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OPPORTUNITIES AND CHALLENGES IN AGRICULTURE AND GARMENTS: A GENERAL EQUILIBRIUM ANALYSIS OF THE BANGLADESH ECONOMY

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Abstract

For the past two decades, Bangladesh has enjoyed steady growth in per capita incomes enabling a significant reduction in poverty. An increase in rice productivity, achieved through a combination of improved seeds, increased fertilizer use, and public and private investments in irrigation, played a major role in the increase in incomes. Among the other major factors were a large expansion in textile exports, made possible by changes in world demand, Bangladesh trade liberalization, and macro-economic stability; and increases in workers' remittances. In order to accelerate or even maintain income growth rates and poverty reduction, future policies must be carefully designed to capture the benefits and minimize the risks of international trade and a constantly changing international environment.

A proper assessment of the impact of such policies and economic developments on the poor requires a comprehensive framework to analyze interactions between different sectors as well as linkages between macro and micro levels. In this paper we construct a social accounting matrix for 1999/2000 and develop a computable general equilibrium model (CGE) with special treatment of the rice and wheat sectors. We then present simulations of the effects of (i) rice productivity shocks, (ii) a decline in the world rice price, and (iii) a reduction in RMG exports, reflecting an end to preferential access to RMG markets for Bangladesh goods.

The simulation results suggest that increases in productivity of rice, a key to the gains in rice production and fall in real rice prices that helped Bangladesh to reduce rural poverty in the last two decades, still have the potential to benefit most households. However, in the absence of intervention in domestic markets, the resulting decline in real rice prices reduces real incomes of larger farmers. If trading links can be established and exports prevent a price fall, however, both producers and consumers enjoy real income gains. Reduced Bangladesh textile (RMG) exports affect all households through the depreciation of the real exchange rate required to offset the decline in export earnings as well as through the overall reduction in labor demand. According to the simulations, a 25 percent decline in RMG export (excluding knitwear) volume would lead to a 6.0 percent

decrease in wage payments to unskilled female labor in non-agricultural sectors and a 0.5 to 1.0 percent decline in the real incomes of urban poor households.

Overall, these simulations illustrate the importance of trade policy and links between Bangladesh and the world economy. International trade offers the potential to prevent a decline in real prices of rice if productivity of paddy production increases and to benefit from increased export earnings. It has also permitted a large increase in RMG export earnings. However, changes in international markets could threaten welfare of some Bangladesh households, as well, as illustrated by the simulations of lower import prices of rice that could sharply reduce farmer incomes, and of a decline in textile export earnings that could sharply reduce female urban employment and urban household incomes. Moreover, the simulations illustrate important general equilibrium considerations that need to be taken into account in policy analysis, including large changes in the real exchange rate needed to avoid an a substantial increase in the current account deficit in the case of a decline in RMG exports.

Further analysis is needed to better quantify the magnitude of the key linkages with alternative model specifications and parameters, and in different policy scenarios. In addition, work is needed on policy alternatives to offset the potential adverse impacts of declines in terms of trade and export opportunities. Nonetheless, these simulations show that the Bangladesh economy and household incomes are clearly linked with the global economy, particularly through foodgrain trade and the RMG sector. Efforts to alleviate poverty and raise the incomes of the poor should not neglect these linkages, particularly in cases where these poverty alleviation interventions are large enough to have major effects on the real exchange rate and female labor earnings.

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1. Introduction

For the past two decades, Bangladesh has enjoyed steady growth in per capita incomes enabling a significant reduction in poverty. An increase in rice productivity, achieved through a combination of improved seeds, increased fertilizer use, and public and private investments in irrigation, played a major role in the increase in incomes. Among the other major factors were a large expansion in textile exports made possible by changes in world demand, Bangladesh trade liberalization, and macro-economic stability; and increases in workers' remittances. In order to accelerate or even maintain income growth rates and poverty reduction, future policies must be carefully designed to capture the benefits and minimize the risks of international trade and a constantly changing international environment.

Rice productivity increases, particularly since the mid-1980s, have spurred real income growth, reduced real rice prices, and contributed to the decline in rural poverty. A major objective of agricultural policy was to reduce or eliminate the reliance on foodgrain imports. Nonetheless, private sector imports, made possible by trade liberalization in the early 1990s, have increased food security through market-stabilizing inflows of rice and wheat following major production shortfalls. In the future, if productivity increases in rice can be sustained, private sector exports of rice could help prevent a further decline in real prices to the benefit of farmers. Sharp falls in the import price of rice, perhaps due to dumping of surpluses by exporters, could also threaten farmer incomes. Thus, trade issues remain vitally important for rice and the agricultural sector.

At the same time, easing of restrictions on foreign investment, combined with substantial depreciation of the Taka, have enabled exports of the labor-intensive ready-made garment industry to expand significantly and greatly increase formal sector female employment and earnings. Yet, as the scheduled expiration of the Multi-Fiber Agreement (MFA) draws near, there is much apprehension about the potential effects of

trade liberalization in the European Union (EU) and the United States leading to a reduction in the market share of Bangladesh and sharp reductions in textile earnings and employment.

A proper assessment of the impact of these policies and external shocks on the poor requires a comprehensive framework to analyze interactions between different sectors as well as linkages between macro and micro levels. Significant changes in productivity of rice, world prices, or export prospects for textiles have profound implications for real incomes through various channels including the trade balance and the real exchange rate, the profitability of tradable goods sectors (in particular, major agricultural commodities and ready-made garments), and returns to labor and capital.

The objective of this paper is to analyze these complex inter-sectoral economic flows and assess the major implications of trade policies on the welfare of the poor. The analysis is based on simulations using a computable general equilibrium (CGE) model of the Bangladesh economy based on a 1999-2000 social accounting matrix (SAM). Because agriculture accounts for a major share of employment, income and consumption in Bangladesh, we highlight the effects of policy changes and external shocks on agricultural prices, output and incomes. The model and the underlying SAM distinguish two different kinds of rice technology and have disaggregated labor markets and socio-economic groups, permitting detailed analysis of household welfare and poverty.

The paper is organized as follows. Section 2 discusses the structure of the Bangladesh economy as reflected in the SAM and discusses the specific features of the applied model of Bangladesh. Section 3 describes the equations and parameters of the CGE model. Section 4 reports the results of a series of model simulations covering the effects of rice productivity shocks, as well as of a decline in the world rice price. Simulations of a reduction in RMG exports, reflecting an end to preferential access to RMG markets for Bangladesh goods, are discussed in section 5. Conclusions and policy implications are presented in section 6.

2. A Social Accounting Matrix for Bangladesh, 1999-2000

A SAM is a consistent set of accounts that quantifies the economic flows involving production, incomes and expenditures at one point in time. Five major types of accounts are described in the 1999-2000 Bangladesh SAM: activities, commodities, factors of production, institutions (including rest of the world) and capital (savings and investment).

The production accounts describe the values of commodity inputs (goods and services) into each production activity, together with payments to factors of production (land, labor and capital) and indirect taxes. Commodity accounts record the value of total supply (the sum of the values of domestic production, imports, indirect taxes and marketing margins) and total demand (including input use, final consumption, investment demand, government consumption and exports). Factor accounts describe the sources of factor income (value added in each production activity) and how these factor payments are distributed to the various institutions in the economy (different types of households, enterprises, government and rest of the world). Accounts for institutions comprise all income and expenditures of institutions, including transfers between institutions. Finally, the savings-investment account records institutions' savings and how they are spent on investment commodities.

The year 1999-2000 was chosen as the base for the Bangladesh SAM, as this is the most recent year for which national accounts data are available. Construction of the SAM was based on information from various sources including: a 1993-94 input-output table (BIDS 1998), 1999-2000 national accounts data, the 1995-96 Bangladesh Labor Force Survey, the 2000 Household Income and Expenditure Survey and several other reports. The procedure involved two steps. First, a "proto-SAM" was built using the above-mentioned data. Given that data come from different years and different sources, the resulting "proto-SAM' was not balanced. Hence, in the second step, the SAM was balanced using a "maximum-entropy" estimation procedure. Section 2.1 describes the

structure of the SAM and how it was constructed. Section 2.2 outlines the estimation procedure that was used for balancing the SAM.

2.1. Structure of the SAM

Table 2.1 lists the accounts of the 1999-2000 Bangladesh SAM. A total of 53 production activities are specified.[1] Of these activities, 12 are agricultural activities, 24 are manufacturing activities, and 17 are services. However, the SAM has only 52 commodities. In all cases but one, each activity produces only one commodity. The exception is the commodity 'rice milling', which is produced by two activities (associated with different production technologies representing aman and boro cropping). The activity/commodity paddy is also split into the 'aman' variety and the 'boro' variety. Aman constitutes about 44 percent of total rice production, is rain-fed and slightly more labor intensive than boro, which is an irrigated crop with higher fertilizer inputs and higher yields.[2] The SAM distinguishes several textile sectors and separates out the ready-made garment industry and the knitwear industry, for their strategic importance in exports. The ready-made garment sector is the most female-intensive sector in the market economy. Conversely, the knitwear industry employs only male labor and is more capital intensive than garments. The distribution of female employment in Bangladesh is highly skewed. Women are concentrated in the garment industry (while most other textiles are male-intensive), in domestic services, and in agriculture, where they mostly work as unpaid family labor in homestead vegetable production and poultry raising.

The SAM includes 21 factors of production: land, ponds, non-agricultural capital, agricultural capital (further disaggregated into cattle and poultry) and 16 labor categories,

[1] This is an aggregation from the 79 activities described in the 1993-94 BIDS IO table. More precisely, the 79 IO sectors were aggregated into 50 SAM sectors, and later two sectors, paddy and rice milling, were split into two, *aman* and *boro,* respectively. Also, an additional sector was added to enable the modeling of domestic production of natural gas for export. Initial value-added for this sector is negligible. Appendix Table 1 documents how the 79 IO sectors were aggregated into the 50 SAM sectors.

[2] The relatively small non-irrigated *aus* season rice crop is also included in *boro*.

disaggregated by gender, four levels of education and type of activity (agricultural and non-agricultural).[3]

Households are disaggregated into twelve types, classified according to land holding size, occupation, and gender of the household's head, in rural areas, and to level of education of the household's head, in urban areas. The main source for the disaggregation was the 1995-96 LFS (BBS, 1998). Details can be found in Table 2.2.

Income distribution is quite unequal: urban educated households receive 23 percent of total income but constitute only 9 percent of the total population, while landless and marginal farmers together receive only 10 percent of total income despite comprising 19 percent of the population (see Figure 2.1). These latter households derive their income mostly from unskilled labor (about 40 percent) and transfers (about 40 percent). Conversely, about 60 percent of the urban educated households' income comes from capital. Poor households, especially female-headed ones, must rely on female employment as an important source of income while female contribution to other households' income is slight. Large farmers receive about half of their income from land and agricultural capital. Details are provided in Table 2.3 and Table 2.4.

Macro-economic data

Table 2.5 shows an aggregate version of the 1999-2000 Bangladesh SAM, derived from national accounts, balance of payments, and government expenditure accounts.

Production Activities

The starting point for construction of the production activities accounts was data on value added by activity from 1999-2000 national accounts. Intermediate

[3] In the model simulations presented in this paper, labor is aggregated across agriculture and non-agriculture, resulting in the use of 8 labor categories, disaggregated by gender and education level.

consumption was calculated using the input-output coefficients from the 1993-94 BIDS I/O table. Shares of each activity's gross output and value added in national production are reported in Table 2.6a and 2.6b.[4] As noted earlier, each activity produces a unique commodity, except for rice milling, in which two activities produce one commodity.

Commodity Accounts

Data on major imports are from *Economic Trends.*[5] Other imports are estimated using the 1993-94 I/O shares by commodity and the 2000 estimates of total imports derived from *Economic Trends* (Bangladesh Bank 2001). Further adjustments were made to account for illegal trade of cattle and manufactures between India and Bangladesh. As for cattle, Z. Bakht (1996, p. 13) estimates illegal imports of cows, bullocks and buffaloes in 1994 as 8654 million Taka. Illegal imports for 1999/2000 are estimated as the 1994 figure adjusted for population growth between 1993/94 and 1999/2000 (129/117) and increase in prices (6620/5362)^6/5, using the percentage change in Dhaka wholesale prices of superior quality beef from 1993/94 to 1998/99, extrapolated to 1999/2000 (12,287 mn Taka). As for manufactured goods, in 1997/98, the discrepancy between India's exports of manufactured goods (HS 16) and other manufactured goods (HS 20) to Bangladesh and figures for Bangladesh imports from India for these goods were each 155 percent greater than total recorded Bangladesh imports of these goods.[6] This factor was used to estimate illegal imports across all manufactured goods categories.

[4] In the 1993-4 BIDS I/O, the value-added share of capital for rural building is 0.98, compared with 0.69 for urban building. In order to reduce this extremely high share of capital while maintaining a balanced SAM, payments to labor were increased (and payments to capital decreased) in the rural building sector and correspondingly, payments to labor were decreased (and payments to capital increased) in the trade and transportation services sectors. The final value-added share of capital in rural building is 0.55; the shares of capital in trade and transport have increased from 0.21 and 0.22 respectively to 0.32 and 0.36.
[5] Bangladesh Bank 2001. Page 20-23, Table-IV.
[6] Dorosh, 1999. FMRSP working paper No. 16, Table 3.2.

Tariffs are estimated from several sources. Total government revenue was calculated from *Bangladesh Arthonoithic Samishaka, 2001*.[7] This was then disaggregated into tax categories based on shares from *IMF Table 14 IMF Staff Country report 98/131*. Finally, total tariff revenue was allocated to commodities applying same average tariff rates as in 1993-94 BIDS I/O.[8] Export demand for major export commodities is also derived from *Economic Trends*.[9] Other exports are estimated by applying shares from the 1993-94 BIDS I/O to 2000 estimates of total exports from *Economic Trends.*

Investment demand by commodity was calculated using the commodity shares from the 1993-4 Bangladesh I-O table. Government consumption is taken from Ministry of Finance data and is broken down into pay and allowances (57,150 million Taka) and purchases of goods and services (24,560 million Taka).[10] Government consumption of good and services was allocated across commodities following 1993-94 SAM shares.

Household Income

No complete data on sources of household income by factor of production is available. Estimates of labor factor payments to households were made on the basis of data from the 1995-1996 Labor Force Survey (BBS 1998) while estimates of non-labor factor payments to households, as well as information on inter-household transfers, were derived from the 2000 Household Income and Expenditure Survey (HIES). Returns to land and capital (both agricultural and non-agricultural) were allocated to households based on HIES data on agricultural production by households, with household earnings

[7] Page: 141, Table-13.1
[8] To take into account rebates on tariffs on intermediate imports into the RMG and knitwear sectors (milled cloth and yarn), we treated these rebates as export subsidies, adding the value of these tariffs to returns to capital in RMG and knitwear. As a result, capital income to enterprises increased, which we offset by a corresponding decrease in government transfers to enterprises. In the base SAM, the value of export subsidies to RMG is 7389 million Taka (4.3 percent of the value of production), and 2457 million Taka for knitwear (4.9 percent of the value of production).
[9] Bangladesh Bank 2001. Page 20-23, Table-IV.
[10] *Bangladesher Arthnonoitik Samiksha*, 2001. pp. 146-147, Table 15.1.

from non-agricultural capital assigned to households so as to bring their incomes approximately in line with reported expenditures. Remittances are also an important source of revenue for most households. Total current private transfers were derived from Balance of Payments data, Bangladesh Ministry of Finance, and then distributed to households according to HIES data on transfers received. The matrix of factor payments to household groups is given in Table 2.7.

Household Consumption

Data from the 2000 HIES were used to estimate household expenditure by household and by commodity. It was noted that private consumption calculated from HIES was lower than total private consumption from national accounts. Hence consumption in each cell of the household consumption block was augmented by the ratio of total private consumption from national accounts to total private consumption from HIES (approximately 1.1). Further adjustments were made to solve discrepancies resulting from a possible mismatch between I/O categories and HIES classification of commodities (for example between what is classified as 'other textiles' and what is classified as 'clothing'). Expenditure on transport, financial services and other services was also adjusted upwards because the figures were far below those in the national accounts (hence consumption in these sectors was increased in each household in proportion to households' shares in total expenditure).

Savings were allocated to households by assuming saving rates inversely correlated to their average income (hence, as a result, poor households save the least while urban educated households save the most).

2.2. Balancing the SAM: the Cross Entropy (CE) Method

The structure of a SAM, with row totals equal to column totals for each account, requires that inconsistencies in data from various sources be removed. In constructing the

SAM, various adjustments to the data were made to produce a "proto-SAM" which was not fully balanced. Final balancing of the SAM was achieved using the cross entropy (CE) method.[11]

The CE technique is a method of solving underdetermined estimation problems. The problem is underdetermined because, for an n x n matrix, we are seeking to identify n^2 unknown, non-negative parameters, i.e. the cells of the SAM. However, there are only $2n-1$ independent row and column adding-up restrictions. In other words, restrictions must be imposed on the estimation problem so that we have enough information to obtain a unique solution and to provide enough degrees of freedom. The underlying philosophy of CE estimation is to use *all* and *only* the information available for the problem at hand: the estimation procedure should not ignore any available information nor should it add any false information. [12]

In the case of SAM estimation, 'information' may be the knowledge that there is measurement error concerning the variables, and that some parts of the SAM are known with more certainty than others. There may be a prior in the form a SAM from a previous year, whereby the entropy problem is to estimate a new set of coefficients 'close' to the prior using new information to update it. Furthermore, 'information' could consist of moment constraints on row and column sums, e.g. the average of the column sums. In addition to the row and column sums, 'information' may also consist of certain economic aggregates such as total value-added, aggregate consumption, investment, government consumption, exports and imports. Such information may be incorporated as linear adding-up restrictions on the relevant elements of the SAM. In addition to equality constraints such as these, information may also be incorporated in the form of inequality constraints placing bounds the mentioned macro aggregates. Finally, one may want to restrict cells that are zero in the prior to remain so also after the CE balancing procedure.

[11] The CE method is an approach which originates from information theory (see e.g. Kapur and Kesavan 1992, and Golan et al. 1996) and has been applied to social accounting matrix estimation in e.g. Robinson et al. (2001), and Robinson and El-Said (2000). Only a concise presentation of the technique will be given here, and the reader is referred to the afore-mentioned references for further detail.

[12] See Shannon (1948) and Theil (1967) for a discussion of the concept of 'information'.

In constructing the Bangladesh SAM, a standard error of 5 percent was specified for column control totals for the activity accounts, with the exception of agriculture activities, where each cell was fixed with no measurement error. For the commodity and institution accounts, a standard error of 15 percent was used for each column control total. For the commodity accounts, column control totals were set at initial column total in the SAM. For all other accounts, the control totals were set at the average of the corresponding raw and column totals in the initial SAM. In addition, the major economic aggregates constraints were imposed with no measurement error. Finally, a few fixed cell constraints were imposed with no measurement error. These included, in addition to agriculture activities, government and rest of the world transfers, and the rest of the world payment to the capital account.

3. Overview of the Bangladesh CGE Model

The Bangladesh CGE model used in this study is based on IFPRI's Standard CGE Model (Lofgren, et al 2001).[13] A CGE model consists of a set of simultaneous equations that describe the functioning of an economy. These equations specify how all the payments (economic flows) that are recorded in a SAM change as a consequence of a change in an exogenous variable or parameter. As a consequence, the model follows the SAM disaggregation of factors, activities, commodities, and institutions. It is written as a set of simultaneous equations, many of which are non-linear. The equations define the behavior of the different actors. In part, this behavior follows simple rules captured by fixed coefficients (for example, *ad valorem* tax rates). For production and consumption decisions, behavior is captured by non-linear, first-order optimality conditions. The equations also include a set of constraints that have to be satisfied by the system as a whole but which are not necessarily considered by any individual actor. These constraints cover markets (for factors and commodities) and macroeconomic aggregates (balances for savings-investment, the government, and the current-account of the rest of

[13] This section draws heavily from Lofgren et. al. (2001), which includes a mathematical statement of the model equations.

the world). The basic CGE model is described in Sections 3.1 – 3.4. Section 3.5 discusses model parameters.

