predominantly in the hands of a single multinational company. The Bangladesh Textile Mills Corporation (BTMC) presently procures 30 percent of the domestic cotton production directly, and private trade procures the remaining 70 percent. Privatization of the state-owned textile sector was insignificant until 1984/85. An administered pricing regime was implemented that year to set cotton fiber prices at the farmgate level, and government procurement of raw cotton was to take place at the fixed price. Since 1985/86, however, administrative pricing has been withdrawn. Cotton producers are free to sell cotton to the government (at designated purchase centers) or to private traders. The minimum price for tobacco is intended to be merely indicative since there is no government procurement, and it reflects the government's concern about exploitation of tobacco growers by the multinational company. Support prices of cotton and tobacco are not published, however.

3. TRADE AND COMMERCIAL POLICIES

MANUFACTURING SECTOR

The import policy delineating import tariffs and quantitative restrictions (QRs) has been the major trade policy instrument influencing incentives in the economy. The degree of restriction determines not only the profitability of import-substituting industries but also has significant implications for export-oriented industries and inter-sectoral resource allocation. High rates of protection may create more distortions than they offset. Moreover, when import restrictions take the form of pervasive nontariff barriers, policymakers themselves may not be aware of the magnitude of protection being enjoyed by different industries.

Even though import tariffs were high on most imports in Bangladesh until the mid-1980s, nontariff restrictions were generally the binding constraints on imports. Though the government initiated reforms to liberalize the trade policy regime in the mid-1980s, major steps toward trade liberalization have been undertaken only since 1988. These trade policy reforms were aimed at (1) removing quantitative restrictions, (2) decreasing tariff levels, (3) rationalizing the tariff structure, and (4) simplifying trade procedures.

Quantitative Restrictions

In January 1985 the import control system was changed significantly. The Positive List (specifying items that could be imported) was changed to a Negative List (specifying items that could not be freely imported), the implications being that any item not on the list could be imported, either freely or by fulfilling specified requirements. The Restricted List was left intact. Targeted reduction of tariffs and rationalization of the tariff structure took place, and a May 1988 amendment to the Import Policy Order (IPO) began the rapid phasing out of the QRs. Two major changes in the IPO of 1989/90 and 1990/91 were made: the IPO would henceforth remain in force for two years instead of one, and the Negative and Restricted Lists of imports were amalgamated into one Control List.

These changes provided greater continuity and easier import procedures. The number of categories containing banned items was reduced by 20 percent per year, with priority given to removing bans in the steel, chemicals, textile, and light engineering sectors. From July 1986 to July 1990 the number of four-digit categories in the Negative and Restricted Lists was reduced from 648 to 343. The remaining items include many products that compete with domestic production. However,

the ambitious target of phasing out all QRs by 1990/91 was not achieved. Since July 1990 the number of four-digit items subject to controls has been reduced by about 25 percent. Allowing for some new restrictions, there has been an effective reduction of about 18 percent in the Control List.

Removal of QRs has been the main objective of the trade policy reforms initiated in the mid-1980s and has been stepped up since 1988. Imports subject to QRs fall into three categories: banned, restricted, and mixed. A frequency index based on tariff line coverage shows that the proportion of total harmonized survey (HS) codes at the eight-digit level subject to QRs decreased from 47 percent in 1986 to 36 percent in 1990. The decline was more pronounced for banned items whose tariff line coverage declined from 9.1 percent to 5.1 percent in the same period. This reduction was undertaken under the provisions of the World Bank Industrial Sector Credit (ISC)-1, which stipulated a 20 percent per year reduction in the number of items on the Control List. Restricted tariff headings, which account for 55 percent of all codes subject to QRs, showed the least decline. The frequency index for this category decreased from 24 percent in 1986 to 20 percent in 1990.

In terms of trade coverage, about 52 percent of total imports face QRs. Once again, the most important category of QRs is the restricted one, accounting for 49 percent of total imports and 95 percent of QR imports. Another important characteristic of QR imports is that 90 percent of the items enter Bangladesh under normal tariff rates, while 10 percent enter at concessionary rates. For freely imported items the distribution is more balanced: 56 percent face normal tariffs and 44 percent enjoy concessionary rates. Tariff rates, however, whether normal or concessionary, are very different for QRs and free imports. Imports facing QRs in the manufacturing sector in the July-December 1990 period were

Total manufacturing sector	27.5 percent
Textile and leather	69.0 percent
Food, beverage, and tobacco	43.0 percent
Metal products, machinery	19.8 percent

The textile and leather and food sectors rely heavily on QRs. By contrast, imports of basic metals (0.88 percent) and nonmetallic minerals (2.2 percent) face few QRs. However, the above data should be viewed with caution, since they may reflect seasonal effects based only on the six-month period of July-December 1990. QR imports constitute only 27.5 percent of total imports in the manufacturing sector, but are 41.9 percent of all imports in the agriculture sector (Rahman 1992b).

Under the World Bank ISC-2, all items on the Control List were to be removed except for products controlled for security, health, safety, and religious (nontrade) reasons in two phases, the first by June 1991 and the second by June 1992. The IPO 1989-91 specifies 326 items at the four-digit level in the Control List. Since 70 tariff lines were removed in July 1990, 256 items remained on the Control List at the time of the

present study. The World Bank has determined that 73 of these items may stay on the list according to the nontrade criteria. Thus, 92 items were to be taken off this list in each of the two fiscal years of 1991 and 1992. The IPO for 1991-93 shows that 96 four-digit items had been removed from the Control List.

Tariff Structure

Imports in Bangladesh have been taxed by customs duties, sales taxes, development surcharges, and license fees. Sales tax is imposed in Bangladesh only on the duty-paid value of imports and hence is actually an import tax. Tariffs, the most important of the taxes, as well as development surcharges and license fees are levied on the c.i.f. value of imports. The government publishes a series of statutory rates governing tariffs. These rates are the highest that can be legally levied, but the operative rates in many cases are much lower because of various exemptions and concessions. (For example, concessions may be given to stimulate investment in priority sectors, promote export-oriented industries, and induce business in less-developed areas.) Reforms in connection with tariff rationalization and reduction have been aimed at (1) reducing maximum tariff rates to 100 percent (with the exception of luxury goods); (2) limiting customs duties to a maximum of 20 percent on raw materials, 75 percent on intermediate products and materials, and 100 percent on final products; and (3) restructuring import tariffs in the textile, steel, and engineering sectors so that the nominal tariffs in these sectors would be in the range of 0-85 percent. These objectives, however, were not achieved until December 1991.

To assess the effects of trade policy liberalization related to imports, statutory tariff rates of 1982/83 were compared with those of 1989/90, the year after significant import policy changes related to tariffs and QRs. The distribution of statutory tariff rates shown in Table 3.1 is based on 106 imported manufactured products covering approximately 60 percent of the total import value and 95 percent of manufacturing output. The number of items falling under the 40 percent and 50 percent duty rates increased significantly in 1989/90. The 75 percent duty rate was withdrawn and rates of 100 percent and above applied to only 29.25 percent of the items covered in 1991, compared with 52.83 percent in 1982/83. The weighted average tariff rate increased slightly, but the dispersion of the tariff rates measured by the coefficient of variation decreased from 0.70 in 1982/83 to 0.59 in 1989/90, indicating that significant trade policy reforms took place.

AGRICULTURE SECTOR

Nominal tariffs under the 1991-93 import policy on agricultural commodities and inputs are shown in Table 3.2. The tariff rates on essential agricultural commodities such as foodgrains, pulses, and

Table 3.1--Distribution of import tariffs in the manufacturing sector

Tariff Rate	Percentage of Import Items	
	1982/83	1989/90
(percent)		
20	13.21	10.38
40	5.66	28.30
50	18.87	31.13
75	6.60	-
100	28.30	22.64
150	18.87	1.89
300	5.66	4.72
Average rate	92.88	103.11
Coefficient of variation	0.71	0.59

Source: S.H. Rahman, "Trade and Industrialization in Bangladesh: An Assessment" (study undertaken for the UNU-WIDER Project on Trade and Industrialization in Developing Countries Reconsidered, United Nations University, World Institute of Development Economics Research, Helsinki, 1992).

spices are lower. High tariffs apply to fruits and vegetables such as brinjal, cauliflower, and cabbage. In the absence of QRs and special concessions or exemptions on tariff rates on agricultural importables, the nominal tariff rates shown in Table 3.2 indicate the actual measure of nominal protection given to the agricultural commodities in question. However, when QRs are imposed and special concessions given on duties, direct price comparisons provide a better measure of nominal protection to each product or sector. Nominal protection to agricultural products is discussed in Chapter 4.

In keeping with the overall restrictive trade policies, international trade in agricultural commodities has also been highly restricted. Most agricultural commodities still appear on the Restricted or Banned List of imports, and export policy toward agricultural commodities continues to impose serious restrictions. Raw jute, the single largest agricultural export commodity, was directly taxed until 1981, and outright bans have been imposed in years of scarcity to maintain supplies of the fiber for domestic jute mills at stable prices. Most agricultural commodities are perceived as essential products. Edible oils, oilseeds, pulses, spices, and the like are not permitted to be exported. Although imports under licensing schemes in the secondary foreign exchange market have been allowed since the late 1970s for the essential commodities discussed earlier, agricultural commodities have continued to be highly restricted. The post-1988 trade policy reforms did not affect agricultural commodities until the 1990/91 fiscal year.

Restrictive import policies were aimed at ensuring remunerative prices to producers, sheltering domestic producers from external competition, and achieving self-sufficiency. Restrictive export

Table 3.2--Operative tariff rates, 1991

Agricultural Products	Customs Duty	Value-Added Tax
Foodgrains		
Aus	0.3	0
Aman	0.3	0
Boro	0.3	0
Wheat	0.3	0
Gram	0.3	0
Barley	0	0
Maize	0	0
Pulses		
Masur	0.2	0
Mung	0.2	0
Mashkalai	0.2	0
Khesari	0.2	0
Oilseeds		
Til	0.6	0
Rape and mustard	0.2	0
Linseed	0.6	0
Spices		
Chilies (dry)	0.3	0
Onion	0.3	0
Coriander seed	0.6	0
Garlic	0.3	0
Turmeric	0.6	0
Ginger	0.3	0
Fiber		
Jute	0.6	0.15
Cotton	0.05	0
Sun hemp	0.6	0.15
Fruits		
Banana	0.5	0
Sugarcane	0.6	0
Mango	0.5	0
Pineapple	0.5	0
Jackfruit	0	0
Watermelon	0.5	0
Vegetables		
Brinjal	1.5	0
Cauliflower	1.5	0
Cabbage	1.5	0
Tomato	1.5	0
Potato	1.5	0
Sweet potato	1.5	0
Groundnut	0.6	0
Mushroom	1.5	0
Motor (peas)	0.6	0
Beans	1.5	0
Cucumber	1.5	0
Barbati	1.5	0

(continued)

Table 3.2--Continued

Agricultural Products	Customs Duty	Value-Added Tax
Others		
Tobacco	0.3	0.15
Betelnut	1	0
Betel leaves	0.6	0
Tea	0	0
Fertilizer		
Urea	0	0
TSP	0	0
MP	0	0
Insecticides/pesticides	0	0.15

Sources: (1) S.R.O NO:150 Law/91/1368/Customs;Dated: 12th June 1991;NBR;IRD;M/O Finance; (2) Bangladesh Customs Tariff (based on the Harmonized Commodity Description & Coding System) 1987;NBR;IRD;M/O Finance; and (3) Finance Ordinance 1991, 30th June 1991.

policies, on the other hand, were mainly aimed at ensuring domestic availability and equitable consumer prices. The overall objective of the "antitrade" policy, however, appears to have been price stability in agricultural commodity markets through insulation of the domestic markets from the instability of world commodity markets.

4. ANALYSIS OF EXCHANGE RATE

EVOLUTION OF THE POLICY

A fixed exchange rate policy was implemented during the 1970s. In August 1979 this policy was replaced by a "managed" flexible exchange rate policy in which the taka (Tk) was pegged to a basket of currencies of Bangladesh's major trading partners, weighted according to their bilateral foreign exchange transactions with Bangladesh. The weights were changed a few times in the 1980s to reflect changing trade weights. Since early 1983 the intervention currency has been the U.S. dollar, which replaced the British pound sterling. A policy of frequent adjustment of the nominal exchange rate was adopted in 1985 in consort with the overall macroeconomic policy reforms under a three-year IMF-SAF program that was to become operative the following year. The primary objective of the frequent exchange rate depreciation was to prevent overvaluation of the currency. The policy objective was to make export prices more competitive, eliminate budgetary subsidies for exports, and help restrain import growth without reimposing quantitative restrictions. Combined with the trade and commercial policy reforms stated earlier, this policy was expected to reduce smuggling, induce reallocation of resources in sectors of export orientation and import substitution, and encourage diversification and rapid growth of nontraditional exports.

Two exchange rate markets, the official (primary) exchange rate market (OEM) and a secondary exchange rate market (SEM), have been operating since the mid-1970s. Multiple exchange rates arose from these two markets. The SEM comprises the Wage Earner's Scheme (WES) and the Export Performance Benefit (XPB) Scheme. Foreign exchange remittances of overseas Bangladeshis and tourists as well as other service earnings are channeled for sale through the WES. The band for the WES rate is determined by a committee of authorized foreign exchange dealers from commercial banks, with the Bangladesh Bank participating as an observer. The actual WES market rate is then set within the predetermined band through auction. The spread between the WES and the official exchange rate was 12 percent in June 1985 but dropped sharply to 4.5 percent in June 1988 due to the frequent exchange rate adjustments from 1984/85 to 1989/90. It was only 2 percent by 1991. Thus, by 1990/91 the foreign exchange market had been almost unified, greatly reducing XPB benefits. Direct assistance to exporters on value added may therefore have to be

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This chapter draws extensively on Rahman (1992c).

considered. The scope of the SEM has been enlarged greatly since 1986/87. The share of imports transacted through the SEM increased from 12 percent in 1980/81 to 45 percent in 1988/89. In 1990/91 around 70 percent of the nonaid imports were transacted through the SEM.

NOMINAL AND REAL EXCHANGE RATES

The official exchange rate (OER) does not reflect the actual price of foreign exchange to importers and exporters due to the existence of tariffs, surcharges, license fees, and so forth on imports, and taxes and subsidies on exports. While taxes on imports (exports) increase the price of foreign exchange to importers (exporters), export subsidies reduce the price of foreign exchange. The official exchange rate adjusted for taxes and subsidies is, therefore, the effective exchange rate. Thus,

$$EE_m = E\ (1 + t_m),\ \text{and}$$

$$EE_x = E\ (1 - t_x),$$

where EE is the effective exchange rate, E is the official exchange rate, m and x represent imports and exports, and t represents implicit import tariffs or export taxes. EE_m, EE_x, and E are expressed in taka per unit of foreign exchange (U.S. dollars). The effective exchange rate is a measure of the effect of trade policy on the exchange rate, that is, the actual price of foreign currency.

Nominal tariff rates, however, do not provide a correct measure of nominal protection in the presence of quantitative trade restrictions (Lewis 1969). When a QR is binding, it becomes the primary determinant of the differential between the border and the domestic price. In other words, the border-domestic price differential exceeds the border price adjusted for the nominal tariff rate and normal marketing costs. Thus, average import tariff or export tax rates computed from actual tariff (tax) revenues and actual trade value data would measure the direct effect of trade policies on the exchange rate less accurately than implicit import tariff or export tax rates computed as the ratio of domestic to world price of imported goods.

Given a free trade equilibrium, an export supply function of S_o, and an import demand function of D_o, the quantity imported would be M_o and the domestic price of P_o would equal $E \cdot P_w$. However, when D_o and S_o are the demand and supply curves, there is an external deficit in the current account given by $M_o - M_r$. With a tariff of t, import is M_t with price of $P_t = P(1 + t)$. However, with a binding quantitative restriction on imports of M_r, the domestic price rises to $P_m = P_o(1 + t_m)$. Thus, the nominal average import tax t understates the true effect of quantitative

restrictions on domestic price given by t_m. That is, it underestimates the implicit tariff rate or the equivalent tariff rate (see Figure 4.1).

The demands for data for computing implicit import tariff and export tax are exacting. In principle, detailed world and domestic price data on all traded goods are required, but such detailed information on traded goods are not available for Bangladesh. World and domestic prices of certain categories of importables and categories of exportables covering approximately 51 percent of total import value and 90 percent of export value in 1985/86 were obtained from several different secondary sources (World Bank 1990). These data were used to compute the average implicit import tariff rate and export tax rate. The average implicit tariff (tax) rate was computed as a trade-weighted average tariff rate where shares of each import (export) category were used as weights. The equivalent tariff calculations thus computed are shown in Tables 4.1 and 4.2, and the average import tax computed as total import tax revenues divided by total value of imports is shown in Table 4.3. The weighted average import tax for the entire period is also trade-weighted.

The estimates show that quantitative restrictions have caused domestic prices to deviate significantly from their border equivalents. While the average import tax was only 23 percent in 1985/86, the

Figure 4.1--Import restrictions and equivalent tariffs

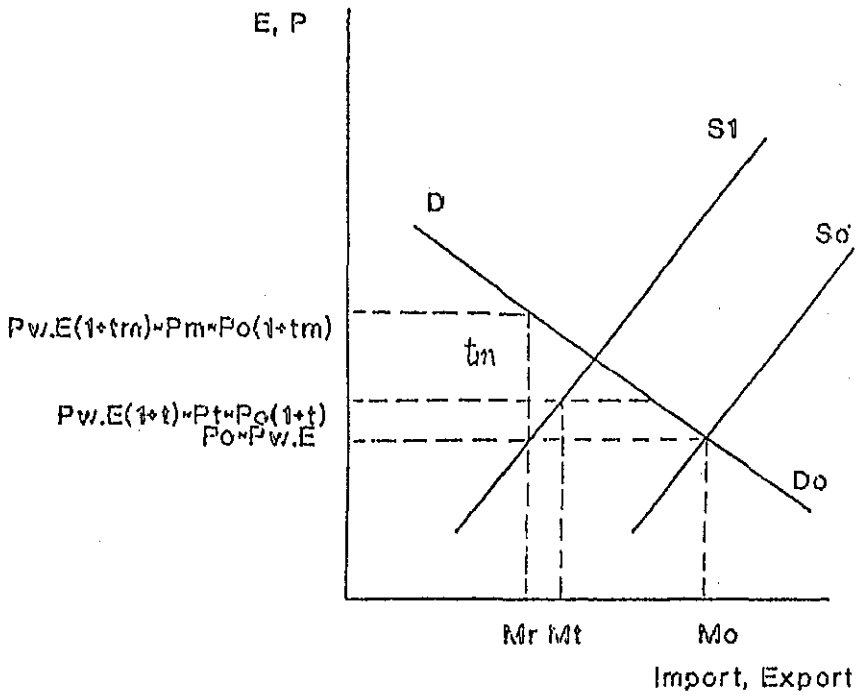


Table 4.1--Equivalent tariff calculation for export items, 1985/86

Export Items	Export Value	Share	Wholesale Price	Export Price (f.o.b.)	NRPX
	(Tk million)		(Tk/metric ton)		
Frozen shrimp, frog legs, and fish	3,427	0.1455	51,030	58,098	0.1217
Newsprint	219	0.0093	14,116	15,078	0.0638
Paper	91	0.0039	107	120	0.1083
Naptha	416	0.0177	8,140	5,196	-0.5666
Furnace oil	174	0.0074	5,704	3,893	-0.4652
Garments	3,929	0.1669	56	67	0.1665
Raw jute	3,702	0.1572	6,840	9,041	0.2434
Jute goods	8,794	0.3735	18,993	18,993	0.0000
Tea	979	0.0416	25,000	32,838	0.2387
Leather and leather products	1,815	0.0771	29	25	-0.1600
Total exports	23,546				0.0689[a]

Source: Bangladesh Bureau of Statistics, Statistical Yearbook (Dhaka: BBS, various issues); World Bank, Bangladesh: Economic Trends and Development Administration, vol. 2, Statistical Appendix (Washington, D.C.: World Bank, 1984); World Bank, Bangladesh: Managing the Adjustment Process--An Appraisal, Report No. 8344-BD (Washington, D.C.: World Bank, 1990).

[a] Weighted average of the nominal rates of protection using trade weights.

implicit import tax was 34 percent. In other words, only 68 percent of the economic rents accruing from quantitative import restrictions were captured by the import taxes.

Implicit tariffs (t_m) and taxes (t_x) over time were constructed using price indexes of import and export goods as follows:

$$\frac{P_m^d \quad P_x^d}{EP_m^w \quad EP_x^w} = 1 + t_m, \quad \text{and} \quad \frac{P_x^d}{EP_x^w} = 1 - t_x,$$

where P_m and P_x denote import and export price indexes, respectively, E denotes the OER, and the superscripts d and w indicate domestic and world prices. The world price indexes, P_m^w and P_x^w, are import and export unit values based on actual values and quantities of Bangladesh's external trade. The domestic price indexes P_m^d and P_x^d were constructed using the domestic wholesale prices of major imports and exports.

