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ELSEVIER

Agricultural Economics 15 (1997) 169–185

AGRICULTURAL ECONOMICS

Food aid, food policy and the Uruguay round: implications for Bangladesh

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Accepted 1 August 1996

Abstract

The relationship between the effects of food aid and those of the completion of the Uruguay Round of the GATT are studied in this paper, focusing upon the food aid recipient countries, and taking Bangladesh as an illustrative example. It is argued that, among other factors, the magnitudes of these effects depend crucially on the policy environment within the food aid recipient country itself, particularly the government's policy with respect to commercial food imports. It is shown that when the quantity of Bangladesh's commercial food imports is controlled by the government, the benefits derived from food aid are smaller than when these imports are liberalised. Likewise, the negative effects that the Uruguay Round may be expected to have on Bangladesh will also be larger if commercial food imports are subject to quantitative controls than if they are liberalised.

The effects the Uruguay Round will have on Bangladesh will also depend on the way food aid donors respond to the Round. If donors reduce the volumes of food aid, either because of reduced food surpluses resulting from lower agricultural subsidies, or in response to increased international food prices resulting from the Round, the losses incurred by Bangladesh will be magnified. But these effects will also depend heavily on whether Bangladesh itself participates in the liberalisations that are central to the Round itself. If it were to participate fully, the negative effects that the Uruguay Round would otherwise have on Bangladesh may be entirely offset by the gains Bangladesh would derive from its own liberalisation.

1. Introduction

The conclusion of the Uruguay Round of the GATT has been welcomed in most quarters but concerns have also been expressed about the potential losers. It has been suggested that the final agreement may have negative implications for some countries which can least afford them—the least-developed, net food importing countries. The partial liberalisation of agricultural markets which was achieved in the Round will lead to increases in the international prices of some key agricultural commodities, especially grains, implying increases in the cost of food imports. Recognition of this fact has in turn led to the argument that the least-developed, food importing countries should be compensated for the adverse effects of the Round (Goldin et al., 1993, p. 25; Hamilton and Whalley, 1995). [1]

This paper analyses the relationship between these

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[1] See also UNCTAD (1990), Francois et al. (1994), GATT (1994), Nguyen et al. (1993), Nguyen et al. (1995) and Schott and Buurman (1994).

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PII S0169-5150(96)01203-0

issues and food aid. We explore these relationships quantitatively in the context of Bangladesh, the world's largest recipient of food aid [2] and one of the world's poorest countries. Within the context of this study, 'food aid' will mean food grains donated to Bangladesh by other countries and will therefore not include food or other commodities preferentially priced for Bangladesh. Most of the least-developed, food importing countries are recipients of food aid from the OECD economies, especially from the food-exporting, industrialised nations who are themselves beneficiaries from the international agricultural price consequences expected from the Uruguay Round. On the one hand, food aid therefore seems a natural vehicle for the compensation of those least-developed, food deficit countries (like Bangladesh) who apparently lose from the Round. It is not surprising that *increases* in food aid have been recommended in some international forums as a means of compensating the losers from the Uruguay Round.

On the other hand, such compensatory adjustments remain hypothetical. The most likely response of food aid donors seems to be the reverse of these recommendations—a *reduction* in food aid commitments. Implementation of the Uruguay Round agreement will mean that production-based subsidies will fall, and the surpluses in food-subsidising industrialised countries that previously contributed to food aid supplies will also fall. Some food aid donors have also reportedly experienced political pressures to reduce their quantitative commitments to food aid, in response to the Uruguay Round, including countries not presently subsidising grains production. The reason is that at present volumes of food aid the increases in the international prices of agricultural commodities will have adverse budgetary implications for their aid agencies. These agencies must purchase the food they deliver as aid and increases in grain prices mean increased budgetary costs of food aid. Unless the overall aid appropriation also rises, which seems unlikely, the share of the total aid package represented by food aid will increase, presumably requiring cuts in other forms of aid—unless the quantity of food aid committed is reduced. [3] The Uruguay Round final agreement specifically rules out reductions in food aid in response to the Round. [4] Nevertheless, reductions of precisely this kind seem the most likely outcome.

The analysis uses a general equilibrium approach, based upon a modified version of a 19-sector computable general equilibrium model of the Bangladesh economy, documented in Ahammad (1995). Our quantitative analysis will ask, first, how the economic benefits derived from food aid are affected by the policy environment within the recipient country, especially as regards policy towards commercial food imports. Second, we ask how much the negative implications the Round will have for the least-developed food deficit countries would be magnified if donors were to *reduce* their food aid commitments in response to their increased budgetary costs. Third, we shall ask what *increases* in food aid would be required if food aid were used as a compensatory instrument to offset the negative effects the Uruguay Round would otherwise have on apparent losers. Finally, we also study the relationship between the size of the required compensation, in the form of food aid, and the degree of liberalisation undertaken by the food aid recipient country itself.

2. Background: the Bangladesh economy

As shown in Table 1, Bangladesh is characterised by low per capita income and slow growth, and a large, negative resource-balance to GDP ratio. The structure of GDP began to change only in recent years and agriculture remains a large share of national output and employment. Since the early 1980s, the contribution of services to GDP has exceeded that of agriculture, while industry's contribution has remained static at around 16%.

[2] Based on an average of total food aid shipments from 1990 to 1993, inclusive. Source: FAO, *Food Aid in Figures*, 1992 and 1993.

[3] Australia's food aid programme provides an example of this process. Increased world grain prices in 1996 forced reductions in planned quantities of future food aid commitments, due to their budgetary implications.

[4] See the Ministerial Declarations on Food Security found in the annex to the Uruguay Round text. This material is accessible on the World Wide Web at: http://ananse.irv.uit.no/trade_law/gatt/nav/toc.html.

Table 1
Bangladesh: key economic indicators, selected years

	1973	1981	1983	1985	1988	1990	1992
Current GNP per capita (US$)	80	150	150	150	180	210	220
Real GDP growth (%)	−0.2	9.5	4.6	3.9	2.8	6.6	4.2
Structure of GDP (%)							
Agriculture	57	40	40	42	39	36	34
Industry [a]	12	17	17	16	15	16	17
Manufacture	9	11	11	10	8	9	9
Services	31	43	43	42	46	48	49
Resource balance (% GDP) [b]	5	−12	−12	−11	−9	−10	−6
Terms of trade (1987 = 100)	164	93	100	122	97	104	116
Gross savings (% of GDP)	4.2	6.2	5.6	4.6	6.3	5.4	9.9
Inflation [c] (%)	49	16	9	11	9	8	5

[a] Industry consists of mining, manufacturing, construction, electricity, water and gas.
[b] Defined as the value of exports of goods and non-factor services minus the value of imports of goods and non-factor services.
[c] Based on consumer price index (CPI).
Sources: Government of Bangladesh (1992, 1993, 1994a) and World Bank (1993).

Since the mid-1980s, the structure of export trade has changed significantly. Table 2 shows that the export shares of the traditional agro-based exports, jute, jute goods and tea, have declined while garments exports, which were insignificant in 1973, have become the major gross foreign exchange earner. In 1993, more than half of gross export dollars were earned by garments alone. Exports of leather and leather products, shrimp and fish are also substantial. While the shift from traditional exports to non-traditional exports is evident, heavy reliance on one or two broad commodities still continues: garments dominating in the 1980s and 1990s and jute goods dominating in the period up to and including the 1970s.