3.1. Activities, Production, and Factor Markets

Each producer (represented by an activity) is assumed to maximize profits, defined as the difference between revenue earned and the cost of factors and intermediate inputs. Profits are maximized subject to a production technology, the structure of which is shown in Figure 3.1. At the top level, the technology is specified by a Leontief function of the quantities of value-added and aggregate intermediate input. Value-added is itself a CES function of primary factors whereas the aggregate intermediate input is a Leontief function of disaggregated intermediate inputs.

Each activity produces one or more commodities according to fixed yield coefficients. (As noted, any commodity may be produced by more than one activity.) The revenue of the activity is defined by the level of the activity, yields, and commodity prices at the producer level.

As part of its profit-maximizing decision, each activity uses a set of factors up to the point where the marginal revenue product of each factor is equal to its wage (also called factor price or rent). Factor wages may differ across activities, not only when the market is segmented but also for mobile factors. In the Bangladesh model, wage rates of each labor type vary across sectors, according to estimated differences in average labor productivity calculated from national accounts data on factor payments by activity and labor force survey data on employment. (See the discussion of model parameters in section 3.5.)

Various factor market closures (mechanisms for equilibrating supplies and demands in factor markets) can be specified with the model. One standard closure is to fix the quantity supplied of each factor (e.g. land, labor, capital) at its initial level. An

economy-wide wage variable (e.g. land rental rate, wage rate, rate of return to capital) is free to vary to assure that the sum of demands from all activities equal the quantity supplied. Each activity pays an activity-specific wage that is the product of the endogenous economy-wide wage and an exogenous activity-specific wage (distortion) term that is fixed in this closure.

An alternative closure is to assume that a factor is unemployed and the real wage is fixed. This assumption is used to model underemployment for a given labor category. Compared to the default closure, the only change is that the economy-wide wage variable is fixed (or exogenized) while the supply variable is "flexed" (or endogenized). Each activity is free to hire any desired quantity at its fixed, activity-specific wage (which, implicitly, is indexed to the model numéraire). In this setting, the supply variable merely records the total quantity demanded.

In all scenarios in this paper, except where explicitly noted, capital is sector-specific. For labor, the simulations adopt two different closures. In the neo-classical closure, labor is considered fully employed and mobile, and real wages adjust to equate supply and demand. In the alternative labor market closure, agricultural labor is mobile across agricultural activities and fully employed, but fixed in the agricultural sector (e.g., agricultural labor cannot engage in non-agricultural activities). For non-agricultural labor, unemployment is assumed to exist for lower skilled labor (classes 0 and 1). A fixed wage is posited for these labor classes.

3.2. Institutions

In the model, households, enterprises, the government, and the rest of the world represent institutions. The households (disaggregated as in the SAM) receive income from the factors of production (directly or indirectly, via the enterprises), and transfers from other institutions. Transfers from the rest of the world to households are fixed in foreign currency. (All transfers between the rest of the world and domestic institutions and factors are fixed in foreign currency.) The households use their income to pay direct taxes, save, consume, and make transfers to other institutions. In the basic model version, direct taxes and transfers to other domestic institutions are defined as fixed shares of household income whereas the savings share is flexible for selected households. The treatment of direct tax and savings shares is related to the choice of closure rule for the government and savings-investment balances. (This topic is discussed in Section 3.4). The income that remains (after taxes, savings, and transfers to other institutions) is spent on consumption.

Household consumption covers marketed commodities, purchased at market prices that include commodity taxes and transactions costs.[14] Household consumption is allocated across different commodities (both market and home commodities) according to Linear Expenditure System (LES) demand functions.

Instead of being paid directly to the households, factor incomes may be paid to one or more enterprises. For example, in our Bangladesh model, non-agricultural capital is paid to enterprises. Enterprises may also receive transfers from other institutions. Enterprise incomes are allocated to direct taxes, savings, and transfers to other institutions. Enterprises do not consume. Apart from this, the payments to and from enterprises are modeled in the same way as the same payments to and from households.

[14] Transactions costs in this SAM (and model) are included as intermediate service inputs in domestic production activities.

The government collects taxes and receives transfers from other institutions. In the basic model version, all taxes are at fixed *ad valorem* rates. The government uses this income to purchase commodities for its consumption and for CPI-indexed transfers to other institutions. In the basic model version, government consumption is fixed in real (quantity) terms whereas government transfers to domestic institutions (households and enterprises) are CPI-indexed. Government savings (the difference between government income and spending) is a flexible residual.

The rest of the world is also treated as an institution. As noted, transfer payments from the rest of the world and domestic institutions and factors are all fixed in foreign currency. Commodity trade with the rest of the world is discussed in section 3.3. Foreign savings (or the current account deficit) is the difference between foreign currency spending and receipts.

Section 3.4 discusses the rules for clearing the macroeconomic balances (the macro closures), *i.e.*, how equilibrium is achieved in the balances for the government, the rest of the world, and the savings-investment account (where institutional savings are aggregated and allocated to domestic investment).

3.3. Commodity Markets

With the exception of home-consumed output, all commodities (domestic output and imports) enter markets. Figure 3.2 shows the physical flows for marketed commodities and associated quantity and price variables as defined in the model equations discussed in Lofgren, et al. (2001).

Domestic output may be sold in the market or consumed at home. For marketed output, the first stage in the chain consists of generating aggregated domestic output from

the output of different activities of a given commodity. These outputs are imperfectly substitutable, for example as a result of differences in timing, quality, and location between different activities. A Constant-Elasticity-of-Substitution (CES) function is used as aggregation function. The demand for the output of each activity is derived from the problem of minimizing the cost of supplying a given quantity of aggregated output subject to this CES function. Activity-specific commodity prices serve the role of clearing the implicit market for each disaggregated commodity.

At the next stage, aggregated domestic output is allocated between exports and domestic sales on the assumption that suppliers maximize sales revenue for any given aggregate output level, subject to imperfect transformability between exports and domestic sales, expressed by a Constant-Elasticity-of-Transformation (CET) function. In the international markets, export demands are infinitely elastic at given world prices. The price received by domestic suppliers for exports is expressed in domestic currency and adjusted export taxes (subsidies).[15] The supply price for domestic sales is equal to the price paid by domestic demanders. If the commodity is not exported, total output is passed to the domestic market.

Domestic demand is made up of the sum of demands for household consumption, government consumption, investment (the determination of which is discussed below), intermediate inputs, and transactions (trade and transportation) inputs.

[15] To model rebates on taxes on intermediate inputs into RMG and knitwear, we make export subsidies endogenous, setting them equal to the estimated value of tariffs paid on yarn and milled cloth by these industries.

To the extent that a commodity is imported, all domestic market demands are for a composite commodity made up of imports and domestic output, the demands for which are derived on the assumption that domestic demanders minimize cost subject to imperfect substitutability. This is also captured by a CES aggregation function.[16] Total market demand is directed to imports for commodities that lack domestic production and to domestic output for non-imported commodities.

The derived demands for imported commodities are met by international supplies that are infinitely elastic at given world prices. The import prices paid by domestic demanders also include import tariffs (at fixed *ad valorem* rates). Similarly, the derived demand for domestic output is met by domestic suppliers. Flexible prices equilibrate demands and supplies of domestically marketed domestic output.

The assumptions of imperfect transformability (between exports and domestic sales of domestic output) and imperfect substitutability (between imports and domestically sold domestic output) apply to most of the commodity markets in the Bangladesh model. The exception is for two commodities, rice and wheat, where the imperfect substitutability assumption is relaxed.[17] For these two commodities the Armington specification would not be appropriate for several reasons. First, if a commodity is not traded in the base data (as it is the case for rice) it will always remain a non-tradable in the standard CGE model[18], and there would be no way of inducing imports. Second, if a commodity is traded, its composition is directly determined through the relative price of its domestic demand component over the domestic price of its import component. Moreover, an Armington specification does not allow for any market

[16] This function is also referred to as an Armington function, named after Paul Armington who introduced imperfect substitutability between imports and domestic commodities in economic models (Armington 1969).
[17] See Fontana et. al., (2001) for a more detailed discussion of this approach to modeling rice and wheat trade in Bangladesh.
[18] In addition, if the share of imports in the composite commodity is small, the absolute value of change will be small compared to the total demand value of the composite good, even when the substitution elasticity is very high.

imperfections or government interventions—like government imports of food aid, which are observed in the Bangladesh wheat market.

To allow a regime switch between non-tradability and tradability we have incorporated a treatment of perfect substitutability into our Bangladesh model. Following this approach, the Armington function for these two commodities is replaced by a quantity equation defining total supply as the sum of imports and domestic output. In addition, a price inequality is added which assures that the demand price of domestic supply is less than or equal to the domestic import price. This price inequality is associated with the quantity of imports in the following way. As long as the demand price of domestic supply is less than the domestic import price, the quantity of imports remains zero. When the demand price of domestic supply equals the domestic import price, imports becomes perfect substitutes with domestic supply.

Though the government may seek to protect the domestic rice and grain markets during a regular year from foreign food influx, it may well encourage foreign imports during deficit years when self-sufficiency in food supply is not given—as in the case of a flood.[19]

The export side for the same two commodities is treated in an analogous fashion. The constant elasticity of transformation (CET) function that usually determines the split of total sectoral output into exports and domestic supply as imperfect substitutes is replaced by a quantity equation defining total supply as the sum of exports and domestic output, and a price inequality between the domestic export price and the demand price of domestic supply. As long as the domestic supply price exceeds the domestic export price, no commercial exports occur. As soon as the two prices are equal, domestic supply and exports will behave as perfect substitutes.

To eliminate the second undesired effect of the Armington specification—the continuous substitution of domestic supply and imports with respect to their relative

[19] Robinson et al. (1998) analyze rice trade by the Indonesian parastatl BULOG using a similar approach.

prices described above—the model distinguishes between government imports and commercial imports, where the sum defines total imports. To account for food aid operations controlled by the government, the government imports can be fixed at any desired level while the commercial imports adjusts to satisfy total imports.

Furthermore, the Bangladesh model allows for a combination of the two features, *i.e.*, fixed government imports in the grain sector, while the sector is modeled with perfect substitutability for commercial imports. In this market environment, if the domestic price is strictly below import parity, a sufficiently small *marginal* reduction of government imports would not lead to an increase in commercial imports to substitute for the decrease of imports in this sector since the domestic rice price would not rise to import parity. However, as reductions in government imports become larger, they will eventually cause the domestic demand price to increase and to converge towards the domestic import (parity) price. If the quantity reduction is large enough, the import parity price will be reached and the commercial imports will be treated as a perfect substitute with domestic supply of grains.

3.4. Macroeconomic Balances

The model includes three macroeconomic balances: the (current) government balance, the external balance (the current account of the balance of payments, which includes the trade balance), and the savings-investment balance. Alternative macro-closures rules for these balances can be specified.[20]

In the simulations for this paper, the closure rule for the government balance fixes all tax rates (and total government consumption in real terms), leaving government savings (the difference between current government revenues and current government expenditures) as the (endogenous) residual.

[20] Macro closures of CGE models is a contentious topic with a large literature. For summaries, see Robinson (1989), Rattsø (1982), and Taylor (1990).

For the external balance (which is expressed in foreign currency), in most simulations, we model a flexible real exchange rate with fixed foreign savings (the current account deficit). Given that all other items in the external balance (transfers between the rest of the world and domestic institutions) are fixed, the trade balance is also fixed. The consumer price index is the numeraire, fixed at its base level.

If, *ceteris paribus*, foreign savings are below the exogenous level, a depreciation of the real exchange rate would correct this situation by simultaneously (i) reducing spending on imports (a fall in import quantities at fixed world prices); and (ii) increasing earnings from exports (an increase in export quantities at fixed world prices). In some simulations (specified below), an alternative closure is used, in which the real exchange rate (indexed to the model numéraire) is fixed while foreign savings (and the trade balance) are flexible.[21]

For the savings-investment balance, we specify a savings-driven closure in which the value of investment adjusts and marginal savings rates of households are fixed. Several alternatives to this closure are also possible, including investment-driven closures, in which the value of savings adjusts according to various specified rules.

The appropriate choice between the different macro closures depends on the context of the analysis. Given that this is a single-period model, a closure combining fixed foreign savings, fixed real investment, and fixed real government consumption may be preferable for simulations that explore the equilibrium welfare changes of alternative policies. Such a closure avoids the misleading welfare effects that appear when foreign savings and real investment change in simulations with a single-period model – *ceteris paribus*, for the simulated period, increases in foreign savings and decreases in investment raise household welfare (and vice versa for decreases in foreign savings and increases in investment). This result is misleading since the analysis does not capture

[21] For a discussion of the real exchange rate in neoclassical, trade-focused CGE models, see Devarajan, Lewis, and Robinson (1993).

welfare losses in later periods that arise from a larger foreign debt and a smaller capital stock.

In addition, it is often informative to explore the impact of any experiment under a set of alternative macro closures. The results often provide important insights into the real-world trade-offs that are associated with alternative macroeconomic adjustment patterns.

3.5. Model Parameters

Production and consumption parameters in the Bangladesh model are calibrated so that both supply and demand are inelastic with respect to price, i.e. so that domestic supply (demand) of each product would increase (decrease) by less than 1 percent when its price increases by one percent, holding other factors constant.[22] For the agricultural sectors, the elasticity of substitution between land and labor is set so that the own-price elasticity of supply for each sector is approximately equal to 0.5.

Household consumption demand is modeled using the linear expenditure system equations described above. The Frisch parameter is set equal to –1.6 for the urban non-poor households, and - 4.0 for all other households (Dervis, de Melo and Robinson, 1982; Lluch, Powell and Williams, 1977). Income elasticities of demand are set equal to one. Given these parameters, the resulting own-price elasticities for the urban non-poor households are approximately equal to - 0.6. For all other household groups, the own-price elasticities of demand are approximately equal to - 0.3.

Differentials in labor productivity (and wage rates) across sectors were calibrated using average wage rates calculated from labor force survey data, adjusted for estimates of labor used in secondary activities. Employment data in the labor force survey based on primary occupation suggests that labor productivity in non-agriculture is more than 5

[22] Note that in the general equilibrium model simulations, other factors are not held constant, so that quantity changes are in general not equal to those implied by the change in price of the product and its own-price elasticities of demand.

times higher than labor productivity in agriculture. To take into account labor time spent in secondary non-agricultural activities, we increased the labor force in non-agriculture by a factor of 1.8. This resulted in a 40-60 split of labor employment between agriculture and non-agriculture, with secondary non-agriculture employment accounting for 27 percent of total employment. With these adjustments, productivity of labor in non-agriculture is 1.4 to 2.0 times higher than productivity of labor in agriculture, with the exception of highly skilled female labor, which is approximately three times as productive in non-agriculture.

4. Rice simulation results

In this section we analyze the effects of productivity shocks in the paddy sector and of changes in the level of world rice prices on sectoral output and real consumption of different socio-economic groups.

4.1 Technical change in paddy production

Technical change in rice (and wheat) production through green revolution technology (irrigation, improved seeds, and fertilizer) has enabled Bangladesh to more than double foodgrain production since Independence in 1971. For the last three decades, a major objective of agricultural and food policy was producing enough foodgrain to provide adequate domestic consumption without reliance on imports. In each of the last three years (1999/2000 – 2001/02), Bangladesh has succeeded in meeting this objective of foodgrain availability, eliminating its national "food gap", the difference between target availability of foodgrains (454 grams/person/day) and net domestic production (gross production less a ten percent allowance for seed, feed and wastage) (Figure 4.1).

Large increases in domestic production of rice and wheat have also led to a long-term decline in real prices of these foodgrains (Figure 4.2). Since, the early 1990s, domestic rice prices have been below import parity levels in years of good harvests.

Only in years of poor harvests, generally caused by floods or droughts, have prices risen to import parity levels, making private sector imports profitable (Dorosh, 2001).

Further increases in rice productivity may be possible in the future through introduction of newly developed rice varieties (e.g. "super-rice" being developed at the International Rice Research Institute). The simulations in this section model the effects of an increase in rice productivity.[23]

To simulate the effects of a rice productivity increase, we model a 10 percent increase in total factor productivity of aman paddy (simulation 1), boro paddy (simulation 2) and both aman and boro paddy (simulation 3). In each simulation, land and labor inputs in aman production are fixed at the base levels, making aman production exogenous. These assumptions on factor inputs reflect a lack of viable alternatives to land use and the general paucity of other opportunities for labor in rural markets in the monsoon season.[24] Thus, aman production is exogenously determined, set at either the base level (simulation 2) or 10 percent above the base level (simulations 1 and 3). These simulations assume a unified market for unskilled labor, with no unemployment. (Sensitivity analysis with an alternative labor market closure is presented later in this chapter.)

The productivity increase in aman paddy production in simulation 1 results in a 10 percent increase in aman production (Table 4.2). Given price-inelastic demand for rice, the market price of aman paddy falls by 4.0 percent and the price of milled rice falls by 1.5 percent. Rice consumption increases by 0.8 percent, because of the rice price decline and positive income effects for most households.[25]

[23] These simulations, using a static framework, can also be interpreted as an approximation of a dynamic simulation where per capita domestic supply increases faster than per capita domestic demand.
[24] One (somewhat more complex) alternative would be to allow some aman land to shift into jute (which competes with aman for land in the monsoon season) as the result of the decline in the aman paddy price.
[25] Note that there is a slight difference between the percentage increases in milled rice production and milled rice consumption because of variations in own-consumption of paddy (rice).

Given the increase in aman paddy productivity and the decline in market prices of rice, boro production becomes less profitable, and land and agricultural labor shift toward other crops. Boro production declines by 6.5 percent; other crop production rises by 1.6 percent (Table 4.1).[26] At a macro-economic level, real GDP increases by 0.5 percent. This increase stems primarily from the increase in productivity in aman. The productivity increase also frees labor for use in more productive non-agricultural sectors enabling a further increase in real GDP.

All household groups except small and large farmers enjoy gains in real incomes and consumption in this simulation, as returns to labor and capital rise with the increase in non-agricultural output (Table 4.5, 4.6). However, the decline in paddy prices leads to a decline in returns to land. Thus, rural households without land benefit less than do urban households, whose incomes rise by between 0.5 to 1.1 percent. The incomes of both small and large farmers actually decline by 0.1 and 0.6 percent respectively as increased incomes from ponds, poultry, cattle and labor are insufficient to offset declines in returns to their land equal to 1.2 percent of their base real incomes, in the case of large farmers, and 0.7 for small farmers.

An increase in boro productivity by 10 percent (simulation 2) leads to only a 2.5 percent increase in boro paddy production, instead of a 10 percent gain in output, because a decline in the price of boro paddy reduces incentives for boro production. Because land and labor in aman production are fixed, there is no change in aman production in simulation 2. The gain in total paddy production (1.4 percent) is still slightly larger with a 10 percent increase in aman productivity (0.9 percent in simulation 1), in part because value added in the boro paddy sector is 24 percent greater than value added in the aman paddy sector in the base SAM. As in simulation 1, productivity increases in boro (and a 6.4 percent decline in the boro paddy price) lead to a shift in labor and land to other agricultural sectors. Value added of other crops increases by 1.6 percent. Overall gains in real GDP are similar in both simulations, as resources freed up from boro production in

[26] Note that in the model, the two rice-milling activities (aman and boro) produce a single undifferentiated product (milled rice). The two types of paddy are not perfect substitutes, however, and there is no restriction explicitly linking the two prices through the cost of storage or other mechanism.

simulation 2 are used elsewhere in the economy. The pattern of the income changes across households are nearly the same as those in simulation 1, given that the distribution of boro area by farm size is approximately the same as that of aman area. Thus, small and large farmers' incomes decline by 0.3 and 1.1 percent, respectively, in simulation 2, compared to declines of 0.1 and 0.6, respectively, in simulation 1.

In simulation 3, the effects of a 10 percent increase in both aman and boro production are approximately equal to the sum of the effects of separate productivity shocks. Thus, paddy output rises by 2.2 percent in simulation 3, compared with 0.9 and 1.4 percent in simulations 1 and 2, respectively. Likewise GDP rises by 1.0, 0.5, and 0.5 percent in simulation in simulations 3, 1 and 2, respectively. Changes in household incomes also approximate the sum of the changes induced by the two separate shocks, with income to large farmers falling by 1.6 percent in this simulation (Table 4.7).