Figure 4.2 depicts the intertemporal behavior of the implicit import tariff and export tax. The implicit tariffs on imports were very high in the early 1970s. By contrast, the export subsidy was much lower. Both the implicit tariff rate and export subsidy declined sharply in 1975/76 following a large devaluation in May 1975. Although implicit tariffs did not change significantly between 1975/76 and 1984/85, with

Table 4.2--Equivalent tariff calculation for import items, 1985/86

Import Items	Import Value	Share	Wholesale Price	Export Price (c.i.f.)	NRP
	(Tk million)		(Tk/metric ton)		
Rice	333	0.0112	6,620	5,459	0.2127
Wheat	3,820	0.1282	5,224	3,285	0.5903
Edible oil, soybean	879	0.0295	24,386	14,486	0.6834
Coconut oil	657	0.0221	39,650	21,033	0.8851
Sugar	846	0.0284	25,524	11,486	1.2222
Crude petroleum	5,291	0.1776	5,406	5,249	0.0299
Petroleum products					
Kerosene	744	0.0250	9,348	6,888	0.3571
Diesel	2,415	0.0811	9,425	8,200	0.1494
Fertilizer					
Urea	1,124	0.0377	3,470	5,327	-0.3486
TSP	1,976	0.0663	6,472	4,843	0.3364
Cement	1,568	0.0526	2,200	1,203	0.8288
Raw cotton	1,542	0.0518	77,205	47,859	0.6132
Cotton yarn	1,494	0.0502	197,600	146,930	0.3449
Cotton fabric	1,455	0.0488	30	25	0.2000
Pig iron	497	0.0167	6,652	4,873	0.3650
Steel billets	47	0.0016	11,456	18,439	-0.3787
M.S. rod	643	0.0216	15,472	12,734	0.2150
M.S. plate	2,025	0.0680	15,472	14,018	0.1037
Diesel engine	224	0.0075	20,406	15,030	0.3577
TV (including radio, monitors, projectors)	287	0.0096	6,897	2,708	1.5469
Textile and Leather machine	1,039	0.0349	29,781	26,125	0.1400
Transport vehicle	105	0.0035	841,406	74,856	0.7719
Motor vehicle	258	0.0087	654,427	70,632	0.3905
Motorcycle	517	0.0174	20,929	16,017	0.3067
Total Imports	29,786				0.3415[a]

Source: Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: BBS, various years); World Bank, Bangladesh: Economic Trends and Development Administration, vol. 2, Statistical Appendix (Washington, D.C.: World Bank, 1984); World Bank, Bangladesh: Managing the Adjustment Process--An Appraisal, Report No. 8344-BD (Washington, D.C.: World Bank, 1990).

[a] Weighted average of the nominal rates of protection using trade weights.

few exceptions, the rate has been declining since 1984/85. In 1990/91 exports were subject to an implicit tax. Implicit import tariffs on the other hand, have ranged from 5 percent to 44 percent in the 1980s. These were made before in the 1970s. Implicit export subsidies ranging from -3 percent to 40 percent remained virtually unchanged at a low 2 percent from 1986/87 to 1989/90. Although, the OER was held fixed at around Tk 15 per U.S. dollar from 1975/76 to 1979/80, the effective exchange rate for imports ranged from Tk 19.4 to Tk 23.4 per U.S. dollar, and the effective exchange rate for exports ranged from Tk 15.8 to Tk 18.7 per U.S. dollar (Table 4.4).

Table 4.3--Average import taxes

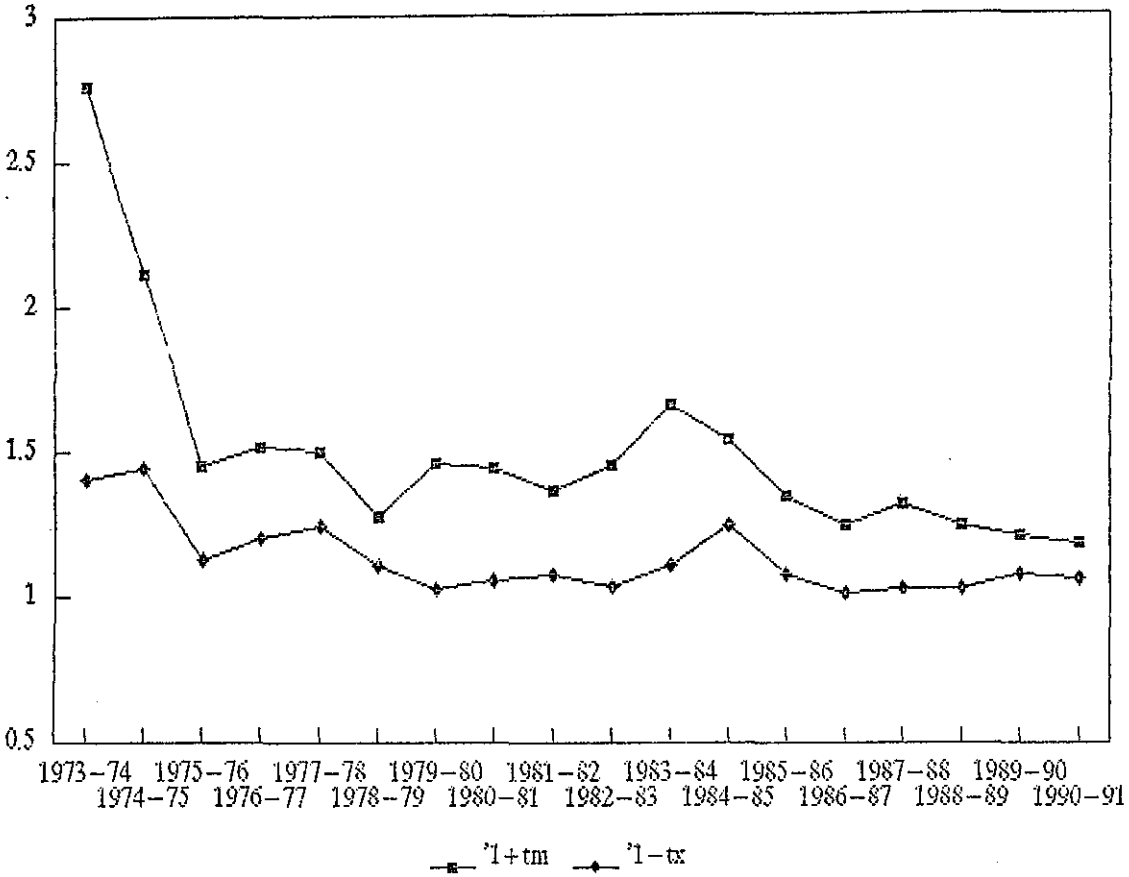
Year	Sales Tax (1)	Import Duty (2)	Total Import Tax (3)	Imports (4)	Average Tax (5)	Equivalent Tariff (6)
		(Tk 10 million)			(percent)	
1974	43.40	117.90	161.3	732.00	22.04	176.12
1975	61.88	151.20	213.1	1,084.00	19.66	111.08
1976	119.69	341.87	461.6	1,470.00	31.40	45.01
1977	123.00	268.74	391.7	1,399.00	28.00	51.45
1978	174.59	414.41	589.0	1,827.00	32.24	49.73
1979	230.14	487.64	717.8	2,334.00	30.75	27.44
1980	270.00	591.60	861.6	3,676.00	23.44	45.98
1981	340.00	710.70	1,050.7	5,216.00	20.14	44.10
1982	350.00	765.20	1,115.2	5,236.00	21.30	36.24
1983	316.00	899.30	1,215.3	5,489.00	22.14	45.09
1984	345.00	993.10	1,338.1	5,869.00	22.80	65.90
1985	410.00	1,104.42	1,514.4	6,874.00	22.03	54.17
1986	440.00	1,193.90	1,633.9	7,065.00	23.13	34.15
1987	550.00	1,537.40	2,087.4	8,026.00	26.01	23.97
1988	525.00	1,618.00	2,143.0	9,329.00	22.97	31.55
1989	540.00	1,807.30	2,347.3	10,848.00	21.64	24.06
1990	530.85	2,151.75	2,682.6	12,375.00	21.68	20.44
Average					24.20	52.15

Sources: Bangladesh Bureau of Statistics, Statistical Yearbook (Dhaka: BBS, various issues); World Bank, Bangladesh: Economic Trends and Development Administration, vol. 2, Statistical Appendix (Washington, D.C.: World Bank, 1984); World Bank, Bangladesh: Managing the Adjustment Process--An Appraisal, Report No. 8344-BD (Washington, D.C.: World Bank, 1990).

Note: (3) = (1) + (2)
(5) = (3)/(4)
(6) = See Table 4.4.

The sharp decline in the OER in 1975/76 reflects the large devaluation of the Bangladeshi taka in May 1975 from Tk 8.87 to Tk 15.05 per U.S. dollar. The devaluation caused a significant decline in both the implicit import tariff and export subsidy. The effective exchange rates for imports and exports increased by 17 percent and 33 percent, respectively, in response to the much larger OER devaluation of nearly 70 percent. The equivalent tariff declined from an index of 1.46 in 1974/75 to 1.28 in 1975/76, reflecting a significant decrease in the trade policy bias against exports. Following the shift to a flexible foreign exchange rate policy in 1979/80, frequent adjustments to the exchange were made throughout the 1980s. From 1980/81 to 1985/86 the OER declined from Tk 16.28 to Tk 29.89, that is, by 83.5 percent. Adjustment of the OER, however, was much slower in the second half of the 1980s. The OER declined by only Tk 3 per U.S. dollar between 1985/86 and 1989/90. The implicit export subsidy declined following the shift to an adjustable-peg exchange rate regime. The subsidy has been low with the exception of 1984/85, when abnormally high domestic jute prices (the

Figure 4.2--Implicit trade taxes, 1973/74-1990/91



highest historically) increased the implicit export subsidy above 20 percent. The effective exchange rate for exports thus was closer to the OER and declined steadily with the depreciation of the latter. Although accelerated trade policy reforms since 1988/89 have caused the implicit tariffs to decline, the overall trade policy bias against exports was significantly large even in 1990/91.

REAL EXCHANGE RATE

The world price of tradables in domestic currency relative to the price of home goods is the real exchange rate (RER), that is,

$$RER = E * \frac{P_t^w}{P_h},$$

Table 4.4--Tariffs and effective exchange rates, 1973/74-1990/91

Year	$1+t_m$ (1)	$1-t_x$ (2)	EQT (3)	OER (4)	EX (5)	EM (6)
1973/74	2.761	1.404	1.967	7.966	11.184	21.997
1974/75	2.111	1.442	1.464	8.875	12.798	18.734
1975/76	1.450	1.128	1.286	15.054	16.978	21.829
1976/77	1.515	1.200	1.262	15.426	18.516	23.363
1977/78	1.497	1.239	1.209	15.117	18.725	22.635
1978/79	1.274	1.101	1.158	15.223	16.755	19.400
1979/80	1.460	1.020	1.431	15.490	15.805	22.612
1980/81	1.441	1.052	1.370	16.259	17.100	23.428
1981/82	1.362	1.069	1.275	20.065	21.440	27.337
1982/83	1.451	1.031	1.408	23.795	24.525	34.525
1983/84	1.659	1.101	1.507	24.944	27.459	41.380
1984/85	1.542	1.239	1.244	25.963	32.164	40.028
1985/86	1.341	1.069	1.255	29.886	31.945	40.092
1986/87	1.240	1.004	1.234	30.629	30.766	37.971
1987/88	1.316	1.025	1.284	31.242	32.018	41.101
1988/89	1.241	1.022	1.214	32.142	32.838	39.876
1989/90	1.204	1.068	1.127	32.921	35.171	39.650
1990/91	1.177	1.054	1.117	35.690	37.612	42.001

Source: Author's calculations.

Notes: (1) $1+t_m$ = PMt/(Et*PMt*), where PMt = weighted average of domestic wholesale price of importables, PMt* = dollar price index of imports, Et = Ei/Eb, where Ei is exchange rate of the ith year and Eb is the exchange rate for 1985/86.
(2) $1-t_x$ = PXt/(Et*PXt*), where PXt = weighted average of domestic wholesale price of exportables, PXt* = dollar price index of exports, Et = Ei/Eb, where Ei is the exchange rate of the ith year and Eb is the exchange rate for 1985/86.
(3) EQT = (1)/(2).
(5) EX = effective exchange rate for exports = (4)*(2).
(6) EM = effective exchange rate for imports = (4)*(1).

where P_t^w and P_h are the world price of traded goods and the domestic price of home goods, respectively, and E is the OER. Changes in the RER thus represent changes in the relative incentives enjoyed by domestic producers of tradable goods.

Data on P_t^w and P_h were needed to compute the RER, since E was already available. A weighted average of the wholesale price indexes of Bangladesh's major trading partners was used to represent P_t^w. Hence,

$$P_t^w = \sum_i w_i \frac{WPI_i}{E_i}$$

where w_i, WPI_i, and E_i are the weight, wholesale price index, and the exchange rate, respectively, in units of the ith country's own currency per U.S. dollar (Appendix 1). The weights are the average share of trade (export plus imports) of Bangladesh's leading trading partners from

1973/74 to 1989/90. Seventeen countries were included in this study in order to compute trade weights. Among these, 12 countries account for approximately 66 percent of Bangladesh's total import trade; the remaining 5 countries account for 60 percent of the total exports during the period. The consumer price index (CPI) was used as a proxy for the prices of home goods on the assumption that it includes a larger proportion of nontraded goods and services than the WPI.

The effective RER indexes for imports and exports were computed (with 1985/86 as the base year) as follows:

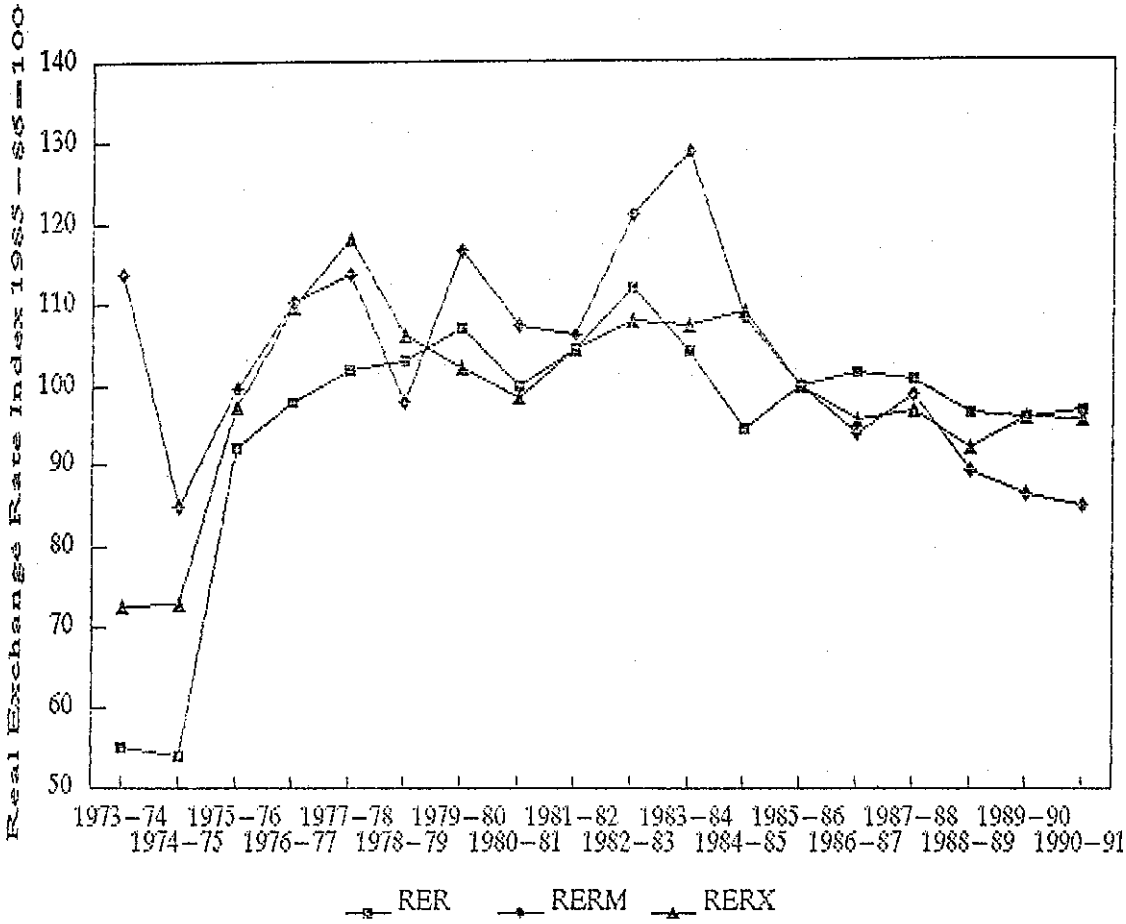
$$RER_x = RER\ (1 - t_x) \quad \text{and} \quad RER_m = RER_x \cdot (1 + t_m)/(1 - t_x).$$

The intertemporal behavior of the RER_x and RER_m are shown in Figure 4.3. The 70 percent devaluation of the OER in 1975/76 did result in an RER devaluation of equivalent proportions, but the depreciation in the RER_m was only 17 percent. However, a 15 percent downward adjustment of the OER in 1985/86 caused only a 6 percent depreciation of RER and a small appreciation of the RER_x. The most significant feature of the real exchange rate behavior depicted in Figure 4.3 is the appreciation of the RER and RER_x--particularly in the latter half of the 1980s compared with the first half--spite of steady nominal exchange rate depreciation throughout the decade. This is due to the strong domestic inflationary response principally caused by the nominal exchange rate depreciation policy itself (Rahman 1992a). Another important aspect of RER behavior depicted in Figure 4.3 is the persistent "anti-export" bias. The ratio of RER_x to RER_m shows the relative incentives to exporters; it has been consistently less than one. However, trade liberalization since 1988/89 has reduced the trade policy bias against exports significantly.

FACTORS INFLUENCING THE REAL EXCHANGE RATE

Changes in the effective RER can be brought about by the variations in world prices relative to prices of nontraded goods and by changes in the implicit import tariff and export tax, that is, commercial policies. Even when the nominal exchange rate is fixed, equilibrium between the traded and nontraded goods markets can be brought about by adjustments in the effective RER (Doronbusch 1974; Garcia 1981). Tariffs on imports and taxes on exports affect the RER by changing domestic supply and demand. The incidence parameter, omega, defined as the percentage change of the RER_x for exportables due to a 1 percent change in domestic prices of importables relative to exportables (P_m/P_x), shows the degree to which an increase in the domestic price of imports causes an increase in the demand for home goods and, hence, their price (Sjaastad 1980). Thus, the larger the substitution between tradables and nontradables, the greater is the value of omega.

Figure 4.3--Indexes of RER, RER_m, and RER_x, 1973/74-1990/91



Several other factors such as the external terms of trade, remittances of Bangladeshis living abroad, foreign aid, and the fiscal deficit are likely to influence the determination of the real exchange rate. The effect of a rise in the world price of importables relative to exportables, that is, a deterioration in the terms of trade, consists of a direct effect and an indirect effect. The price increase is reflected in an increase in the domestic price of tradables relative to nontradables. Due to substitution between imported and home goods, there is a shift in the demand for home goods that raises their price and causes an appreciation in the RER. Thus, the substitution effect on the RER of a deterioration in the terms of trade is similar to that of an import tariff. The terms of trade effect also reduces the purchasing power of exports or real income. This indirect income effect causes a decrease in the demand for home goods (and its price) and, hence, a depreciation in the RER. Though the a priori net effect on the RER is indeterminate, the income effect is likely to dominate in Bangladesh.

Remittances of Bangladeshi expatriates and workers abroad emerged as a major source of foreign exchange earnings in the 1970s. A large proportion of the remittances is expended on home goods (including nontraded services such as housing), causing their prices to rise. With world prices unchanged, this results in appreciation of the RER. Foreign aid and grants are also partly spent on home goods, causing their prices to rise, thereby appreciating the RER. However, since aid and grants accrue to the government and not the private sector, and the marginal propensity to consume home goods relative to traded goods is likely to be different, the magnitude of the effect of grants and aid on RER is also expected to be different from the effect of remittances (Dorosh and Valdés 1990).

Bangladesh's large fiscal deficit reflects government expenditures on both traded and nontraded goods. Public expenditure, which consists mainly of outlays for nontraded goods and services such as investment in infrastructure, salaries, and subsidies, raises the relative price of nontraded goods, while government expenditure on traded goods is unable to affect their prices. Government expenditures thus cause the RER to appreciate.

The RER is specified as a function of trade policy, external terms of trade, and other explanatory variables. The real exchange rate rather than the real effective exchange rate for exports was used to estimate the real exchange rate model below because neither explicit nor implicit export taxes have been sufficiently large. Thus,

$$RER = c + b_1\ LTRPOL + b_2\ LTT + b_3\ RREMIT + b_4\ RAID\ b_5\ RDEF + U$$

where

RER = real exchange rate index,
c = the unit constant,
LTRPOL = $\log\ (1 + t_m)/(1 - t_x)$,
LTT = $\log\ (P_x^w/P_m^w)$,
RREMIT = (private transfers in dollars/P_t^w)/real GDP index,
RAID = (total foreign aid plus grants to Bangladesh in U.S. dollars/P_t^w)/real GDP index,
RDEF = fiscal deficit/real GDP index,
U = random disturbance term, and
b_i = the parameters.