About 60% of total garments exports go to the USA under the Multi-Fibre Arrangement (MFA). This arrangement, which controls world trade in textiles and garments, formally expired in December 1992 and was due for renegotiation. The conclusion of the Uruguay Round of the GATT provides that the MFA is to be phased out over a 10-year period. Increased competition following the withdrawal of export quotas under the MFA would lead to lower

Table 2
Bangladesh: structure of exports, selected years

	1973	1981	1983	1985	1988	1990	1992	1993
Total exports (million US$)	354	711	686	934	1231	1524	1994	2383
Total exports (% of GDP)	6.1	5.0	5.6	6.0	6.4	6.8	8.4	9.6
Commodity group (% of total)								
Raw jute	37.8	16.8	16	16.1	6.6	8.2	4.3	3.1
Jute goods	52.3	51.6	46.6	41.7	24.4	21.5	15.2	12.3
Tea	2.7	5.7	6.8	6.5	3.2	2.6	1.6	1.7
Leather and leather products	4.5	8.0	8.5	7.5	11.9	11.7	7.5	6.3
Ready-made garments	[a]	0.5	1.7	12.5	35.3	40.0	53.4	53.3
Shrimp and fish	1.3	5.6	10.5	9.3	11.8	9.5	6.8	7.3
Others	1.4	11.8	9.9	6.4	6.8	6.5	11.2	16.0
Export price index (1987 = 100)	58	96	94	108	99	115	129	[b]

[a] Insignificant.
[b] Not available.
Sources: Government of Bangladesh (1994a,b) and World Bank (1993).

Table 3
Bangladesh: composition of imports, selected years

	1973	1981	1983	1985	1988	1990	1992	1993
Total imports (million US$)	780	2533	2309	2647	2986	3759	3464	3986
Total imports (% of GDP)	13.1	17.7	18.7	16.9	15.6	16.8	14.6	16.1
Commodity group (% of total)								
Food and major primary goods	54.7	28.1	35.5	31.6	25.2	12.8	14.4	10.2
Rice	[a]	1.6	4.2	6.6	5.0	2.7	0.1	0.2
Wheat	[a]	8.3	11.7	12.2	11.4	6.4	7.2	3.5
Major intermediate goods	16.1	16.7	13.5	16.3	15.9	17.8	17.2	18
Edible oil	1.3	3.6	3.6	3.9	5.9	5.3	4.1	3.8
Petroleum	3.9	6.3	3.6	5.0	4.6	4.6	4.9	4.1
Fertiliser	3.1	4.1	2.9	5.2	1.5	1.2	3.4	3.3
Cement	0.9	1.3	1.9	1.0	2.2	2.2	3.1	2.9
Capital goods	12.8	27.2	25.9	26.1	36.5	34.5	37.1	31.3
Miscellaneous	25.8	28.0	25.1	26.0	22.4	34.9	31.3	40.5
Import price index (1987 = 100)	35	103	94	89	102	110	111	[a]

[a] Not available.
Sources: Government of Bangladesh (1994a,c) and World Bank (1993).

world prices of garments. At least in the short run, it will have adverse implications for the balance of trade, employment and welfare of a country where 50% of merchandise exports earnings are from garments. [5]

2.1. Food imports: political sensitivity and budgetary implications

An important change in the structure of Bangladesh's import trade over the past 2 decades has been the increased share of capital goods relative to that of food and major primary goods. Nevertheless, Table 3 indicates that food, predominantly rice and wheat, constitutes a considerable proportion of the total import bill with a combined share which ranged between 19 and 4% over the decade to 1993. Meeting the growing consumption requirements for cereals, particularly rice, remains an important political issue and a central objective of public policy.

About 80% of the total cultivated area of Bangladesh is devoted to intensive rice and wheat production, but this commitment of resources does not produce sufficient food to meet demand. [6] Imports account for an average of 10% of domestic food grains absorption. As Table 4 indicates, the bulk of these imports occur through food aid, although commercial imports are also significant. [7] Aside from a partial liberalisation in early 1994, most commercial imports of food have been controlled by the government to meet target levels of availability and to maintain low and stable food prices. Rising world prices thus put pressure on the balance of payments and on the government's budget. The possibility of comprehensive food import liberalisation remains controversial within Bangladesh because it would leave domestic food grain markets vulnerable to international price fluc-

[5] The growth of Bangladesh's garment exports since the early 1980s was partly a result of reallocations from quota constrained exporting countries such as Sri Lanka and South Korea, towards the then unconstrained exporting country, Bangladesh. The success of the garments industry is also partly attributable to preferential export incentives provided by the Bangladesh government. Together with the fact that for some categories quotas have not been not binding, it appears that the Bangladesh garments industry may not be competitive internationally. Hence, a fall in the world prices of garments following the dismantling of the MFA (leading to a transfer of rents from exporting to importing countries) will affect Bangladesh negatively.

[6] The cropping intensity in 1990–91 was 171% reflecting multiple cropping (Government of Bangladesh, 1992).

[7] In 1988–89, the base period for the simulation model to be used below, the proportion of food aid in total food imports was 63%.

Table 4
Grains import by sources: 1975/76 to 1989/90 (percentage shares by total volume)

Year	Aided import	Cash/loan import
1975/76	90	10
1976/77	82	18
1977/78	82	18
1978/79	96	4
1979/80	49	51
1980/81	70	30
1981/82	91	9
1982/83	51	49
1983/84	68	32
1984/85	50	50
1985/86	91	9
1986/87	81	19
1987/88	61	39
1988/89	63	37
1989/90	56	44

Source: Hamid (1991).

tuations—not unlike those projected to occur as a result of the Uruguay Round.

2.2. *Import substitution*

The Bangladesh government has pursued a protectionist, import-substitution industrialisation strategy. For some selected manufacturing industries it established import controls to insulate domestic markets from international competition. These included outright bans and discretionary quantitative restrictions through import policy orders, import licenses and tariffs. Until 1984, import licenses were used to ration foreign currency at the official exchange rate to importers. The extent of the commodity coverage of the import licensing system has subsequently declined.

The tariff structure designed for protecting some selected domestic industries is also used to raise government revenue. Even in the late 1980s, more than 30% of total government revenue came directly from tariffs (Government of Bangladesh, 1993). The result was high and discretionary rates of protection which, instead of merely guiding investment decisions, have tended to be an instrument of ensuring the ex post profitability of selected industrial investments. Import controls and limited export incentives have meant that adjustments to the official exchange rate have played a minor role as an instrument of trade policy (Ahammad, 1995, p. 17). The taka (the Bangladesh currency) has been over-valued in the sense that, because of tariffs and exchange controls, the official exchange rate (taka per US$) has been lower than it would have been, at an unchanged money supply, if these barriers to trade had been eliminated.