Simulation results with an alternate labor market closure

Simulations 1 through 3 assume a single labor market for each type of labor and full employment – assumptions that may reflect medium-term labor market conditions, but may overstate the wage adjustment in non-agricultural markets and the mobility of labor between agriculture and non-agriculture in the short-run. To test the sensitivity of the results to changes in the labor market closure, simulations 1a, 2a, and 3a model separate labor markets in agriculture and non-agriculture, with open unemployment and a fixed real wage for unskilled non-agricultural labor (labor classes 0 and 1 for both males and females).

Under these assumptions, the paddy productivity shocks lead to slightly larger increases in paddy production than in simulations 1, 2 and 3 as agricultural labor is freed up from paddy production remains in the agricultural sector (Table 4.1a). As a result, prices of paddy and rice fall more than with labor mobility between agricultural and non-agricultural sectors (Table 4.2a). For example, the consumer rice price falls by 3.6 percent in simulation 2a, but falls by only 3.4 percent in simulation 2.

Output of other agricultural sectors (other crops, livestock, fishing and forestry) increase by more with the segmented agricultural and non-agricultural labor markets because labor released from paddy production is constrained to remain in the agricultural sector. For the non-agricultural sectors as a whole, there is no gain in available labor (and capital is fixed). Nonetheless, output of most non-agricultural sectors still increases because increases in incomes derived from agricultural sectors lead to increased consumer demand and prices for these goods. Overall, real GDP increases by more in the unemployment simulations. However, because there is little domestic demand for the output of the RMG and knitwear sectors, increases in domestic household incomes do not lead to increased demand and prices for these goods. Thus prices and profitability of most non-agricultural sectors rise relative to the prices and profitability of the RMG and knitwear sectors. Labor demand and output increase for activities oriented to the domestic market; they decrease for the export-oriented RMG and knitwear sectors. For example, RMG and knitwear decline by 0.4 to 0.7 percent in simulations 1a – 3a, but increase by 0.4 to 0.6 percent in simulations 1 – 3.

Distributional effects are similar to the full employment case. The larger decline in rice prices is reflected in a greater decrease in returns to land under the unemployment closure (Table 4.5a). Additionally, returns to both skilled male labor and capital increase by relatively more in simulations 1a - 3a due to the availability of unskilled labor in these sectors at a fixed wage.

4.2 Impacts of increased productivity with exports of rice

In simulations 1-3, productivity shocks in paddy production result in significant declines in rice prices and reductions in real incomes of medium and large farmers. Simulations 4 - 7 shown in Table 4.3 and 4.4 model the same productivity shocks, but allow exports of rice. In the model, the export parity price of rice is equal to the domestic price, reflecting actual prices in 1999/2000. In this case, any increase in rice production would lead to exports, with no domestic price decline -- the domestic price remains equal

to the export parity price. It is important to emphasize that a low domestic price is not, in itself, sufficient to generate substantial exports of rice. In addition, Bangladesh traders would need to develop trading contacts in importing countries, meet importers' requirements in terms of grades and standards for rice, and establish a reputation as a reliable supplier of rice. The strong assumption of an effective export parity price floor for domestic rice prices (in foreign currency terms) is meant to counterbalance the strong assumption of no possibilities for rice exports made in the simulations described in Section 4.1. These two simulations thus bracket the range of possible outcomes.

In these simulations, there is a small decline in the price of rice in local currency terms because rice export earnings lead to an appreciation of the real exchange rate and a decrease in the export parity price (in Taka) by the same percentage. For example, in simulation 4, the 10 percent increase in aman paddy productivity leads to exports equal to 2.3 percent of base rice production, a real exchange appreciation of 1.0 percent and a decrease in the consumer price of rice of 1.0 percent. Due to the perfect link with world markets, the export price of rice in Taka falls by exactly 1.0 percent as does the price of domestic rice production. When productivity of both aman and boro rice is shocked, exports as a share of base rice production increase from zero (the value observed in the base SAM) to 7.4 percent.

Since exports mitigate the decline in the price of rice, the gains in rice production are larger in simulations 4 – 6 than in the corresponding simulations with no export parity price floor (simulations 1 – 3). Thus, paddy production increases by 8.2 percent in simulation 6 (aman and boro productivity shocks with an export parity price floor) versus only 2.2 percent in simulation 3 where the rice price declines by 4.7 percent. The maintenance of resources in agriculture implies fewer factors of production available to non-agricultural sectors. In addition, the foreign currency earned through exports of rice reduces the need to export knitwear and ready-made garments (RMG). For these reasons, production of knitwear and RMG exhibit declines rather than the increases in simulations 1-3

Other crops decrease in simulations 4 - 6 rather than increase as they did in simulations 1 - 3, because more labor and land remain in the paddy sectors when the paddy price declines less. Similarly, because fewer resources are released from the paddy sectors, absolute gains in non-agricultural sectors are smaller, as well.

With an export parity price floor for rice, real incomes of medium and large farmers rise slightly, (e.g. by 0.1 percent for large farmers in simulation 6, as compared with a decline of 0.1 percent for small farmers and 1.6 percent for large farmers in simulation 3; Table 4.8). The absence of a decline in the consumer price of rice, however, results in a lower gain in the value of total consumption of goods and services for poor households, for whom rice accounts for a large share of total expenditures. Thus, for urban households with illiterate household heads, total consumption increases by 0.7 percent in simulation 6, compared with 1.0 percent in simulation 3.

Simulation results with an alternate labor market closure

Results are qualitatively similar across the two closures (Tables 4.3a and 4.4a). Because labor is fixed in agriculture in the alternative labor market closure, production of paddy is higher than in the full employment case. Rice exports therefore rise slightly more in simulations 4a-6a as compared with 4 - 6, resulting in a larger exchange rate appreciation (1.3 percent in simulation 4a, for example, as compared with 1.0 in simulation 4) and a larger decline in the consumer rice price, which is directly determined by the export parity price. As a result, large farmer incomes in simulation 4a decline by 0.2 percent rather than remaining essentially unchanged in simulation 4.

4.3 Implications of a fall in the import price of rice

Simulation 7 models a 35% decline in the world price of rice. This substantial decline is sufficient to transfer Bangladesh from a position of being at or near export parity prices to a position of importing rice at rice import price parity. International rice

markets do exhibit price volatility in this range. In addition, there is the possibility of large-scale sales of rice by India at low prices.

Transport costs to and from Bangladesh create a sizeable wedge between import and export parity prices. Based on 1999/2000 data for import parity prices from India and Dhaka wholesale prices for coarse rice, the wedge in the model sets the import parity price in the base simulation at 30 percent more than the export parity price, which, as in the immediately preceding section, is also equal to the domestic price (world price times the exchange rate).[27] With a 35 percent decline in world prices, import parity prices are attained. The domestic rice price declines by 6.0 percent and rice imports increase dramatically (from a small base)[28] to a level equal to about 21.5 percent of the base level rice production. This level of imports compensates for a 30.0 percent decline in boro rice production. Again, due to a lack of viable alternatives, aman production remains constant (by assumption) so the entire adjustment in production must be undertaken by boro production.

The decline in prices for milled rice causes resources to flow away from rice production and towards other sectors. Production of paddy declines by 16.6 percent while production of other crops increases by 10.1%. Labor also moves out of agriculture entirely with knitwear and RMG production expanding particularly sharply. Growth in this dominant exporting sector is required to generate the foreign exchange to cover the rapid growth in rice imports.

As expected, medium and large farmers suffer large income declines (1.9 and 4.8 percent, respectively; Table 4.9). Urban consumers, however, enjoy large gains in real income, which enable them to increase real consumption by 1.1 to 1.6 percent.

[27] Dhaka wholesale prices for coarse rice averaged 11.7 Tk/kg in 1999/2000; import parity was estimated as 15.2 Tk/kg. A 35 percent fall in import parity prices implies a wholesale price of 9.9 Tk/kg, 15.6 percent below the base value.

[28] A small value for rice imports is observed in the base data even though empirical analysis indicates that Bangladesh rice prices were essentially equivalent to export prices in 1999/2000. These imports are assumed to be high quality or specialty rice. These imports are fixed exogenously. Standard rice imports begin from a zero import level.

Simulation results with an alternate labor market closure

With labor fixed in agriculture in the alternative closure, production of boro falls by 28.1 percent, which is less than the 30.0 percent decrease in production observed in the fully mobile case. Rice imports therefore increase by less than in simulation 7, and the real exchange rate depreciation is of a smaller magnitude. Due to this lower magnitude of depreciation, and the greater fall in domestic rice prices which follows, returns to land decrease by more in simulation 7a, and so both small and large farmers are hurt relatively more.

Although production of RMG and knitwear increases by less than in the full employment simulation due to the smaller depreciation, returns to capital increase by more in 7a than in 7. This is because, in simulation 7a, total returns to capital are higher due to the relatively smaller contraction of the rice milling and service sectors. Urban households therefore experience higher income gains (between 1.8 and 2.3 percent, as compared with between 1.1 and 1.6 percent in simulation 7).

5. Impacts of a decline in Textile Exports

Textile exports (ready-made garments and knitwear) and remittances have been Bangladesh's dominant sources of foreign exchange earnings in the last two decades (Figure 5.1). From a small base of only 1183 million dollars in 1991, textile exports have grown to 4353 million dollars in 2000, accounting for 76 percent of export earnings and 46 percent of total foreign exchange earnings in 1999/2000. Workers' remittances have been more stable, averaging 1.328 billion dollars a year between 1991 and 2000.

With the end of the Multi-Fiber Agreement (MFA) on January 1, 2005, Bangladesh is projected to lose the export advantage it has enjoyed over other competitors. Bangladesh currently has unconstrained access to EU markets, where many other competitors are constrained by quotas. In the U.S. market, Bangladesh enjoys a sizeable quota, while competitors' exports are limited by relatively small quotas. For example, Spinanger and Francois (2002) estimate the value of the quota on exports of clothing in 1999 from the People's Republic of China (PRC) to the European Union to be 15% of the total value of exports. Greater China's exports of clothing are strongly constrained by quotas while Bangladesh's exports are not. Thus, if trade reform occurs, prices received by Bangladeshi exporters of ready-made garments (RMG) and knitwear are likely to decline and Bangladesh may lose market share to greater China and other countries, as these countries gain more access to E.U. and U.S. markets.

Because of differences in the structures of production, input use and trade, (Table 5.1), the RMG and knitwear sectors are likely to be respond differently to changes in world markets and price incentives. In both sectors, value added accounts for a relatively small share of the value of production (34.1 percent in RMG and 21.8 percent in knitwear). Female labor, typically operating small sewing machines, accounts for 12.2 percent of value added in RMG production, almost three times the value added of male labor. In contrast, essentially no female labor is used in production of knitwear, where production using knitting machines is more capital intensive (capital accounts for 23.2 percent of value added in knitwear, but only 17.1 percent of value added in the RMG sector). Much of the inputs are imported. 80.5 percent of milled cloth in Bangladesh, a major input into RMG production, is imported. Likewise, 66.0 percent of the yarn (the major input into knitwear) is imported (Table 5.2).

Moreover, policies and external shocks that affect the RMG sector may have major implications for female wage labor and the situation of women in Bangladesh. Traditionally, women's participation in market activities in Bangladesh has been very low and confined to a narrow range of casual jobs on the margins of the labor market. However, since the establishment of the garment factories, significant increases in female

labor force participation have taken place, with important consequences for gender equity.[29]

5.1 Impacts of a decline in demand for Bangladesh textile exports

In the first three simulations in this chapter (simulations 8, 9 and 10), we simulate a reduction in Bangladesh garment export volume, using a full employment labor market closure. The simulations are conducted under fairly pessimistic assumptions about the ability of these exporting sectors to respond to reduced market access. In particular, the simulations assume that some factories in these sectors would be forced to shut down, rather than continuing to produce at a lower rental rate on their installed capital. This would correspond to a scenario where some exporters enter bankruptcy and fail to start new companies, at least within the simulation period.

In simulation 8, a 25 percent decrease in the quantity (and value, in foreign currency terms) of RMG Bangladesh exports leads to a 6.8 percent depreciation of the exchange rate (CPI deflated, Tables 5.3-5.4). This exchange rate depreciation increases incentives for other exports. Indeed, non-RMG exports, which comprise about 44% of the value of total exports, increase by 8.6%. The depreciation also decreases incentives to purchase imports, which decline by 4.6%. The volume of imported intermediates into RMG production, such as milled cloth, drop particularly steeply. The decline in the import of cloth accounts for almost one half of the decline in total import volume.

In addition, in any situation requiring an adjustment to a sudden imbalance in the supply of, and demand for, foreign exchange, the relative sizes of the import and export accounts must be kept in mind. Since the value of imports in the base exceeds the value of exports by a factor or more than two, a relatively small level of import volume adjustment can compensate for a relatively large decline in export receipts. Consequently, outside of cloth, a relatively small level of import compression for imports excluding

[29] See Sobhan and Khundker (2001) and Kabeer (1991).

cloth (about 3.0 percent) combined with the export response and the reduction in cloth imports is sufficient to re-establish external balance.

In simulation 8, all households experience decreases in income as well as real consumption (Table 5.5, 5.6). Returns to capital fall as RMG contracts, as do the trade, transportation, and housing services sectors, which decline as household demand falls. Total wages paid to both unskilled and skilled female labor fall as a direct result of the decline in RMG production, and returns to both unskilled and skilled male labor also decline due to the lower demand for services. Though the exchange rate depreciation increases the value of foreign remittances in local currency terms, this effect is not enough to counteract the other negative effects on income. The end effect on household income is greater for urban households (0.5 to 1.6 percent decrease) and nonagricultural rural households (0.7 to 1.2 percent decrease), which rely heavily on capital, than for agricultural rural households (0.3 to 0.6 percent decrease).

Simulation 9 models a 25 percent decrease in the export volume of knitwear. Given that knitwear exports are only about 1/3 the size of RMG exports, the exchange rate depreciation that results is only 1.3 percent. This exchange rate depreciation induces a 1.6 percent increase in RMG exports, but the effects in knitwear dominate, causing total exports to fall by 3.0 percent.

As in Simulation 8, all households lose when the knitwear sector faces reduced market access (Table 5.7). The decline in returns to capital is smaller when only knitwear contracts, however, despite the fact that knitwear is more capital-intensive than RMG. This is because the fall in household incomes and demand for services is smaller in simulation 9 than in simulation 8. For the same reason, the fall in returns to male labor is lower. In contrast to simulation 8, female labor gains slightly in the knitwear simulation as the RMG sector expands due to the depreciation. The end result is that household incomes decrease by less than in simulation 8, particularly those of urban households whose incomes fall by between 0.1 and 0.4 percent in simulation 9 as

compared with 0.5 to 1.6 percent as well as non-agricultural rural households (0.1 to 0.2 percent decrease in simulation 9 rather than 0.7 to 1.2 percent).

Reduced market access for both major textile export sectors is modeled in simulation 10 by a reduction in export volume for both RMG and knitwear by 25 percent. The resulting depreciation in the exchange rate is 8.9 percent, which is approximately equal to the sum of the changes for the individual shocks. This larger depreciation results in a 14.6 percent increase in non-RMG, non-knitwear exports, and a 6.3 percent decline in total imports.

The distributional effect of simulation 10 is approximately equal to the sum the impacts of the individual textile shocks. Returns to capital as well as male and female labor fall, as both RMG and knitwear as well as the service sectors contract. As in simulation 8 and 9, urban and rural non-agricultural households are hurt more than agricultural households.

In these simulations, we assume that rice export parity is not encountered (as in the first set of paddy productivity increase simulations) despite the steep decline in the real exchange rate. As a consequence, real value added in agriculture is largely unchanged. Paddy rice production declines very marginally in order to release resources to traded agricultural products. The impacts of a decline in world prices for RMG and knitwear on the agricultural sector would differ dramatically if large scale exports of rice at a price close to base domestic prices were possible. In this case, rice production and exports would increase dramatically (results from this simulation not presented).

Simulation results with an alternate labor market closure

The alternative labor market closure, in which the wage for unskilled labor is fixed, may more accurately capture the behavior of labor markets in the short-run, especially for women.. With few formal employment opportunities outside the garment industry, more female labor time is likely to be devoted to within home activities in the

event of a decline in the garment industry, even with relatively little change in the wage rates paid by remaining garment factories.[30]

With wage rates for unskilled labor are fixed, and unemployment is allowed in non-agricultural sectors, the impacts of reduced textile exports on output and incomes is slightly greater than the impacts under full-employment (Tables 5.3a-5.4a). Real GDP falls more as fewer factors are utilized in production (1.5 percent in simulation 10a, for example, as compared with 1.0 percent in simulation 10). Therefore household incomes are generally lower as well. The subsequent fall in import demand necessitates a smaller depreciation and so exports fall by more.

As in the full employment case, all households face lower incomes in all three simulations. The magnitudes of these declines are very similar for farm households, and higher for non-farm households. This is mostly because returns to capital fall by more in simulations 8a-10a due to the more pronounced negative impact of the shocks.

The assumption of rigid wages (relative to the CPI) for unskilled labor (classes zero and one) implies that employment effects are large. Since employment of women is concentrated in the RMG activity where the impacts of lower world demand for Bangladesh RMG exports are most directly felt, total demand for female unskilled labor suffers the most. When demand for both knitwear and RMG decline simultaneously, unskilled female employment in the non-agricultural sectors declines by 5.6 percent. Male unskilled employment in non-agriculture, on the other hand, declines by only about 3.2 percent.

5.2 Increased foreign exchange inflow

In simulations 8-10, real exchange rate adjustments had major effects on sectoral output and income distribution. In order to highlight the importance of real exchange rate adjustment to a reduction in textile export demand, simulation 11 allows foreign savings

[30] Elson (1995) discusses women's trade-offs between work within the home and work outside the home. See also Fontana and Wood (2000) for an example of this trade-off can be incorporated in a CGE model.

(foreign capital inflows) to increase so as to keep the real exchange rate unchanged. Without the benefit of the real depreciation of simulations 8 – 10, exports decline by 18.3 percent, compared to 14.0 percent in simulation 10 and value added of RMG and knitwear falls by 22.2 percent.

The increased inflow of foreign capital adds to the pool of savings leading to a 3.6 percent increase in investment particularly in building and construction. Value added and returns to capital in these sectors increase as do total returns to capital, offsetting the adverse effects of a fixed exchange rate on export prices in local currency and the resulting lower returns to capital in RMG and knitwear. For the same reason, returns to unskilled male labor, which is used intensively in the investment sectors, increases. Female labor, which is not generally employed by building or construction, loses due to the contraction of RMG. Additionally, without the real exchange rate depreciation, the value of foreign remittances remains constant rather than increasing as in simulation 10. The end effect is that most households still lose, but the magnitude of this loss is generally very small (Table 5.8). Rural, non-agricultural households with female heads suffer the most, with their income decreasing by 0.3 percent for the non-poor and by 0.7 percent for the poor.

Simulation 12 then isolates the impact of the foreign savings inflows by modeling an increase in foreign savings of a magnitude identical to that of simulation 11, (equal to 0.1% percent of base imports), but with no exogenous change in world demand for RMG and knitwear exports. This increase in capital inflows increases available savings as in simulation 11, in this case enabling an increase in total investment by 3.2 percent. Investment spending on construction contributes to an increase of 2.7 percent in output in this sector. Output of other non-traded sectors, notably private services, also rises. Increase in demand for traded goods leads to an increase in net imports, but has little effect on their domestic prices. As a result, the relative price of tradable to non-tradable goods (the real exchange rate) decreases (appreciates) by 6.0 percent. Export oriented sectors, such as RMG and knitwear, suffer declines, as evidenced by the 4.6 percent fall in value added for these two sectors combined.

In contrast to simulations 8-11, household incomes all increase in simulation 12 due to the inflow of foreign savings (Table 5.9). Returns to capital as well as to unskilled and skilled male labor rise but returns to female labor fall, as RMG contracts. Urban households gain by between 0.4 and 1.4 percent, while agricultural households experience income gains of between 0.2 and 0.6 percent.