The RER functions were estimated using the 2SLS method to correct for possible simultaneity between the RER and some of the explanatory variables, particularly the trade policy variable. Since quarterly data were not available for Bangladesh, annual time series data from 1973/74 to 1990/91 were used in the econometric estimations. The econometric results are presented in Table 4.5. The results show that the terms of trade, remittances, and foreign aid are not important determinants of

Table 4.5--Econometric estimates of real exchange rate equations

Equation Number	C	LTRPOL	LTT	RREMIT	RAID	RDEF	DW	R^2	
(1)	-0.853	-0.4397**	-0.064	0.0001	0.00009	-0.00002***	2.21	0.88	0.83
	(0.311)	(0.1695)	(0.159)	(0.0001)	(.0001)	(0.000004)			
(2)	-0.6223	-0.491053***				-0.000021***	2.09	0.86	0.84
	(0.1185)	(0.158)				(0.0000028)			
(3)	-0.6279	-0.4871**	-0.0236			-0.00002***	2.084	0.86	0.83
	(0.1279)	(0.165)	(0.155)			(0.000003)			
(4)	-0.6183	-0.4747***		0.0001		-0.000019***	1.94	0.87	0.84
	(0.117)	(0.157)		(0.000094)		(0.0000031)			
(5)	-0.8225	-0.4708**			0.00008	-0.00002***	2.36	0.87	0.84
	(0.294)	(0.162)			(.0001)	(.000004)			

Source: Author's calculations.

Notes: All regressions were estimated using the 2SLS method with annual time series data from 1973/74-1990/91. Figures in parentheses show standard errors. Double and triple asterisks indicate significance at the 5 percent and 1 percent error probability levels, respectively.

Definitions: LTRPOL = log $(1+t_m)/(1-t_x)$,
LTT = log (P^w_x/P^w_m),
RREMIT = (private transfer in dollars/P^w_t)/real GDP index,
RAID = (total foreign aid plus grants to Bangladesh in U.S. dollars/P^w_t)/real GDP index, and
RDEF = fiscal deficit/real GDP index.

the RER. But the trade policy variable LTRPOL and the fiscal deficit both have the a priori expected signs and are statistically significant at the 5 percent or greater error probability level in all the regressions. The DW statistic lies in the inconclusive range. Reestimating the equations with correction for serial correlation even when the DW statistic lies in the inconclusive range provides a more robust test. However, in small samples such as the present case, the DW statistic is only indicative; hence, autocorrelation corrections may not be meaningful.

The parameter estimate of the trade policy variable or b_1, which lies between -0.44 and -0.49, is highly stable. Since only the trade policy variable and the share of the fiscal deficit were important determinants, equation (2) in Table 4.5 was selected as the "best" estimate of omega. Equation (2) shows that a 10 percent increase in the equivalent tariff will lead to a 49 percent appreciation of the exchange rate. The results also show that an increase in the fiscal deficit would cause the RER to appreciate.

EQUILIBRIUM EXCHANGE RATE ANALYSIS

The Omega Approach

The omega approach yields an equilibrium RER (e^*) based on the parameter omega, ϕ, which measures the incidence of the equivalent tariff $(1 + t_m)/(1 - t_x)$ on the RER. Since the parameter ϕ shows the effect of a 1 percent change in the equivalent tariff on the RER, e, it allows computation of the *free trade* equilibrium exchange rate, that is, when $t_m = t_x = 0$. The RER, the equivalent tariff, the adjustment factor (or percentage misalignment in the RER), and the equilibrium RER are shown in Table 4.6. The table shows the percentage change in the RER when the implicit tariff and export tax are zero, that is, when a free-trade equilibrium prevails. Thus, in any given year the percentage decrease in the equivalent tariff $[(1 + t_m)/(1 - t_x)]$ needed to restore equilibrium in the external sector is multiplied by $-\phi$ (which shows the effect of a 1 percent share in the equivalent tariff on the RER). This

Table 4.6--Calculation of equilibrium real exchange rate (omega approach)

Year	RER (1)	EQTARIFF (2)	$(1+T)^{-w}$ (3)	EQRER (4)
1973/74	55.244	1.967	1.394	77.008
1974/75	53.964	1.464	1.206	65.066
1975/76	92.141	1.286	1.131	104.245
1976/77	97.752	1.262	1.121	109.575
1977/78	102.029	1.209	1.098	111.987
1978/79	103.061	1.158	1.075	110.752
1979/80	107.132	1.431	1.192	127.735
1980/81	100.017	1.370	1.167	116.741
1981/82	104.554	1.275	1.127	117.804
1982/83	112.025	1.408	1.183	132.511
1983/84	104.183	1.507	1.223	127.425
1984/85	94.278	1.244	1.113	104.967
1985/86	100.000	1.255	1.118	111.800
1986/87	101.579	1.234	1.109	112.637
1987/88	100.776	1.284	1.130	113.925
1988/89	96.438	1.214	1.100	106.086
1989/90	95.942	1.127	1.061	101.760
1990/91	96.763	1.117	1.056	102.151
Average				
1973/74 to 1975/76	67.116	1.572	1.244	82.107
1976/77 to 1980/81	101.998	1.286	1.131	115.358
1981/82 to 1985/86	103.008	1.338	1.153	118.901
1986/87 to 1990/91	98.300	1.195	1.091	107.312

Source: Author's calculations.

Notes: (1) Real exchange rate index (1985/86 = 100).
(2) Equivalent tariff = $1 + T = (1 + t_m)/(1 - t_x)$.
(3) Percent misalignment in real exchange rate ($w = -0.491$).
(4) Equilibrium real exchange rate index [columns (1)*(3)].

yields the desired percentage change (depreciation) in the RER in a free-trade equilibrium.

The econometric estimate of ϕ defined earlier was -0.49. During the period preceding the move to an adjustable pegged exchange rate system (1973/74-1978/79), the average equivalent tariff was 139 percent. It decreased to 129 percent after 1978/79. Thus, removal of all trade barriers or complete trade liberalization would have resulted in a smaller depreciation of the RER in the post-1978/79 period than in the pre-adjustable pegged exchange rate period (10.7 percent compared with 14.0 percent). The average equivalent tariff declined by over 18 percent in the five-year period from 1975/76 to 1980/81 following the large devaluation of the taka in May 1975. However, implicit tariffs were high until the late 1980s despite the nominal exchange adjustment policy.

The estimated RER models shown in Table 4.6 may be used for analyzing the effects of trade and fiscal policies on the RER and for forecasting. Such analysis is, however, not within the scope of this study.

The Elasticity Approach

The elasticity approach uses the reduced form of a three-sector (exportables, importables, and nontradables) model to estimate the equilibrium real exchange rate (e^*) under free trade, which is equivalent to the equilibrium nominal exchange rate (E^*) for a given price of nontraded goods (Krueger, Schiff, and Valdés 1988). Two estimates of E^* may be obtained, depending on whether the foreign exchange market clears completely, that is, whether the current account deficit is zero or whether a current account deficit considered sustainable in the long run is assumed. The two estimates are denoted as E_1 and E_2, respectively. Estimates of the unsustainable part of the current account deficit, the implicit tariff protection to importable goods (t_m), the implicit export tax (t_x), and the demand and supply elasticities of foreign exchange are required to estimate E^*. The three-sector model of exchange rate determination yields the reduced-form solution of the equilibrium nominal exchange rate E^* as follows:

$$E^* = \left[\left(\frac{Q_0 + Q_1}{n_s Q_s + n_d Q_d}\right) + 1\right] E_0,$$

where Q_0 is the nonsustainable part of the current account deficit, Q_1 represents the excess demand for foreign exchange due to elimination of trade taxes, that is, t_m and t_x, Q_s and Q_d are the supply of and demand for foreign exchange, n_s and n_d are the elasticities of supply and demand for foreign exchange, and E_0 and E^* are the official and equilibrium nominal exchange rates that, as noted earlier, correspond to the official and equilibrium real exchange rates e_0 and e^*, respectively, for a given level of prices of nonagricultural nontraded goods.

Both the omega and elasticity approaches are similar in principle and yield comparable measures of e^* when a current account deficit considered sustainable in the elasticity approach reflects historically observed levels of capital (aid) inflows.

Using the elasticity approach, two sets of equilibrium exchange rates were calculated (Table 4.7). The first set of equilibrium exchange rates, E_1^*, is calculated with zero tariffs and no deficit in the current account. The second set, E_2^*, is computed with zero tariffs and the observed current account balance each year reflecting the assumption that observed levels of external deficit are sustainable. The exchange rate E_2^* is, therefore, more directly comparable to the RER computed using the omega approach. Remittances were added to exports in estimating the current account balance in calculating E_2^*. In both computations, the export supply elasticity is assumed to be 1 and the import demand elasticity is assumed to be −1. Figure 4.4 depicts the behavior of the equilibrium exchange rates obtained from the alternative methods.

Alternative equilibrium exchange rates along with the official exchange rate and the secondary exchange rate represented by the Wage Earner's Scheme (WES) are shown in Table 4.8. To facilitate comparison

Table 4.7--Equilibrium exchange rates (elasticity approach)

Year	$1 + t_m$	$1 - t_x$	Q	OER	E^*_1	E^*_2
			(Tk million)			
1973/74	2.761	1.404	5,571.971	7.966	15.396	12.211
1974/75	2.111	1.442	5,257.554	8.875	16.512	12.961
1975/76	1.450	1.128	4,023.301	15.054	22.969	18.667
1976/77	1.515	1.200	6,022.324	15.426	24.295	19.728
1977/78	1.497	1.239	7,763.434	15.117	24.648	19.446
1978/79	1.274	1.101	5,677.678	15.223	22.214	17.829
1979/80	1.460	1.020	9,198.648	15.490	23.955	18.838
1980/81	1.441	1.052	10,774.213	16.259	24.546	19.761
1981/82	1.362	1.069	11,640.921	20.065	29.984	23.983
1982/83	1.451	1.031	15,048.337	23.795	32.116	28.373
1983/84	1.659	1.101	23,485.124	24.944	36.051	31.704
1984/85	1.542	1.239	31,427.327	25.963	40.804	33.599
1985/86	1.341	1.069	18,914.005	29.886	40.122	35.128
1986/87	1.240	1.004	13,493.341	30.629	37.002	33.947
1987/88	1.316	1.025	23,561.361	31.242	41.044	35.920
1988/89	1.241	1.022	19,912.159	32.142	41.012	36.030
1989/90	1.204	1.068	22,463.170	32.921	43.325	37.097
1990/91	1.177	1.054	22,149.066	35.690	48.998	39.742

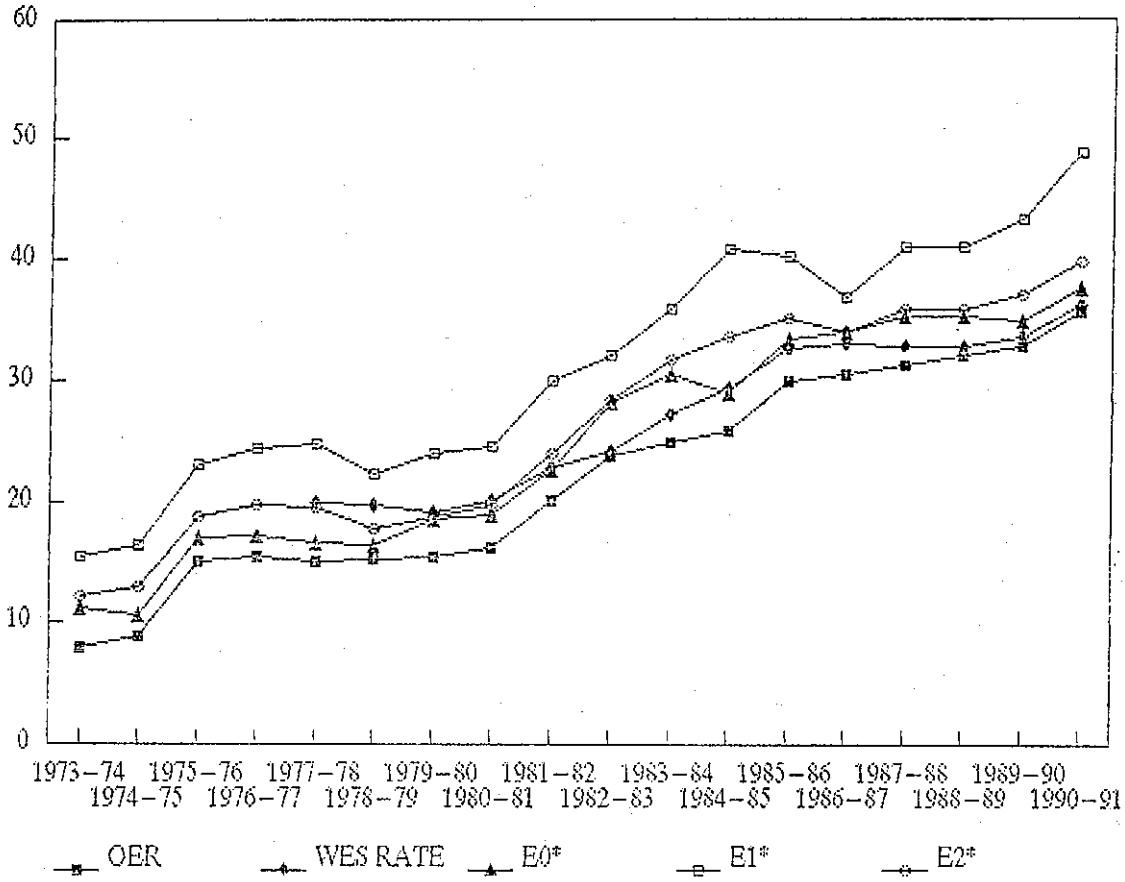
Source: Author's calculations.

Definitions: Q = Current account imbalance due to trade taxes and quotas
$= [t_m/1 + t_m] \cdot m \cdot n_d - [t_x/(1 - t_x) \cdot (x + \text{remit})] \cdot e_x$. Here $n_d = -1$, $e_x = 1$.

$E_1^* = E \cdot \{(\text{Current Account Deficit} + Q)/[M \cdot n_d + (X + \text{Remit}) \cdot e_x] + 1\}$.

$E_2^* = E \cdot [Q/(M \cdot n_d + (X + \text{Remit}) \cdot e_x) + 1]$.

Figure 4.4--Alternative exchange rates, 1973/74-1990/91



with the equilibrium exchange rates calculated using the elasticity approach, the equilibrium RER calculated using the omega approach is expressed as a nominal exchange rate in Table 4.8. If the price of nontradables is unchanged through adjustment of monetary policy, the calculated percentage change in the RER is equal to the percentage change in the nominal exchange rate (Dorosh and Valdés 1990). Figure 4.4 depicts the intertemporal behavior of the equilibrium exchange rates obtained from the alternative methods.

Movements of the equilibrium exchange rates using both approaches are similar. As expected, the equilibrium exchange rate using the omega parameter, E_0^*, and that using the elasticity approach assuming that the observed current account deficit is sustainable in the long run, E_2^*, are much closer than E_0^* and E_1^*, which assumes free trade and equilibrium in the current account. The secondary market exchange rate, WES, was generally closer to the equilibrium exchange rate based on the omega approach, but it was not available before 1977/78 because the scheme was not in existence until then. It was closest to E_2^* on average in the last

Table 4.8--Comparison of official, wage earners', and equilibrium exchange rates

Year	OER (1)	WES Rate (2)	E_o (3)	E^*_1 (4)	E^*_2 (5)	((1-3)/3)*100 (6)	((1-5)/5)*100 (7)	((2-3)/3)*100 (8)	((2-5)/5)*100 (9)
1973/74	7.966	11.105	15.396	12.211	-28.263	-34.758			
1974/75	8.875	10.701	16.512	12.961	-17.063	-31.523			
1975/76	15.054	17.032	22.969	18.667	-11.612	-19.355			
1976/77	15.426	17.292	24.295	19.728	-10.790	-21.808			
1977/78	15.117	19.860	16.592	24.648	19.446	-8.892	-22.264	19.695	2.127
1978/79	15.223	19.680	16.359	22.214	17.829	-6.944	-14.617	20.300	10.380
1979/80	15.490	19.210	18.469	23.955	18.838	-16.129	-17.774	4.013	1.973
1980/81	16.259	20.110	18.977	24.546	19.761	-14.326	-17.723	5.969	1.767
1981/82	20.065	22.790	22.608	29.984	23.983	-11.248	-16.336	0.805	-4.974
1982/83	23.795	24.120	28.147	32.116	28.373	-15.460	-16.134	-14.306	-14.989
1983/84	24.944	27.160	30.508	36.051	31.704	-18.240	-21.324	-10.975	-14.334
1984/85	25.963	29.380	28.907	40.804	33.599	-10.184	-22.725	1.636	-12.556
1985/86	29.886	32.740	33.413	40.122	35.128	-10.555	-14.922	-2.013	-6.798
1986/87	30.629	33.080	33.964	37.002	33.947	-9.817	-9.773	-2.602	-2.555
1987/88	31.242	32.940	35.318	41.044	35.920	-11.541	-13.022	-6.734	-8.296
1988/89	32.142	32.910	35.358	41.012	36.030	-9.094	-10.790	-6.923	-8.659
1989/90	32.921	33.580	34.918	43.325	37.097	-5.717	-11.256	-3.831	-9.481
1990/91	35.690	36.380	37.677	48.998	39.742	-5.274	-10.196	-3.443	-8.460
Average									
1973/74, 1975/76	10.6319	12.9460	18.2923	14.6128	-18.9792	-28.5454			
1976/77, 1980/81	15.5029	19.7150	17.5378	23.9316	19.1207	-11.4162	-18.8375	12.4942	4.0615
1981/82, 1985/86	24.9307	27.2380	28.7166	35.8154	30.5574	-13.1371	-18.2881	-4.9709	-10.7302
1986/87, 1990/91	32.5251	33.7780	35.4470	42.2762	36.5472	-8.2888	-11.0075	-4.7066	-7.4900

Sources: (1), (2): Bangladesh Bank, Economic Trends (Dhaka: Bangladesh Bank, various issues); (3): see Table A4.1, Appendix 4; (4) and (5): see Table 4.7.

Notes: OER is the official exchange rate. WES rate is the secondary foreign exchange market rate. The rate was not available before 1977/78 since the scheme was not in existence prior to this year.

five-year period shown in Table 4.8. The misalignment of the WES rate decreased to nearly zero in 1981/82 but then increased significantly in the next two years. The WES rate, however, was above the equilibrium exchange rate, E_2^*, until 1981/82 and again in 1984/85.

The official exchange rate was consistently overvalued, but the overvaluation decreased over time. Trade liberalization since 1988/89 has therefore reduced the exchange rate misalignment.

5. MEASURING THE IMPACT OF POLICIES ON ECONOMIC INCENTIVES

ANALYTICAL FRAMEWORK

Direct Effects of Trade and Pricing Policies on Output Prices

The basic analytical approach of this study follows that of Krueger, Schiff, and Valdés (1988). Border prices are commonly used as reference prices in measuring the impact of direct price interventions or sector-specific pricing policies. This is because it is assumed that most agricultural commodities are traded goods, either exportables or import-substituting goods, and that the market share of an individual trading country in world trade is negligible, that is, these countries are price takers in world markets. However, border prices must be adjusted for marketing costs, including handling, transport, and storage, quality differentials, and other factors. In unregulated markets, therefore, the producer price for exportables would be related to the border prices as follows:

$$P_i = P_i^w E_0 (1 - t_i) - C_i, \quad (1)$$

where P_i = producer price, P_i^w = world price at the border (f.o.b.) in foreign currency, E_0 = nominal official exchange rate, t_i = export tax or subsidy depending on whether $t_i \gtrless 0$, and C_i = adjustment for differences in quality, location (transport), time (storage), and other marketing costs. The export tax may be explicit or implicit when export quotas exist or when output is procured below market prices, and so forth.

When there is no intervention in the market, the producer price bears the following relationship to the border price:

$$P_i = P_i^w E_0 - C_i, \quad (2)$$

where C_i represents all components of the marketing margin as in C_i above but is now measured under free-trade conditions.

For importables, the relationship between the domestic producer price and the world border price would be

$$P_j = P_j^w E_0 (1 + t_j) + C'_{md} - C'_{jd}, \quad (3)$$

and in the absence of direct intervention,

$$P_j' = P_j^w E_0 + C_{jm}' - C_{jd}, \tag{4}$$

where P^w = foreign currency border (c.i.f) price, C_{jm}' represents the marketing margin from the port of entry to the wholesale market, and C_{jd}' represents the components of the marketing spread between the wholesale market to the farmgate.

Though explicit tax and subsidy rates exist, the nominal protection rate may differ from those rates because of concessions, quantitative restrictions, and the like. It is, therefore, of interest to compute the implicit nominal protection rates t_i and t_j through direct price comparisons. The hypothetical free trade prices P_i' and P_j' must be computed from the border prices P_i^w and P_j^w after adjustment for C_i' and C_j'. The adjustment yields border (export and import) parity prices that may be compared with the domestic prices at various points in the marketing chain such as the wholesale market, millgate, and farmgate.

The nominal rate of protection (NRP) measures the direct effect on output prices of agricultural trade and output price policies including trade taxes, quotas, marketing and processing subsidies, price supports, and government monopolies on trade, if any. The NRP of agricultural commodity i is given by

$$NRP = \frac{P_i/P_{na} - P'_i/P_{na}}{P'_i/P_{na}} = \frac{P_i - P'_i}{P'_i} = \frac{P_i}{P'_i} - 1. \tag{5}$$

The NRP on good i, therefore, measures the direct effects of trade and pricing policies on output price by comparing actual domestic prices with free-trade prices that would prevail in the absence of government intervention. P_{na} represents the nonagricultural price index.