Agricultural and agro-based exports (mainly jute, jute products and tea) have been seriously disadvantaged by Bangladesh's trade policies. The overall policy bias lies in protecting industry at the expense of agriculture, directly through tariffs and non-tariff barriers (NTBs), and indirectly through the overvalued exchange rate. An anti-export bias was also evident—with the possible exception of garments, which has access to duty free imports, some export incentives and a secured overseas market. Estimates of effective rates of protection by Hutcheson (1986), summarised in Table 5, indicate that the average effective rate of protection for import-substituting activities was 135% compared with 11% for export industries. The overall level of effective protection to manufacturing was 114% as against 13% to agriculture, and for rice and wheat it was around 4%. The policy bias against food production has contributed to the continued dependency on food imports, predominantly consisting of food aid. Food security continues to be a serious concern for the government, but the problem has been partly self-induced.

In the 1980s several attempts were made to reform the tariff structure by reducing the variance of tariffs. In 1986, the number of statutory rates was reduced from 24 to 11. In 1988 the government adopted a phased 3-year programme intended eventually to reduce maximum tariffs: (i) for most final good imports, from over 200% to 100%; (ii) for raw materials, to 20% and (iii) for intermediate products, to 75%.

Despite these trade policy reforms, Bangladesh remains highly protectionist. Bhuyan and Rashid (1993) estimated the effective rates of protection for selected industries using survey data for 1990 and the Balassa et al. (1971) method of treating non-traded inputs. The estimates showed that industries received degrees of nominal and effective protection which varied widely. Wet-blue cow leather had a 4483% effective rate of protection for domestic sale,

while hand loom industry produce had effective protection as low as 20%. Negative effective protection, due to value added at border prices exceeding value added at domestic prices, was also found for several industries. [8]

Table 5
Bangladesh: nominal and effective rates of protection (%)

	Nominal	Effective [a]
Industry estimates		
Rice growing	5.0	3.9
Wheat growing	5.0	3.6
Jute growing	22.4	25.9
Cotton growing	23.4	31.6
Tea cultivation	2.3	−6.1
Other crops	5.0	1.6
Livestock	7.9	6.9
Fishing	11.6	6.5
Forestry	32.6	33.8
Sugar	42.7	291.9
Edible oils	35.4	962.2
Salt	28.6	30.2
Tobacco products	7.5	−89.8
Other foods [c]	28.7	44.0
Cotton yarn	56.3	[b]
Mill-made cloth	48.9	61.8
Hand loom cloth	48.5	45.8
Jute textiles	2.1	−5.2
Paper and paper products	69.6	290.4
Leather	2.7	−29.6
Fertiliser	−6.5	−28.6
Pharmaceuticals	33.2	21.8
Other chemicals [c]	58.0	225.6
Cement	13.9	−15.5
Basic metals	52.2	62.6
Metal products	61.9	87.5
Machinery	26.0	9.6
Automotive vehicles	147.2	994.8
Wood products	34.8	41.6
Miscellaneous products [c]	55.5	92.1
Petroleum products	27.7	38.5
Sectoral averages		
Primary activities	7.1	12.6
Manufacturing	45.9	114.3
Import substituting sectors	49.5	134.9
Export sectors	10.2	11.2

[a] Based on 1977 inter-industry table. The estimates were based on the conversion factor approach (for details, see Hutcheson, 1986). The rates based on the prevailing exchange rate were called 'gross effective rates of protection'. If the entire protection structure were withdrawn, the exchange rate would have to rise sufficiently to maintain the same trade balance as before. The gross effective rates adjusted for such exchange rate effects, are the 'net effective rates of protection' (Hutcheson, 1986).
[b] Negative value-added at border prices.
[c] Not elsewhere clarified.
Source: calculated from Hutcheson (1986).

Import-substitution activities continued to enjoy very high protection (Bhuyan and Rashid, 1993). Stern et al. (1988) estimated the real effective trade-weighted exchange rates for imports and exports, incorporating the effects of taxes, subsidies, relative inflation rates and changes in the relative values of trading partner currencies. From 1974 to 1985, the real effective exchange rate for imports consistently exceeded the real effective exchange rate for total exports. The real effective exchange rates for non-traditional exports (mainly garments) always exceeded those for total exports, reflecting the policy bias towards the non-traditional activities and discrimination against the traditional agricultural exports.

2.3. Implications of the Uruguay Round

Bangladesh has been among the developing countries which have protested the possible negative implications of the Uruguay Round for their international trading position. These concerns would seem, in general terms, to be well founded. In Table 6 we summarise the results of ten previous studies which have projected the changes in world commodity prices which may result from the conclusion of the Uruguay Round.

It must be stressed that the price changes summarised in Table 6 represent the projected effects of the Uruguay Round, ceteris paribus. They project the differences between the prices that will emerge after the completion of the Round compared with what those prices would otherwise have been if the Round had not been successfully completed but all other

[8] Negative rates of effective protection can also occur for another, quite different reason—negative value added at border prices. Negative rates arising from this source indicate industries receiving very high rates of protection because without their protection they would become non-viable. At least one example of this kind can be found for Bangladesh—a rate of −693% for cotton fabric. It is obviously important to distinguish negative effective rates arising from negative value added at border prices from the more usual source of (positive) value added at border prices exceeding value added at domestic prices because their implications are entirely opposite.

Table 6
Projected impact of the Uruguay Round on world prices (%)

Industry		S1		S2	S3	S4	S5	S6	S7	S8	S9	S10	S_M	S_X
		cif	*fob*											
1	Rice	6.60	7.10	16.87	8.48	8.00	10.00	7.00	−1.90	5.60	1.99	4.22	0.00	1.20
2	Wheat	10.30	10.90	12.52	13.26	8.00	7.00	7.00	5.90	30.20	4.35	6.32	0.00	5.46
3	Jute [a]	4.60	5.40	−0.45	−0.15								10.04	0.00
4	Tea [a]	0.60	0.60	−0.59	−0.51				3.00	17.50	1.88	2.34	0.28	0.00
5	Fishing [a]	1.10	1.10	−0.66	−0.21								13.18	0.00
6	Forestry [a]	1.80	2.20	−0.88	−0.55								0.01	0.00
7	Edible oil	4.60	5.40	−0.45	−0.15	6.00		7.00	4.10	17.70	2.51	4.52	0.00	5.03
8	Other agriculture	1.70	1.80	−0.07	0.71	2.00	2.00	4.00	5.90	27.10	1.23	2.23	2.12	10.53
9	Sugar refining	4.60	5.40	−0.45	−0.15	1.00	1.00	3.00	10.20	59.30	6.31	10.18	0.00	3.50
10	Textiles	−6.70	−7.10	−1.07	−1.85								0.00	3.25
11	Garments [a]	−6.70	−7.10	−2.14	−14.51								29.36	0.16
12	Jute textiles [a]	4.60	5.40	−1.07	−1.85								26.92	0.00
13	Paper and paper products	0.20	0.10	−0.77	−0.71								1.08	2.10
14	Leather & footwear [a]	0.20	0.10	−0.99	−1.56								13.27	0.01
15	Chemicals	0.20	0.10	−0.74	−0.59								0.04	4.60
16	Other manufacturing	0.20	0.10	−0.57	−0.32								3.68	64.14
17	Physical overheads	0.60	0.60	−0.43	−0.05								0.00	0.00
18	Social overheads	0.60	0.60	−0.22	−0.42								0.00	0.00
Export price index		na	0.11	−1.21	−5.01	0.04	0.04	0.09	0.14	0.63	0.03	0.05		
Import price index		1.13	na	0.39	0.56	1.08	0.75	1.34	1.48	7.54	0.74	1.21		
Terms of trade		−1.02		−1.60	−5.57	−1.04	−0.71	−1.25	−1.34	−6.91	−0.71	−1.16		