Simulation results with an alternate labor market closure

The effect of the foreign savings shock under the unemployment closure, simulated in 12a, is greater than under the full-employment closure. Given the availability of unemployed factors (unskilled male and female labor), output in the investment sectors is able to expand by more than in simulation 12. Output in construction increases by 3.2 percent in simulation 12a as compared with 2.7 percent in simulation 12. Larger increases in incomes and demand results in higher output in other non-traded sectors and so real GDP increases by 0.5 percent as compared with 0.2 percent under full-employment. The increase in import demand is therefore also higher, while exports remain initially unchanged, resulting in a lower level of appreciation. Effects on household income are likewise generally greater, with most urban and rural non-agricultural households gaining significantly due to increased returns to capital.

The effects of simulation 11a are very similar to the effects of simulation 11. As observed when comparing simulations 10 and 10a, the negative impact of a garment export volume shock is of a greater magnitude under unemployment than under full-employment. Similarly, as seen in simulations 12 and 12a, the positive impact of a foreign savings shock is greater in the unemployment simulation. Therefore, when we combine these two shocks in simulations 11 and 11a, the effect of allowing unemployment acts in the negative direction in terms of the garment shock and in the positive direction in terms of the foreign savings shock. For example, GDP declines by slightly more in simulation 11a than in 11, indicating that the larger negative effect of the export shock overpowers the larger positive effect of the foreign savings shock. Income

effects are also very similar in 11 and 11a, though generally slightly lower, as GDP is lower.

6. Conclusions

In this paper, we have analyzed the impact of different external shocks and policy changes on sectoral output and household welfare in Bangladesh. using a computable general equilibrium (CGE) model. In particular, this paper presents simulations of the impact of (i) an increase in rice productivity and production with and without exports of rice, (ii) a sharply lower import price for rice, and (iii) a decline in the price received for Bangladesh textile exports as preferential trade arrangements come to an end.

The results suggest that increases in productivity of rice, a key to the gains in rice production and fall in real rice prices that helped Bangladesh to reduce rural poverty in the last two decades, still have the potential to benefit most households. However, in the absence of intervention in domestic markets, the resulting decline in real rice prices reduces real incomes of larger farmers. If trading links can be established and exports prevent a price fall, however, both producers and consumers enjoy real income gains. On the other hand, sharply lower *import* prices of rice would have adverse effects on producers, though the simulations suggest that most household groups benefit.

Reduced revenues from Bangladesh textile (RMG) exports affect all households through a reduction in labor demand in textile industries, the resulting fall in consumer demand and output for other sectors, and a depreciation of the real exchange rate that raises the costs of imported goods. Households for which female labor is an important source of income suffer relatively greater declines in real incomes. According to the simulations, a 25 percent decline in RMG exports (excluding knitwear) would lead to a 6 percent decrease in total real wages of unskilled female labor in non-agricultural sectors and a 0.5 to 1.0 percent decline in the real incomes of urban poor households. The rural sector benefits little from the 6.8 percent depreciation of the real exchange rate, however, unless rice exports are feasible, since much of agricultural output is non-traded.

Given the massive dislocations of workers and negative effects on household incomes and consumption implied by a shard decline in RMG exports, policy-makers may wish to consider steps to ease a transition to lower export earnings (an event largely beyond the direct control of Bangladesh). Increased investments in transport and telecommunications infrastructure, improved port management, and avoidance of public work disruptions could help reduce turnaround time for RMG exports, helping Bangladesh to minimize loss of market share (Spinanger, 2000). Development of grades and standards for agricultural exports, establishment of trading contacts, investments in mechanical graders and sorters for rice and in cold storage facilities and warehouses for perishable fruits and vegetables could help agricultural exports be more responsive to a real exchange rate depreciation. Careful macro-economic management, including avoidance of fiscal deficits and balance of payment deficits, even accumulation of foreign exchange reserves, may make for an easier adjustment to a loss of RMG export revenues, if it occurs. Finally, investment in human capital through basic education for garment sector workers and others, offers the prospect for increased labor productivity and incomes.

Overall, these simulations illustrate the importance of trade policy and links between Bangladesh and the world economy. International trade offers the potential to prevent a decline in real prices of rice if productivity of paddy production increases. It has also permitted a large increase in RMG export earnings. However, changes in international markets could threaten welfare of some Bangladesh households, as well, as illustrated by the simulations of lower import prices of rice that could sharply reduce farmer incomes, and of a decline in textile export earnings that could sharply reduce female urban employment and urban household incomes. Moreover, the simulations illustrate important general equilibrium considerations that need to be taken into account in policy analysis, including large changes in the real exchange rate needed to avoid an a substantial increase in the current account deficit in the case of a decline in RMG exports.

Further analysis is needed to better quantify the magnitude of the key linkages with alternative model specifications and parameters, and in different policy scenarios. In addition, work is needed on policy alternatives to offset the potential adverse impacts of declines in terms of trade and export opportunities. Nonetheless, these simulations show that the Bangladesh economy and household incomes are clearly linked with the global economy, particularly through foodgrain trade and the RMG sector. Efforts to alleviate poverty and raise the incomes of the poor should not neglect these linkages, particularly in cases where these poverty alleviation interventions are large enough to have major effects on the real exchange rate and female labor earnings.

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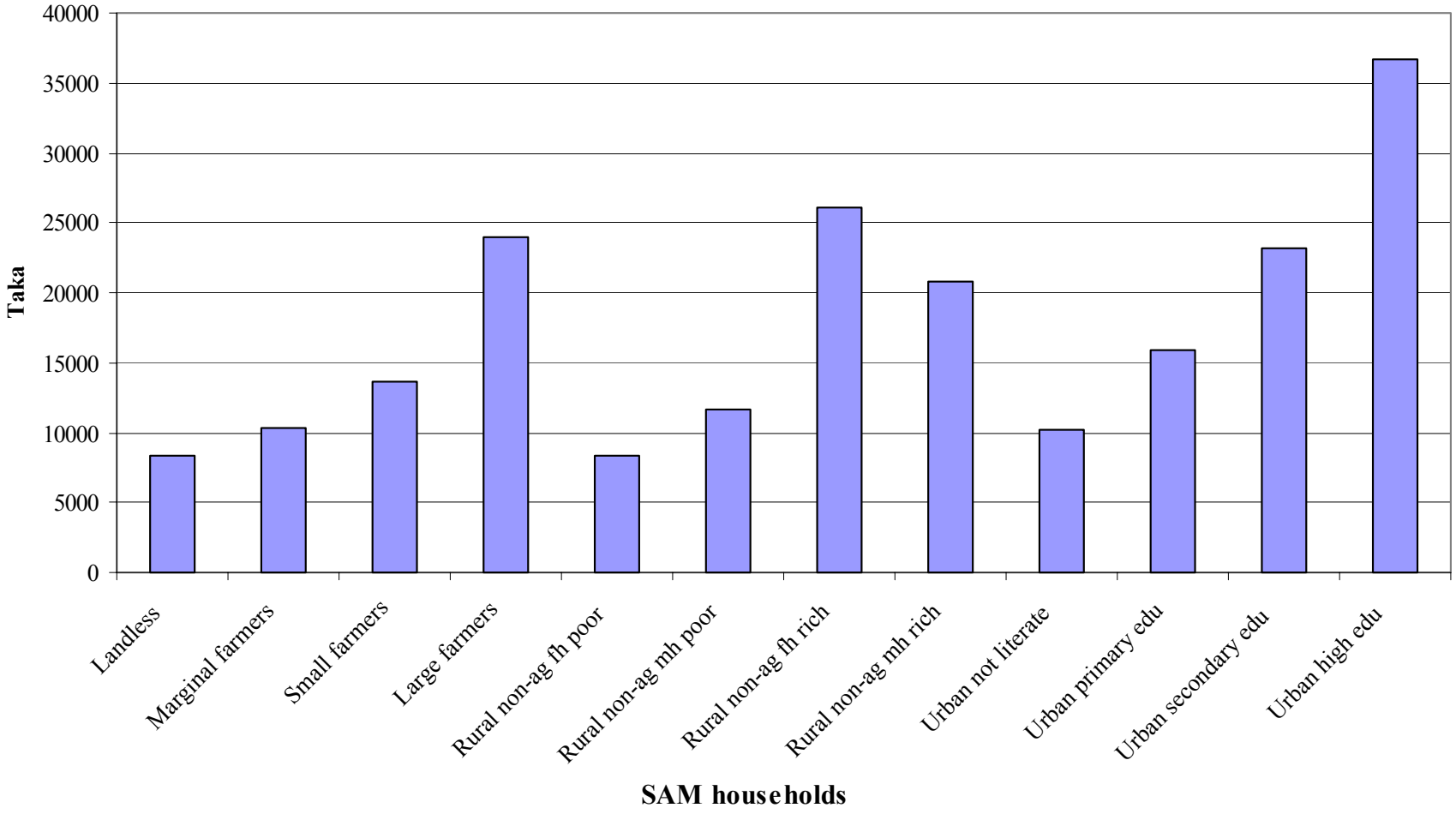
Figure 2.1 Expenditure per capita by household type



Source: 1999/2000 Bangladesh SAM

Figure 3.1. Production technology

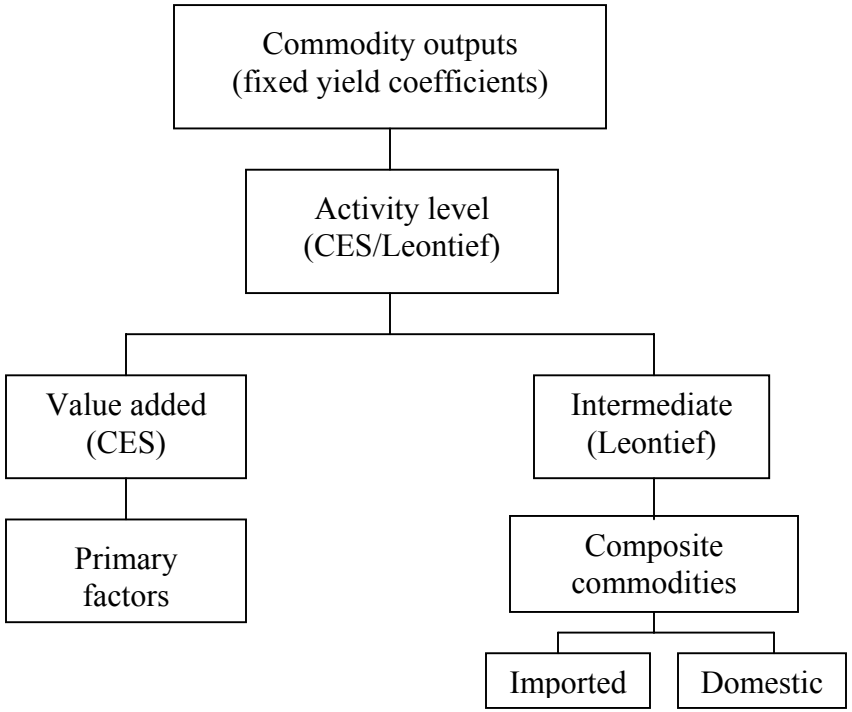


Figure 3.2. Flows of marketed commodities

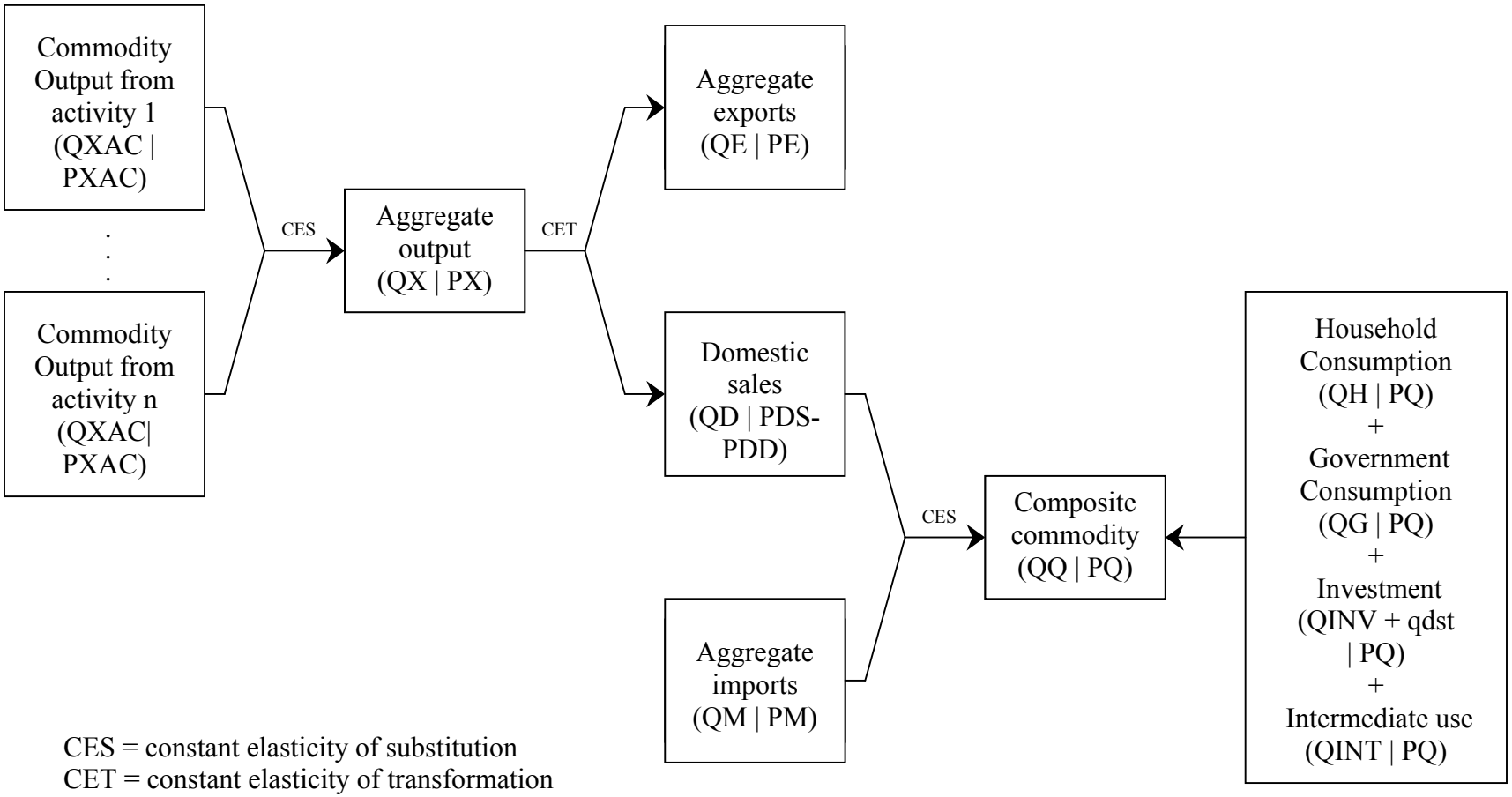


Figure 4.1 The Food Gap in Bangladesh: 1980/81 - 2000/01

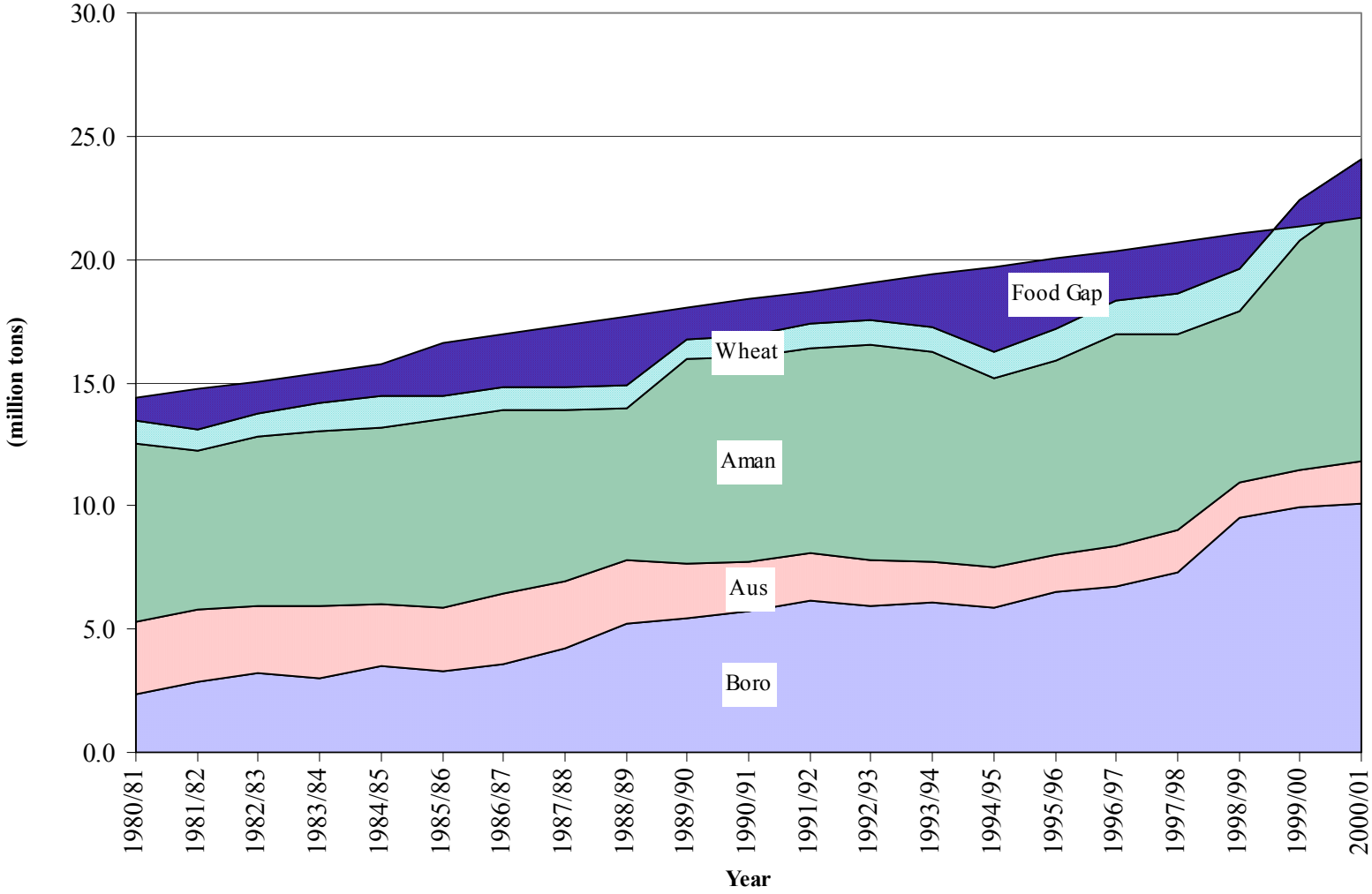
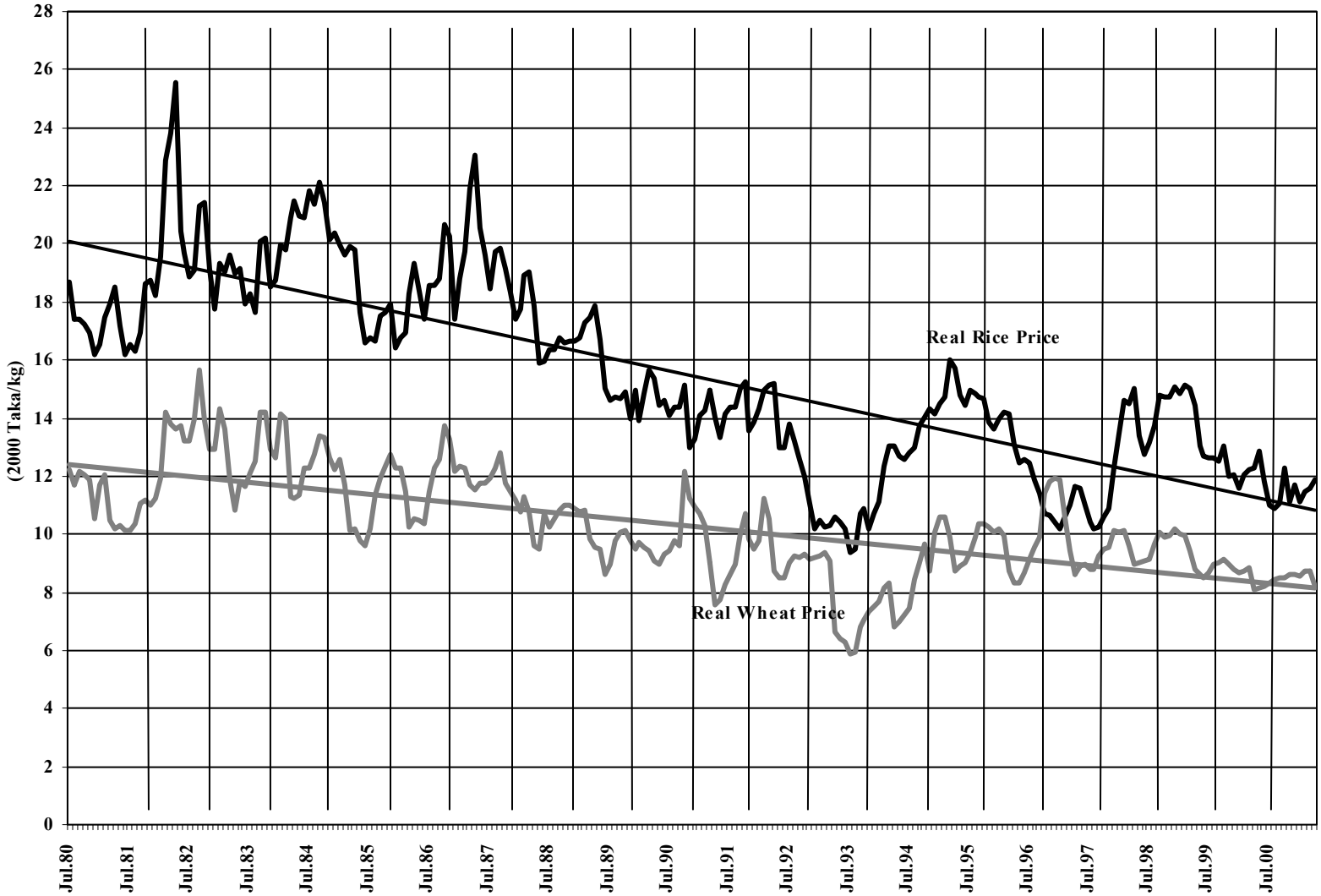


Figure 4.2 National Average Real Wholesale Price of Rice and Wheat in Bangladesh, 1980-2001



Note: Prices are deflated using the non-food Dhaka middle-income Cost of Living Index (and the national CPI after June 1998).
Source : Dorosh (2001); FPMU data.