Trade policies for the nonagricultural sector and real exchange rate policies affect agricultural prices relative to nonagricultural prices, that is, P_i/P_{na}. The nonagricultural price index consists of a traded and a nontraded component:

$$P_{na} = \alpha P_{nat} + (1 - \alpha)P_{nah}, \tag{6}$$

where P_{nat} and P_{nah} are the price indexes of traded and nontraded nonagricultural commodities, respectively.

Indirect and Total Effects of Policy Interventions

The indirect nominal protection rate is given by

$$NRP_I = \frac{P'_i/P_{na}}{P_i^*/P_{na}^*} - 1 = \frac{P'_i/P_{na}}{(E^*/E_0)P_i/P_{na}^*} - 1 = \frac{E_0}{E^*} \cdot \frac{P_{na}^*}{P_{na}} - 1. \qquad (7)$$

P_i^* and P_{na}^* represent the free-trade equilibrium values of P_i and P_{na} evaluated at the equilibrium exchange rate. The indirect nominal protection rate measures the effect of misalignment of the exchange rate E_0 from E^* and the effects of trade policies (protection) on P_{nat}, that is, the tradable component of the nonagricultural price index and, hence, appreciation of the real exchange rate. The NRP_I represents economy-wide effects. It is common to all tradable agricultural commodities and does not pertain to the individual commodity under consideration.

The total nominal rate of protection may be defined as follows:

$$NRP_T = \frac{P_i/P_{na}}{P_i^*/P_{na}^*} - 1. \qquad (8)$$

Thus, NRP_T measures the combined effects of sectoral and economywide price, trade, and exchange rate interventions on agricultural commodities. The total effect on output prices is, therefore, the NRP adjusted for sectoral and economy-wide policies (Dorosh and Valdés 1990). Since the denominator of NRP as stated in equation (5) above is different from that of NRP_I and NRP_T, the sum of NRP and NRP_I does not yield NRP_T. To make these measures comparable and additive, the definition of NRP may be modified as follows:

$$NRP_D = \frac{P_i/P_{na} - P'_i/P_{na}}{P_i^*/P_{na}^*}, \qquad (9)$$

which measures the impact of direct output price and trade policies as a percentage of the relative price that would prevail in a free-trade regime under an equilibrium exchange rate.

ESTIMATES OF THE EFFECTS OF TRADE AND EXCHANGE RATE POLICIES ON OUTPUT PRICES

Estimates of the direct effect or nominal rates of protection and indirect effects of trade and exchange rate policies on prices of

agricultural commodities are presented in this section. International reference prices, that is, world prices, are either import parity or export parity prices depending on whether the commodity is an importable or exportable. However, when the share of import or export is 10 percent or less of total production, the average of the two parity prices has been used as the reference price. Producer prices are annual average farmgate prices. See Appendix 2 for details of the computations.

Rice

It is somewhat difficult to arrive at a reference price for rice because of quality differences between internationally traded rice and domestic rice produced in Bangladesh. The bulk of rice produced in Bangladesh, that is, the coarse variety, is of a relatively low quality. In determining a comparable internationally traded grade of rice, we relied on assessments of private traders. Discussions with them suggested that Bangladeshi coarse rice is markedly superior to the internationally traded 25 percent broken Thai variety--consumer preference for the domestic coarse rice is strong. Traders also suggested that the mainly 15 percent broken Thai rice imported through the public international procurement system is inferior to domestic coarse rice, and they would not import it in a free-trade regime. However, an IFPRI rice market survey (1992) has shown that domestic aman coarse rice consists mainly of 14 percent broken. We have therefore chosen Thai 15 percent broken rice as the reference grade for comparison with domestic coarse rice. However, the international price of 15 percent broken Thai rice was not available, so the price of 5 percent and 25 percent broken Thai rice was averaged to represent the price of 15 percent broken Thai rice in the present study. This may be viewed as a downward quality adjustment on the 5 percent broken Thai rice to make it comparable to domestic coarse rice.

As Bangladesh has been a marginal rice importer, the import parity price appears to be the relevant world reference price. The nominal rate of protection is significantly negative at the import parity price. Out of the 18 years for which protection rates are shown in Table 5.1, the NRP was negative in 13. In the famine year 1974/75, the domestic price increased 75 percent over the previous year. Excluding this year as an abnormal year, average NRP was −26.5 percent, which reflects the nominal protection to rice more accurately in the period 1973/74-1975/76. At −26.3 percent, the direct effect of trade and agricultural price policies on rice prices was highest from 1976/77 to 1980/81. However, because of lower world rice prices from 1981/82 to 1985/86, average direct nominal protection was virtually zero. A sharp increase in domestic producer price in 1986/87 resulted in a direct NRP of 15 percent, the highest excluding 1974/75. Since then, however, the direct effect of trade and price policies has been consistently and significantly negative. Average nominal protection from 1986/87 to 1990/91 was −10.3 percent.

Table 5.1--Direct and total nominal rates of protection to producers of agricultural commodities

Commodity		Average 1973/74 to 1975/76	1976/77 to 1980/81	1981/82 to 1985/86	1986/87 to 1990/91
Rice 15%	NRP	0.035	-0.304	-0.007	-0.113
Import parity	NRP D	0.036	-0.263	-0.005	-0.103
	NRP T	-0.187	-0.389	-0.149	-0.194
Rice 15%	NRP	0.563	-0.067	0.618	0.402
Export parity	NRP D	0.427	-0.054	0.510	0.351
	NRP T	0.167	-0.199	0.328	0.233
Rice 15%	NRP	0.244	-0.203	0.229	0.086
Average parity	NRP D	0.196	-0.173	0.194	0.076
	NRP T	-0.042	-0.307	0.035	-0.025
Wheat U.S.	NRP	0.529	-0.095	-0.032	0.101
Import parity	NRP D	0.394	-0.083	-0.026	0.093
	NRP T	0.167	-0.210	-0.170	0.003
Rapeseed oil	NRP	1.655	0.790	0.690	0.781
Import parity	NRP D	1.397	0.714	0.624	0.737
	NRP T	1.222	0.620	0.522	0.681
Rapeseed	NRP	1.371	0.366	0.278	1.014
Import parity	NRP D	1.029	0.314	0.238	0.910
	NRP T	0.783	0.177	0.085	0.806
Sugar	NRP	0.089	0.748	2.237	1.500
Import parity	NRP D	0.094	0.666	1.975	1.390
	NRP T	-0.113	0.552	1.854	1.313
Sugarcane	NRP	0.027	0.982	18.568	27.983
Import parity	NRP D	0.046	0.779	3.688	6.081
	NRP T	-0.236	0.569	3.113	5.642
Cotton	NRP	-0.748	-0.823	-0.483	0.051
Import parity	NRP D	-0.575	-0.716	-0.405	0.042
	NRP T	-0.806	-0.845	-0.555	-0.058
Lentils	NRP		-0.425	-0.255	-0.096
Import parity	NRP D		-0.370	-0.220	-0.090
	NRP T		-0.498	-0.367	-0.184
Potatoes	NRP	-46.439	8.633	2.699	1.707
Export parity	NRP D	29.438	4.705	1.733	1.343
	NRP T	27.171	4.373	1.440	1.161
Potatoes	NRP	0.310	-0.262	-0.428	-0.333
Import parity	NRP D	0.233	-0.224	-0.370	-0.308
	NRP T	0.016	-0.345	-0.507	-0.393

(continued)

Table 5.1--Continued

		Average			
		1973/74 to 1975/76	1976/77 to 1980/81	1981/82 to 1985/86	1986/87 to 1990/91
Potatoes	NRP	1.653	0.298	-0.054	0.053
Average parity	NRP D	1.156	0.267	-0.043	0.042
	NRP T	0.883	0.119	-0.207	-0.064
Jute	NRP	-0.194	-0.219	-0.210	-0.308
Export parity	NRP D	-0.151	-0.188	-0.178	-0.277
	NRP T	-0.414	-0.336	-0.344	-0.387
Dry chilies	NRP	0.783	0.052	0.291	0.409
Import parity	NRP D	0.584	0.038	0.225	0.370
	NRP T	0.358	-0.089	0.081	0.280
Onion	NRP	0.441	0.057	0.036	0.031
Import parity	NRP D	0.349	0.046	0.044	0.022
	NRP T	0.151	-0.071	-0.090	-0.062
Tea	NRP	0.717	-0.103	-0.228	-0.170
Export parity	NRP D	0.485	-0.088	-0.187	-0.155
	NRP T	0.221	-0.228	-0.344	-0.261
Total agriculture	NRP	0.1136	-0.1965	-0.0369	-0.0967
	NRP D	0.0900	-0.1756	-0.0308	-0.0889
	NRP T	-0.1368	-0.3076	-0.1763	-0.1814

Source: Author's calculations.

Note: Total agriculture is a weighted average of nominal rates of protection of importables and exportables. The weights are the relative value shares of production:

Weights (percent)	1974-76	1977-81	1982-86	1987-90
Rice	81	78	75	79
Wheat	1	3	8	5
Masur	1	2	1	2
Rape & mustard	4	4	3	2
Onion	1	1	1	1
Chilies	2	2	1	1
Jute	5	8	8	5
Cotton	0.003	0.004	0.05	0.06
Tea	1	2	1	1
Potatoes	4	3	3	4

Nominal rates of protection for sugarcane are excessively large owing to very large processing margins in the parity price calculations. Including sugarcane (weight 4.5 percent) gives a misleading picture of the incentive structure in agriculture as a whole. Sugarcane is thus excluded in the weighted average nominal rate of protection computed for the agriculture sector.

Including the indirect effects of economy-wide exchange rate and trade policies in the manufacturing sector yields a much lower nominal protection rate; that is, the direct effect is accentuated when protection is negative and reduced when protection is positive and the indirect effects are included. Thus, the total effect of trade and exchange rate policies was to depress the domestic price of rice below its corresponding free-trade equilibrium border prices by 15-19 percent in the 1980s and 19-39 percent in the 1970s.

A recent study by the World Bank uses an f.o.b. Thailand price of rice of only US$150 per ton[1] (World Bank 1991). Such a low price compares with the price of Thai A1 super grade, a vastly inferior grade of rice even when compared with Thai 25 percent broken rice. Such a low reference price would of course suggest that domestic rice production was being protected and that trade liberalization would cause domestic prices to decline, clearly establishing rice as an importable. On the supply side, a decline in the relative price of rice would induce diversification away from rice. However, this result depends critically on the assumed reference price. A price of US$150 per ton is unrealistically low. Any f.o.b. price below US$250 per ton appears to be unrealistic. At this f.o.b. price the border parity price still would indicate negative protection.

Using the import parity price as the reference price assumes that incremental rice production will substitute for imports. Imports are a very small proportion of total rice production (only 2 percent as shown earlier), so the export parity price was also computed, since the country could be a rice exporter in any given year simply due to weather-induced supply fluctuations. However, with wheat production declining in the 1980s, incremental rice production would substitute for foodgrain imports. Interestingly, the domestic price has always been between the import and export parity prices, as shown in Figures 5.1 and 5.2. Thus, in free-trade equilibrium the market-clearing price would lie between the import and export parity price. The width of the band given by the two parity prices is also very large, implying that rice is effectively a nontraded good, hence trade liberalization will not alter domestic prices. In these cases, however, the average of the two border parity prices has often been used as an approximation of the free-trade equilibrium price.

Using the average of the import and export parity price as the world price that would prevail under free trade, the average direct effect of trade and agricultural price policies in the most recent five-year period (1986/87-1990/91), was estimated at 7.6 percent. Including the indirect effects of appreciation of the real exchange rate alters the direction of the nominal protection rate and yields a total nominal protection of −2.5 percent in the 1980s. Thus, rice production has been implicitly taxed by indirect policy interventions aimed at exchange rate management and protection to the nonagriculture sector. Domestic real

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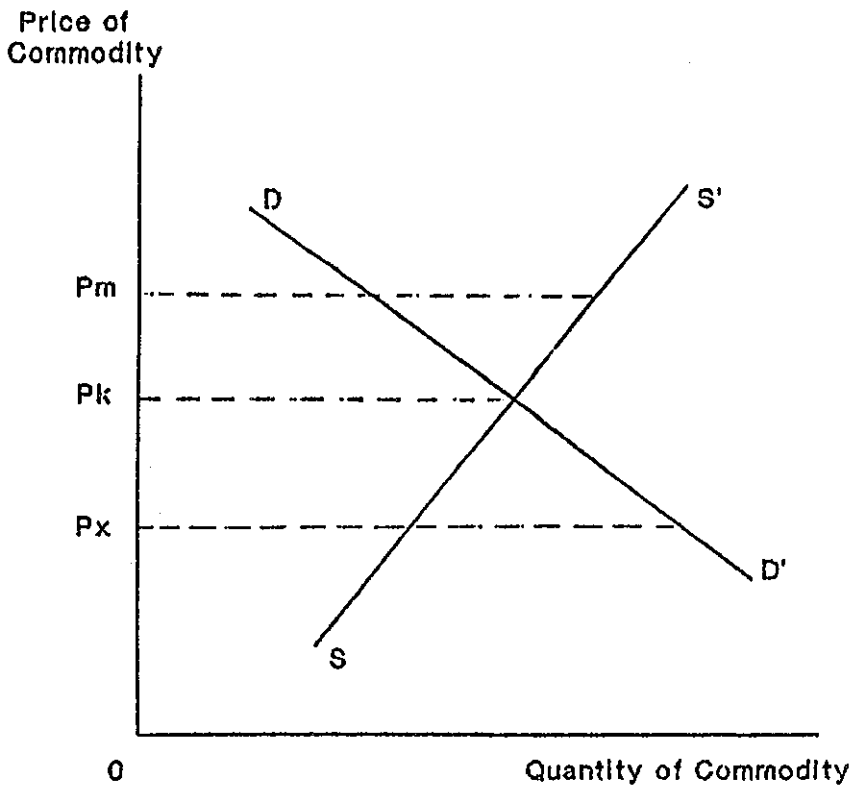
[1] All tons in this study are metric tons.

Figure 5.1--Comparison of export and import parity prices in domestic market



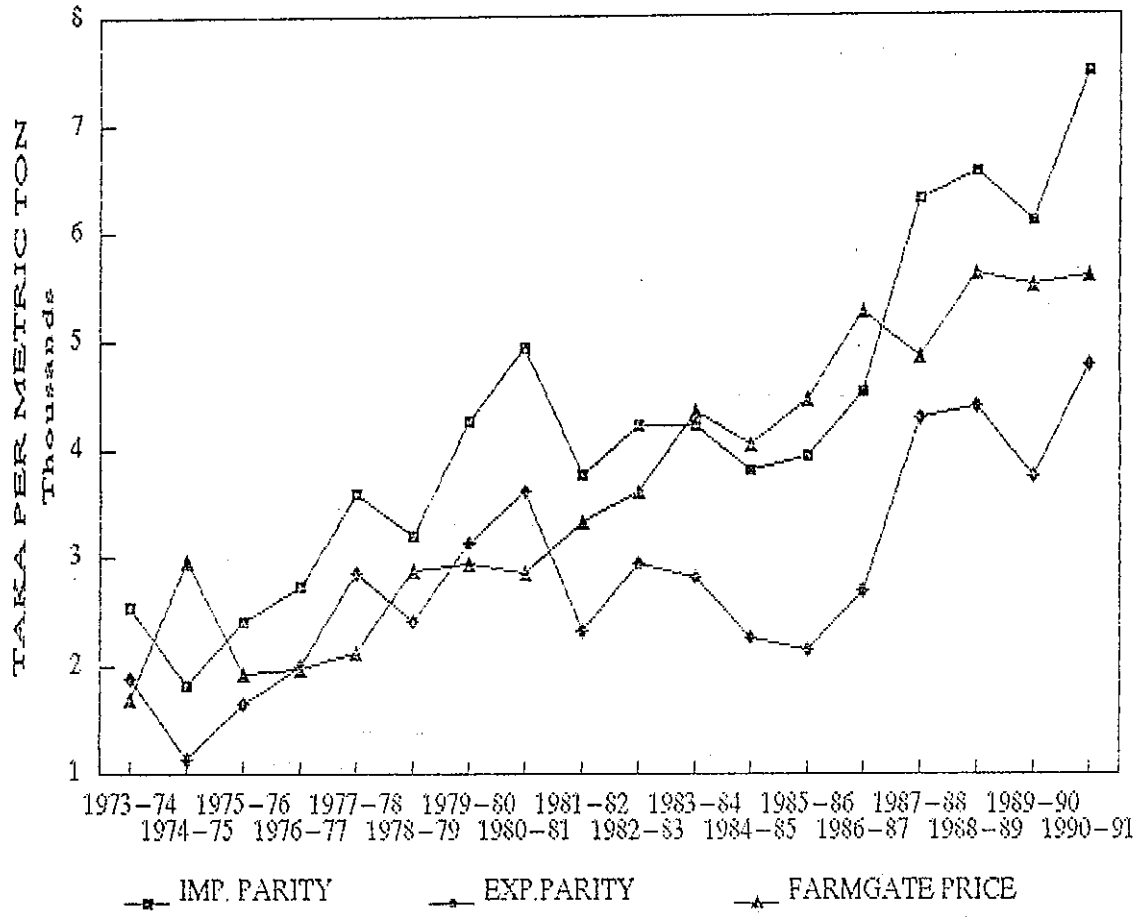
Pm=Import Parity Price; Pk=Domestic Market Price; Px=Export Parity Price

paddy prices received by farmers were therefore 97.5 percent of their corresponding free-trade equilibrium real prices on average between 1986/87 and 1990/91.

Wheat

The foodgrain deficit of the country has historically been made up mainly through wheat imports. Wheat is clearly an importable, and domestic production substitutes for imports. The government has operated a procurement program since 1975/76 to purchase wheat from farmers for distribution through the food rationing system. However, the program has not been large enough to influence grower-level prices. Instead, market demand and supply appear to have determined the country's wheat prices. Thus, farmgate prices have been used as the domestic producer prices, and the U.S. hard winter wheat price has been used as the world wheat price. The Canadian Red Spring wheat price has been significantly higher in the period under consideration in this study and is therefore less

Figure 5.2--Rice prices, 1973/74-1990/91



likely to be imported in a free-trade regime. The direct effect of price and trade policies on wheat prices received by farmers has declined over time, reflecting a greater increase in domestic prices as compared with world prices. It was -8.3 percent from 1976/77 to 1980/81, -2.6 percent from 1981/82 to 1985/86, and then turned positive, averaging 9.3 percent from 1986/87 to 1990/91. Out of the 18 years for which the analysis was undertaken, the direct effect was negative in 11 years and positive only in the other 7. Thus, the border parity price of wheat at the farmgate measured at the official exchange rate has mostly remained above the domestic producer price. Including the indirect effects of economy-wide exchange rate and commercial policies yields significantly negative total nominal protection in all but three years. The total nominal

protection rate for wheat declined sharply from -21 percent during 1981/82-1985/86 to -0.3 percent during 1986/87-1990/91 (Figure 5.3).