[a] Exporting industry in the Bangladesh CGE model.
S1 is Scenario 1 based on Duncan et al. (1994); S2 is Scenario 2 based on Table 3 in Dee et al. (1992); S3 is Scenario 3 based on Dee (1994); S4 is Scenario 4 drawn from Table 1 in Andrews et al. (1994); S5 is based on Scenario 1 of Table 9 in Vanzetti et al. (1994); S6 is based on Scenario 1 of Table 2 in Vanzetti et al. (1993); S7 and S8 are based on Scenario 1 (PLIBA) and Scenario 2 (FLIBA), respectively, of Table 3.1 in Goldin et al. (1993); S9 and S10 are Scenario 9 and Scenario 10 drawn, respectively, from columns 1 and 5 of Table 7 in Brandao and Martin (1993).
S_X and S_M are, respectively, the industry's shares in base-year aggregate exports and imports in Bangladesh.
na, not applicable.

relevant circumstances had been the same. That is, these projections should not be confused with predictions of the price changes that will *actually* occur in the period following the Round. These actual price changes will be products of many changes in market conditions other than the completion of the Uruguay Round and the projections shown in Table 6 do not allow for factors other that the completion of the Round itself.

The price changes indicated in Table 6 refer to a time frame of 6 to 10 years after the conclusion of the Round, during which the policy adjustments agreed upon in the Round are to be implemented. Table 6 refers to price changes after this period of adjustment, but are to be considered permanent thereafter. Since the early 1990s, perceptions of the achievements of the Uruguay Round have abated significantly. In general, the more recent the study, the more modest are the changes in international prices projected to result from the Round.

In the final two columns of Table 6 we show Bangladesh's import and export shares for each of the commodities shown. These trade shares are used as the basis for calculating the projected changes in Bangladesh's terms of trade in the last row of the table. Although the ten studies shown differ considerably in the modelling basis for their price projections, all imply a deterioration in Bangladesh's terms of trade. [9] Of these, the set of results reported by

[9] For a critical review of the simulation models underlying most of these studies, see Schott and Buurman (1994).

Duncan et al. (1994) have been used as the basis for our simulations based on the Uruguay Round, to be presented in Table 8, below.

3. The simulation model

The global economic models used to study the impact of the successful conclusion of the Round, as summarised in Table 6, vary somewhat in their behavioural assumptions, but more significantly in their geographical (i.e. regional) dimensions and levels of commodity aggregation. In all such global models of which the authors are aware, the Bangladesh economy is aggregated together with many other economies with diverse production and trade compositions, producing aggregates such as the entire 'South Asia' region or 'low income Asia'. The need to simplify such global models is obvious, but important information can be lost through aggregation. The effects that the Uruguay Round has on the Bangladesh economy could well be significantly different from those found for the region or country group within which Bangladesh is included.

This study uses a 19-sector computable general equilibrium (CGE) model of the Bangladesh economy, based on the model documented in Ahammad (1995), which featured a dual foreign exchange market. In view of the recent dismantling of the legal secondary exchange market, the earlier model is modified for the purpose of the present study to incorporate a single unified exchange rate. The Bangladesh model belongs to the Johansen class of CGE models. The structural equations are specified in percentage change form. Each sector produces a single composite commodity using intermediate inputs and two primary factors—labour and capital. The two primary factors are Cobb–Douglas substitutes for one another in the production of a composite primary factor input. Production functions for industry output then use each of the intermediate inputs and the composite primary input in fixed proportions.

Sectors maximise their total revenue by producing for domestic and overseas markets. Outputs sold domestically are imperfect substitutes for exported output. Symmetrically, goods produced domestically are treated as imperfect substitutes in domestic demand for imported goods within the same statistical category. Only one representative household is considered, which maximises utility given its income from profits, wages and net transfers from the government. Consumer demands for commodities are based on a linear expenditure system (LES). The government also intervenes in domestic markets through indirect taxes, including trade taxes. Any surplus or deficit in the government budget is financed by lump-sum subsidies to or taxes on the household.

The version of the Bangladesh model used in this paper includes data base and structural amendments intended to improve its capacity to handle issues involving food aid. Imports of foodgrains (rice and wheat) are divided into food aid and commercial import categories. Commercial imports enter the balance of payments as a debit item but food aid imports do not. The latter are assumed to be sold domestically by the Bangladesh government and the proceeds of these sales enter general government revenue. It will be evident that the economic mechanism by which the level of commercial imports is determined will have important consequences for the simulated effects of food aid.

4. The data base and simulation experiments

The model contains base period structural coefficients including cost, revenue and sales shares. The share coefficients are calculated from the same input–output table for 1989 used by Mansur and Khondker (1991), supplemented by data from other official documents. [10] The model also contains behavioural elasticities, which include: elasticities of substitution in demand between domestically produced and imported commodities (Armington elasticities); [11] elasticities of transformation in production between goods destined for the domestic market and exports; substitution elasticities between primary factors; household expenditure elasticities; world export

[10] The table in Appendix A.1 summarises the characteristics of the industries appearing in the model.

[11] The Armington elasticities were derived from Adelman and Robinson (1978) and Habito (1984).

demand elasticities. [12] The elasticity parameters were based on an extensive literature search. The complete sets of input–output data files and the elasticity and miscellaneous parameter files are documented in Ahammad (1995). [13]

4.1. Model closure

The simulations are designed to evaluate the impact of changes in food aid, on the one hand, and the successful completion of the Uruguay Round on the other. We examine their effects on the structure of the economy and on economic welfare within Bangladesh in a *one-period* framework. Household welfare depends on its real consumption of goods and services. The changes in the Bangladesh economy, brought about by the exogenous changes in food aid or in world prices following the multilateral trade liberalisation under the Round, are constrained to channel into household consumption within Bangladesh. To do this, investment expenditures of all kinds, government current consumption, and the balance of trade are held at their base-year levels. This is done because changes in these variables would lead to real-world benefits but would not lead to any *measured* benefits to the household in a one-period modelling context, as measured by changes in its real consumption. The government budget is balanced in the sense that any increase (decrease) in the government's net budget surplus is transferred to (from) households in lump sum form. A fixed current account deficit should be understood to mean that any short-run change in the current account balance will be eliminated by policy adjustments exogenous to the model.

As explained above, the economy is a price taker for its imports, and faces constant elasticity downward-sloping foreign demand curves for its exports. However, unless otherwise stated, the government is assumed to possess monopoly power with respect to all food imports. This is captured in the model used here by exogenising commercial food imports and thus endogenising the difference between *cif* import prices for food and the domestic prices for these imports. For all commodities except jute and jute goods, export demand elasticities are finite but very large. The world prices for these commodities are 'almost' exogenous. But Bangladesh enjoys some market power for world trade in jute and jute products, as discussed above. Any rise (or fall) in Bangladesh exports of jute and jute products would, therefore, reduce (or raise) their world prices. As a result of the supply responses of Bangladesh exporters, price rises (or falls) of jute and jute goods would be somewhat less than those actually predicted by those studies under consideration. The low elasticities for jute and jute products are based on the empirical studies (Imam, 1970; Nguyen and Bhuyan, 1977; Thomas, 1979).