Figure 5.1 Sources of Foreign Exchange, Bangladesh 1991-2000 (million US$)

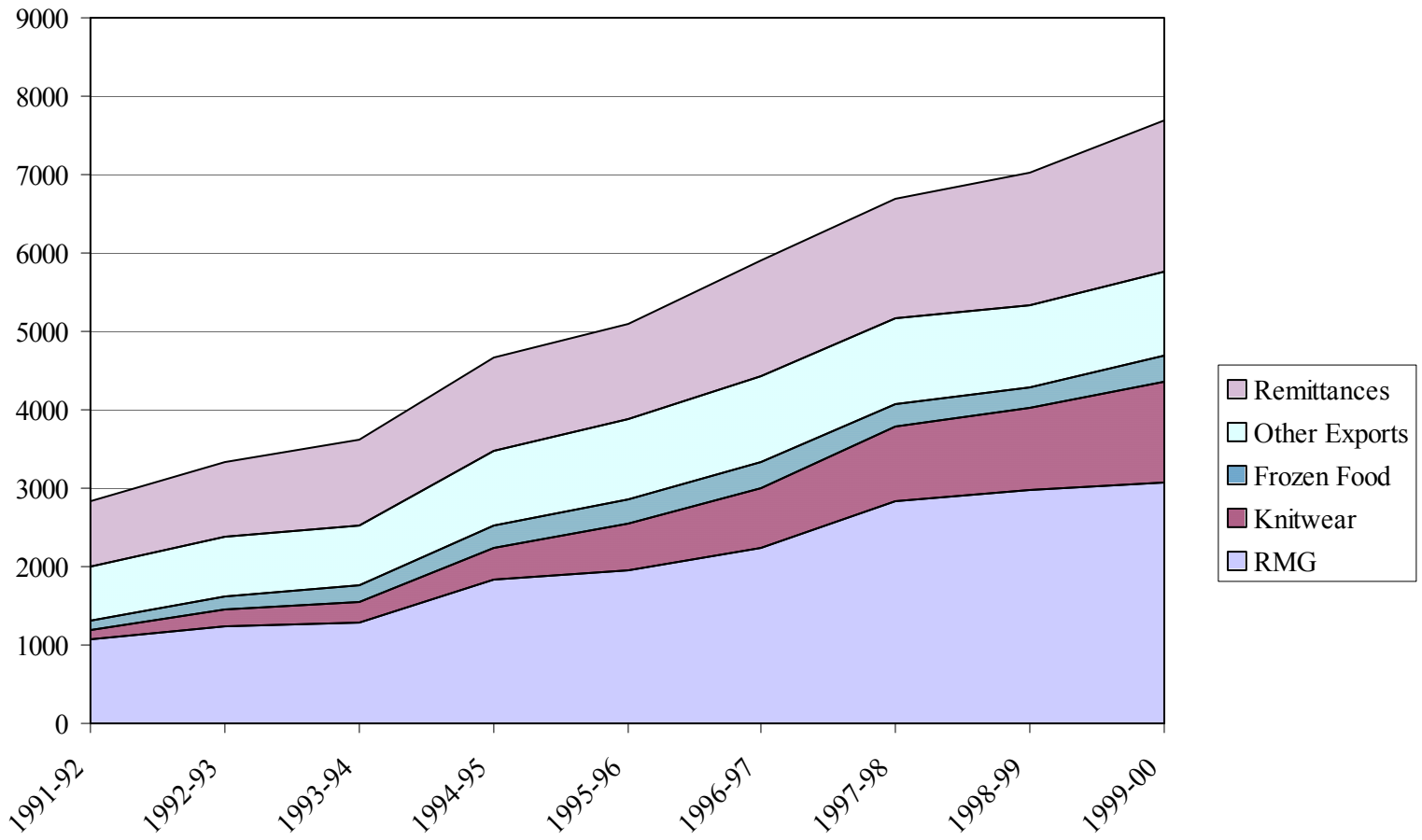


Table 2.1. Accounts in the Bangladesh SAM 1999-2000 SAM

Activities (53)

Agriculture (12)	**Industry (24)**	**Services (17)**
Paddy Aman	Rice milling Aman	Urban building
Paddy Boro	Rice milling Boro	Rural building
Grains	Ata and flour	Construction (electricity)
Jute	Edible oil	Construction (roads)
Sugarcane	Sugar	Construction (others)
Commercial crops	Other food	Utilities (electricity)
Other crops	Leather	Utilities (gas)
Livestock	Jute textiles	Trade services
Poultry	Yarn	Transportation services
Shrimps	Mill cloth	Housing
Fish	Other cloth	Health
Forestry	Ready-made garments	Education
	Knitwear	Public administration
	Other textiles	Financial services
	Tobacco products	Hotels and restaurants
	Wood products	Communications
	Chemicals	Other services
	Fertilizer	
	Petroleum products	
	Clay	
	Steel	
	Machinery	
	Other industries	
	Natural Gas	

Commodities (52): Same as activities, but only one rice milling

Factors of production (21)

Agricultural labor female (4 educational levels)	Poultry capital	Land
Agricultural labor male (4 educational levels)	Cattle capital	Ponds
Non-agricultural labor female (4 educational levels)	Non-agricultural capital	
Non-agricultural labor male (4 educational levels)		

Households (12)

Landless	Rural non-ag poor fem head	Urban no education
Marginal farmers	Rural non-ag poor male head	Urban prim education
Small farmers	Rural non-ag rich fem head	Urban sec education
Large farmers	Rural non-ag rich male head	Urban tert education

Other institutions (3)

Enterprises	Government	Rest of the world

Table 2.2 – Household types and their definition

1.Agricultural landless	Rural agricultural households who own no land
2.Agricultural marginal	Rural agricultural households who own up to 0.49 acres
3.Agricultural small	Rural agricultural households who own between 0.5 and 2.49 acres
4.Agricultural large	Rural agricultural households who own more than 2.49 acres
5.Non-agricultural poor female-headed	Rural households whose head is female and not engaged in agricultural activities, and who own less than 0.5 acres of land
6.Non-agricultural poor male-headed	Rural households whose head is male and not engaged in agricultural activities, and who own less than 0.5 acres of land
7.Non-agricultural rich female-headed	Rural households whose head is female and not engaged in agricultural activities, and who own more than 0.5 acres of land
8. Non-agricultural rich male-headed	Rural households whose head is male and not engaged in agricultural activities, and who own more than 0.5 acres of land
9.Urban illiterate	Urban households whose head has no schooling
10.Urban low educated	Urban households whose head's education is 'I-V class' (LFS definition)
11.Urban medium educated	Urban households whose head's education is either 'VI-VIII class' or 'IX-X class' (LFS definition)
12.Urban highly educated	Urban households whose head's education is either 'SSC/HSC' or 'graduate and above' (LFS definition)

Table 2.3 - Household groups and their expenditure, Bangladesh 1999-2000

	Population (million)	Expenditure (billion Taka)	Expenditure p.c. (Taka)	Population (per cent of total)	Expenditure (per cent of total)
Landless	1.9	16.1	8339	1.5	0.8
Marginal farmers	22.3	230.8	10340	17.3	11.0
Small farmers	22.4	307.5	13699	17.4	14.6
Large farmers	9.9	238.4	24001	7.7	11.3
Rural non-ag fh poor	2.1	17.3	8393	1.6	0.8
Rural non-ag mh poor	19.1	222.7	11665	14.8	10.6
Rural non-ag fh rich	0.3	6.7	26057	0.2	0.3
Rural non-ag mh rich	9.2	190.2	20768	7.1	9.0
Urban not literate	13.7	140.2	10254	10.6	6.7
Urban primary edu	9.3	147.2	15850	7.2	7.0
Urban secondary edu	7.9	182.6	23200	6.1	8.7
Urban high edu	11.0	402.5	36710	8.5	19.1
Total	129.0	2102.3	16297	100.0	100.0
Rural poor	67.9	794.4	11708	52.6	37.8
Rural non-poor	19.4	435.3	22498	15.0	20.7
Urban poor	13.7	140.2	10254	10.6	6.7
Urban non-poor	28.1	732.3	26040	21.8	34.8

Table 2.4: Sources of household income (as share of total income), Bangladesh 1999-2000

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Non-Ag Poor, F	Non-Ag Poor, M	Non-Ag NPoor, F	Non-Ag NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu
Male Ag Lab: Ed 0	10.0	9.1	4.5	1.7	1.5	5.0	0.4	1.1	0.0	0.0	0.0	0.0
Male Ag Lab: Ed 1	2.3	2.9	3.0	1.5	0.9	3.5	0.0	1.8	0.0	0.0	0.0	0.0
Male Ag Lab: Ed 2	0.8	1.1	2.2	2.1	0.5	2.3	0.1	2.1	0.0	0.0	0.0	0.0
Male Ag Lab: Ed 3	0.0	0.2	0.8	1.2	0.3	1.1	0.7	2.7	0.0	0.0	0.0	0.0
Female Ag Lab: Ed 0	2.8	2.6	1.6	0.8	6.1	1.5	1.0	0.5	0.0	0.0	0.0	0.0
Female Ag Lab: Ed 1	0.6	0.7	1.0	0.7	1.1	0.8	0.4	0.7	0.0	0.0	0.0	0.0
Female Ag Lab: Ed 2	0.0	0.2	0.4	0.5	0.4	0.4	0.0	0.6	0.0	0.0	0.0	0.0
Female Ag Lab: Ed 3	0.0	0.0	0.1	0.1	0.3	0.0	0.2	0.2	39.7	1.3	0.1	0.1
Male Non-ag Lab: Ed 0	24.3	22.1	10.9	4.2	3.6	12.1	1.0	2.6	8.1	34.5	0.9	0.2
Male Non-ag Lab: Ed 1	7.8	9.9	10.1	4.9	3.0	11.6	0.0	6.1	4.8	6.7	26.8	0.9
Male Non-ag Lab: Ed 2	2.4	3.6	6.8	6.6	1.5	7.1	0.5	6.8	2.8	4.4	4.6	28.9
Male Non-ag Lab: Ed 3	0.0	0.8	4.7	6.5	1.5	6.2	3.6	14.9	4.0	0.7	0.3	0.3
Female Non-ag Lab: Ed 0	2.1	1.9	1.2	0.6	4.6	1.1	0.7	0.4	0.8	1.8	0.4	0.1
Female Non-ag Lab: Ed 1	0.4	0.5	0.6	0.4	0.7	0.6	0.3	0.5	0.4	0.3	0.8	0.3
Female Non-ag Lab: Ed 2	0.0	0.1	0.2	0.3	0.3	0.2	0.0	0.4	0.1	0.4	0.4	1.8
Female Non-ag Lab: Ed 3	0.0	0.1	0.4	0.5	1.4	0.2	1.1	0.9	0.0	0.0	0.0	0.0
Land	0.6	5.8	20.9	36.2	3.1	2.2	10.0	18.4	0.0	0.0	0.0	0.0
Ponds	0.6	6.0	6.8	12.7	2.4	2.9	26.0	9.6	0.0	0.0	0.0	0.0
Poultry Capital	0.7	0.8	0.7	0.8	0.7	0.6	0.2	0.5	0.0	0.0	0.0	0.0
Cattle Capital	1.6	1.9	2.2	1.9	0.9	0.9	0.4	1.0	0.0	0.0	0.0	0.0
Household Transfers	15.8	12.8	5.1	4.1	5.1	1.3	16.4	0.1	7.8	2.6	0.7	0.0
Enterprise Transfers	0.0	0.0	3.9	4.9	45.7	28.2	19.0	20.9	10.1	31.4	57.2	61.6
Government Transfers	14.5	2.2	1.7	1.5	7.2	1.7	13.2	1.4	3.7	3.0	2.3	0.3
ROW Transfers	12.7	14.8	10.1	5.4	7.3	8.5	4.8	5.8	17.7	12.9	5.6	5.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total income (bill taka)	18.2	241.3	335.2	307.7	18.7	245.7	9.9	229.2	149.3	169.5	242.8	578.7

Table 2.5 - Macro SAM for Bangladesh, 1999-2000 (million Taka)

	ACT	COM	FAC	HHLD	ENT	DOM TAX	TARIFF	GOVT RECUR	ROW	K ACCT PRIV	K ACCT PUB	TOTAL
ACT	0	4,442,447	0	0	0	0	0	0	0		0	**4,442,447**
COM	2,207,682	0	0	2,048,390	0	0	0	81,710	249,230	328,194	159,809	**5,075,014**
FAC	2,234,765	0	0	0	0	0	0	0	0		0	**2,234,765**
HLLD	0	0	1,474,921	0	733,964	0	0	42,520	183,448		0	**2,434,853**
ENT	0	0	759,844	0	0	0	0	33,630	0		0	**793,474**
DOM TAX	0	38,983	0	0	0	0	0	0	0		0	**38,983**
TARIFF	0	99,517	0	0	0	0	0	0	0		0	**99,517**
GOVT RECURR	0	0	0	9,449	23,011	38,983	99,517	0	22,287		0	**193,247**
ROW	0	494,068	0	0	0	0	0	7,850	0	11,119	0	**513,036**
CAP ACCT PRIV	0	0	0	377,014	36,500	0	0	0	43,833		0	**457,347**
CAP ACCT PUB	0	0	0	0	0	0	0	27,537	14,238	118,034	0	**159,809**
TOTAL	**4,442,447**	**5,075,014**	**2,234,765**	**2,434,853**	**793,474**	**38,983**	**99,517**	**193,247**	**513,036**	**457,347**	**159,809**	

Table 2.6a – Structure of agricultural production, Bangladesh 1999-2000

Sector	Share of total Value Added	Share of total Production	Share of total Employment
Aman rice	3.3	2.9	7.5
Boro rice	3.7	3.5	7.1
Other grains	0.6	0.7	2.0
Jute	0.4	0.3	1.1
Sugarcane	0.4	0.4	0.6
Other commercial crops	0.2	0.2	0.4
Other crops	5.5	5.1	6.6
Livestock	2.5	2.4	8.0
Poultry	0.6	0.6	0.7
Shrimps	0.5	0.6	0.7
Other fish	5.6	5.7	3.7
Forestry	2.0	2.3	0.7
Total agriculture	25.2	24.8	39.0

Table 2.6b– Structure of non-agricultural production, Bangladesh 1999-2000

Sector	Share of total Value Added	Share of total Production	Share of total Employment
Rice milling	2.6	8.6	0.7
Ata and flour	0.4	1.0	0.2
Edible oil	0.3	0.7	0.1
Sugar	0.3	0.8	0.5
Other food	0.6	1.0	0.4
Leather	0.3	0.8	0.2
Jute textiles	0.2	0.5	0.3
Yarn	0.3	0.6	0.4
Mill cloth	0.2	0.4	0.3
Other cloth	1.0	1.9	1.1
Ready-made garments	2.7	4.0	3.5
Knitwear	0.6	1.2	0.1
Other textiles	0.1	0.2	0.3
Tobacco products	0.5	0.6	0.2
Wood products	0.6	1.0	0.7
Chemicals	0.6	1.0	0.3
Fertilisers	0.1	0.2	0.1
Petroleum products	0.4	0.4	0.1
Clay	0.3	0.4	0.2
Steel	0.6	1.2	0.7
Machinery	0.2	0.3	0.1
Other industries	0.2	0.3	0.2
Natural Gas	0.0	0.0	0.0
Urban building	1.9	2.2	0.9
Rural building	7.7	6.7	5.2
Construction (electricity)	0.2	0.4	0.1
Construction (roads)	0.2	0.2	0.1
Construction (others)	0.4	0.7	0.5
Utilities (electricity)	1.2	0.9	0.2
Utilities (gas)	1.0	0.8	0.6
Trade services	16.0	10.9	15.6
Transportation services	11.0	8.6	11.2
Housing	6.6	4.5	0.0
Health	0.8	0.8	0.3
Education	1.8	1.4	1.7
Public administration	2.6	1.9	2.2
Financial services	5.1	4.5	4.4
Hotels and restaurants	0.5	0.9	0.6
Communications	0.8	0.6	0.6
Other services	3.6	2.1	6.0
Total non-agriculture	74.8	75.2	61.0