Oilseeds and Edible Oil

Edible oil and oilseeds are among Bangladesh's largest imports. Mustard seed is the major variety of oilseed produced in Bangladesh, and mustard oil extracted from this seed is the major edible oil produced in the country. However, only rapeseed and rapeseed oil, close substitutes for mustard seed and oil, are internationally traded. Bangladesh imports both rapeseed and rapeseed oil (Figures 5.4 and 5.5). Thus, edible oil producers may use either imported seeds or domestically produced oilseeds in the local oil mills. The direct and total nominal protection

Figure 5.3--Wheat prices, 1973/74-1990/91

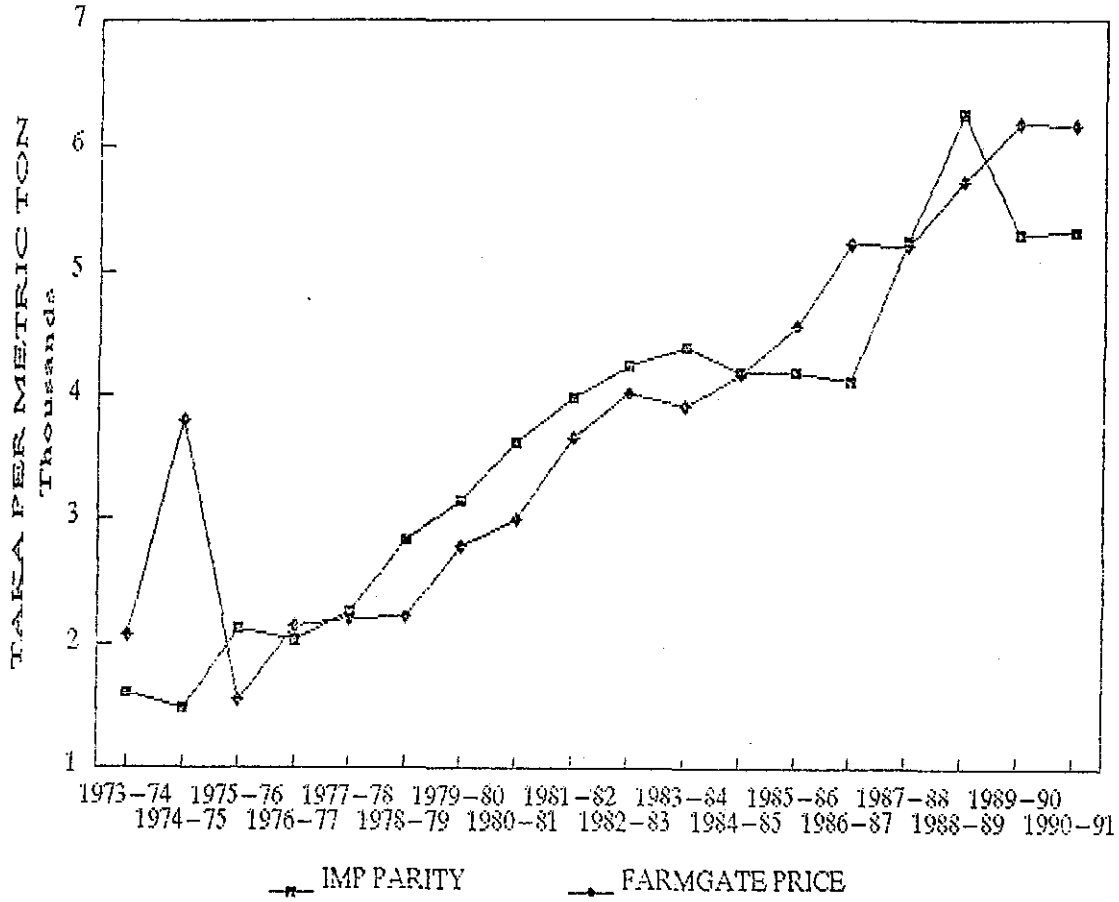
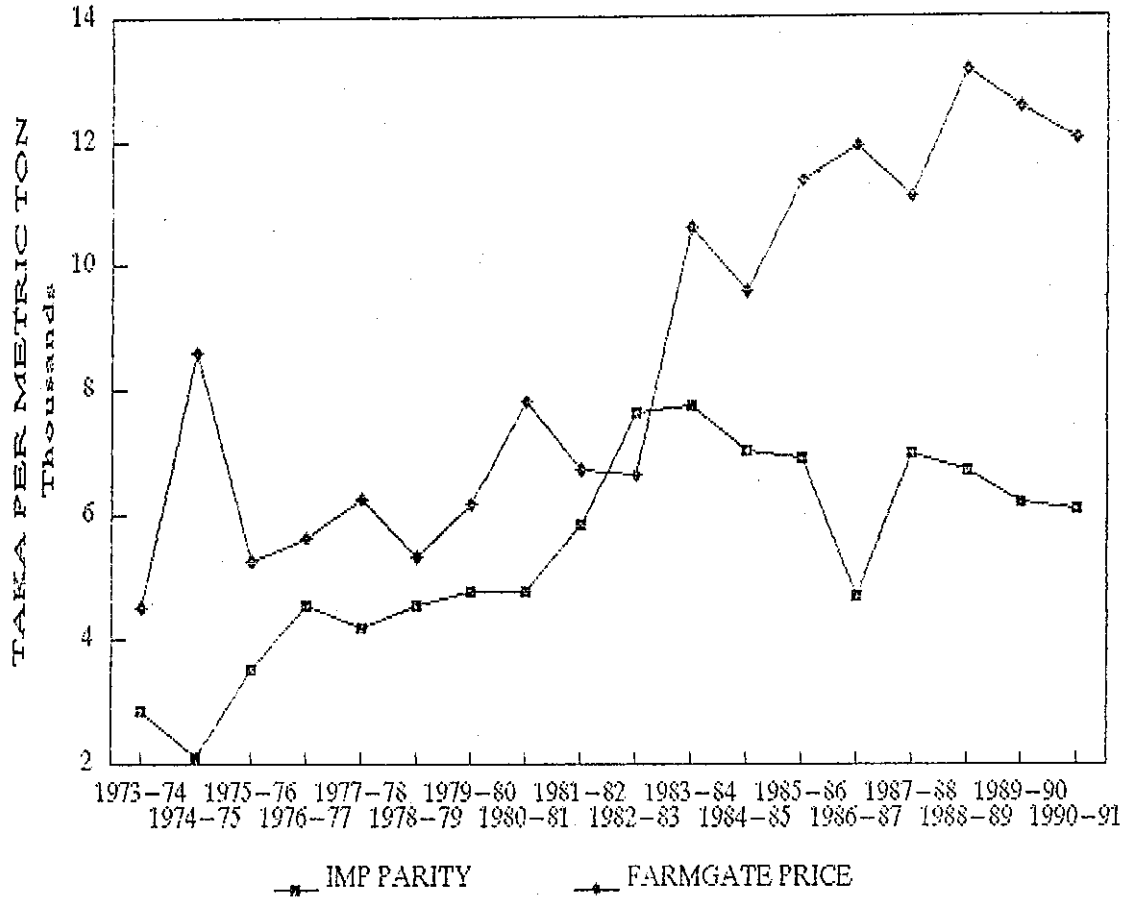


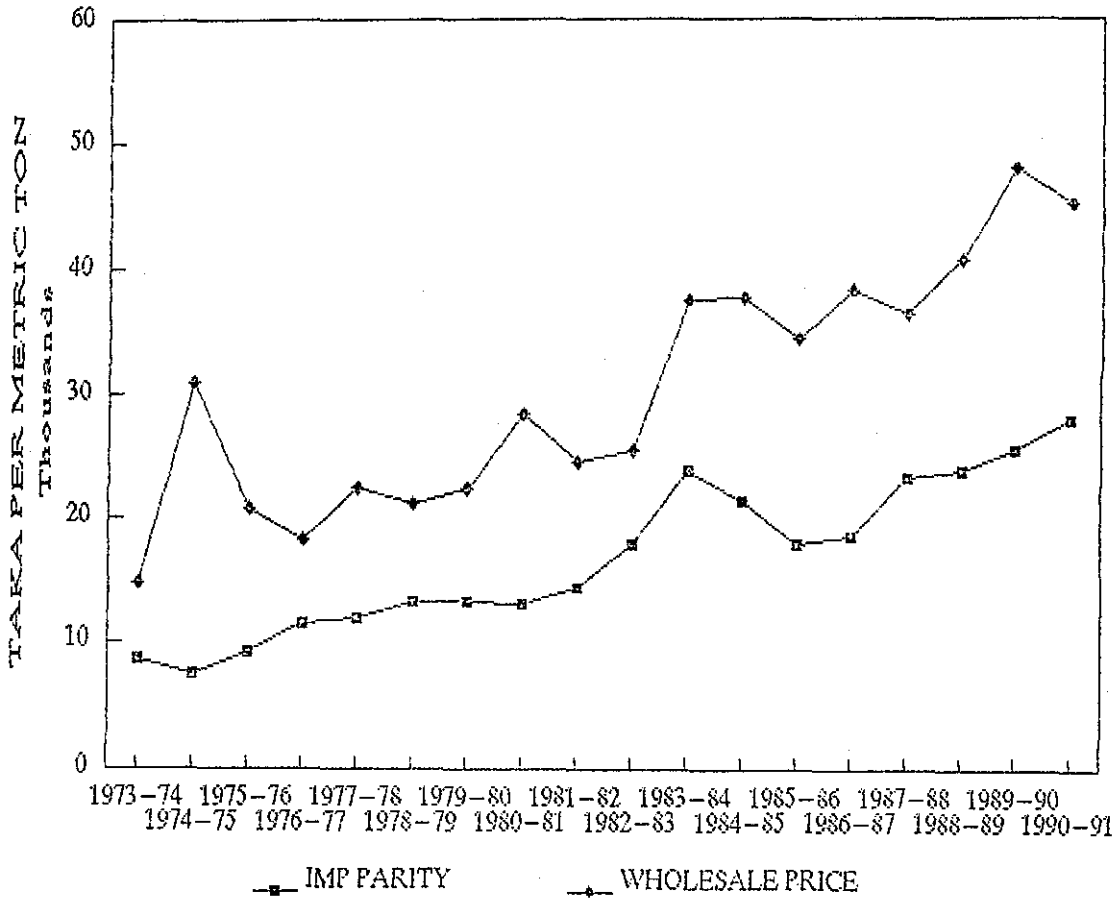
Figure 5.4--Rapeseed prices, 1973/74-1990/91



for domestic mustard seed and oil was computed using the international prices of rapeseed and rapeseed oil as the reference prices. Oilseed production in Bangladesh has been highly protected with a direct nominal protection rate of 91 percent in the most recent five-year period, 1986/87-1990/91. Thus, the border parity price at farmgate was only half the domestic producer price in this period. The direct effect, however, was between 20 and 30 percent on average from 1976/77 to 1985/86. The indirect effects of economy-wide exchange rate and commercial policies were negative, which significantly reduced the protection rate. Including these effects, the average total nominal protection rate was 80.6 percent in the five-year period from 1986/87 to 1990/91.

The direct effect of agricultural price and trade policies pertaining to edible oil production was to keep the domestic wholesale price of mustard oil an average of 73.7 percent above its border price measured at wholesale from 1986/87 to 1990/91. However, this nominal

Figure 5.5--Rapeseed oil prices, 1973/74-1990/91



protection rate decreases to 68.1 percent when indirect effects are included.

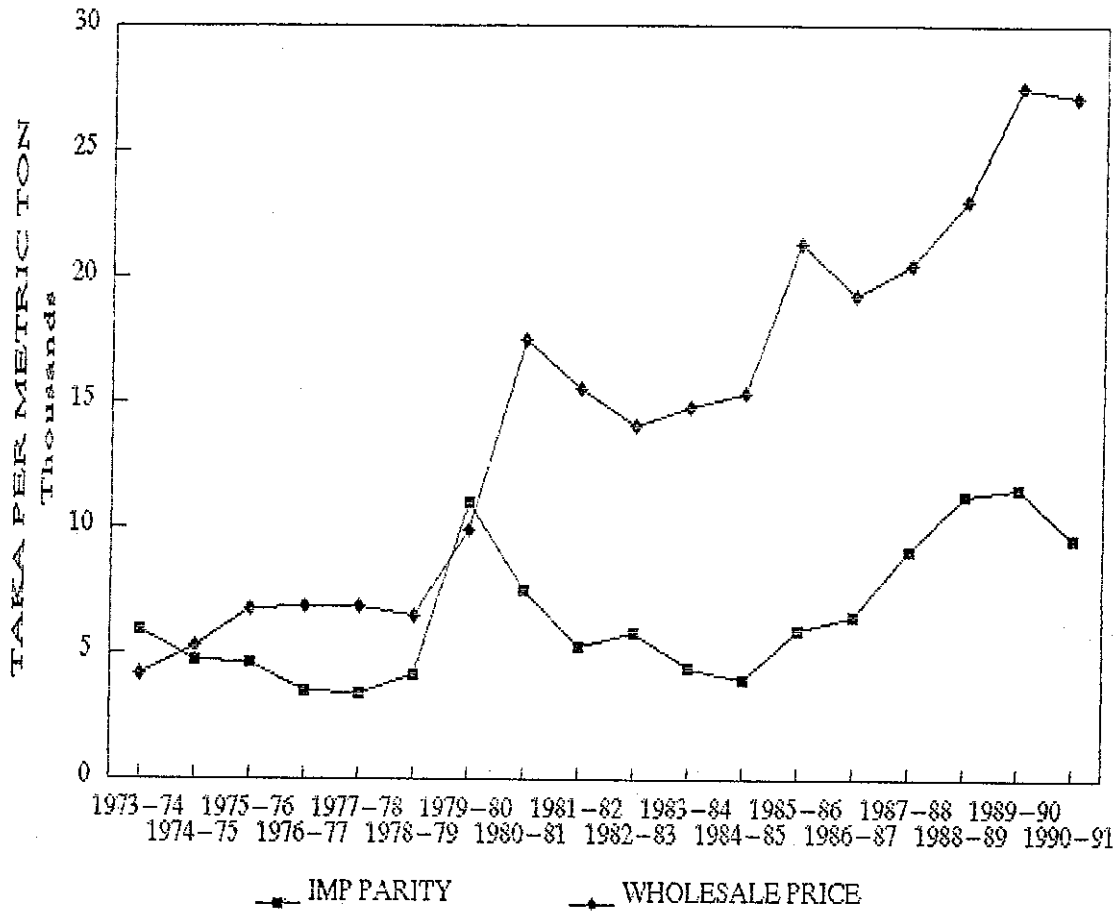
Sugar/Sugarcane

The direct effect of government policies resulted in extremely high rates of direct nominal protection to sugar. The highest average direct effect was 197.5 percent from 1981/82 to 1985/86 and declined to an average of 139 percent from 1986/87 to 1990/91. Although there is great variability in the world sugar price, nominal protection to sugar has been consistently high except during 1973/74 and 1979/80 when world sugar prices were highest. But the negative signs in the the rate of direct protection in 1984/85 require interpretation. A low world price in that year yields a negative border parity price for sugarcane at farmgate. The negative sign is therefore due to the denominator. The

direct nominal protection rate in 1984/85 should thus be treated as being *infinitely* high.

World sugarcane prices were computed by making adjustments for milling costs, extraction rates, and so forth (details of the calculations are given in Appendix 2). The direct protection provided to sugarcane in the five-year period from 1986/87 to 1990/91 was 608.1 percent. The variability of world sugar prices is reflected in the implicit protection rates to sugarcane production. Thus, the direct nominal protection rates were 320 percent from 1981/82 to 1985/86, 58 percent from 1976/77 to 1980/81, and 3 percent before 1976/77. By including the indirect effects in the most recent five years, domestic wholesale sugar prices and farmgate sugarcane prices were 131.0 percent and 564.2 percent above their free-trade equilibrium border parity prices (Table 5.1 and Figure 5.6).

Figure 5.6--Sugar prices, 1973/74-1990/91



Cotton

Bangladesh mostly imports cotton with staple lengths of 1-1/32 and 1-1/16 inches. Domestically produced cotton is superior to the imported grades. The international price of cotton with a staple length of 1-1/16 inches was used as the international reference price, but no quality adjustment was made. The import parity price of cotton at the farmgate was above the domestic farmgate price in 13 out of the 18 years shown in Table 5.1. Until 1984/85 direct nominal protection was negative in each year, ranging from –48 percent to –76 percent. Since then it has been negative only in 1990/91. The direct nominal rate of protection was only 4.2 percent on average between 1986/87 and 1990/91. However, the effect of economy-wide exchange rate and commercial policies offset the direct protection, resulting in a total nominal protection rate of –5.8 percent. Thus, the domestic real farmgate cotton price was 94.2 percent of the free-trade equilibrium real border price of cotton measured at the farmgate on average in the five-year period ending in 1990/91. In interpreting the results for cotton shown in Table 5.1, it is important to note that, since the cotton textile sector was almost completely state-owned a low procurement price was fixed (administered pricing) for BTMC purchases of raw cotton from farmers. After privatization, administered pricing was withdrawn in 1985/86. Thus, the average direct nominal protection rate was –64.3 percent from 1973/74 to 1984/85 (the administered pricing period) but increased sharply to 11.5 percent from 1985/86 to 1990/91 (Figure 5.7).

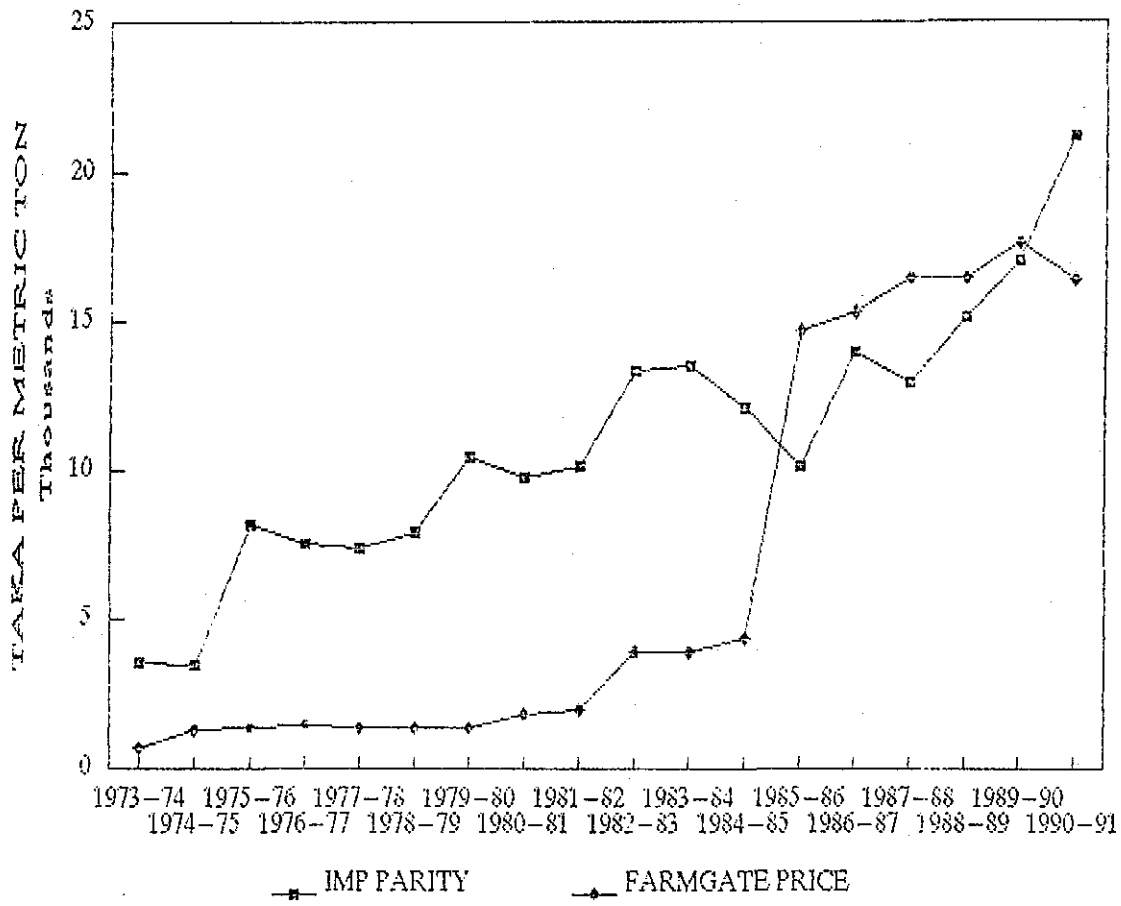
Pulses

Masur and khesari are the most important pulse varieties produced and consumed in Bangladesh. Only masur is closely comparable to internationally traded Turkish lentils. Turkish prices of lentils were therefore used in the parity price calculations. Protection accorded to masur through direct policy interventions has been consistently negative except in 1987/88 but appears to have increased over time from an average of –37 percent in 1976/77-1980/81 to –22 percent in 1981/82-1985/86 and further to –9 percent in 1986/87-1990/91. However, domestic farmgate prices were only 81.6 percent of the corresponding free-trade equilibrium border prices of lentils on average during 1986/87-1990/91 as implied by the total nominal protection rate of –18.4 percent (Figure 5.8).

Potato

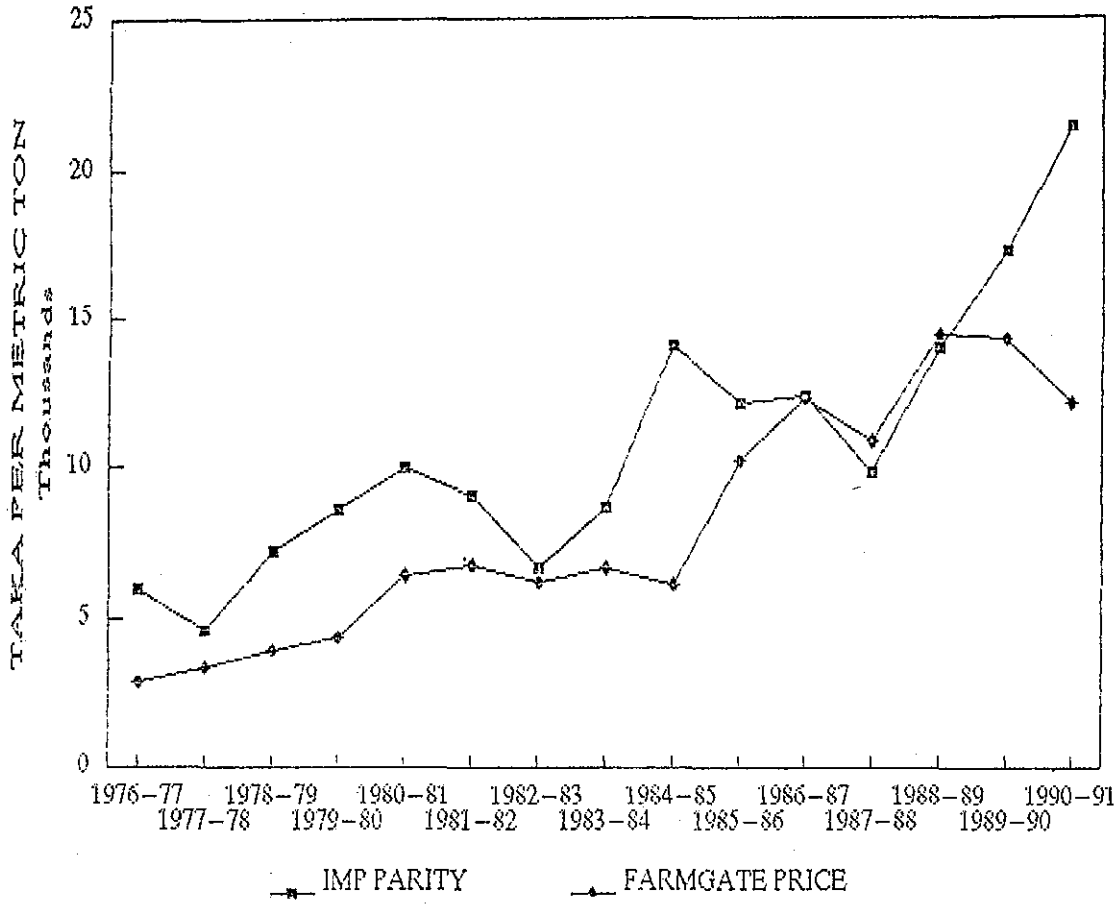
Bangladesh is self-sufficient in potato production, but production instability induced mainly by weather shifts causes periods of scarcity and surplus that alter Bangladesh's potential trade status in this commodity. Except for the period 1973/74-1975/76 and 1978/79, when both the import and export parity prices were below domestic producer prices, the latter has been between the two border parity prices. In calculating

Figure 5.7--Cotton prices, 1973/74-1990/91



protection rates, the average of the import and export parity prices was used as the reference price under free trade. The results indicate that potato production was highly protected in the early years but declined over time, becoming negative in the 1980s. In the period 1986/87-1990/91, direct nominal protection was 8 percent on average. When the indirect effects of economy-wide exchange rate and commercial policies are included, the average total nominal protection rate was -22 percent in the same period. This implies that the real domestic producer price of potatoes was only 78 percent of its free-trade equilibrium real price. Some informal imports appear to come from neighboring India, particularly during the lean season. With increasing domestic cold storage facilities, however, off-season informal trade appears to have declined. Some potato exports were recorded in the second half of the 1980s (Figure 5.9).