The model treats capital as industry-specific. A slack employment market under constant real wages is assumed so as to capture the reality of involuntary unemployment in Bangladesh. Any government budget deficit (or surplus) on account of food subsidies is financed by lump-sum taxes on (or subsidies to) the household, thereby affecting household welfare. There is an unlimited number of possible alternative ways for the government to finance the food budget which will, ultimately, also affect household welfare. But in assuming lump-sum taxes or subsidies we are abstracting, for simplicity, from the possible distortionary impacts associated with alternative methods of financing.

The closure described above is the base case. For some simulations, this closure is amended, particularly with respect to the treatment of commercial food imports. The presentation of our results will be in three parts. First, we simulate the effects that changes in the level of food aid delivered to Bangladesh have on the Bangladesh economy, in isolation from the effects of the Uruguay Round. Next, we take the results of past studies on the implications that the conclusion of the Uruguay

[12] See Ahammad (1995) for further discussion of the sources of all parameters used.

[13] In assembling the present version of the model some minor adjustments were made to the *cif* import values and *fob* export values for some relevant commodities from those shown in Ahammad (1995). The reasons are that the present version of the model incorporates a single unified exchange rate, eliminating the implicit tariffs or export subsidies previously present under the multiple exchange rate system, and also that total food (rice and wheat) imports are decomposed into aid and commercial import components, requiring that each component be treated appropriately for balance of payments purposes.

Round of the GATT may have for international commodity prices, as summarised in Table 6 above and apply them as exogenous shocks to the Bangladesh model. Then, finally, we explore the relationship between food aid and the effects of the Uruguay Round, focusing on the way the domestic policy environment within Bangladesh affects this relationship.

5. Simulation results [14]

5.1. Effects of food aid

Table 7 summarises the simulated effects on the Bangladesh economy of exogenous changes in the level of food aid. The simulations presented are designed to show the relationship between the effects of food aid and the domestic policy environment within Bangladesh with regard to food grain imports. The results are expressed as the percentage changes in endogenous variables of interest resulting from a 10% increase in the type of food aid indicated. The simulations reported in Table 7 fall into two sets. *Set 1*, indicated by the suffix 1 (A1, B1 and so forth), reflects the assumption that commercial food imports (all food imports other than food aid) are subject to fixed government controls. *Set 2*, indicated by the suffix 2 (A2, B2, ...), assumes that commercial food imports are liberalised.

Table 7 shows the effect of an *increase* in food aid merely for convenience. The linearity of the underlying model implies that the effects of a 10% *reduction* in food aid are the same as those shown, but with all signs reversed. In simulation A1 rice food aid is increased by 10%, in B1 wheat food aid is increased by 10% and in C1 both forms of food aid are each increased by 10%. Linearity also implies that the results of simulation C1 are simply the sum of those obtained from A1 and B1.

Within Set 2, simulations A2 through C2 are identical to A1 to C1, respectively, except that they are carried out on the assumption that commercial food imports are market determined. The quantity of such imports is determined by domestic demand for imports at the going price and the domestic price of these imports is determined by the *cif* price of imports and the exchange rate. In Bangladesh, neither rice nor wheat imports are subject to tariffs and our treatment reflects this reality. [15] It follows that in simulation Set 2, but not in simulation Set 1, the quantities of commercial imports of rice and wheat may adjust in response to exogenous changes in food aid or to other external shocks. [16]

In modelling terms, the difference between the simulation experiments in Sets 1 and 2 is that in Set 1, the quantities of commercial imports of rice and wheat are each exogenously fixed and the domestic prices of these imports are endogenously determined. In Set 2, the quantities of these imports are each endogenous and the domestic producer and consumer prices of each of these two kinds of imports are determined by the *cif* prices of these imports and the exchange rate.

An increase in food aid in the form of rice, in the presence of exogenously fixed commercial imports of rice and wheat (column A1 of Table 7), leads to a reduction in the domestic producer price of rice and hence to reduced rice production. Rice producers' incomes also fall in real terms. [17] The changes in relative prices lead to an increase in non-rice agricultural production. Consumption of rice as well as aggregate consumption increases. As rice constitutes a major share of agricultural value added, aggregate agricultural output falls. Manufacturing output and services expand, resulting in an overall increase in GDP at market prices. The demand for labour expands and aggregate employment rises at the exogenously fixed real wage. The rise in aggregate consumption is an indicator of a welfare improvement.

A 10% increase in food aid in the form of wheat (column B1 of Table 7) is also welfare augmenting.

[14] For the reader's convenience, the table in Appendix A.2 summarises the economic meaning of the various simulation experiments reported in Tables 7 and 8.

[15] The bound rates of duty submitted to the GATT in Bangladesh's country schedule were 50%. Source: Bangladesh submission to GATT (1994).

[16] Linearity also implies that the results of C2 are the sum of those of A2 and B2.

[17] This can be inferred from the fact that the fall in price plus the fall in production exceeds the fall in the CPI.

The larger welfare gain from a 10% increase in wheat aid is due primarily to the fact that the share of wheat in the total value of food aid at *cif* prices in the base year is considerably larger than that of rice. Effects on the domestic wheat market are also larger than was the case with rice food aid and the domes-

Table 7
Bangladesh: effects of 10% increase in food aid (percentage change from base year level)

	A1, rice	B1, wheat	C1, total	A2, rice	B2, wheat	C2, total
Key macro variables						
GDP at market prices (real)	0.006	0.050	0.057	0.020	0.089	0.109
Consumer price index (CPI)	−0.007	−0.063	−0.070	0.039	0.174	0.213
GDP (at market prices) deflator	−0.007	−0.062	−0.070	0.045	0.199	0.244
Nominal wage	−0.007	−0.063	−0.070	0.039	0.174	0.213
Employment effects	0.001	0.050	0.051	0.008	0.036	0.044
Aggregate exports (volume)	0.013	0.111	0.124	−0.152	−0.669	−0.821
Aggregate imports (volume)	0.003	0.023	0.026	−0.032	−0.141	−0.173
Aggregate consumption (real)	0.006	0.050	0.056	0.021	0.093	0.114
BOT deficit in current world prices (US$) [b]	[a]	[a]	[a]	[a]	[a]	[a]
Output aggregates (real)						
Agriculture	−0.004	0.009	0.005	0.005	0.020	0.025
Manufacturing	0.006	0.049	0.054	−0.023	−0.103	−0.127
Services	0.005	0.035	0.040	0.010	0.043	0.053
Exporting	0.006	0.053	0.059	−0.034	−0.148	−0.182
Import-competing	−0.002	0.015	0.013	0.002	0.007	0.009
Producer price						
Rice	−0.022	−0.038	−0.060	0.044	0.195	0.239
Wheat	−0.001	−1.090	−1.091	0.031	0.135	0.165
Industry output						
Rice	−0.018	0.023	0.005	0.007	0.032	0.039
Wheat	0.007	−1.518	−1.511	−0.010	−0.043	−0.053
Terms of trade effects						
Export price index	−0.002	−0.013	−0.015	0.016	0.069	0.084
Import price index	[a]	[a]	[a]	[a]	[a]	[a]
Difference	−0.002	−0.013	−0.015	0.016	0.069	0.084
Commercial imports (real)						
Rice	[a]	[a]	[a]	−18.386	2.907	−15.479
Wheat	[a]	[a]	[a]	0.304	−15.944	−15.640
Consumer price (real)						
Rice	−0.018	0.025	0.007	0.005	0.021	0.026
Wheat	0.009	−2.631	−2.622	−0.028	−0.127	−0.156
Food consumption (real)						
Rice	0.006	0.021	0.028	0.008	0.036	0.044
Wheat	0.003	0.673	0.676	0.020	0.087	0.107
Food aid (real)						
Rice	10.000	[a]	10.000	10.000	[a]	10.000
Wheat	[a]	10.000	10.000	[a]	10.000	10.000