Table 2.7: Factor Income Sources for Household Groups, Bangladesh 1999/2000 SAM (million Taka)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Ag Poor, F	Rural Non-Ag Poor, M	Rural Non-Ag NPoor, F	Rural Non-Ag NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu
M Ag Lab: Ed 0	1,821.2	21,933.6	15,012.6	5,270.3	276.3	12,258.4	42.4	2,474.9	--	--	--	--
M Ag Lab: Ed 1	421.0	7,088.1	10,036.1	4,519.9	168.6	8,494.3	--	4,125.8	--	--	--	--
M Ag Lab: Ed 2	141.4	2,760.5	7,283.8	6,456.9	90.3	5,550.1	14.2	4,920.8	--	--	--	--
M Ag Lab: Ed 3	--	368.6	2,848.9	3,623.1	49.5	2,749.3	65.0	6,197.6	--	--	--	--
F Ag Lab: Ed 0	505.2	6,159.7	5,309.6	2,317.8	1,129.2	3,647.0	96.1	1,209.0	--	--	--	--
F Ag Lab: Ed 1	110.0	1,677.4	3,260.7	2,033.3	198.4	2,072.8	40.0	1,696.3	--	--	--	--
F Ag Lab: Ed 2	--	373.1	1,245.7	1,421.7	76.5	862.7	--	1,362.8	--	--	--	--
F Ag Lab: Ed 3	--	52.5	285.0	303.3	54.9	120.4	23.3	450.8	--	--	--	--
M Non-Ag Lab: Ed 0	4,431.9	53,375.6	36,533.2	12,825.2	672.4	29,831.0	103.1	6,022.7	59,286.8	2,137.0	307.0	436.7
M Non-Ag Lab: Ed 1	1,416.5	23,851.3	33,771.3	15,209.4	567.4	28,583.1	--	13,883.3	12,091.8	58,450.1	2,240.3	1,407.7
M Non-Ag Lab: Ed 2	445.3	8,694.0	22,939.6	20,335.2	284.4	17,479.5	44.7	15,497.5	7,117.2	11,331.1	65,081.9	5,214.4
M Non-Ag Lab: Ed 3	--	2,037.1	15,745.0	20,023.8	273.7	15,194.3	359.3	34,252.1	4,220.7	7,397.5	11,199.5	167,333.6
F Non-Ag Lab: Ed 0	383.7	4,678.4	4,032.7	1,760.4	857.7	2,770.0	73.0	918.2	5,907.1	1,163.2	628.1	1,667.0
F Non-Ag Lab: Ed 1	71.8	1,095.5	2,129.6	1,328.0	129.6	1,353.8	26.1	1,107.9	1,247.6	3,031.2	973.8	823.3
F Non-Ag Lab: Ed 2	--	238.6	796.8	909.4	48.9	551.8	--	871.7	571.7	570.3	1,857.4	1,451.4
F Non-Ag Lab: Ed 3	--	247.8	1,346.6	1,433.1	259.3	569.1	110.2	2,129.8	191.9	688.4	891.9	10,554.2
Capital	--	--	--	--	--	--	--	--	--	--	--	--
Land	100.4	14,055.2	69,997.3	111,284.9	580.9	5,346.5	992.8	42,127.9	--	--	--	--
Ponds	115.6	14,394.0	22,956.8	39,094.1	449.3	7,012.2	2,579.3	22,031.5	--	--	--	--
Poultry Capital	131.7	1,812.6	2,428.2	2,583.8	132.8	1,385.6	18.7	1,094.1	--	--	--	--
Cattle Capital	291.8	4,485.8	7,331.3	5,773.9	174.3	2,254.5	40.1	2,391.1	--	--	--	--
Total Income	10,387.5	169,379.3	265,290.7	258,507.6	6,474.6	148,086.5	4,628.2	164,765.8	90,634.8	84,768.9	83,180.0	188,888.3

Table 4.1: Macroeconomic Indicators and Sectoral Output: Simulations 1-3
(Full employment closure*)

		Sim 1	Sim 2	Sim 3
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy
		(percent change)		
Real Exchange Rate (index)	100.00	0.34%	0.78%	1.07%
Consumption	210.78	0.46%	0.53%	0.94%
Investment	47.74	0.36%	0.26%	0.57%
Government	7.88	0.00%	0.00%	0.00%
Exports	24.72	0.13%	0.15%	0.24%
Imports	-54.55	0.06%	0.07%	0.11%
GDP	236.57	0.48%	0.53%	0.95%
Sector Output (Value Added)				
Paddy	15.53	1.25%	1.34%	2.52%
Other Crops	15.76	1.55%	1.62%	3.04%
Livestock, Fishing, Forestry	24.98	0.32%	0.30%	0.58%
Rice Milling	5.79	0.83%	1.42%	2.18%
Other Food Processing	3.65	0.36%	1.00%	0.68%
RMG, Knitware	7.49	0.14%	0.09%	0.21%
Other Textiles	4.76	0.36%	0.31%	0.61%
Other Industry	7.79	0.29%	0.31%	0.56%
Construction	23.28	0.36%	0.30%	0.62%
Other Private Services	108.74	0.36%	0.42%	0.73%
Public Administration	5.80	0.16%	0.17%	0.31%
Total	223.56	0.50%	0.54%	0.99%

Simulation 1: 10 percent increase in total factor productivity of aman paddy.
Simulation 2: 10 percent increase in total factor productivity of boro paddy.
Simulation 3: 10 percent increase in total factor productivity of both aman and boro paddy.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 4.2: Agricultural Sector Prices and Output: Simulations 1-3
(Full-employment closure*)

		Sim 1	Sim 2	Sim 3
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy
		(percent change)		
Aman Paddy Production	12.76	10.00%	0.00%	10.00%
Boro Paddy Production	15.74	-6.52%	2.52%	-4.11%
Total Paddy Production	28.51	0.88%	1.39%	2.21%
Aman Paddy Price	1.00	-3.95%	-6.12%	-9.66%
Boro Paddy Price	1.00	-1.89%	-6.40%	-7.95%
Milled Rice Production	38.44	0.81%	1.42%	2.16%
Consumer Rice Price	1.00	-1.53%	-3.38%	-4.70%
Rice Consumption				
Urban poor	4.54	0.62%	1.03%	1.60%
Urban non-poor	6.57	1.27%	2.38%	3.56%
Rural landless, marginal	5.79	0.53%	0.83%	1.32%
Rural non-farm poor	5.44	1.10%	1.86%	2.88%
Rural small, large farm	11.85	0.62%	1.31%	1.88%
Rural non-farm non-poor	3.82	0.49%	0.90%	1.35%
Total	38.01	0.77%	1.43%	2.14%
Rice Exports/Base Production	0.00%	0.00%	0.00%	0.00%
Rice Imports/Base Production	1.30%	0.00%	0.00%	0.00%
Wheat Imports/Base Production	48.99%	-6.36%	-7.02%	-12.88%

Simulation 1: 10 percent increase in total factor productivity of aman paddy.
Simulation 2: 10 percent increase in total factor productivity of boro paddy.
Simulation 3: 10 percent increase in total factor productivity of both aman and boro paddy.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 4.3: Macroeconomic Indicators and Sectoral Output: Simulations 4-7
(Full-employment closure*)

		Sim 4	Sim 5	Sim 6	Sim 7
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy	Lower World Price
		(percent change)			
Real Exchange Rate (index)	100.00	-0.98%	-2.30%	-3.20%	11.67%
Consumption	210.78	0.57%	0.81%	1.35%	0.02%
Investment	47.74	0.40%	0.33%	0.69%	2.11%
Government	7.88	0.00%	0.00%	0.00%	0.00%
Exports	24.72	2.11%	4.59%	6.43%	16.38%
Imports	-54.55	0.96%	2.08%	2.92%	7.42%
GDP	236.57	0.59%	0.79%	1.34%	0.44%
Sector Output (Value Added)					
Paddy	15.53	3.04%	5.53%	8.29%	-15.90%
Other Crops	15.76	-0.12%	-2.01%	-1.95%	10.13%
Livestock, Fishing, Forestry	24.98	0.25%	0.15%	0.39%	0.92%
Rice Milling	5.79	3.01%	6.51%	9.20%	-19.37%
Other Food Processing	3.65	0.25%	0.11%	0.35%	1.76%
RMG, Knitware	7.49	-0.73%	-2.00%	-2.69%	7.58%
Other Textiles	4.76	-0.16%	-0.88%	-0.97%	8.31%
Other Industry	7.79	0.04%	-0.27%	-0.24%	2.81%
Construction	23.28	0.48%	0.57%	1.00%	1.11%
Other Private Services	108.74	0.48%	0.70%	1.14%	-0.34%
Public Administration	5.80	0.15%	0.16%	0.31%	0.25%
Total	223.56	0.58%	0.74%	1.27%	-0.27%

Simulation 4: 10 percent increase in total factor productivity of aman paddy, with rice exports.
Simulation 5: 10 percent increase in total factor productivity of boro paddy, with rice exports.
Simulation 6: 10 percent increase in total factor productivity of both aman and boro paddy, with rice exports.
Simulation 7: 35 percent reduction in world price of rice.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 4.4: Agricultural Sector Prices and Output: Simulations 4-7
(Full-employment closure*)

		Sim 4	Sim 5	Sim 6	Sim 7
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy	Lower World Price
		(percent change)			
Aman Paddy Production	12.76	10.00%	0.00%	10.00%	0.00%
Boro Paddy Production	15.74	-3.14%	10.43%	6.78%	-30.01%
Total Paddy Production	28.51	2.74%	5.76%	8.22%	-16.58%
Aman Paddy Price	1.00	-2.81%	-3.85%	-6.56%	-11.51%
Boro Paddy Price	1.00	-1.19%	-5.07%	-6.17%	-6.99%
Milled Rice Production	38.44	2.99%	6.53%	9.19%	-19.40%
Consumer Rice Price	1.00	-0.98%	-2.30%	-3.21%	-6.00%
Rice Consumption					
Urban poor	4.54	0.46%	0.72%	1.17%	2.07%
Urban non-poor	6.57	1.04%	1.96%	2.97%	3.81%
Rural landless, marginal	5.79	0.39%	0.55%	0.92%	1.57%
Rural non-farm poor	5.44	0.92%	1.53%	2.43%	2.86%
Rural small, large farm	11.85	0.56%	1.24%	1.76%	1.28%
Rural non-farm non-poor	3.82	0.54%	1.05%	1.56%	0.45%
Total	38.01	0.65%	1.22%	1.85%	2.00%
Rice Exports/Base Production	0.00%	2.32%	5.31%	7.36%	0.00%
Rice Imports/Base Production	1.30%	0.00%	0.00%	0.00%	21.54%
Wheat Imports/Base Production	48.99%	7.57%	23.19%	28.86%	-48.99%

Simulation 4: 10 percent increase in total factor productivity of aman paddy, with rice exports.
Simulation 5: 10 percent increase in total factor productivity of boro paddy, with rice exports.
Simulation 6: 10 percent increase in total factor productivity of both aman and boro paddy, with rice exports.
Simulation 7: 35 percent reduction in world price of rice.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 4.1a: Macroeconomic Indicators and Sectoral Output: Simulations 1a-3a
(Underemployment closure*)

		Sim 1a	Sim 2a	Sim 3a
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy
		(percent change)		
Real Exchange Rate (index)	100.00	0.08%	0.55%	0.55%
Consumption	210.78	0.55%	0.68%	1.17%
Investment	47.74	0.23%	0.25%	0.45%
Government	7.88	0.00%	0.00%	0.00%
Exports	24.72	-0.42%	-0.23%	-0.67%
Imports	-54.55	-0.19%	-0.10%	-0.31%
GDP	236.57	0.54%	0.66%	1.14%
Sector Output (Value Added)				
Paddy	15.53	1.40%	1.51%	2.82%
Other Crops	15.76	2.35%	2.45%	4.61%
Livestock, Fishing, Forestry	24.98	0.51%	0.53%	0.97%
Rice Milling	5.79	0.97%	1.59%	2.47%
Other Food Processing	3.65	0.40%	0.46%	0.80%
RMG, Knitware	7.49	-0.40%	-0.27%	-0.65%
Other Textiles	4.76	0.20%	0.30%	0.42%
Other Industry	7.79	0.15%	0.28%	0.39%
Construction	23.28	0.25%	0.31%	0.52%
Other Private Services	108.74	0.38%	0.52%	0.85%
Public Administration	5.80	0.17%	0.21%	0.35%
Total	223.56	0.56%	0.68%	1.18%

Simulation 1a: 10 percent increase in total factor productivity of aman paddy.
Simulation 2a: 10 percent increase in total factor productivity of boro paddy.
Simulation 3a: 10 percent increase in total factor productivity of both aman and boro paddy.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).

Source: Model simulations.

Table 4.2a: Agricultural Sector Prices and Output: Simulations 1a-3a
(Underemployment closure*)

		Sim 1a	Sim 2a	Sim 3a
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy
		(percent change)		
Aman Paddy Production	12.76	10.00%	0.00%	10.00%
Boro Paddy Production	15.74	-6.22%	2.86%	-3.55%
Total Paddy Production	28.51	1.04%	1.58%	2.52%
Aman Paddy Price	1.00	-4.46%	-6.54%	-10.44%
Boro Paddy Price	1.00	-2.44%	-6.85%	-8.79%
Milled Rice Production	38.44	0.95%	1.59%	2.45%
Consumer Rice Price	1.00	-1.76%	-3.57%	-5.05%
Rice Consumption				
Urban poor	4.54	0.74%	1.15%	1.82%
Urban non-poor	6.57	1.57%	2.70%	4.13%
Rural landless, marginal	5.79	0.59%	0.90%	1.44%
Rural non-farm poor	5.44	1.31%	2.10%	3.29%
Rural small, large farm	11.85	0.71%	1.43%	2.07%
Rural non-farm non-poor	3.82	0.57%	1.02%	1.54%
Total	38.01	0.92%	1.59%	2.42%
Rice Exports/Base Production	0.00%	0.00%	0.00%	0.00%
Rice Imports/Base Production	1.30%	0.00%	0.00%	0.00%
Wheat Imports/Base Production	48.99%	-12.94%	-13.77%	-25.96%

Simulation 1a: 10 percent increase in total factor productivity of aman paddy.
Simulation 2a: 10 percent increase in total factor productivity of boro paddy.
Simulation 3a: 10 percent increase in total factor productivity of both aman and boro paddy.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).

Source: Model simulations.

Table 4.3a: Macroeconomic Indicators and Sectoral Output: Simulations 4a-7a
(Underemployment closure*)

		Sim 4a	Sim 5a	Sim 6a	Sim 7a
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy	Lower World Price
		(percent change)			
Real Exchange Rate (index)	100.00	-1.26%	-2.57%	-3.72%	11.08%
Consumption	210.78	0.67%	0.98%	1.61%	0.30%
Investment	47.74	0.25%	0.30%	0.53%	1.72%
Government	7.88	0.00%	0.00%	0.00%	0.00%
Exports	24.72	1.48%	4.14%	5.49%	15.82%
Imports	-54.55	0.67%	1.87%	2.49%	7.17%
GDP	236.57	0.65%	0.94%	1.55%	0.61%
Sector Output (Value Added)					
Paddy	15.53	3.23%	5.84%	8.82%	-14.87%
Other Crops	15.76	0.75%	-1.06%	-0.22%	10.97%
Livestock, Fishing, Forestry	24.98	0.47%	0.45%	0.91%	1.49%
Rice Milling	5.79	3.19%	6.84%	9.74%	-18.23%
Other Food Processing	3.65	0.29%	0.22%	0.51%	1.97%
RMG, Knitware	7.49	-1.42%	-2.69%	-4.00%	7.05%
Other Textiles	4.76	-0.36%	-0.96%	-1.22%	8.07%
Other Industry	7.79	-0.13%	-0.36%	-0.48%	2.46%
Construction	23.28	0.35%	0.55%	0.88%	0.81%
Other Private Services	108.74	0.49%	0.80%	1.25%	-0.28%
Public Administration	5.80	0.16%	0.20%	0.35%	0.26%
Total	223.56	0.64%	0.89%	1.49%	-0.08%

Simulation 4a: 10 percent increase in total factor productivity of aman paddy, with rice exports.
Simulation 5a: 10 percent increase in total factor productivity of boro paddy, with rice exports.
Simulation 6a: 10 percent increase in total factor productivity of both aman and boro paddy, with rice exports.
Simulation 7a: 35 percent reduction in world price of rice.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).

Source: Model simulations.

Table 4.4a: Agricultural Sector Prices and Output: Simulations 4a-7a
(Underemployment closure*)

		Sim 4a	Sim 5a	Sim 6a	Sim 7a
	Base (10 bn Taka)	Increased Productivity Aman	Increased Productivity Boro	Increased Productivity All Paddy	Lower World Price
		(percent change)			
Aman Paddy Production	12.76	10.00%	0.00%	10.00%	0.00%
Boro Paddy Production	15.74	-2.78%	11.02%	7.77%	-28.06%
Total Paddy Production	28.51	2.94%	6.08%	8.77%	-15.50%
Aman Paddy Price	1.00	-3.42%	-4.46%	-7.72%	-12.65%
Boro Paddy Price	1.00	-1.85%	-5.73%	-7.43%	-8.50%
Milled Rice Production	38.44	3.17%	6.85%	9.73%	-18.27%
Consumer Rice Price	1.00	-1.26%	-2.58%	-3.72%	-6.50%
Rice Consumption					
Urban poor	4.54	0.60%	0.88%	1.47%	2.44%
Urban non-poor	6.57	1.39%	2.39%	3.77%	4.74%
Rural landless, marginal	5.79	0.45%	0.62%	1.05%	1.68%
Rural non-farm poor	5.44	1.16%	1.84%	2.98%	3.46%
Rural small, large farm	11.85	0.66%	1.38%	1.98%	1.44%
Rural non-farm non-poor	3.82	0.63%	1.19%	1.78%	0.64%
Total	38.01	0.82%	1.43%	2.21%	2.38%
Rice Exports/Base Production	0.00%	2.33%	5.42%	7.52%	0.00%
Rice Imports/Base Production	1.30%	0.00%	0.00%	0.00%	20.78%
Wheat Imports/Base Production	48.99%	0.52%	15.98%	15.92%	-48.99%

Simulation 4a: 10 percent increase in total factor productivity of aman paddy, with rice exports.
Simulation 5a: 10 percent increase in total factor productivity of boro paddy, with rice exports.
Simulation 6a: 10 percent increase in total factor productivity of both aman and boro paddy, with rice exports.
Simulation 7a: 35 percent reduction in world price of rice.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).

Source: Model simulations.

Table 4.5 Percentage Change in Household Income and Consumption: Simulations 1-7
(Full employment closure*)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Ag Poor, F	Rural Non-Ag Poor, M	Rural Non-Ag NPoor, F	Rural Non-Ag NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Sim 1													
Income	0.39	0.34	-0.06	-0.57	0.66	0.70	0.26	0.19	0.52	0.78	1.00	1.11	0.48
Consumption	0.47	0.54	0.11	-0.49	0.69	0.86	-0.01	0.20	0.50	0.59	0.82	0.89	0.46
Sim 2													
Income	0.36	0.27	-0.33	-1.10	0.83	0.88	0.22	0.11	0.62	1.08	1.43	1.62	0.57
Consumption	0.50	0.63	-0.02	-0.92	0.87	1.17	-0.22	0.18	0.60	0.76	1.13	1.20	0.53
Sim 3													
Income	0.71	0.57	-0.37	-1.60	1.42	1.50	0.46	0.28	1.07	1.77	2.32	2.59	0.99
Consumption	0.93	1.12	0.09	-1.33	1.49	1.94	-0.22	0.37	1.04	1.28	1.86	1.99	0.94
Sim 4													
Income	0.27	0.28	0.18	0.01	0.65	0.70	0.42	0.48	0.38	0.70	1.04	1.15	0.60
Consumption	0.41	0.44	0.31	0.08	0.75	0.82	0.33	0.50	0.37	0.56	0.90	0.96	0.57
Sim 5													
Income	0.10	0.14	0.19	0.14	0.82	0.93	0.57	0.77	0.33	0.95	1.60	1.80	0.86
Consumption	0.38	0.42	0.41	0.31	1.04	1.14	0.52	0.86	0.32	0.72	1.37	1.43	0.81
Sim 6													
Income	0.36	0.40	0.33	0.09	1.43	1.59	0.95	1.19	0.69	1.62	2.59	2.89	1.42
Consumption	0.78	0.83	0.67	0.35	1.75	1.92	0.81	1.31	0.68	1.25	2.22	2.35	1.35
Sim 7													
Income	0.97	0.60	-1.88	-4.77	1.32	0.94	-0.44	-1.57	1.61	1.88	1.53	1.78	-0.03
Consumption	0.61	1.21	-1.29	-4.44	0.77	1.48	-2.03	-1.56	1.58	1.37	1.10	1.36	0.02

Simulation 1: 10 percent increase in total factor productivity of aman paddy.
Simulation 2: 10 percent increase in total factor productivity of boro paddy.
Simulation 3: 10 percent increase in total factor productivity of both aman and boro paddy.
Simulation 4: 10 percent increase in total factor productivity of aman paddy, with rice exports.
Simulation 5: 10 percent increase in total factor productivity of boro paddy, with rice exports.
Simulation 6: 10 percent increase in total factor productivity of both aman and boro paddy, with rice exports.
Simulation 7: 35 percent reduction in world price of rice.

* Full employment (neo-classical) labor market closure.
Source: Model simulations.