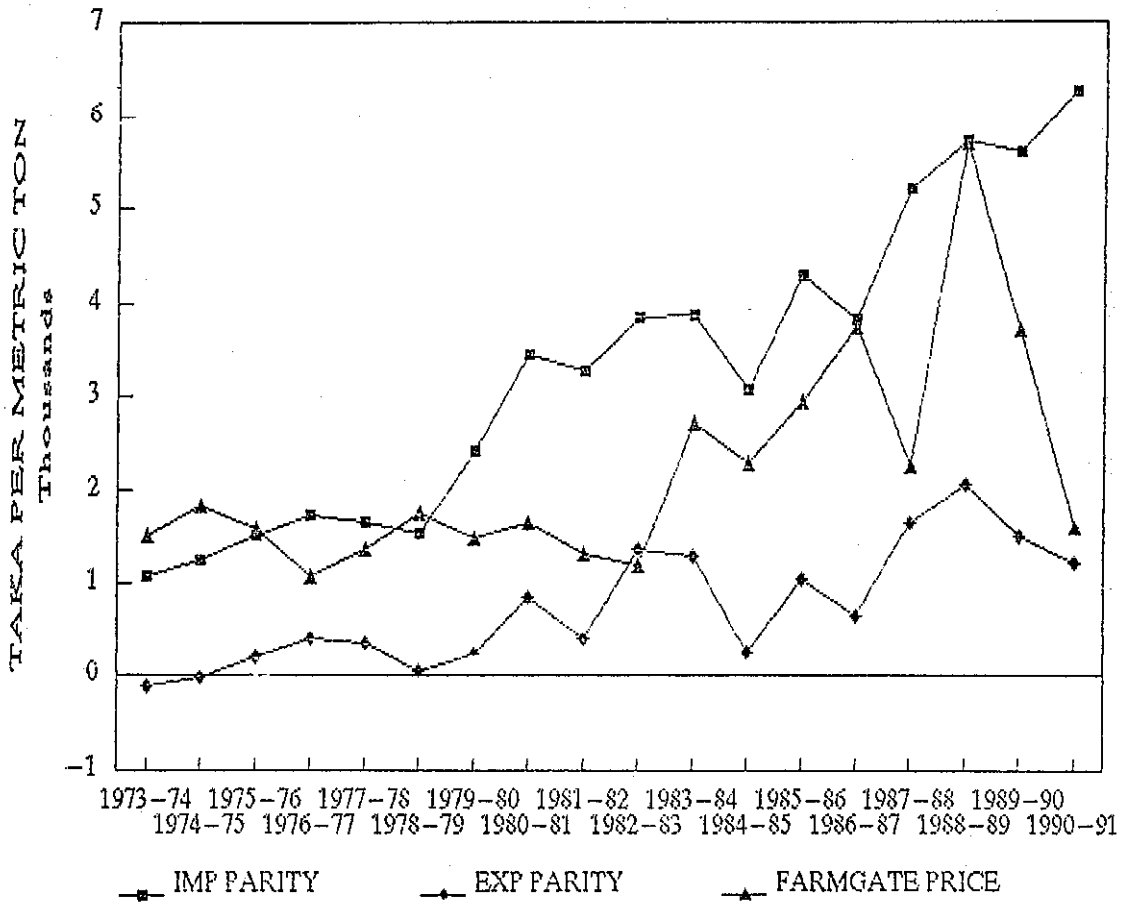
Figure 5.8--Pulse prices, 1976/77-1990/91



Chilies

Dry red chilies have been imported from India in periods of scarcity. The price of imported chilies was lower than that of domestic chilies in 6 out of 10 years in the 1980s. Dry red chilies have enjoyed positive nominal protection in 11 out of the 18 years considered in this study. In the most recent five-year period ending in 1990/91, the direct nominal protection rate for dry red chilies was 37 percent. However, the indirect effects of real exchange rate appreciation reduced the nominal protection rate to 28 percent. Thus, domestic producer prices of these chilies were 28 percent higher than they would have been under free trade with a free-trade equilibrium exchange rate (Figure 5.10).

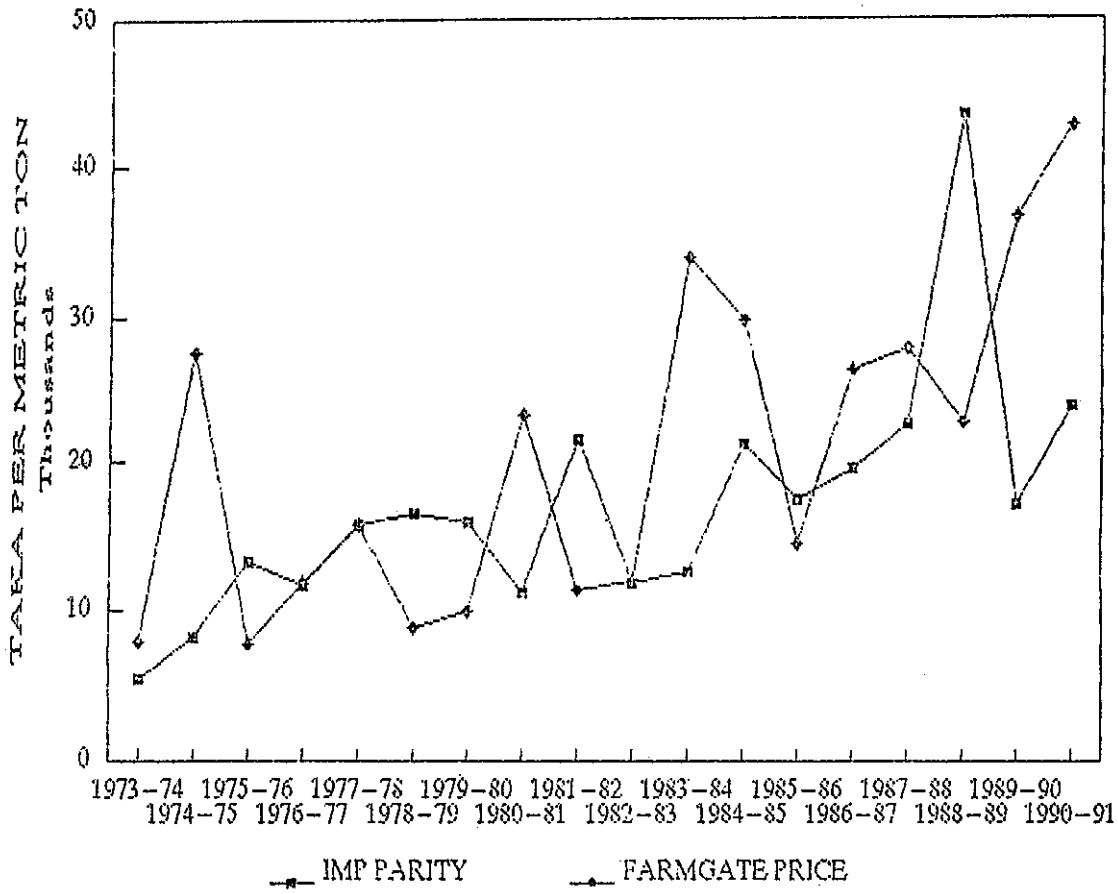
Figure 5.9--Potato prices, 1973/74-1990/91



Onions

Onions have also been imported from India in certain years. In 11 out of 18 years considered in the study, producer prices have exceeded the import parity price. Nominal protection of onions ranged from 2 percent to 5 percent between 1976/77 and 1990/91. The nominal rate of protection was around 2 percent only from 1986/87 to 1990/91. But the total protection, including the effects of real exchange rate appreciation, yields a total nominal protection rate of -6.2 percent (Figure 5.11).

Figure 5.10--Dry chilies prices, 1973/74-1990/91



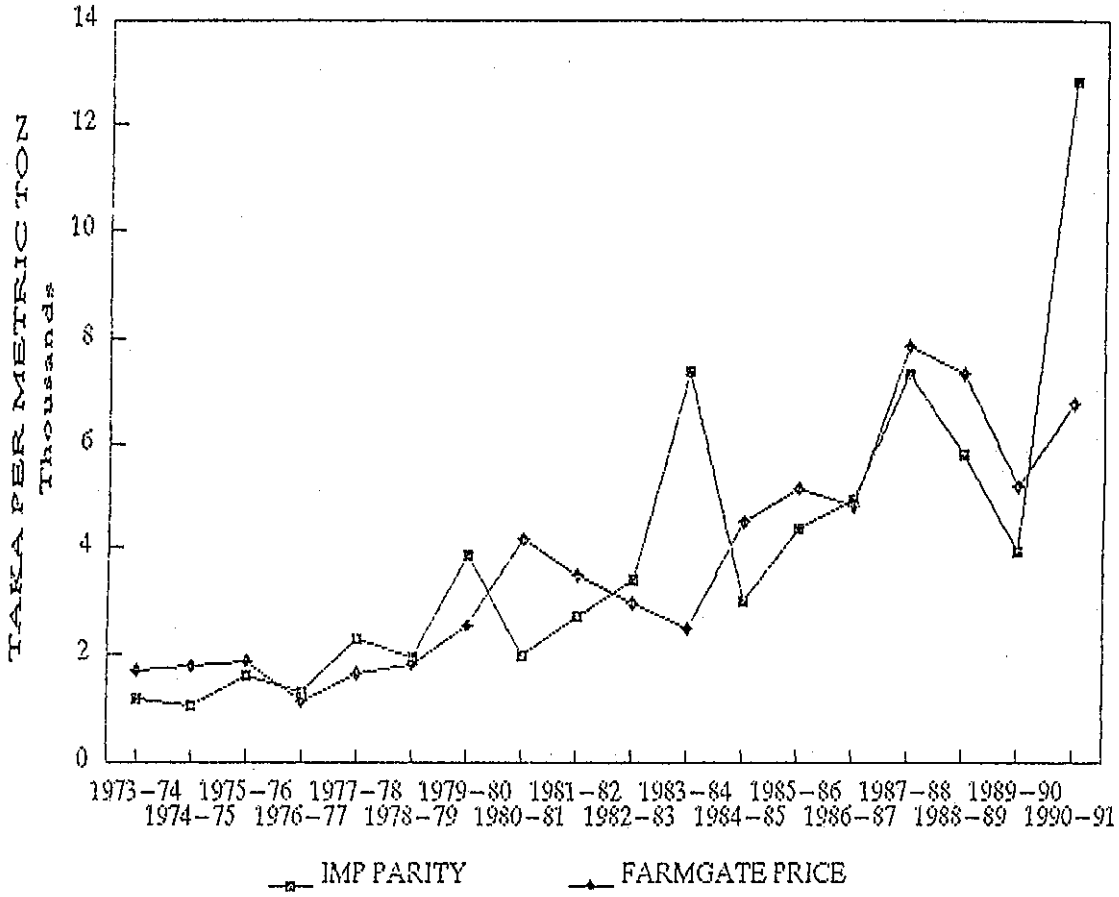
EXPORTABLES

Jute

Jute lost its central position in Bangladesh's exports with the emergence of ready-made garments in the early 1980s. It is still an important export commodity, however, and the most important of the agricultural exports. Bangladesh is the predominant raw jute supplier in the world market. The price of jute fiber ex-Bangladesh ports is thus considered as the world price.

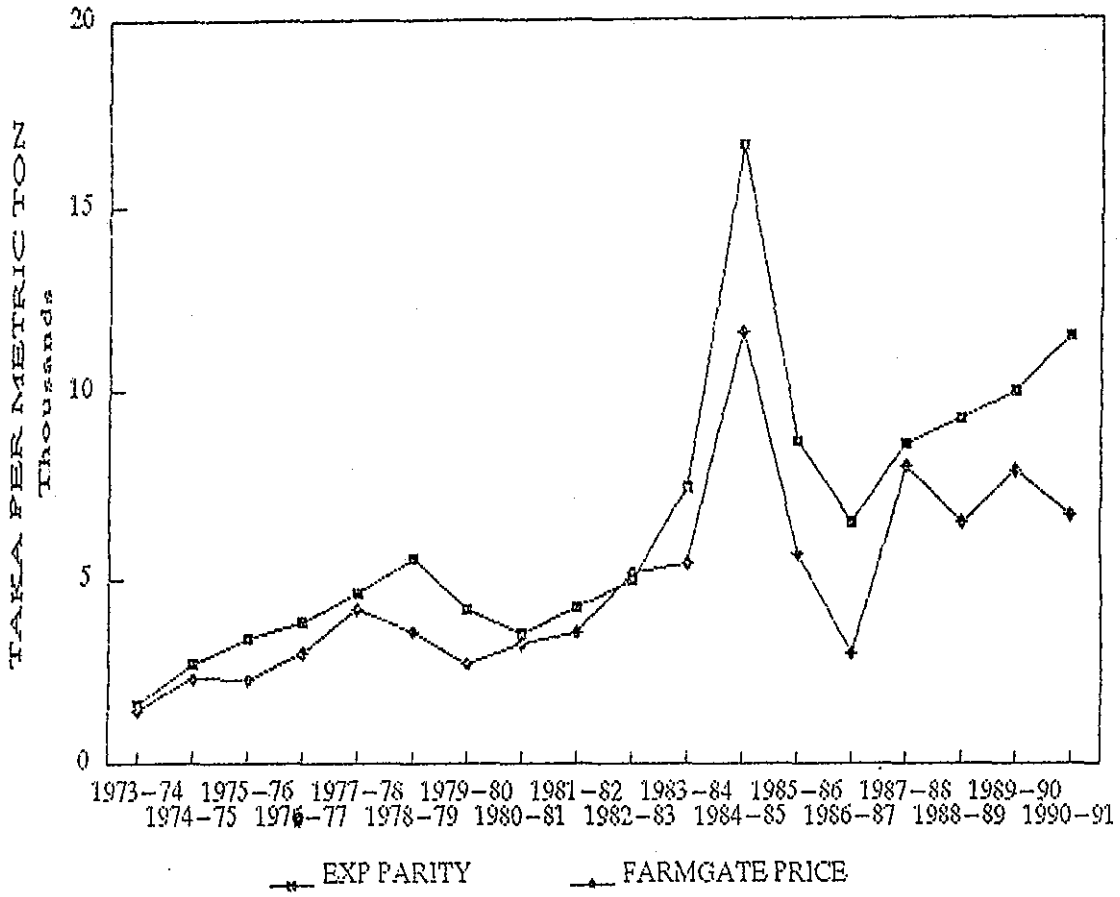
The direct effects of jute pricing and trade policies have resulted in negative nominal protection. Thus, domestic producer prices have always been below the world border price at farmgate at the official exchange rate. A large increase in the export tax on raw jute in 1975/76 following a 60 percent devaluation of the exchange rate depressed the domestic price of raw jute to 64 percent of its border parity price at

Figure 5.11--Onion prices, 1973/74-1990/91



farmgate at the official exchange rate in that year. Similarly, a ban on raw jute exports toward the end of the 1984/85 season depressed domestic prices to 70 percent of the world price measured at farmgate. On average, domestic raw jute prices ranged from 81 percent to 85 percent of the export parity price until 1985/86 but then declined to an average of 72 percent of the world price at farmgate between 1986/87 and 1990/91. The implicit total taxation of raw jute measured at the free-trade equilibrium exchange rate was almost twice as much as the direct tax measured at the official exchange rate in the 1980s but declined to 40 percent from 1986/87 to 1990/91. Evaluated at the free-trade equilibrium exchange rate, the average domestic producer's price of raw jute was only 59 percent of the farmgate export parity price in 1973/74-1975/76. Since then it has been approximately 64 percent of the export parity price on average at free-trade equilibrium real exchange rates. Thus, real exchange rate appreciation significantly increased the implicit tax on raw jute exports (Figure 5.12).

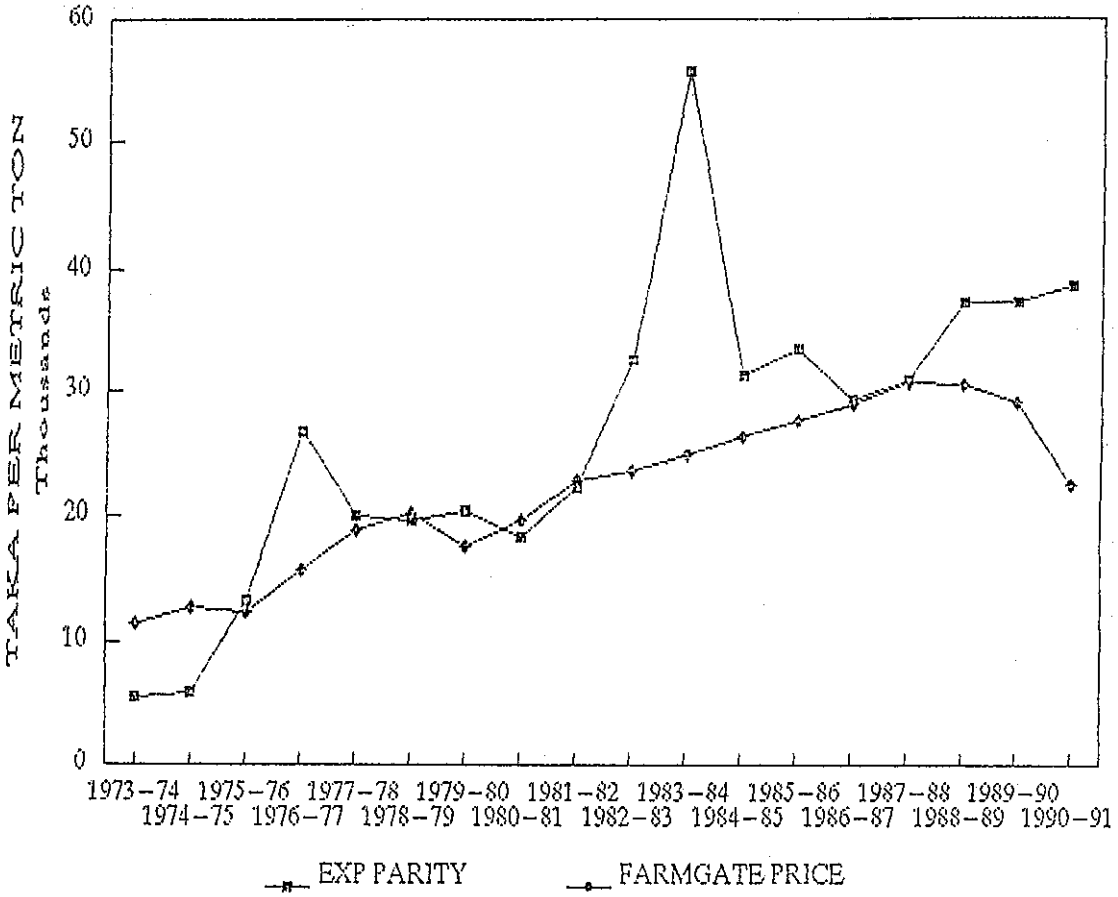
Figure 5.12--Jute prices, 1973/74-1990/91



Tea

The direct effects of trade and economic policies have been adverse for tea, an important export commodity of Bangladesh. The domestic producer price of tea has been below the export parity farmgate price whether evaluated at the official or equilibrium exchange rate in all but five years, thus the nominal rate of protection has always been negative except in these five years. Domestic tea prices averaged 81 percent of the border parity price at farmgate from 1981/82 to 1985/86, but they increased to 85 percent of the export parity price between 1986/87 and 1990/91. Including the indirect effects of real exchange rate appreciation increases the discrimination against tea exports. Producer prices were estimated to average 76 percent and 73 percent of the free-trade equilibrium export parity price from 1981/82 to 1985/86 and from 1986/87 to 1990/91, respectively (Figure 5.13).