[a] Exogenously fixed.
Guide to simulations: A1, B1 and C1, food aid increased by 10% with fixed commercial food imports fixed exogenously; A2, B2 and C2, food aid increased by 10% with commercial food imports liberalised.
[b] BOT deficit is the current account trade deficit.
Source: authors' computations.

tic rice market because wheat food aid represents a much larger share of the domestic market for that commodity than is the case with rice.

When commercial imports are liberalised, as in simulation Set 2, an increase in food aid in the form of either rice or wheat induces a reduction in commercial imports, but is still welfare improving. Since the social benefit derived from a unit increase in food aid in this situation is its *cif* value, the form in which food aid is given (rice or wheat) is unimportant. This fact is reflected in the proportionality relationship between the effects of an increase in rice aid (column A2) and the corresponding effects of that in wheat aid (column B2). [18] The constant of proportionality reflects the relative *cif* values of a unit proportional increase in each of these two forms of food aid. When commercial food imports are liberalised it is solely the *cif* value of the aid, in whichever form it takes, that determines the magnitude of its economic effects.

The effects on the domestic markets for wheat and rice are quite different in these two sets of cases. Three important points to notice are first, that in simulation Set 2, commercial imports decline substantially when food aid is increased. This is unsurprising but it is the key to understanding the difference between the results of simulation Sets 1 and 2. When commercial food imports are liberalised, the increased consumption that an increase in food aid makes possible is taken partly in the form of imports of commodities *other than food.* Second, as a result of this fact, the increase in food consumption which results from a 10% increase in food aid is smaller in simulation Set 2 than in Set 1. Third, the simulated increase in overall welfare (aggregate real consumption) resulting from food aid is significantly larger in simulation Set 2 than in Set 1.

When commercial food imports are liberalised, it is possible to substitute freely between food aid and commercial imports. In welfare terms, it is *efficient* to consume the benefits of increased food aid partly in the form of increased imports of commodities other than food. When the level of commercial food imports is market-determined (Set 2), this is exactly what happens. A decline in commercial imports of food is the means by which part of the value of the increased food aid is consumed in the form of non-food imports. But when the quantity of commercial food imports are fixed (Set 1), these adjustments are impeded; a contraction in food imports, freeing foreign exchange for increased purchases of non-food imports, cannot occur. The value of the food aid, in terms of the increase in consumer welfare that it produces, is correspondingly smaller. The resulting increase in food consumption is smaller when food imports are liberalised, but the welfare gain is larger —more than double. Clearly, the economic effects of food aid depend heavily on the government's policy stance with respect to commercial food imports.

5.2. *Implications of the Uruguay Round*

Table 8 summarises the results of a set of simulations designed the draw out the relationships between the effects of the Uruguay Round and the policy responses of both the food aid donor and recipient countries. Columns D1 and D2 simulate the effects of the post-Uruguay Round changes in international prices summarised in Table 6 (based on the *cif* and *fob* columns marked S1), under the two different domestic policy environments regarding commercial food imports discussed above in relation to Table 7. In simulation D1 the volumes of commercial food imports are exogenously fixed and in D2 these imports are liberalised. The volume of food aid is fixed exogenously at the base-year level in both D1 and D2.

It is not surprising that welfare (aggregate real consumption) falls in both scenarios depicted in simulation Sets 1 and 2. In simulation D2, commercial food imports decline in response to the increase in their price. This adjustment reduces the welfare impact of the increases in international food prices induced by the Uruguay Round because Bangladesh is able to substitute away from the imports which have become more costly. But these adjustments are again impeded when the quantities of commercial

[18] The economic basis for this result is that in simulation set 2, where imports of rice and wheat imports are liberalised, imported rice and wheat correspond to pure traded goods. Their social values (shadow prices) are proportional to their *cif* prices (Warr, 1977). In simulation set 1, the quantitative restrictions on imports of rice and wheat mean that these commodities are not strictly traded goods and their social values (shadow prices) are not necessarily proportional to their *cif* prices (Warr, 1982).

Table 8
Bangladesh: effects of post-Uruguay Round world price changes (percentage change from base year level)

	D1	D2	E1	E2	F1	G1
Key macro variables						
GDP at market price (real)	−0.131	0.051	−0.186	−0.054	0.009	0.295
Consumer price index (CPI)	−0.147	0.796	−0.077	0.591	−0.304	−1.622
GDP (at market price) deflator	−0.373	0.675	−0.305	0.440	−0.537	−2.131
Nominal wage	−0.147	0.796	−0.077	0.591	−0.304	−1.622
Employment effects	−0.201	−0.211	−0.253	−0.253	−0.171	0.618
Aggregate exports (volume)	0.200	−2.964	0.077	−2.175	0.491	6.375
Aggregate imports (volume)	−0.947	−1.612	−0.973	−1.446	−0.887	0.360
Aggregate consumption (real)	−0.332	−0.132	−0.387	−0.242	−0.192	0.070
BOT deficit at current world prices (US$) [b]	[a]	[a]	[a]	[a]	[a]	[a]
Output aggregates (real)						
Agriculture	0.084	0.160	0.077	0.136	0.002	0.329
Manufacturing	−0.835	−1.437	−0.889	−1.316	−0.711	0.117
Services	−0.190	−0.143	−0.229	−0.194	−0.088	0.157
Exporting	−0.178	−0.980	−0.237	−0.805	−0.042	1.654
Import-competing	−0.226	−0.232	−0.240	−0.241	−0.273	−0.040
Producer price						
Rice	−0.228	0.799	−0.174	0.5691	−0.699	−1.540
Wheat	−0.246	3.646	0.877	3.487	−0.432	−1.490
Industry output						
Rice	−0.120	0.028	−0.132	−0.010	−0.501	0.075
Wheat	−0.243	4.183	1.316	4.234	−0.314	0.078
Terms of trade effects						
Export price index	−1.041	−0.710	−1.026	−0.792	−1.075	−1.647
Import price index	0.750	0.750	0.750	0.750	0.750	[a]
Difference	−1.791	−1.460	−1.776	−1.542	−1.825	−2.396
Commercial imports (real)						
Rice	[a]	−78.225	[a]	−69.080	[a]	[a]
Wheat	[a]	−47.259	[a]	−31.040	[a]	[a]
Consumer price (real)						
Rice	−0.081	0.015	−0.095	−0.010	−0.459	0.088
Wheat	−0.251	7.218	2.453	7.367	−0.459	0.088
Food consumption (real)						
Rice	−0.136	−0.083	−0.162	−0.125	[a]	[a]
Wheat	−0.152	−1.863	−0.847	−1.965	[a]	[a]
Food aid (real)						
Rice	[a]	[a]	−6.600	−6.600	209.833	−19.212
Wheat	[a]	[a]	−10.300	−10.300	1.477	0.229
Total	[a]	[a]	−9.614	−9.614	40.092	−3.375