Table 4.5a Percentage Change in Household Income and Consumption: Simulations 1a-7a
(Underemployment closure*)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Ag Poor, F	Rural Non-Ag Poor, M	Rural Non-Ag NPoor, F	Rural Non-Ag NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Sim 1a													
Income	0.44	0.34	-0.10	-0.74	0.73	0.85	0.07	0.21	0.64	0.94	1.29	1.41	0.58
Consumption	0.55	0.59	0.12	-0.63	0.77	1.04	-0.25	0.22	0.60	0.70	1.06	1.15	0.55
Sim 2a													
Income	0.42	0.30	-0.30	-1.16	0.97	1.07	0.12	0.21	0.74	1.26	1.78	1.99	0.73
Consumption	0.58	0.70	0.04	-0.95	1.02	1.38	-0.38	0.29	0.70	0.88	1.42	1.54	0.68
Sim 3a													
Income	0.82	0.60	-0.38	-1.80	1.60	1.81	0.19	0.39	1.29	2.07	2.89	3.21	1.23
Consumption	1.07	1.22	0.17	-1.46	1.70	2.30	-0.57	0.49	1.22	1.48	2.34	2.54	1.17
Sim 4a													
Income	0.32	0.27	0.12	-0.22	0.73	0.87	0.18	0.48	0.50	0.89	1.36	1.50	0.71
Consumption	0.49	0.48	0.30	-0.11	0.85	1.02	0.02	0.51	0.48	0.68	1.17	1.26	0.67
Sim 5a													
Income	0.16	0.14	0.16	-0.02	1.01	1.15	0.38	0.85	0.47	1.19	2.05	2.29	1.05
Consumption	0.47	0.47	0.45	0.19	1.24	1.40	0.24	0.95	0.43	0.87	1.74	1.87	0.98
Sim 6a													
Income	0.46	0.38	0.22	-0.32	1.70	1.98	0.51	1.26	0.95	2.05	3.37	3.74	1.71
Consumption	0.92	0.91	0.69	0.02	2.05	2.38	0.22	1.39	0.90	1.53	2.88	3.11	1.61
Sim 7a													
Income	0.99	0.52	-2.09	-5.34	1.43	1.37	-1.04	-1.55	1.94	2.43	2.45	2.80	0.28
Consumption	0.68	1.24	-1.36	-4.91	0.93	1.99	-2.72	-1.53	1.85	1.77	1.89	2.27	0.30

Simulation 1a: 10 percent increase in total factor productivity of aman paddy.
Simulation 2a: 10 percent increase in total factor productivity of boro paddy.
Simulation 3a: 10 percent increase in total factor productivity of both aman and boro paddy.
Simulation 4a: 10 percent increase in total factor productivity of aman paddy, with rice exports.
Simulation 5a: 10 percent increase in total factor productivity of boro paddy, with rice exports.
Simulation 6a: 10 percent increase in total factor productivity of both aman and boro paddy, with rice exports.
Simulation 7a: 35 percent reduction in world price of rice.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).
Source: Model simulations.

Table 4.6: Decomposition of Changes in Household Incomes, Simulation 1*

(Percentage Change from Base)**

(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	0.16	0.17	0.13	0.06	0.04	0.15	0.01	0.06	0.17	0.22	0.01	0.00	0.09
Male Labor: Educ 2,3	0.03	0.05	0.13	0.16	0.04	0.16	0.07	0.26	0.07	0.10	0.27	0.32	0.19
Female Labor: Educ 0,1	0.01	0.01	0.01	0.00	0.03	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.01
Female Labor: Educ 2,3	--	0.00	0.01	0.01	0.03	0.01	0.02	0.02	0.00	0.01	0.01	0.02	0.01
Land	-0.04	-0.19	-0.68	-1.18	-0.11	-0.07	-0.31	-0.60	--	--	--	--	-0.31
Ponds	0.01	0.06	0.07	0.12	0.03	0.03	0.22	0.09	--	--	--	--	0.04
Poultry Capital	0.02	0.01	0.01	0.01	0.02	0.01	0.02	0.01	--	--	--	--	0.01
Cattle Capital	0.14	0.12	0.14	0.12	0.09	0.06	0.09	0.07	--	--	--	--	0.06
Non-Agric Capital	--	--	0.05	0.06	0.50	0.34	0.21	0.25	0.12	0.38	0.69	0.75	0.34
Household Transfers	0.02	0.05	0.04	0.04	-0.03	-0.01	-0.08	0.00	0.08	0.03	0.01	--	0.02
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	0.04	0.05	0.03	0.02	0.02	0.03	0.02	0.02	0.06	0.04	0.02	0.02	0.03
Total	0.39	0.34	-0.06	-0.57	0.66	0.70	0.26	0.19	0.52	0.78	1.00	1.11	0.48
Total Consumption**	0.47	0.54	0.11	-0.49	0.69	0.86	-0.01	0.20	0.50	0.59	0.82	0.89	

* Productivity Increase in Aman Paddy only

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model simulations.

Table 4.7: Decomposition of Changes in Household Incomes, Simulation 3*
(Percentage Change from Base)**
(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	0.24	0.27	0.22	0.10	0.07	0.25	0.01	0.11	0.24	0.44	0.01	0.00	0.15
Male Labor: Educ 2,3	0.07	0.11	0.30	0.35	0.10	0.35	0.15	0.60	0.16	0.23	0.59	0.73	0.43
Female Labor: Educ 0,1	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Female Labor: Educ 2,3	--	0.01	0.02	0.02	0.06	0.01	0.05	0.03	0.01	0.01	0.01	0.04	0.02
Land	-0.09	-0.47	-1.68	-2.92	-0.28	-0.18	-0.78	-1.48	--	--	--	--	-0.77
Ponds	0.03	0.13	0.15	0.27	0.06	0.06	0.49	0.21	--	--	--	--	0.09
Poultry Capital	0.04	0.02	0.02	0.03	0.04	0.02	0.03	0.02	--	--	--	--	0.01
Cattle Capital	0.28	0.25	0.29	0.25	0.19	0.13	0.19	0.14	--	--	--	--	0.12
Non-Agric Capital	--	--	0.11	0.14	1.17	0.80	0.49	0.59	0.28	0.89	1.62	1.75	0.80
Household Transfers	0.02	0.10	0.10	0.10	-0.08	-0.02	-0.24	0.00	0.19	0.07	0.02	--	0.05
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	0.13	0.16	0.11	0.06	0.08	0.09	0.06	0.06	0.19	0.14	0.06	0.06	0.09
Total	0.71	0.57	-0.37	-1.60	1.42	1.50	0.45	0.28	1.07	1.77	2.32	2.59	0.99
Total Consumption**	0.93	1.12	0.09	-1.33	1.49	1.94	-0.22	0.37	1.04	1.28	1.86	1.99	

* Productivity Increase in both Aman and Boro Paddy

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model simulations.

Table 4.8: Decomposition of Changes in Household Incomes, Simulation 6*
(Percentage Change from Base)**
(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	0.50	0.55	0.39	0.18	0.13	0.45	0.02	0.18	0.55	0.63	0.02	0.01	0.27
Male Labor: Educ 2,3	0.08	0.14	0.37	0.43	0.12	0.43	0.18	0.73	0.20	0.28	0.75	0.88	0.52
Female Labor: Educ 0,1	-0.07	-0.05	-0.06	-0.04	-0.11	-0.05	-0.06	-0.04	-0.04	-0.05	-0.01	-0.01	-0.04
Female Labor: Educ 2,3	--	-0.01	-0.01	-0.01	-0.01	-0.01	0.02	-0.01	-0.01	0.00	-0.01	0.01	0.00
Land	-0.03	-0.15	-0.55	-0.96	-0.09	-0.06	-0.26	-0.48	--	--	--	--	-0.25
Ponds	0.03	0.13	0.15	0.27	0.06	0.06	0.49	0.20	--	--	--	--	0.09
Poultry Capital	0.05	0.03	0.03	0.03	0.04	0.02	0.04	0.02	--	--	--	--	0.01
Cattle Capital	0.08	0.07	0.08	0.07	0.06	0.04	0.05	0.04	--	--	--	--	0.04
Non-Agric Capital	--	--	0.14	0.17	1.45	0.99	0.60	0.73	0.35	1.10	2.01	2.17	0.99
Household Transfers	0.12	0.17	0.11	0.12	0.00	0.00	0.01	0.00	0.21	0.08	0.02	--	0.07
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	-0.39	-0.47	-0.33	-0.18	-0.23	-0.27	-0.17	-0.19	-0.56	-0.41	-0.18	-0.18	-0.28
Total	0.36	0.40	0.33	0.09	1.43	1.59	0.95	1.19	0.69	1.62	2.59	2.89	1.42
Total Consumption****	0.78	0.83	0.67	0.35	1.75	1.92	0.81	1.31	0.68	1.25	2.22	2.35	

* Productivity Increase in both Aman and Boro Paddy, with rice exports

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model simulations.

Table 4.9 Decomposition of Changes in Household Incomes, Simulation 7*

(Percentage Change from Base)**

(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	-0.76	-0.77	-0.43	-0.18	-0.15	-0.48	-0.05	-0.14	-0.92	-0.28	-0.01	0.00	-0.29
Male Labor: Educ 2,3	0.00	0.01	0.04	0.06	0.02	0.05	0.04	0.14	0.02	0.03	0.02	0.23	0.09
Female Labor: Educ 0,1	0.20	0.17	0.16	0.10	0.35	0.14	0.16	0.10	0.14	0.13	0.03	0.02	0.10
Female Labor: Educ 2,3	--	0.03	0.08	0.09	0.22	0.06	0.13	0.14	0.05	0.06	0.08	0.12	0.09
Land	-0.20	-1.02	-3.63	-6.30	-0.61	-0.39	-1.68	-3.19	--	--	--	--	-1.67
Ponds	0.03	0.14	0.16	0.29	0.07	0.07	0.53	0.22	--	--	--	--	0.10
Poultry Capital	0.02	0.01	0.01	0.01	0.02	0.01	0.02	0.01	--	--	--	--	0.01
Cattle Capital	0.43	0.38	0.44	0.38	0.30	0.19	0.29	0.22	--	--	--	--	0.19
Non-Agric Capital	--	--	0.05	0.06	0.52	0.35	0.22	0.26	0.13	0.39	0.72	0.78	0.35
Household Transfers	-0.17	-0.07	0.06	0.07	-0.25	-0.07	-0.70	0.00	0.14	0.05	0.01	--	0.01
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	1.43	1.72	1.18	0.64	0.84	0.99	0.61	0.68	2.05	1.51	0.66	0.64	1.00
Total	0.97	0.59	-1.88	-4.77	1.32	0.94	-0.44	-1.57	1.61	1.88	1.52	1.78	-0.03
Total Consumption**	0.61	1.21	-1.29	-4.44	0.77	1.48	-2.03	-1.56	1.58	1.37	1.10	1.36	

* World Price Shock on on rice

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model simulations.

Table 5.1: Structure of final textiles (value in ten billion Taka)

	RMG Value	RMG Share	Knitwear Value	Knitwear Share
Production	17.82	100.0%	5.36	100.0%
Inputs	11.73	65.9%	3.95	73.7%
Milled Cloth	6.83	38.4%	0.03	0.6%
Yarn	0.07	0.4%	3.15	58.8%
Other Textiles	0.90	5.0%	0.06	1.2%
Other Inputs	3.93	22.0%	0.70	13.1%
Value-added	6.08	34.1%	1.17	21.8%
Male Labor	0.87	4.9%	0.17	3.1%
Female Labor	2.17	12.2%	-	0.0%
Capital	3.04	17.1%	1.24	23.2%
Exports	13.80		4.52	
Exports/Production		77.5%		84.5%

Source: Bangladesh SAM, 1999/2000

Table 5.2: Intermediate textile supply (values in ten billion Taka)

	Milled Cloth	Yarn	Other Textiles
Imports	5.85	4.85	0.23
Import Taxes	0.74	0.41	0.02
Imports (incl. taxes)/Total Supply	80.5%	66.0%	20.7%

Source: Bangladesh SAM, 1999/2000

Table 5.3: Macroeconomic Indicators and Sectoral Output: Simulations 8-12
(Full employment closure*)

	Base	Sim 8 RMG export quantity shock (flexible EXR)	Sim 9 Knitwear export quantity shock (flexible EXR)	Sim 10 RMG and Knitwear export quantity shock (flexible EXR)	Sim 11 RMG and Knitwear export quantity shock (fixed EXR)	Sim 12 Increase in FSAV by same amount as Sim 11
		(percent change)				
Real Exchange Rate (index)	48.06	6.77%	1.30%	8.88%	0.00%	-6.02%
Consumption	210.78	-0.91%	-0.19%	-1.19%	-0.06%	0.83%
Investment	47.74	0.28%	0.00%	0.32%	3.58%	3.19%
Government	7.88	0.00%	0.00%	0.00%	0.00%	0.00%
Exports	24.72	-10.08%	-3.01%	-13.99%	-18.33%	-7.35%
Imports	54.55	-4.57%	-1.36%	-6.34%	-3.18%	1.80%
GDP	236.57	-0.76%	-0.17%	-1.00%	-0.52%	0.20%
Sector Output (Value Added)						
Paddy	15.53	-0.23%	-0.05%	-0.31%	0.00%	0.22%
Other Crops	15.76	0.85%	0.07%	0.96%	-0.14%	-0.95%
Livestock, Fishing, Forestry	24.98	0.56%	0.08%	0.69%	0.43%	-0.06%
Rice Milling	5.79	-0.39%	-0.07%	-0.51%	-0.02%	0.34%
Other Food Processing	3.65	0.49%	0.07%	0.64%	-0.06%	-0.42%
RMG, Knitware	7.49	-18.21%	-3.35%	-23.09%	-22.18%	-4.63%
Other Textiles	4.76	-1.75%	-0.85%	-2.86%	-4.13%	-1.92%
Other Industry	7.79	1.30%	0.25%	1.70%	0.25%	-0.94%
Construction	23.28	0.10%	-0.03%	0.08%	2.91%	2.72%
Other Private Services	108.74	-0.36%	-0.08%	-0.48%	-0.15%	0.20%
Public Administration	5.80	-0.16%	-0.07%	-0.24%	-0.18%	0.01%
Total	223.56	-0.67%	-0.15%	-0.88%	-0.56%	0.10%

Simulation 8: 25 decrease in the quantity of RMG exports (flexible exchange rate).
Simulation 9: 25 decrease in the quantity of Knitwear exports (flexible exchange rate).
Simulation 10: 25 decrease in the quantity of both RMG and Knitwear exports (flexible exchange rate).
Simulation 11: 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).
Simulation 12: increase in foreign savings by the same amount as in Simulation 11.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 5.4: Textile Prices and Output: Simulations 8-12
(Full employment closure*)

	Base (10 bn Taka)	**Sim 8** RMG export quantity shock (flexible EXR)	**Sim 9** Knitwear export quantity shock (flexible EXR)	**Sim 10** RMG and Knitwear export quantity shock (flexible EXR)	**Sim 11** RMG and Knitwear export quantity shock (fixed EXR)	**Sim 12** Increase in FSAV by same amount as Sim 11
		(percent change)				
RMG Production	17.82	-22.73%	1.25%	-22.96%	-21.98%	-5.40%
Knitwear Production	5.36	1.33%	-23.18%	-23.66%	-23.09%	-1.29%
Yarn Production	2.71	-0.18%	-8.57%	-9.73%	-10.52%	-1.96%
Milled Cloth Production	1.60	-16.26%	1.50%	-15.85%	-17.73%	-6.61%
Other Cloth Production	8.56	-2.95%	-0.54%	-3.80%	0.19%	2.91%
Other Textiles Production	0.94	-16.51%	-0.16%	-17.87%	-17.61%	-4.57%
Total Textiles Production	42.81	-9.46%	-2.71%	-13.07%	-13.60%	-3.50%
RMG Producer Price	1.00	8.72%	1.08%	10.67%	2.42%	-5.02%
Knitwear Producer Price	1.00	6.16%	3.61%	10.66%	2.22%	-5.59%
Yarn Producer Price	1.00	2.32%	-0.12%	2.37%	-1.10%	-2.61%
Milled Cloth Producer Price	1.00	0.67%	0.37%	1.17%	-1.74%	-2.48%
Other Cloth Producer Price	1.00	1.77%	0.27%	2.25%	-0.28%	-1.77%
Other Textiles Producer Price	1.00	0.63%	0.25%	0.97%	-1.52%	-2.11%
RMG Exports	14.54	-25.00%	1.60%	-25.00%	-25.00%	-7.04%
Knitwear Exports	4.77	1.93%	-25.00%	-25.00%	-25.00%	-1.90%
Yarn Exports	0.03	8.70%	-5.95%	2.11%	-8.53%	-8.70%
Milled Cloth Exports	0.01	-5.85%	3.33%	-2.60%	-14.80%	-13.33%
Other Cloth Exports	0.00	--	--	--	--	--
Other Textiles Exports	0.01	-5.98%	1.95%	-4.52%	-15.01%	-12.02%
RMG Imports	0.79	-7.50%	-1.14%	-9.22%	-1.63%	5.57%
Knitwear Imports	0.14	-6.00%	-0.99%	-7.41%	0.12%	5.97%
Yarn Imports	5.26	-3.66%	-9.63%	-14.24%	-11.34%	0.97%
Milled Cloth Imports	6.59	-20.22%	0.73%	-20.79%	-18.91%	-3.73%
Other Cloth Imports	0.00	--	--	--	--	--
Other Textiles Imports	0.25	-20.61%	-1.04%	-22.96%	-18.67%	-1.24%

Simulation 8: 25 decrease in the quantity of RMG exports (flexible exchange rate).
Simulation 9: 25 decrease in the quantity of Knitwear exports (flexible exchange rate).
Simulation 10: 25 decrease in the quantity of both RMG and Knitwear exports (flexible exchange rate).
Simulation 11: 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).
Simulation 12: increase in foreign savings by the same amount as in Simulation 11.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 5.3a: Macroeconomic Indicators and Sectoral Output: Simulations 8a-12a
(Underemployment closure*)

	Base	Sim 8a RMG export quantity shock (flexible EXR)	Sim 9a Knitwear export quantity shock (flexible EXR)	Sim 10a RMG and Knitwear export quantity shock (flexible EXR)	Sim 11a RMG and Knitwear export quantity shock (fixed EXR)	Sim 12a Increase in FSAV by same amount as Sim 11
		(percent change)				
Real Exchange Rate (index)	48.06	6.17%	1.21%	8.08%	0.00%	-5.60%
Consumption	210.78	-1.23%	-0.22%	-1.57%	-0.13%	1.02%
Investment	47.74	-0.21%	-0.08%	-0.32%	3.64%	3.67%
Government	7.88	0.00%	0.00%	0.00%	0.00%	0.00%
Exports	24.72	-10.53%	-3.06%	-14.52%	-18.40%	-7.06%
Imports	54.55	-4.77%	-1.39%	-6.58%	-3.20%	1.93%
GDP	236.57	-1.13%	-0.21%	-1.46%	-0.57%	0.47%
Sector Output (Value Added)						
Paddy	15.53	-0.56%	-0.07%	-0.69%	-0.10%	0.39%
Other Crops	15.76	0.36%	0.03%	0.40%	-0.31%	-0.68%
Livestock, Fishing, Forestry	24.98	0.10%	0.03%	0.14%	0.29%	0.17%
Rice Milling	5.79	-0.67%	-0.10%	-0.84%	-0.10%	0.50%
Other Food Processing	3.65	0.13%	0.03%	0.20%	-0.13%	-0.21%
RMG, Knitware	7.49	-18.25%	-3.34%	-23.09%	-22.20%	-4.64%
Other Textiles	4.76	-2.30%	-0.92%	-3.52%	-4.20%	-1.51%
Other Industry	7.79	0.82%	0.18%	1.08%	0.24%	-0.58%
Construction	23.28	-0.35%	-0.11%	-0.50%	2.96%	3.15%
Other Private Services	108.74	-0.74%	-0.13%	-0.95%	-0.18%	0.49%
Public Administration	5.80	-0.30%	-0.09%	-0.41%	-0.19%	0.11%
Total	223.56	-1.05%	-0.20%	-1.36%	-0.61%	0.37%

Simulation 8a: 25 decrease in the quantity of RMG exports (flexible exchange rate).
Simulation 9a: 25 decrease in the quantity of Knitwear exports (flexible exchange rate).
Simulation 10a: 25 decrease in the quantity of both RMG and Knitwear exports (flexible exchange rate).
Simulation 11a: 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).
Simulation 12a: increase in foreign savings by the same amount as in Simulation 11a.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).