Figure 5.13--Tea prices, 1973/74-1990/91



Horticultural Products

Vegetables and fruits have been exported from Bangladesh since the 1980s. These horticultural products cater to the demands of expatriate Bangladeshis living mainly in the United Kingdom and the Arab Middle East. Vegetable and fruit exports increased greatly in the late 1980s. Bangladesh's potential for exporting horticultural commodities is, however, constrained by the large domestic marketing margins between farmgate and export prices. Marketing margins are typically four to six times the farmgate price, reflecting great inefficiency in marketing of horticultural exports. Table 5.2 shows that direct trade policies discriminated against all of Bangladesh's horticultural exports in 1990/91 and that implicit taxation of these export products increased significantly due to exchange rate policies. The direct effects of trade policies have caused the producer prices of horticultural exports to be

Table 5.2--Direct and indirect nominal rates of protection to producers of horticultural products in 1990/91

Horticultural Commodities	Farmgate Price	Export Price (f.o.b. Dhaka)	NRP	NRP D	NRP T
	(Tk/kilogram)				
Vegetables					
Cucumber	6.00	31.535	-0.714	-0.667	-0.733
Kakrol	6.00	31.535	-0.714	-0.666	-0.733
Green papaya	3.00	31.535	-0.857	-0.800	-0.867
Green chilies	12.00	31.535	-0.426	-0.398	-0.465
Olive	7.00	31.535	-0.666	-0.621	-0.688
Poi sak	4.00	31.535	-0.809	-0.755	-0.822
Long yard bean	7.00	31.535	-0.667	-0.622	-0.689
Tamarind	5.00	31.535	-0.762	-0.711	-0.778
Green banana	8.00	31.535	-0.620	-0.578	-0.645
Fruits					
Mango	20.00	49.380	-0.471	-0.444	-0.501
Litchi	12.00	49.380	-0.691	-0.653	-0.708
Banana	12.00	49.380	-0.691	-0.653	-0.708
Papaya	6.00	49.380	-0.846	-0.798	-0.854
Jambura	2.00	31.535	-0.905	-0.844	-0.911
Guava	4.00	31.535	-0.809	-0.755	-0.822
Amra	3.00	31.535	-0.857	-0.800	-0.867
Others					
Betel leaves	42.00	67.225	-0.259	-0.246	-0.297
Dry betelnuts	70.00	129.682	-0.412	-0.393	-0.440

Source: Author's calculations.

significantly below their free-trade border prices. The modal implicit taxation rate was approximately 70 percent in 1990/91. In interpreting the results shown in Table 5.2, one important caveat should be borne in mind: the large implicit taxation reflects large domestic marketing spreads between farmgate and export prices in Bangladesh. Therefore, the direct and nominal protection rates mainly reflect great inefficiencies in the export marketing chain for horticultural products. Due to lack of price data before 1990/91, the analysis of direct and indirect effects of trade and exchange rate policies for horticultural commodities could be conducted only for 1990/91.

EFFECTIVE RATES OF PROTECTION

Trade and exchange rate policies influence not only the prices of agricultural outputs but also the prices of tradable inputs used in agricultural production. Thus, in general, the effective rate of protection is the more relevant measure of incentives. The direct effects of trade and exchange rate policies on output price are measured by the nominal rate of protection (NRP) discussed earlier, but the

direct effects on value added per unit of output of a commodity (defined as gross output value minus cost of material inputs) are measured by the effective rate of protection (ERP). Thus,

$$ERP_i = (VA_i - VA_i')/VA_i' = VA_i/VA_i' - 1, \quad (10)$$

where ERP is the effective rate of protection, VA is value added at domestic prices, VA′ is value added at world prices evaluated at the official exchange rate, and i denotes commodity. Following the method given at the beginning of this chapter (see Appendix 3), the total ERP (direct and indirect effects, including exchange rate policy) is given by

$$\begin{aligned} ERP\ T &= [(VA_i/V_{na}) - (VA^*/VA^*_{na})]/(VA_i^*/VA^*_{na}) \\ &= [(VA_i/V_{na})/(VA_i^*/VA^*_{na})] - 1, \end{aligned} \quad (11)$$

where V_{na} is the value added in the nonagricultural sector and the asterisks indicate that value added is measured at border prices evaluated at the equilibrium exchange rate. Since computing VA^*_{na} from VA_{na} is beyond the scope of this study, P_{na} and P^*_{na} are used as proxies. Input costs used to calculate value added by crop are based on cost and returns surveys undertaken for this project (Zohir 1993) for 1990/91. The time series of input costs assumes constant yields and constant input-output relations. The time series for output prices for the period before 1990/91 was obtained from Ahmed;[2] for border prices of fertilizers it was computed using World Bank data. Time series prices of all other material inputs including seed, pesticides, and organic fertilizer for the pre-1990/91 period were based on cost data obtained from Ahmed. Year-to-year changes in costs were assumed to reflect price changes.

VA′ used in the calculation of direct effects was computed with fertilizer measured at border prices assuming free trade in agricultural inputs but no change in exchange rates. For VA required in estimating total effects of policy on value added, input costs were evaluated at equilibrium exchange rates.

Table 5.3 shows the direct and total effective rates of protection of agricultural commodities. The effective rates of protection are in general similar to the direct and total nominal rates of protection presented earlier. This is due to the low traded input cost component of most of the commodities shown in the table. The effect of real exchange rate depreciation, as in the case of NRPs, is to increase the effective

[2] Akhter U. Ahmed, consumption economist, The Bangladesh Food Policy Project, International Food Policy Research Institute, Dhaka.

Table 5.3--Measures of direct and total effective rates of protection (ERP) to producers of agricultural commodities

Crops	1973/ 1974	1974/ 1975	1975/ 1976	1976/ 1977	1977/ 1978	1978/ 1979	1979/ 1980	1980/ 1981	1981/ 1982	1982/ 1983	1983/ 1984
Average parity Rice (coarse)											
ERP	-0.18	1.37	0.03	-0.13	-0.33	0.09	-0.17	-0.31	0.18	0.04	0.32
ERP T	-0.47	0.81	-0.12	-0.25	-0.40	0.00	-0.32	-0.42	0.01	-0.15	0.02
Import parity Rice (coarse)											
ERP	-0.30	0.85	-0.15	-0.26	-0.40	-0.06	-0.29	-0.41	-0.08	-0.13	0.07
ERP T	-0.53	0.46	-0.27	-0.35	-0.46	-0.13	-0.41	-0.50	-0.19	-0.28	-0.15
Export parity Rice (coarse)											
ERP	-0.03	2.30	0.31	0.04	-0.23	0.30	-0.00	-0.17	0.63	0.30	0.71
ERP T	-0.38	1.39	0.09	-0.11	-0.32	0.18	-0.20	-0.32	0.36	0.03	0.27
Import parity Wheat											
ERP	0.55	2.51	-0.21	0.14	0.05	-0.17	-0.03	-0.11	-0.03	-0.02	-0.07
ERP T	0.01	1.66	-0.32	-0.01	-0.07	-0.24	-0.20	-0.25	-0.15	-0.19	-0.27
Import parity Masur											
ERP				-0.53	-0.27	-0.46	-0.50	-0.35	-0.25	-0.05	-0.23
ERP T				-0.59	-0.36	-0.50	-0.58	-0.45	-0.34	-0.22	-0.39
Import parity Rapeseed											
ERP	0.89	5.26	0.73	0.33	0.66	0.29	0.50	0.97	0.28	-0.12	0.49
ERP T	0.20	3.41	0.47	0.14	0.46	0.18	0.21	0.62	0.11	-0.28	0.15
Export parity Jute											
ERP	-0.06	-0.13	-0.32	-0.21	-0.11	-0.36	-0.35	-0.07	-0.17	-0.00	-0.28
ERP T	-0.41	-0.33	-0.42	-0.32	-0.21	-0.41	-0.47	-0.23	-0.28	-0.18	-0.44
Import parity Cotton											
ERP	-0.80	-0.62	-0.84	-0.82	-0.82	-0.84	-0.89	-0.83	-0.84	-0.73	-0.74
ERP T	-0.87	-0.70	-0.86	-0.84	-0.84	-0.85	-0.91	-0.86	-0.86	-0.78	-0.79
Import parity Chili											
ERP	1.09	4.00	-0.43	0.08	0.05	-0.50	-0.41	1.95	-0.55	0.11	2.98
ERP T	0.36	2.80	-0.50	-0.05	-0.06	-0.54	-0.52	1.40	-0.61	-0.12	1.98
Import parity Onion											
ERP	0.48	0.92	0.19	-0.14	-0.28	-0.07	-0.35	1.26	0.33	-0.14	-0.68
ERP T	0.02	0.56	0.05	-0.24	-0.35	-0.14	-0.46	0.92	0.18	-0.27	-0.74
Average parity Potato											
ERP	3.02	3.19	1.14	0.05	0.49	1.68	0.26	-0.21	-0.29	-0.64	0.09
ERP T	1.26	1.90	0.77	-0.11	0.28	1.37	-0.02	-0.35	-0.39	-0.71	-0.17
Import parity Sugarcane											
ERP	-0.57	0.51	0.39	1.90	3.30	2.27	-0.47	0.26	5.66	4.37	-5.09
ERP T	-0.73	0.06	0.11	1.13	2.11	1.65	-0.59	-0.05	2.78	1.65	-11.45

(continued)

Table 5.3--Continued

Crops	1984/ 1985	1985/ 1986	1986/ 1987	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	Average 1973/74 to 1975/76	Average 1976/77 to 1980/81	Average 1981/82 to 1985/86	Average 1986/87 to 1990/91
Average parity											
Rice (coarse)											
ERP	0.44	0.58	0.55	-0.08	0.04	0.14	-0.08	0.41	-0.17	0.31	0.11
ERP T	0.24	0.37	0.38	-0.19	-0.06	-0.01	-0.13	0.07	-0.28	0.10	-0.00
Import parity											
Rice (coarse)											
ERP	0.10	0.17	0.20	-0.24	-0.14	-0.09	-0.26	0.13	-0.28	0.03	-0.10
ERP T	-0.03	0.04	0.09	-0.32	-0.21	-0.20	-0.29	-0.11	-0.37	-0.12	-0.19
Export parity											
Rice (coarse)											
ERP	1.07	1.40	1.18	0.16	0.32	0.54	0.21	0.86	-0.01	0.82	0.48
ERP T	0.71	0.99	0.87	-0.01	0.17	0.32	0.13	0.36	-0.16	0.47	0.30
Import parity											
Wheat											
ERP	0.04	0.15	0.38	0.01	-0.07	0.22	0.22	0.95	-0.02	0.01	0.15
ERP T	-0.09	0.02	0.24	-0.11	-0.15	0.07	0.16	0.45	-0.15	-0.14	0.04
Import parity											
Masur											
ERP	-0.58	-0.16	0.01	0.13	0.05	-0.17	-0.44	-0.42	-0.26	-0.09	
ERP T	-0.63	-0.25	-0.09	-0.00	-0.05	-0.27	-0.47	-0.50	-0.37	-0.18	
Import parity											
Rapeseed											
ERP	0.49	0.86	2.35	0.75	1.22	1.35	1.38	2.30	0.55	0.40	1.41
ERP T	0.29	0.61	1.90	0.52	0.99	1.03	1.21	1.36	0.32	0.18	1.13
Export parity											
Jute											
ERP	-0.32	-0.35	-0.51	-0.11	-0.29	-0.22	-0.40	-0.17	-0.22	-0.22	-0.31
ERP T	-0.41	-0.42	-0.56	-0.22	-0.36	-0.32	-0.43	-0.39	-0.33	-0.35	-0.38
Import parity											
Cotton											
ERP	-0.67	0.50	0.11	0.30	0.11	0.05	-0.24	-0.75	-0.84	-0.49	0.06
ERP T	-0.71	0.31	-0.00	0.13	-0.00	-0.09	-0.28	-0.81	-0.86	-0.57	-0.05
Import parity											
Chili											
ERP	0.58	-0.23	0.55	0.33	-0.53	1.77	0.58	1.55	0.23	0.58	0.54
ERP T	0.38	-0.33	0.35	0.15	-0.58	1.56	0.48	0.89	0.05	0.26	0.39
Import parity											
Onion											
ERP	0.55	0.19	-0.02	0.07	0.28	0.34	-0.30	0.53	0.08	0.05	0.07
ERP T	0.37	0.07	-0.10	-0.04	0.17	0.19	-0.33	0.21	-0.05	-0.08	-0.02
Average parity											
Potato											
ERP	0.55	0.14	0.82	-0.38	0.50	0.06	-0.64	2.45	0.45	-0.03	0.07
ERP T	0.29	-0.02	0.58	-0.46	0.35	-0.08	-0.66	1.31	0.23	-0.20	-0.06
Import parity											
Sugarcane											
ERP	-3.59	-10.66	-10.14	4.31	1.78	3.83	-23.01	0.11	1.45	-1.86	-4.65
ERP T	-3.98	-36.47	-30.77	2.13	1.12	2.64	-281.45	-0.19	0.85	-9.50	-61.27

Source: Author's calculations.

Note: Rice (15% broken Thai).

protection when ERPs are negative and reduce the effective protection when the ERPs are positive.

INSTABILITY OF PRICES

Maintaining price stability in agricultural markets is often an important policy objective of governments. Trade, exchange rate, and pricing policies are therefore designed to insulate the domestic market from the price volatility of world commodity markets. Food price stability and security has been the overriding price policy concern of Bangladesh's government. Since rice is the predominant food crop, the focus of price stabilization has been on rice. Table 5.4 shows that the coefficient of variation of the relative domestic rice price was significantly lower than the relative import parity price of rice and the relative import parity price measured at the equilibrium exchange rate. The relative rice price is the ratio of the domestic farmgate price to the nonagricultural price index.

The relative price variability of sugar also was much lower than the border price equivalent, at both the official and equilibrium exchange rates. The trade policy regime may also have been able to insulate the domestic market for pulses (lentils) from the price

Table 5.4--Coefficient of variation and average of real producer prices, 1974-91

Commodity	Coefficient of Variation			Mean		
	p/pna	p′/pna	p*/pna*	p/pna	p′/pna	p*/pna*
Rice 15% (import parity)	0.22	0.28	0.33	5,052.88	5,976.88	7,025.72
Wheat (import parity)	0.30	0.18	0.22	5,258.14	5,013.58	5,872.40
Rapeseed oil (import parity)	0.33	0.21	0.26	43,529.75	23,096.66	25,930.11
Rapeseed (import parity)	0.32	0.31	0.34	12,276.13	7,839.21	9,357.05
Sugar (import parity)	0.18	0.49	0.58	18,345.73	9,654.19	11,331.34
Chilies, red (import parity)	0.52	0.37	0.35	28,535.88	24,194.85	28,036.36
Onion (import parity)	0.23	0.37	0.38	4,756.71	4,817.46	5,528.48
Cotton (import parity)	0.68	0.25	0.25	6,742.07	14,964.88	17,547.55
Lentil (import parity)	0.15	0.22	0.22	9,029.73	12,825.22	14,644.33
Potatoes (import parity)	0.38	0.15	0.17	3,110.28	4,222.92	4,889.08
Jute (export parity)	0.36	0.36	0.34	6,415.27	8,898.35	10,513.78
Tea (export parity)	0.27	0.40	0.40	31,667.53	36,929.03	43,586.08

Sources: Author's calculations of border prices and nonagricultural price index. Farmgate prices are from Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: various years) except for 1990/91, for which data were obtained from IFPRI market survey.

Notes: P/P_{na} is the actual relative price received by producers. P'/P_{na} is the border price relative to an actual nonagricultural price index. P_p^*/P_{na}^* is the ratio of the border price of a farm product to the price of nonagricultural products with both prices evaluated at the equilibrium exchange rate.

instability of the world market. Domestic and international price variability are not significantly different for jute fiber and rapeseed; but for cotton, potatoes, rapeseed oil, and wheat, the variability of domestic relative prices are significantly higher than their corresponding border price equivalents.

The analysis of price variability shows that agricultural trade and price policies have helped stabilize producer prices of rice, sugar, and lentils. This reduction of real price instability was accompanied by a higher average price for sugar but lower average prices for rice and lentils. As stated earlier, the government has historically used direct interventions such as rationing, stock management, and price support in addition to trade restrictions to stabilize rice and sugar prices. For wheat, edible (rapeseed) oil, cotton, and potatoes, trade and price policies have resulted in greater producer price instability accompanied by a decline in the average real price of wheat, cotton, and potatoes but an increase in the average real price of edible oil.

6. CONCLUSIONS

The high protection accorded to the industrial sector in Bangladesh caused significant real exchange rate appreciation. Concern regarding this appreciation has traditionally focused on erosion of export competitiveness. This study, however, shows that the concern must extend to implicit taxation of the agriculture sector. Thus, the indirect effects of exchange rate policies have been a major determinant of price incentives in the agriculture sector. Although an adjustable peg exchange rate policy has been in effect since 1979, high nominal protection and pervasive quantitative restrictions on industrial imports caused the real exchange rate to appreciate.

The indirect effects of exchange rate policies consistently lowered the protection to agricultural commodities. Appreciation of the exchange rate offset the protection provided by direct trade policies for wheat, cotton, and potatoes and increased the implicit taxation of rice (when the import parity price is considered as the reference price), lentils, jute, and tea. For all other crops nominal protection was reduced due to appreciation of the real exchange rate in the second half of the 1980s.

If the import parity price is taken as the reference price, rice has been implicitly taxed throughout the 18 years considered in the study. Even when the average parity price is used, implicit taxation of rice is evident except in the first half of the 1980s. Nevertheless, implicit taxation was only 2-5 percent from 1956/57 to 1990/91 and 3-5 percent from 1981/82 to 1985/86. In other words, the domestic rice price was close to its free-trade equilibrium price when the average parity price was considered as the international reference price. Implicit protection of wheat was positive until the mid-1970s, but between 1976/77 and 1985/86 wheat was implicitly taxed. The combined effects of trade and exchange rate policies on wheat was neutral from 1986/87 to 1990/91.

Oilseed and vegetable oil production has been excessively protected. The domestic oilseed and vegetable prices averaged 76 percent and 46 percent, respectively, above the world prices evaluated at the equilibrium exchange rate in the 18-year period from 1973/74 to 1990/91. Sugar and sugarcane also have enjoyed very high implicit protection. However, producers of cotton, lentils, and the major export crops--jute and tea--were implicitly taxed.

Direct government policies also provided benefits through price stability. Domestic prices of rice, sugar, and lentils were significantly more stable than the respective world prices evaluated at free-trade equilibrium exchange rates.

The implicit protection rate of the agriculture sector as a whole averaged -18.1 percent from 1986/87 to 1990/91. With an aggregate

agricultural supply response of 0.05 (Rahman and Yunus 1992), the implicit taxation implies an average transfer of resources out of agriculture due to direct and indirect price and trade policies of Tk 34,926 million from 1986/87 to 1989/90, which amounts to 19.9 percent of the average agricultural value added in the same period. This transfer, however, must be weighed against the transfers into agriculture through subsidies such as input subsidies.

APPENDIX 1: ESTIMATION OF PNA, PNA′, AND PNA*

PNA is defined as

$$PNA = W_1\ PM_{na} + W_2\ PX_{na} + (1 - W_1 - W_2) \cdot PNT,$$

where PM_{na} and PX_{na} are price indexes of nonagricultural imports and exports, respectively, and PNT is the price index of nonagricultural nontradables. Weights W_1(=0.075) and W_2(=0.032), the shares of nonagricultural importables and exportables in the nonagricultural value added, were estimated using 1985/86 data for GDP and value added. The nonagricultural export sector value added was the sum of the value added of the export-substituting sector. The remainder of the value added in manufacturing was assigned to the nonagricultural import sector.

PM_{na} and PX_{na} are weighted averages of the domestic prices of nonagricultural import and export goods used in the construction of $(1 + t_m)$ and $1 - t_x)$. The consumer price index (CPI) is used as a proxy for the index of nonagricultural nontradables (PNT).

PNA′ and PNA* were constructed using estimates of world prices of imports (PM_{na} \$) and exports (PX_{na} \$) measured in dollars and indexes of official and equilibrium nominal exchange rates (E and E^*, respectively).

$$PNA' = W_1 \cdot E \cdot PM_{na}\ \$ + W_2 \cdot E \cdot PX_{na}\ \$ + (1 - W_1 - W_2)\ PNT, \text{ and}$$

$$PNA^* = W_1 \cdot E^* \cdot PM_{na}\ \$ + W_2 \cdot E^*\ PX_{na} + (1 - W_1 - W_2) \cdot PNT.$$

Finally, PM_{na} \$ and PX_{na} \$ are calculated using PM \$ and PX \$ and PM_a \$ and PX_a \$, where PM_a \$ is calculated using dollar prices of raw cotton, wheat, rice, and edible oil and PX_a \$ is calculated using dollar prices of jute. Then PM_{na} \$ and PX_{na} \$ are defined as

$$PM_{na}\ \$ = (PM\ \$ - d_1.\ PM_a\ \$)/(1 - d_1),\ d_1 = 0.17, \text{ and}$$

$$PX_{na}\ \$ = (PX\ \$ - e,\ PX_a\ \$)/(1 - e_1),\ e_1 = 0.15.$$

See Table A1.1 for indexes of nonagricultural prices.