[a] Exogenously fixed.
Guide to simulations: D1, food aid quantities exogenous, commercial food imports fixed exogenously; D2, food aid quantities exogenous, commercial food imports liberalised; E1, food aid quantities endogenous holding the *cif* value of food aid constant, commercial imports as in D1; E2, food aid quantities endogenous holding the *cif* value of food aid constant, commercial imports as in D2; F1, food aid endogenous to maintain food (rice and wheat) consumption, commercial imports as in D1; G1, endogenous food aid with 24% cut in protection, commercial imports as in D1.
[b] BOT deficit is the current account trade deficit.
Source: authors' computations.

food imports are controlled (D1) and the welfare loss induced by the Uruguay Round is thus substantially greater—by a factor of more than 2.5. As in Table 7 above, the domestic effects of external events (an increase in food aid, as in Table 7, and the Uruguay Round induced international price changes as in Table 8) depend considerably on the domestic policy environment.

Simulations E1 and E2 are intended to show the effects of a hypothetical policy response to the Uruguay Round on the part of food aid donors. As noted above, by increasing international food prices, the Uruguay Round increases the budgetary cost of food aid to donor agencies. Suppose they were to respond by *reducing* the volume of food aid so as to keep its US dollar value constant. What would that mean for food aid recipient countries like Bangladesh? Columns E1 and E2 show the projected effects of the Uruguay Round changes simulated in columns D1 and D2, but this time with donor agencies responding as just described.

It is not surprising that the welfare loss from the Uruguay Round is magnified when donors respond in this way. That is, the estimated welfare losses found in E1 and E2 are greater than those estimated in simulations D1 and D2. The welfare loss in E2 is around 80% larger than in D2, but the loss in simulation E1 is only 17% larger than in D1. The reason for the large difference is that when the quantity of commercial food imports can be adjusted in response to the Uruguay Round (D2), food aid has greater value at the margin than it does when commercial imports are fixed in quantity terms (D1). Thus, when donors reduce their food aid in response to the Uruguay Round, the welfare loss caused is greater when commercial food imports are liberalised (E2 compared with D2) than when these imports are controlled (E1 compared with D1). Nevertheless the total welfare loss that results from the Uruguay Round combined with this response from donors remains smaller when commercial food imports are liberalised (E2) than when they are not (E1).

Finally, simulations F1 and G1 examine the *increases* in food aid that would be required if food aid were to be used as an instrument for compensating the least-developed food importing countries like Bangladesh for the welfare loss that the Uruguay Round would otherwise cause. The policy scenario depicted by these simulations is hypothetical. As noted above, reductions in food aid seem the more likely policy response for virtually all food aid donors. Nevertheless, compensatory increases in food aid have indeed been recommended and it is therefore of interest to analyse what such a prescription would actually entail. The increases in food aid shown should be interpreted as permanent increases that would be required by the end of the 6- to 10-year implementation period of the Uruguay Round agreement.

For brevity, we shall consider only the case where the quantities of commercial food imports are controlled, as in D1 and E1. From column F1, an increase in total food aid to Bangladesh of 40% would be required to achieve this outcome. [19] But column G1 varies this simulation by assuming that, at the same time, Bangladesh reduces its own rates of tariff protection (across the board) on all commodity imports subject to positive tariffs—by 24%. This is the average rate of liberalisation agreed to by developing countries at the Uruguay Round, except for the least developed countries like Bangladesh, which were exempted from any required liberalisation. In this case, simulation G1 shows that *no* increased food aid would be required to maintain welfare in Bangladesh; a small reduction in food aid would still be consistent with maintaining welfare. Another way of expressing this result is that the simulated aggregate benefits derived by Bangladesh from a 24% liberalisation of its own rates of protection would more than offset the losses it incurs from the Uruguay Round.

6. Conclusions

This paper has focused upon the food aid recipient countries, taking Bangladesh as an illustrative example, and has studied the relationship between the effects of food aid and those of the conclusion of

[19] In modelling terms, simulations F1 and G1 hold the composition of food aid between rice and wheat constant at its base value and treat the volume of food aid as endogenous so as to maintain aggregate real aggregate consumption exogenously constant.

the Uruguay Round of the GATT. We have argued that, among other factors, the magnitudes of these effects depend crucially on the policy environment within the food aid recipient country itself. We have drawn particular attention to the role of the government's policy towards commercial food imports, a controversial policy issue within Bangladesh. We have also analysed the way the effects of the Uruguay Round depend on the response of food aid donors to the international effects of the Round.

When the quantity of Bangladesh's commercial food imports is controlled by the government, the benefits derived from food aid are smaller than when these imports are liberalised. Likewise, the negative effects that the Uruguay Round may be expected to have on Bangladesh will also be larger if commercial food imports are subject to quantitative controls than if they are liberalised. Finally, we have shown that the effects the Uruguay Round will have on Bangladesh will depend significantly on the way food aid donors respond to the Round. If donors reduce the volumes of food aid in response to increased international food prices resulting from the Round, the losses incurred by the least-developed, food deficit countries (such as Bangladesh) will be magnified. But these effects will also depend heavily on whether Bangladesh itself participates in the liberalisations that are central to the Round itself. If it were to participate fully, the negative effects that the Uruguay Round would otherwise have on Bangladesh may be entirely offset by the gains Bangladesh would derive from its own liberalisation.

Acknowledgements

The helpful comments of Will Martin and an unusually thorough anonymous referee are gratefully acknowledged, along with the financial support of the Australian Agency for International Development (AusAID). The authors are responsible for all defects.