Source: Model simulations.

Table 5.4a: Textile Prices and Output: Simulations 8a-12a
(Underemployment closure*)

	Base	Sim 8a: RMG export quantity shock (flexible EXR)	Sim 9a: Knitwear export quantity shock (flexible EXR)	Sim 10a: RMG and Knitwear export quantity shock (flexible EXR)	Sim 11a: RMG and Knitwear export quantity shock (fixed EXR)	Sim 12a: Increase in FSAV by same amount as Sim 11
		(percent change)				
RMG Production	17.82	-22.75%	1.25%	-22.96%	-21.99%	-5.45%
Knitwear Production	5.36	1.19%	-23.18%	-23.67%	-23.10%	-1.13%
Yarn Production	2.71	-0.65%	-8.62%	-10.23%	-10.55%	-1.58%
Milled Cloth Production	1.60	-16.50%	1.45%	-16.17%	-17.71%	-6.39%
Other Cloth Production	8.56	-3.34%	-0.59%	-4.26%	0.10%	3.18%
Other Textiles Production	0.94	-16.69%	-0.17%	-18.07%	-17.68%	-4.52%
Total Textiles Production	42.81	-9.77%	-2.74%	-13.42%	-13.65%	-3.30%
RMG Producer Price	1.00	8.11%	0.99%	9.85%	2.40%	-4.60%
Knitwear Producer Price	1.00	5.56%	3.52%	9.83%	2.21%	-5.17%
Yarn Producer Price	1.00	2.08%	-0.15%	2.08%	-1.13%	-2.46%
Milled Cloth Producer Price	1.00	0.43%	0.35%	0.89%	-1.84%	-2.40%
Other Cloth Producer Price	1.00	1.56%	0.26%	1.99%	-0.37%	-1.71%
Other Textiles Producer Price	1.00	0.59%	0.21%	0.89%	-1.37%	-1.92%
RMG Exports	14.54	-25.00%	1.61%	-25.00%	-25.00%	-7.08%
Knitwear Exports	4.77	1.79%	-25.00%	-25.00%	-25.00%	-1.72%
Yarn Exports	0.03	7.47%	-6.13%	0.63%	-8.53%	-7.82%
Milled Cloth Exports	0.01	-6.67%	3.17%	-3.82%	-14.63%	-12.44%
Other Cloth Exports	0.00	--	--	--	--	--
Other Textiles Exports	0.01	-7.16%	1.88%	-5.91%	-15.36%	-11.54%
RMG Imports	0.79	-7.59%	-1.12%	-9.27%	-1.77%	5.51%
Knitwear Imports	0.14	-6.07%	-0.98%	-7.44%	-0.01%	5.91%
Yarn Imports	5.26	-3.85%	-9.65%	-14.40%	-11.39%	1.11%
Milled Cloth Imports	6.59	-20.24%	0.74%	-20.80%	-18.95%	-3.80%
Other Cloth Imports	0.00	--	--	--	--	--
Other Textiles Imports	0.25	-20.42%	-1.00%	-22.72%	-18.63%	-1.40%

Simulation 8a: 25 decrease in the quantity of RMG exports (flexible exchange rate).
Simulation 9a: 25 decrease in the quantity of Knitwear exports (flexible exchange rate).
Simulation 10a: 25 decrease in the quantity of both RMG and Knitwear exports (flexible exchange rate).
Simulation 11a: 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).
Simulation 12a: increase in foreign savings by the same amount as in Simulation 11a.
* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).
Source: Model simulations.

Table 5.5 Percentage Change in Household Income and Consumption: Simulations 8-12
(Full employment closure*)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Ag Poor, F	Rural Non-Ag Poor, M	Rural Non-Ag NPoor, F	Rural Non-Ag NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Sim 8													
Income	-0.34	-0.33	-0.52	-0.60	-1.14	-1.19	-0.68	-1.10	-0.51	-0.96	-1.50	-1.60	-1.00
Consumption	-0.88	-0.40	-0.52	-0.58	-1.69	-1.22	-1.35	-1.17	-0.55	-0.93	-1.43	-1.25	-0.91
Sim 9													
Income	0.00	-0.01	-0.06	-0.10	-0.11	-0.23	-0.07	-0.21	-0.07	-0.20	-0.37	-0.40	-0.20
Consumption	-0.13	-0.03	-0.07	-0.11	-0.25	-0.23	-0.28	-0.23	-0.08	-0.19	-0.35	-0.34	-0.19
Sim 10													
Income	-0.37	-0.37	-0.62	-0.74	-1.38	-1.56	-0.81	-1.42	-0.64	-1.28	-2.06	-2.21	-1.32
Consumption	-1.10	-0.46	-0.61	-0.70	-2.12	-1.59	-1.76	-1.51	-0.68	-1.23	-1.96	-1.74	-1.19
Sim 11													
Income	-0.09	-0.05	-0.06	0.02	-0.65	-0.09	-0.33	-0.14	0.02	-0.09	-0.06	-0.11	-0.08
Consumption	-0.14	-0.08	-0.08	0.03	-0.70	-0.11	-0.34	-0.16	0.03	-0.06	-0.03	-0.02	-0.06
Sim 12													
Income	0.15	0.21	0.41	0.62	0.30	0.98	0.31	0.90	0.43	0.79	1.37	1.43	0.86
Consumption	0.63	0.26	0.45	0.71	0.80	1.01	0.99	0.96	0.49	0.80	1.37	1.26	0.83

Simulation 8: 25 decrease in the quantity of RMG exports (flexible exchange rate).
Simulation 9: 25 decrease in the quantity of Knitwear exports (flexible exchange rate).
Simulation 10: 25 decrease in the quantity of both RMG and Knitwear exports (flexible exchange rate).
Simulation 11: 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).
Simulation 12: increase in foreign savings by the same amount as in Simulation 11.

* Full employment (neo-classical) labor market closure.

Source: Model simulations.

Table 5.5a Percentage Change in Household Income and Consumption: Simulations 8a-12a
(Underemployment closure*)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Ag Poor, F	Rural Non-Ag Poor, M	Rural Non-Ag NPoor, F	Rural Non-Ag NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Sim 8a													
Income	-0.37	-0.38	-0.64	-0.73	-1.46	-1.46	-0.81	-1.40	-0.64	-1.26	-2.10	-2.29	-1.33
Consumption	-0.87	-0.50	-0.70	-0.76	-1.95	-1.53	-1.29	-1.47	-0.64	-1.14	-1.96	-1.93	-1.23
Sim 9a													
Income	0.00	-0.02	-0.09	-0.14	-0.17	-0.25	-0.12	-0.25	-0.07	-0.22	-0.42	-0.46	-0.24
Consumption	-0.13	-0.04	-0.10	-0.16	-0.30	-0.26	-0.31	-0.27	-0.07	-0.20	-0.40	-0.40	-0.22
Sim 10a													
Income	-0.40	-0.43	-0.79	-0.94	-1.78	-1.87	-1.02	-1.79	-0.78	-1.62	-2.75	-3.01	-1.71
Consumption	-1.08	-0.58	-0.85	-0.96	-2.46	-1.94	-1.73	-1.88	-0.77	-1.46	-2.56	-2.53	-1.57
Sim 11a													
Income	-0.11	-0.07	-0.02	0.14	-0.60	-0.20	-0.18	-0.14	-0.10	-0.23	-0.26	-0.34	-0.15
Consumption	-0.16	-0.11	-0.06	0.14	-0.64	-0.23	-0.16	-0.16	-0.07	-0.16	-0.20	-0.24	-0.13
Sim 12a													
Income	0.16	0.24	0.56	0.85	0.65	1.11	0.56	1.14	0.42	0.90	1.69	1.80	1.07
Consumption	0.61	0.31	0.61	0.95	1.11	1.16	1.13	1.21	0.47	0.87	1.65	1.61	1.02

Simulation 8a: 25 decrease in the quantity of RMG exports (flexible exchange rate).
Simulation 9a: 25 decrease in the quantity of Knitwear exports (flexible exchange rate).
Simulation 10a: 25 decrease in the quantity of both RMG and Knitwear exports (flexible exchange rate).
Simulation 11a: 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).
Simulation 12a: increase in foreign savings by the same amount as in Simulation 11.

* Full employment in agriculture (flexible real wage); underemployment in non-agriculture (fixed real wage).

Source: Model simulations.

Table 5.6: Decomposition of Changes in Household Incomes, Simulation 8*

(Percentage Change from Base)**

(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	-0.88	-0.93	-0.62	-0.27	-0.21	-0.70	-0.05	-0.26	-1.00	-0.80	-0.03	-0.01	-0.42
Male Labor: Educ 2,3	-0.08	-0.14	-0.35	-0.40	-0.11	-0.40	-0.16	-0.65	-0.18	-0.27	-0.73	-0.75	-0.47
Female Labor: Educ 0,1	-0.27	-0.22	-0.19	-0.11	-0.48	-0.17	-0.18	-0.10	-0.19	-0.13	-0.04	-0.02	-0.12
Female Labor: Educ 2,3	--	-0.02	-0.05	-0.07	-0.15	-0.05	-0.10	-0.10	-0.03	-0.04	-0.06	-0.09	-0.06
Land	0.00	0.00	-0.01	-0.01	0.00	0.00	0.00	0.00	--	--	--	--	0.00
Ponds	-0.01	-0.07	-0.08	-0.15	-0.03	-0.03	-0.27	-0.11	--	--	--	--	-0.05
Poultry Capital	-0.05	-0.03	-0.03	-0.04	-0.05	-0.03	-0.05	-0.02	--	--	--	--	-0.02
Cattle Capital	0.24	0.22	0.25	0.22	0.17	0.11	0.17	0.13	--	--	--	--	0.11
Non-Agric Capital	--	--	-0.07	-0.09	-0.73	-0.50	-0.31	-0.37	-0.18	-0.56	-1.02	-1.10	-0.50
Household Transfers	-0.12	-0.13	-0.07	-0.07	-0.03	-0.01	-0.09	0.00	-0.12	-0.04	-0.01	--	-0.04
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	0.83	1.00	0.69	0.37	0.49	0.57	0.36	0.39	1.19	0.87	0.38	0.37	0.58
Total	-0.34	-0.33	-0.52	-0.60	-1.15	-1.19	-0.68	-1.10	-0.51	-0.96	-1.50	-1.60	-1.00
Total Consumption****	-0.88	-0.40	-0.52	-0.58	-1.69	-1.22	-1.35	-1.17	-0.55	-0.93	-1.43	-1.25	

* 25 decrease in the quantity of RMG exports (flexible exchange rate).

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model Simulations.

Table 5.7: Decomposition of Changes in Household Incomes, Simulation 9*

(Percentage Change from Base)**

(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	-0.19	-0.20	-0.13	-0.06	-0.04	-0.15	-0.01	-0.05	-0.21	-0.17	-0.01	0.00	-0.09
Male Labor: Educ 2,3	-0.02	-0.03	-0.07	-0.08	-0.02	-0.08	-0.03	-0.13	-0.04	-0.05	-0.15	-0.16	-0.10
Female Labor: Educ 0,1	0.03	0.03	0.02	0.01	0.06	0.02	0.02	0.01	0.02	0.02	0.01	0.00	0.02
Female Labor: Educ 2,3	--	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Land	0.00	0.00	-0.01	-0.02	0.00	0.00	-0.01	-0.01	--	--	--	--	-0.01
Ponds	0.00	-0.01	-0.01	-0.02	0.00	-0.01	-0.04	-0.02	--	--	--	--	-0.01
Poultry Capital	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	--	--	--	--	0.00
Cattle Capital	0.04	0.04	0.04	0.04	0.03	0.02	0.03	0.02	--	--	--	--	0.02
Non-Agric Capital	--	--	-0.02	-0.03	-0.21	-0.15	-0.09	-0.11	-0.05	-0.16	-0.30	-0.32	-0.15
Household Transfers	-0.02	-0.03	-0.02	-0.02	-0.01	0.00	-0.01	0.00	-0.03	-0.01	0.00	--	-0.01
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	0.16	0.19	0.13	0.07	0.09	0.11	0.07	0.08	0.23	0.17	0.07	0.07	0.11
Total	0.00	-0.01	-0.06	-0.10	-0.11	-0.23	-0.08	-0.21	-0.07	-0.20	-0.37	-0.40	-0.21
Total Consumption****	-0.13	-0.03	-0.07	-0.11	-0.25	-0.23	-0.28	-0.23	-0.08	-0.19	-0.35	-0.34	

* 25 decrease in the quantity of Knitwear exports (flexible exchange rate).

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model Simulations.

Table 5.8: Decomposition of Changes in Household Incomes, Simulation 11*

(Percentage Change from Base)**

(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	0.24	0.25	0.14	0.06	0.05	0.16	0.02	0.05	0.29	0.10	0.00	0.00	0.10
Male Labor: Educ 2,3	0.00	0.00	-0.02	-0.02	-0.01	-0.02	-0.01	-0.05	-0.01	-0.01	-0.02	-0.08	-0.03
Female Labor: Educ 0,1	-0.33	-0.27	-0.23	-0.14	-0.58	-0.21	-0.23	-0.13	-0.23	-0.17	-0.05	-0.03	-0.15
Female Labor: Educ 2,3	--	-0.03	-0.07	-0.08	-0.18	-0.06	-0.10	-0.12	-0.04	-0.05	-0.08	-0.10	-0.08
Land	0.01	0.04	0.14	0.25	0.02	0.02	0.07	0.13	--	--	--	--	0.07
Ponds	0.00	-0.02	-0.02	-0.05	-0.01	-0.01	-0.08	-0.03	--	--	--	--	-0.02
Poultry Capital	-0.02	-0.01	-0.01	-0.01	-0.02	-0.01	-0.02	-0.01	--	--	--	--	-0.01
Cattle Capital	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	--	--	--	--	0.00
Non-Agric Capital	--	--	0.01	0.01	0.06	0.04	0.02	0.03	0.01	0.04	0.08	0.09	0.04
Household Transfers	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	--	0.00
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	-0.09	-0.05	-0.06	0.02	-0.66	-0.10	-0.33	-0.14	0.02	-0.09	-0.06	-0.11	-0.08
Total Consumption****	-0.14	-0.08	-0.08	0.03	-0.70	-0.11	-0.34	-0.16	0.03	-0.06	-0.03	-0.02	

* 25 decrease in the quantity of both RMG and Knitwear exports (fixed exchange rate).

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model Simulations.

Table 5.9: Decomposition of Changes in Household Incomes, Simulation 12*

(Percentage Change from Base)**

(Full employment closure***)

	Landless Farmers	Marginal Farmers	Small Farmers	Large Farmers	Rural Non-Agric Poor, F	Rural Non-Agric Poor, M	Rural Non-Agric NPoor, F	Rural Non-Agric NPoor, M	Urban Illitera	Urban LowEdu	Urban MedEdu	Urban HighEdu	Total
Male Labor: Educ 0,1	1.02	1.07	0.68	0.30	0.23	0.77	0.06	0.27	1.17	0.81	0.03	0.01	0.46
Male Labor: Educ 2,3	0.07	0.12	0.30	0.34	0.10	0.34	0.13	0.54	0.16	0.23	0.64	0.61	0.40
Female Labor: Educ 0,1	-0.16	-0.13	-0.12	-0.07	-0.28	-0.11	-0.12	-0.07	-0.11	-0.09	-0.03	-0.01	-0.08
Female Labor: Educ 2,3	--	-0.01	-0.03	-0.04	-0.08	-0.03	-0.03	-0.06	-0.02	-0.02	-0.04	-0.03	-0.03
Land	0.01	0.05	0.19	0.34	0.03	0.02	0.09	0.17	--	--	--	--	0.09
Ponds	0.01	0.04	0.05	0.09	0.02	0.02	0.17	0.07	--	--	--	--	0.03
Poultry Capital	0.03	0.02	0.02	0.02	0.03	0.01	0.03	0.01	--	--	--	--	0.01
Cattle Capital	-0.19	-0.17	-0.20	-0.17	-0.13	-0.09	-0.13	-0.10	--	--	--	--	-0.08
Non-Agric Capital	--	--	0.08	0.10	0.79	0.54	0.33	0.40	0.19	0.60	1.10	1.19	0.54
Household Transfers	0.10	0.11	0.06	0.06	0.03	0.01	0.09	0.00	0.10	0.04	0.01	--	0.04
Government Transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ROW Transfers	-0.74	-0.89	-0.61	-0.33	-0.43	-0.51	-0.32	-0.35	-1.06	-0.78	-0.34	-0.33	-0.52
Total	0.15	0.21	0.41	0.62	0.30	0.98	0.30	0.89	0.43	0.78	1.37	1.43	0.86
Total Consumption****	0.63	0.26	0.45	0.71	0.80	1.01	0.99	0.96	0.49	0.80	1.37	1.26	

* Increase in foreign savings by the same amount as in Simulation 11.

** Change in income of each factor of production expressed as a percentage of total household income in the base simulation.

*** Full employment (neo-classical) labor market closure.

**** Percentage change in real consumption.

Source: Model Simulations.

Appendix Table 1: Aggregation of Original 79 Sectors

1999-2000 SAM Activities	1993-94 BIDS I-O Activities	Value-Added (million Taka)
Apaddy	Paddy	157,352
AGrains	Wheat; Other Grains	12,437
AJute	Jute	7,409
ASugCane	Sugarcane	8,506
AOComCrop	Cotton; Tobacco; Tea	4,215
AOthCrop	Potato; Vegetables; Pulses; Oilseeds; Fruits; Major Spices; Other Crops	125,626
ALivesto	Livestock	56,815
APoultry	Poultry	11,762
AShrimp	Shrimp	12,000
AOFish	Other Fish	125,820
AForest	Forestry	44,169
ARiceMil	Rice Milling	57,213
AAtaFlou	Ata & flour Milling	8,979
AEdOil	Edible Oil	5,688
ASugar	Sugar and Gur	6,401
AOFood	Fish & Sea-food Processing; Tea Processing or Blending; Salt; Other Food	13,437
ALeather	Tanning & Leather Finishing; Leather Products	5,147
AJuteTex	Jute Baling; Jute Textile	4,078
AYarn	Yarn	6,085
AMilClot	Mill Cloth	4,172
ACloth	Handloom Cloth; Dyeing & Bleaching	22,144
ARMG	Readymade Garments	61,766
AKnitwear	Knitting & Hosiery	14,128
AOthText	Other Textile	2,732
ATobP	Cigarettes, Bidi	11,156
AWoodP	Saw & Planning Mills; Wooden Furniture; Pulp, Paper & Board; Printing & Publishing	13,082
AChem	Drugs & Pharmaceuticals; Other Chemicals	13,273
AFerti	Fertilizer	1,120
APetroP	Petroleum Products	7,617
AClayP	Pottery & Earthenware; China & Ceramic; Glass & Glass Products; Bricks, Tiles & Clay Products; Cement	6,459
ASteel	Iron & Steel Basic Industry; Fabricated Metal Products	13,466
AMachin	Machinery; Transport Equipment	3,961
AMiscInd	Miscellaneous Industry	4,304
AUrbBuil	Urban Building	41,764
ARurBuil	Rural Building	174,661
AConElec	Construction: Electricity & Gas	3,388
AConRoad	Construction: Rural Road	4,226
AConOth	Construction: Other Transport; Other Construction	9,782
AUtElec	Electricity	25,319
AUtGasM	Gas, Mining & Quarrying	22,946
ATradeS	Trade Service	363,917
ATransS	Transport Service	249,829
AHous	Housing Service	150,833
AHealth	Health Service	17,686
AEdu	Education Service	41,722
APubAdm	Public Administration & Defense	57,372
AFinS	Banking & Insurance; Professional Service	116,121
AHotel	Hotels & Restaurants	11,878
AComm	Communications	18,631
AOthS	Other Services	82,020

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