Table A1.1--Indexes of nonagricultural prices

	PNA	PNA′	PNA*	PNA′/PNA	PNA*/PNA
1973/74	0.292	0.273	0.276	0.933	0.946
1974/75	0.351	0.335	0.337	0.956	0.961
1975/76	0.364	0.357	0.358	0.980	0.981
1976/77	0.381	0.373	0.373	0.980	0.981
1977/78	0.398	0.391	0.390	0.984	0.982
1978/79	0.453	0.453	0.451	0.999	0.995
1979/80	0.524	0.517	0.521	0.986	0.994
1980/81	0.604	0.599	0.601	0.990	0.995
1981/82	0.679	0.676	0.676	0.994	0.995
1982/83	0.752	0.743	0.748	0.988	0.994
1983/84	0.838	0.815	0.824	0.973	0.983
1984/85	0.910	0.896	0.896	0.985	0.984
1985/86	1.000	1.000	1.000	1.000	1.000
1986/87	1.080	1.095	1.094	1.014	1.013
1987/88	1.185	1.196	1.197	1.009	1.010
1988/89	1.302	1.318	1.316	1.012	1.010
1989/90	1.536	1.556	1.434	1.013	0.934
1990/91	1.551	1.577	1.568	1.017	1.011

Source: Author's calculations.

APPENDIX 2: METHODOLOGY FOR CALCULATING BORDER PARITY PRICES

RICE (IMPORT PARITY)

World price is c.&f. Chittagong equals f.o.b. Bangkok plus freight from Bangkok to Chittagong.

- Average of f.o.b. Bangkok prices of 5 percent broken parboiled and 25 percent broken is used to represent the c.i.f. price of 15 percent broken Thai rice.

- Freight Rates: Freight rate from Bangkok to Dhaka (obtained from shipping agents) for 1990/91 is used. The time series was generated using an index of freight rates calculated from ocean freight rates for wheat (see below). International freight rates for individual agricultural commodities are not available. The wheat freight rate index is, therefore, used as a proxy for freight rates of all commodities considered in the study, unless otherwise stated.

Border price measured at farmgate: World price times official exchange rate plus import handling, transport, and domestic trading cost less cost from millgate to wholesale is equal to border price at millgate. From this, milling cost is subtracted and adjusted by the milling rate. Interest cost for three months and the cost from millgate to farmgate is then subtracted to yield border price at farmgate.

- Official exchange rate

- Milling cost is estimated to be Tk 200.88 per ton in 1990/91.

- Milling rate is 67 percent or .666.

- Interest adjustment for three months is used, that is, time lag between harvest and import is assumed to be three months.

- Costs from millgate to wholesale are estimated as Tk 596.54 per ton for 1990/91.

- Costs from farmgate to millgate are estimated at Tk 559.88 per ton in 1990/91.

- Domestic farmgate price is price of coarse rice, that is, HYV boro.

Estimates of all costs and marketing margins were obtained from a marketing survey of indenters, importers, domestic traders, millers, wholesalers, suppliers and other market intermediaries and farmers. For details see Rahman 1992c. For all commodities, international freight cost and domestic marketing margins were obtained for 1990/91, and the parity prices were first computed for that year. The international and domestic transport cost and trading cost were extended backwards in time to 1973/74 by using an international freight rate index, a domestic transport cost index, and the CPI. The international freight index based on ocean freights for wheat was computed from International Wheat Council data. While, the domestic transport cost index and CPI were obtained from BBS Yearbook (various issues). International prices (f.o.b.), exchange rates, wholesale prices and farmgate prices were available directly for each year. All domestic prices are taken from the *Statistical Yearbook of Bangladesh* (BBS various years). The official exchange rate is the nominal average exchange rate published in *Economic Trends* (Bangladesh Bank, various dates).

RICE (EXPORT PARITY)

World price (f.o.b. Chittagong) equals f.o.b. Bangkok price minus the freight from Bangkok to Chittagong.

- F.o.b. Bangkok 15 percent broken.
- Freight rate (same as in case of rice import parity).

Border price measured at farmgate equals world price times official exchange rate less export handling and transport cost less domestic trading costs less cost from millgate to wholesale. Milling costs are then subtracted and the conversion rate is applied. Then the costs from farmgate to millgate are subtracted to yield border price at farmgate.

- Export handling cost is estimated at Tk 477.57 per ton for 1990/91.

WHEAT (IMPORT PARITY)

World price is c.&f. Chittagong: equals f.o.b. U.S. Gulf Hard Winter No. 2, Ordinary Protein plus freight from U.S. Gulf to Chittagong. Direct freight rates to Chittagong for the years before 1987/88 are not available. For this period, therefore, the freight rates from U.S. Gulf ports to India's East Coast (Calcutta) are used as the freight to Chittagong port. In the years when freight rates from both U.S. Gulf to India's East Coast and U.S. Gulf to Chittagong were available, the divergence was negligible.

Freight rates were taken from FAO *Food Outlook* 1992 (1/2), and FAO *Trade Yearbook*, 1988. World price is taken from FAO *Production Yearbook*

(various issues) and FAO *Quarterly Bulletin of Statistics*, Third Quarter 1991.

Border price measured at farmgate equals world price times official nominal exchange rate plus import handling transport from Chittagong to Dhaka, plus domestic trading costs less costs from farmgate to wholesale market less interest cost for six months (to account for time differences).

- Import handling cost is estimated to be Tk 658.88 per ton in 1990/91, including license fee, insurance, port dues, bank commission L/C opening charges, unloading and loading cost, clearing agency commission, and so forth. Except port dues, the import handling cost is estimated at approximately 3 percent of c.&f. price.

- Transport cost from Chittagong to Dhaka by road is estimated at Tk 715 per ton in 1990/91.

- Domestic trading cost includes selling costs (labor, utilities, rent, storage, and so forth). It is estimated to be Tk 75 per ton for 1990/91.

- Cost from farmgate to wholesale is estimated to be Tk 1,108.55 per ton in 1990/91.

- Interest adjustment: Interest costs for six months at an annual rate of 18 percent on the farmgate price, assuming that the imported wheat would appear in the domestic wholesale market after six months of the harvest.

LENTILS (IMPORT PARITY)

World price is c.&f. Chittagong equals c.i.f. U.K. price of Turkish lentils less 1 percent of c.i.f. U.K. price yields c.&f. U.K. price. Subtraction of freight from Turkey to U.K. gives f.o.b. price in Turkish ports. Adding freight from Turkey to Chittagong gives world price of Turkish lentils c.&f. Chittagong port. World price is obtained from FAO statistics.

Border price measured at millgate equals world price (c.i.f. Chittagong) times official exchange rate plus import handling, transport, and domestic trucking less costs from millgate to wholesale. Then milling cost is subtracted and, after applying the conversion rate, costs from farmgate to wholesale and interest costs of six months are deducted to yield border price at farmgate. This gives border price at farmgate.

Turkish lentils are compared with domestic masur.

- Milling cost is Tk 211.81 per ton in 1990/91.

- Conversion rate is 0.857353 (0.857353 kilogram of masur is extracted from 1 kilogram of masur seed).
- Cost from millgate to wholesale is estimated at Tk 56.27 per ton in 1990/91.
- Cost from farmgate to millgate is estimated at Tk 1,563.64 per ton in 1990/91.

POTATO (IMPORT PARITY)

World price is c.&f. Chittagong equals f.o.b. U.S. plus freight from U.S. Gulf to Chittagong.

- F.o.b. price U.S. is average producer prices.

Border price measured at farmgate equals world price times official exchange rate plus import handling, transport, and domestic trading cost less costs from farmgate to wholesale less interest cost for six months.

- Import handling estimated for 1990/91 is Tk 671.05 per ton.
- Transport costs (same as wheat).
- Domestic trading cost is estimated at Tk 80 per ton in 1990/91.
- Interest adjustment for six months.
- Cost from farmgate to wholesale is estimated at Tk 990 per ton in 1990/91.

(Source: World price, various issues of *FAO Production Yearbook* and FAO *Quarterly Bulletin of Statistics*.)

POTATO (EXPORT PARITY)

World price is f.o.b. Chittagong equals f.o.b. U.S. average producer less freight from U.S. to Chittagong.

- F.o.b. U.S., average producer.

Border price measured at farmgate equals world price times official exchange rate less export handling, transport, domestic trading cost, and costs from farmgate to wholesale.

- Export handling cost is estimated to be Tk 330.50 per ton in 1990/91.

SUGAR (IMPORT PARITY)

World price is c.&f. Chittagong equals f.o.b. white sugar at Caribbean ports plus freight.

- F.o.b. Caribbean ports, white.

Border price measured at wholesale equals world price times official exchange rate plus import handling, transport, and trading cost.

- Import handling cost is estimated at Tk 733 per ton in 1990/91.
- Trading cost is estimated at Tk 80 per ton in 1990/91.

SUGARCANE (IMPORT PARITY)

World price of sugarcane c.i.f. Chittagong is same as sugar.

Border price measured at farmgate equals border price of sugar at wholesale less costs from millgate to wholesale less milling cost times the conversion rate less the cost from farmgate to millgate.

- Milling cost for 1990/91 is estimated Tk 3,934.10 per ton.
- Milling rate is 8.66 percent.

All sugar mills are in the state-owned sector. Due to huge financial losses in these public sector mills, the estimated conversion cost could not be used. Discussions with Sugar Corporation officials, mill engineers, and private traders yielded estimates of sugar milling costs that would prevail under competitive market conditions.

RAPESEED (IMPORT PARITY)

World price is c.&f. Chittagong equals c.i.f. N.W. European or Canadian origin less 1 percent for insurance cost plus the freight from European ports to Chittagong port.

- C.&f. N.W. European or Canadian origin (Canadian 40 percent).

Border price measured at farmgate equals world price of rapeseed times official exchange rate plus import handling, transport cost, and trading cost less cost from farmgate to wholesale.

- Import handling cost is estimated at Tk 715.91 per ton in 1990/91.
- Cost from farmgate to wholesale is estimated at Tk 1704.25 per ton in 1990/91.

RAPESEED OIL (IMPORT PARITY)

World price of rapeseed oil is available only for 1988-1991. The price series is extended backward to 1973/74 by using a simple soybean price index, since soybean oil prices were available for all years. These international prices of rapeseed oil and soybean oil are assumed to move identically in years for which rapeseed oil prices were not available. World price is c.&f. Chittagong equals f.o.b. Rotterdam price of Dutch crude plus freight from N. European ports to Chittagong.

- Price of rapeseed oil, Rotterdam f.o.b. Dutch crude ex-mill.
- Refining margin for 1990/91 is estimated to be Tk 9,725.98 per ton.

Border price at wholesale equals world price times official exchange rate plus import handling, transport, trading cost, refining margin.

JUTE (EXPORT PARITY)

World price is f.o.b. Chittagong or Chalna.

Border price measured at farmgate equals world price times official exchange rate less export handling, transport, trading cost, and interest cost of four months.

- Export handling cost is estimated at Tk 1,001.67 per ton in 1990/91.
- Trading cost is estimated at Tk 1,009.32 per ton in 1990/91.

COTTON (IMPORT PARITY)

World price is c.&f. Chittagong equals cotton lint Liverpool c.i.f. sm 1-1/16 U.S. Memphis less 1 percent of the price from European ports to Chittagong.

- Cotton lint Liverpool, c.i.f. sm 1-1/16 U.S. Memphis.

Border price measured at farmgate equals world price times official exchange rate plus import handling, transport, and trading costs yields the border price at millgate. Then ginning cost is deducted and multiplied by the conversion rate. The cost from farmgate to millgate and interest cost of six months are then deducted to obtain the border price at farmgate.

- Conversion rate is 0.32467 units (0.32467 kilogram of lint cotton is extracted from 1 kilogram of seed cotton).
- Milling cost is estimated to be Tk 3,864.78 per ton in 1990/91.
- Cost from farmgate to millgate is estimated at Tk 1,272.31 per ton in 1990/91.

DRY CHILIES (IMPORT PARITY)

World price is c.&f. Hili (Dinajpur): equals wholesale price of dry chilies in Patna plus the transport cost from Patna (Bihar, India) to Hili.

- Wholesale price of dry chilies in Patna.[3]
- Transport cost from Patna to Hili is estimated at US$13 in 1990/91.

Border price measured at farmgate equals world price times official exchange rate plus import handling, transport, trading cost less cost from farmgate to wholesale less interest cost for six months.

- Import handling is estimated at Tk 863.10 per ton in 1990/91.
- Transport cost from Hili (Dinajpur) to Dhaka is estimated at Tk 1,200 per ton in 1990/91.
- Trading cost is estimated to be Tk 79 per ton for 1990/91.
- Cost from farmgate to wholesale is estimated at Tk 1,505.51 per ton in 1990/91.

(Source: *World Price: Agricultural Situation in India*, various issues).

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[3] Price data collected from the exporters during interviews with them.

ONION (IMPORT PARITY)

World price is c.&f. Benapole (Jessore) equals wholesale price of Bombay quality onion in Calcutta (West Bengal, India) plus transport cost from Calcutta to Benapole.

- Wholesale price of Bombay quality onion in Calcutta.[4]
- Transport cost from Calcutta to Benapole is estimated at US$5 in 1990/91.

Border price measured at farmgate equals world price times official exchange rate plus import handling, transport, trading costs less costs from farmgate to wholesale less interest cost for six months.

- Transport cost from Benapole to Dhaka is estimated at Tk 1,200 per ton in 1990/91.

(Source: World price--same as in case of chilies.)

TEA (EXPORT PARITY)

London auction prices are considered to be the world price. However, there is a large quality differential between Bangladeshi tea and internationally traded tea. Export prices received for Bangladeshi tea were on average 70 percent of the London auction price in Chittagong, that is, after adjustment for freight from London to Chittagong. Thus, the London auction price in Chittagong was marked down using .7 as the quality discount factor to yield the international reference price of tea in Chittagong.

Direct and indirect costs of exporters, that is, export handling transport, storage, utility, packaging, and so forth, from Chittagong port to the tea gardens in Sylhet, and interest costs of two months were then deducted to yield the export parity price at farmgate.

HORTICULTURAL PRODUCTS (EXPORT PARITY)

World price is f.o.b. Dhaka equals price at Saudi Arabia less the air freight from Dhaka to Saudi Arabia.

- Price at Saudi Arabia.[5]

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[4] Price data collected from the exporters during interviews with them.

[5] Price data collected from the exporters during interviews with them.

- Air freight was Tk 22 per kilogram in 1990/91.[6]

Border price measured at farmgate equals world price times official exchange rate less cost from farmgate to the export point, which also includes exporting costs.[7]

See Table A2.1 for rates used in calculations.

Table A2.1--Rates used in calculations

Year	Exchange Rate	Consumer Price Index	Transport Index	Ocean Freight Rates		
				U.S. Gulf	European Port	Bangkok
				(US$/metric ton)		
1973/74	7.97	0.29	0.37	46.46	38.14	27.97
1974/75	8.88	0.35	0.48	39.24	32.21	23.62
1975/76	15.05	0.36	0.54	21.76	17.86	13.10
1976/77	15.43	0.38	0.49	21.74	17.85	13.09
1977/78	15.12	0.40	0.50	21.73	17.84	13.08
1978/79	15.22	0.45	0.48	27.47	22.55	16.54
1979/80	15.49	0.51	0.56	45.04	36.98	27.12
1980/81	16.26	0.60	0.57	53.86	44.22	32.42
1981/82	20.07	0.67	0.64	46.42	38.11	27.95
1982/83	23.80	0.74	0.64	29.54	24.25	17.78
1983/84	24.94	0.81	0.74	30.00	24.63	18.06
1984/85	25.96	0.90	0.84	30.00	24.63	18.06
1985/86	29.89	1.00	1.00	30.00	24.63	18.06
1986/87	30.63	1.10	1.15	25.33	20.79	15.25
1987/88	31.24	1.20	1.26	25.75	21.14	15.50
1988/89	32.14	1.33	1.21	30.88	25.35	18.59
1989/90	32.92	1.45	1.28	31.99	26.26	19.26
1990/91	35.69	1.58	1.46	36.54	30.00	22.00

Sources: Bangladesh Bank, Economic Trends (Dhaka: various issues); Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: various issues); Food and Agriculture Organization of the United Nations, Food Outlook, No. 1/2 (Rome: various issues); FAO, Trade Yearbook (Rome: various issues).

[6] Air freight rate is taken from the local air line offices.

[7] For details, see Food Policy Project (1993).

APPENDIX 3: CALCULATION OF EFFECTIVE RATES OF PROTECTION

Data on costs and returns of production of different agricultural crops were obtained from a survey of costs and returns undertaken in 1991 within the IFPRI-BIDS Agriculture Diversification Project (Zohir 1993). In constructing a time series of the costs of production, the physical input-output relationships of 1991, that is, technology, were assumed to remain constant. Thus, changes in costs of production reflect changes in input prices only.

Parity prices of all three types of chemical fertilizer used in Bangladesh--urea, TSP, and MP--were computed from their international prices for each year to generate the time series. Import parity prices were used for urea until 1986/87, followed by export parity prices from 1987/88 to 1990/91. The method of computation of the parity prices is shown in Table A3.1. Domestic marketing margins used in the border price calculations were obtained from Mahmud and Rahman (1987) until 1985/86. From 1986/87 to 1990/91 the margins were updated using the CPI.

For rice, time series of costs of seed, draft animal labor, organic fertilizers, other chemical fertilizers, and pesticides from 1973/74 to 1987/88 were obtained from Ahmed.[8] The input cost series were extended to 1990/91 using a nonagricultural wholesale price index. Time series of costs of these inputs for other crops were not available. Thus, for each year the cost of each of these inputs was expressed relative to 1990/91. The simple input costs index was assumed to reflect price changes of the inputs and, hence, applied to the physical input quantities obtained from the 1991 IFPRI-BIDS survey to yield costs of these inputs with constant technology of 1991. Seed costs were assumed to vary with the price of output.

Border prices at farmgate computations shown in Appendix 2 were used for all outputs. The 1990/91 value of by-products of each crop was extended backward from 1990/91 using the agricultural price index.

[8] Akhter U. Ahmed, consumption economist, The Bangladesh Food Policy Project, International Food Policy Research Institute, Dhaka.

Table A3.1--Parity price of fertilizers at official exchange rate for 1990/91

	Urea[a]	TSP[b]	MP[c]	Urea[a]
	(import parity)	(export parity)		
F.o.b. (US$/metric ton)	164	141	101	164
Freight (Tk/metric ton)	30	37	37	30
Bangladesh c.&f. (US$/metric ton)	194	178	137	134
Domestic handling cost (from port to wholesale) (Tk/metric ton)	1,903	1,944	1,944	743
Border price measured at wholesale (Tk/metric ton)	8,809	8,281	6,835	4,022
Domestic handling cost (from wholesale to farmgate) (Tk/metric ton)	350	350	350	350
Border price measured at farmgate (Tk/metric ton)	9,159	8,631	7,185	4,372
Market price at farmgate (Tk/metric ton)	5,310	5,750	4,890	5,310
Conversion factor	1.72	1.50	1.47	0.82

Sources: Q. Shahabuddin and K.M. Rahman, Estimation of Economic Prices of Selected Commodities for Use in FAP Planning Studies (Dhaka: Water Development Board, 1990); World Bank, Price Prospects for Major Agricultural Commodities 1990-2005, Vol. 2 (Washington, D.C.: World Bank, 1991); Akhlaqur Rahman and Wahiduddin Mahmud, "Rice Market Intervention System: The Case of Bangladesh" (study undertaken for the Asian Development Bank, Manila, 1987); Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: various years).

Notes: The same procedure has been followed in the calculation of parity prices of fertilizer using the equilibrium exchange rate.

[a] F.o.b N.W. Europe.

[b] F.o.b. U.S. Gulf.

[c] F.o.b. Vancouver.

APPENDIX 4: SUPPLEMENTARY TABLE

Table A4.1--Equilibrium nominal and real exchange rates

Year	OER	EQNER	RER	EQRER
1973/74	7.966	11.105	16.510	23.015
1974/75	8.875	10.701	16.128	19.446
1975/76	15.054	17.032	27.537	31.155
1976/77	15.426	17.292	29.214	32.748
1977/78	15.117	16.592	30.493	33.469
1978/79	15.223	16.359	30.801	33.100
1979/80	15.490	18.469	32.018	38.175
1980/81	16.259	18.977	29.891	34.889
1981/82	20.065	22.608	31.247	35.207
1982/83	23.795	28.147	33.480	39.603
1983/84	24.944	30.508	31.136	38.082
1984/85	25.963	28.907	28.176	31.371
1985/86	29.886	33.413	29.886	33.413
1986/87	30.629	33.964	30.358	33.663
1987/88	31.242	35.318	30.118	34.048
1988/89	32.142	35.358	28.822	31.705
1989/90	32.921	34.918	28.673	30.412
1990/91	35.690	37.677	28.919	30.529

Source: Author's calculations.

Note: OER = official exchange rate; EQNER = equilibrium nominal exchange rate; RER = real exchange rate; EQRER = equilibrium real exchange rate.

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