Appendix A

A.1. Industry characteristics of the Bangladesh model

Sectors	Gross output (million taka)	Value-added to ouput ratio	Capital–labour ratio	Export–output ratio [a]	Import–demand ratio [a]	Average tariff rate
Exportables						
Jute	9336	0.62	0.05	0.34	na	na
Tea	7785	0.73	13.45	0.01	na	na
Fish	35005	0.76	0.43	0.12	na	na
Forestry	31705	0.79	6.02	0.00	na	na
Ready-made garments	10714	0.31	0.52	0.87	0.14	na
Jute textiles	10204	0.44	0.08	0.83	na	na
Leather	4983	0.39	0.72	0.84	0.02	na
Importables						
Rice	164498	0.75	0.77	na	0.01	na
Wheat	6628	0.77	0.83	na	0.54	na
Edible oil	11293	0.31	2.46	na	0.43	0.23
Other agriculture	151517	0.66	1.40	0.00	0.09	0.04
Sugar	12455	0.33	0.67	na	0.33	0.23
Cotton textiles	20485	0.33	0.13	na	0.20	0.12
Paper	10821	0.15	0.90	0.03	0.26	0.27
Chemicals	23571	0.26	7.82	na	0.27	0.37
Other manufactures	110583	0.31	1.41	0.01	0.48	0.13

Non-tradables						
Physical overheads	277868	0.67	2.09	na	na	na
Social overheads	27932	0.89	0.12	na	na	na
Public administration	78172	0.83	0.53	na	na	na
Total	1005555	0.63	1.12	0.03	0.14	0.13

[a] Imports and domestic demands include both final consumption and intermediate uses.All the ratios are calculated at the basic prices. Source: Ahammad (1995).
na, not applicable.

A.2. Summary guide to simulation results [a]

A1 to C1	Food aid exogenously increased by 10%; commercial imports fixed exogenously
A2 to C2	Food aid exogenously increased by 10%; commercial imports liberalised
D1	Uruguay Round world price changes; food aid exogenously constant; commercial imports exogenous
D2	Uruguay Round world price changes; food aid exogenously constant; commercial imports liberalised
E1	Uruguay Round world price changes; food aid value exogenously constant; commercial imports exogenous
E2	Uruguay Round world price changes; food aid value exogenously constant; commercial imports liberalised
F1	Uruguay Round world price changes; food aid adjusted endogenously to maintain food consumption; commercial imports exogenous
G1	Uruguay Round world price changes; food aid adjusted endogenously to maintain real consumption; commercial imports exogenous; 24% cut in tariffs

[a] Suffixes used in the labelling of simulations: 1, indicates commercial imports fixed exogenously by quantitative government controls; 2, indicates commercial imports liberalised—freely imported at international *cif* prices and not subject to tariffs or quantitative restrictions.

References

Adelman, I. and Robinson, S., 1978. Income Distribution Policy in Developing Countries: A Case Study of Korea. Stanford University Press, Stanford, CA.

Ahammad, H., 1995. Foreign Exchange and Trade Policy Issues in a Developing Economy: The Case of Bangladesh. Avebury, UK.

Andrews, N., Roberts, I. and Hester, S., 1994. The Uruguay Round outcome: implications for agricultural and resource commodities. Outlook, 94: 65–75.

Balassa, B. and Associates, 1971. The Structure of Protection in Developing Countries. Johns Hopkins University Press, Baltimore, MD.

Bhuyan, A.R. and Rashid, M.A., 1993. Trade Regimes and Industrial Growth: A Case Study of Bangladesh. Bureau of Economic Research, University of Dhaka, Dhaka.

Brandao, A.S.P. and Martin, W.J., 1993. Implications of agricultural trade liberalisation for the developing countries. Agric. Econ., 8: 313–43.

Dee, P., 1994. The most recent estimates of the effects of the Uruguay Round. Industry Commission, Canberra, Australia, mimeo.

Dee, P., Jomini, P. and McDougall, R., 1992. Alternatives to regionalism—Uruguay and APEC. Working Paper No. 92/15, Centre for International Economic Studies, The University of Adelaide, Adelaide, Australia.

Duncan, R., Robertson, D. and Yang, Y., 1994. Analysis of the benefits and challenges facing Asian–Pacific agricultural exporting countries in the Post-Uruguay period. Report prepared for United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP), Bangkok, Thailand.

Francois, J.F., McDonald, B. and Nordström, H., 1994. The Uruguay Round: A Global General Equilibrium Assessment. GATT Secretariat, Geneva.

General Agreement on Tariffs and Trade (GATT), 1994. The Results of the Uruguay Round of Multilateral Trade Negotiations. GATT Secretariat, Geneva.

Goldin, I., Knudsen, O. and van der Mensbrugghe, D., 1993. Trade Liberalisation: Global Economic Implications. OECD/World Bank

Government of Bangladesh, 1992. Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics, Dhaka.

Government of Bangladesh, 1993. Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics, Dhaka.

Government of Bangladesh, 1994a. Bangladesh Economic Review 1993–94. Ministry of Finance, Dhaka.

Government of Bangladesh, 1994b. Export from Bangladesh 1972–73 to 1992–93. Export Promotion Bureau, Dhaka.

Government of Bangladesh, 1994c. Imports. Planning Commission, Dhaka, mimeo.

Habito, C.F., 1984. Equity and efficiency trade-offs in Philippine tax policy analysis: a general equilibrium approach. PhD dissertation, Harvard University.

Hamid, M.A., 1991. A Data Base on Agriculture and Foodgrains in Bangladesh (1947–48 to 1989–90). Dhaka.

Hamilton, C. and Whalley, J., 1995. Evaluating the impact of the Uruguay Round results on developing countries. World Econ., 18: 31–49.

Hutcheson, T.L., 1986. Effective Rates of Protection: An Input–Output Analysis. Trade and Industrial Policy Reform Program, Doc. TIP-MU-H.3, Dhaka.

Imam, K.H., 1970. Export demand elasticities for Pakistan's jute trade. Bull. Oxf. Univ. Inst. Econ. Stat., 32: 47–58.

Mansur, A.H. and Khondker, B.H., 1991. Revenue effects of the VAT system in Bangladesh. Bangladesh Dev. Stud., 19: 1–34.

Nguyen, D.T. and Bhuyan, A.R., 1977. Elasticities of export and import demand in some South-Asian countries: some estimates. Bangladesh Dev. Stud., 5: 133–152.

Nguyen, T., Perroni, C. and Wigle, R., 1993. An evaluation of the Draft Final Act of the Uruguay Round. Econ. J., 103: 1530–1549.

Nguyen, T., Perroni, C. and Wigle, R., 1995. A Uruguay Round success? World Econ., 18: 25–30.

Schott, J.J. and Buurman, J.W., 1994. The Uruguay Round: An Assessment. Institute of International Economics, Washington, DC.

Stern, J.J., Mallon, R.D. and Hutcheson, T.L., 1988. Foreign exchange regimes and industrial growth in Bangladesh. World Dev., 16: 1419–1439.

Thomas, V., 1979. Price elasticities of demand for Bangladesh's jute. Bangladesh Dev. Stud., 7: 101–106.

UNCTAD, 1990. Agricultural Trade Liberalisation in the Uruguay Round: Implications for Developing Countries. A Joint UNCTAD/UNDP/WIDER Study. United Nations, New York.

Vanzetti, D., Andrews, N., Hester, S. and Fisher, B., 1993. US–EC agricultural trade relations and the Uruguay Round: a Cairns Group perspective. ABARE Conference Paper No. 93.14, Canberra, Australia.

Vanzetti, D., Melanie, J. and Barry, G., 1994. South East Asian agriculture post-Uruguay Round.

Warr, P.G., 1977. On the shadow pricing of traded commodities. J. Polit. Econ., 85: 165–872.

Warr, P.G., 1982. Shadow pricing rules for non-traded commodities. Oxf. Econ. Pap., 34: 305–325.

World Bank, 1993. World Tables 1993. Washington, DC.