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Analyzing the Impact of Trade Reforms on Bangladesh Economy: A CGE Approach¹

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Abstract

This study investigates the short run and long run effects of trade liberalisation using a static computable general equilibrium approach on the economy of Bangladesh. Trade liberalisation has been simulated by a complete removal of tariffs on imported goods and services and the impacts on the domestic economy is measured in terms of changes in output, employment, balance of trade, exports, imports and household consumption. Simulation results show that export oriented agricultural and manufacturing industries experience substantial increases both in the short run and long run, however, their extent are larger in the long run compared to the short run. Real consumption increases in the long run even though urban groups are in a better position than their rural counterparts.

¹ This paper is based on a chapter of an ongoing PhD research at the University of New England, Australia.

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Introduction

Over the past 20 years, the liberalisation of domestic markets and integration into the global economy has become an important development strategy for developing countries. During this period, a growing number of developing countries have adopted outward oriented liberalisation measures in the hope that trade liberalisation will have a greater impact on the national economy. It has also long been recognized that by influencing the allocation of resources and switching the production from non-traditional and inefficient import substitutes to efficient exportable trade liberalisation increases the demand for unskilled labour in which the country has comparative advantage.

Like many other developing countries, Bangladesh has gone through a variety of structural adjustment process since its political independence in 1971. Immediately after independence Bangladesh adopted a protectionist inward-oriented policy regime with rigid trade and exchange controls. In the 1980's and 1990's, the country experienced radical shift to a more liberal policy regime under the Structural Adjustment Programs (SAP) suggested by the World Bank and the International Monetary Fund (IMF).

Trade reforms which were initiated in the 1980's, were aimed at mainly, privatization of state owned enterprises, withdrawal of quantitative import restrictions, financial restrictions and some downward adjustment of tariffs and quantitative restrictions (QR's). However, the major progress in trade policy reform occurred in the 1990's with a substantial scaling down and rationalization of tariffs, removal of trade-related QR's and elimination of import licensing, unification of exchange rates and the move to a more flexible exchange rate system (Ahmed and Sattar 2004). Trade liberalisation policies also have been accompanied by some monetary and fiscal management. As a result, Bangladesh becomes increasingly open to international market forces. The openness, measured by trade (Exports and Imports) to GDP ratio, increased from 18.01 per cent in the 1980's to 22.92 percent in 1990's and 30.41 per cent during the period 2000-05 (IFS). The economic performance of the post liberalisation reforms were quiet impressive, high growth rate of GDP, investment and savings rate, export all show notable improvement in its overall performance. However, despite the success, concerns are growing about the short and medium

term GDP growth prospects. It has also been said that economic growth has been insufficient to mitigate the high unemployment levels. With this background, this study investigates the short run and long run effects of trade liberalisation in Bangladesh using a static Computable General Equilibrium Approach. Especially this study seeks to answer the following questions: what will be the impact of reduction of nominal trade of protection on allocation of resources? Which sectors will be most affected by tariff reductions? Which socio-economic groups among the poor will be affected by the trade liberalisation? And how will various macro economic variables such as GDP, employment, exports, imports, consumer prices, import prices, trade balance and household consumption change because of the effects of the reductions in import tariffs.

The CGE model will be used here is called ORANI-G, resembles the original ORANI (Dixon, R et al. 1982) specification. ORANI-G is a single country CGE model designed for comparative static analysis of a variety of issues. It is fully documented in Horridge (Horridge 2003). However, to show the tariff impacts on various households groups, this study uses the Multiple Household Versions of ORANIG03 (Horridge 2004). Trade liberalisation has been simulated by a complete removal of all tariffs on imported goods and services and the results have been presented in percentage-changed form.

The rest of the paper is organized as follows: Section 2 presents country background focusing on key trade and macro economic policies. Section 3 presents the model and discusses the data used to run the model. Section 4 discusses the simulations and results obtained. Some concluding remarks are presented in section 5.

2 Changes in Trade Policy and Economic Structure in Bangladesh

Bangladesh maintained a restrictive trade regime since its independence in 1971. The highly protectionist trade policy regime was regulated through quantitative controls on imports and exceptionally higher tariff rates. Import bans, quotas and other restrictions were imposed to protect the domestic industries. Import substitution strategies were followed through various quantitative restrictions on import and import licensing. In addition, strict exchange control measures were undertaken.

A major change of policy directions occurred in the early 1980s with the adoption of market oriented liberalisation policy reforms under the guidelines of the IMF and the World Bank. Trade reforms lunched in the 1980s were aimed at mainly privatization of state-owned enterprises, withdrawal of quantitative import restrictions, financial liberalisation and some downward adjustment of tariffs and QRs. However trade reforms initiated in the 1990s were aimed at moving towards an open economy by making the currency convertible on the current account, involving foreign investors in key sectors, reducing import duties generally to much lower levels, and removing nearly all controls on the movements of foreign private capitals. The specific measures of trade liberalisation that Bangladesh adopted were as follows:

- ∞ The unweighted average protection rate declined from 36.0 per cent in 1993/94 to 12.51 per cent in fiscal year 2005/06. In contrast, the weighted average rate of protection, which was 24.1 per cent in 1993/94, was reduced to 8.09 per cent in fiscal year 2005/06 (GOB 2006).
- ∞ Reduction in the number of commodities under the four-digit subject to quantitative restrictions from 550 in 1987 to 63 under the import Policy Order of 2003-06.
- ∞ The maximum tariff rate was lowered from 350 per cent in fiscal year 1991 to 37.5 per cent in 2000. During the same period, the Most Favoured-Nation (MFN) tariff fell from an average of 58 per cent to 22 per cent, which again reduced to 15.5 per cent in 2005/06.
- ∞ The number of tariff bands reduced to 5 in 2004/05 (0 per cent, 7.5 per cent, 15 per cent, 22.5 per cent and 30 per cent) from 15 in 1992/93.
- ∞ On the export side, the greater emphasis was to diversify the export base, improving the quality of exports and to stimulate higher-value added exports to machinery and intermediate inputs. In line with the above objectives an incentive package including fiscal and financial facilities have been made. They included income tax rebate, rebate on insurance premiums, duty drawback, lower interest rates on bank loans, tax holiday, cash

compensation scheme, export credit guarantee scheme, export credit support, special bonded warehouse scheme, back-to-back letter of credit system, export development fund and establishment of export processing zones.

- ∞ Adoption of a unified exchange rate system in 1992 instead of multiple exchange system⁴. Since then, to maintain flexibility in the exchange rate, a policy of creeping devaluation was also followed. A bold exchange liberalization step took place in 2003 by introducing fully market-based exchange rate.

As a result of the trade policy reforms, Bangladesh's has become increasingly open to international market forces. Openness measures such as import orientation ratio, export orientation ratio and trade-GDP ratio all show upward trend during the period 1973-2005 (Figure 1).

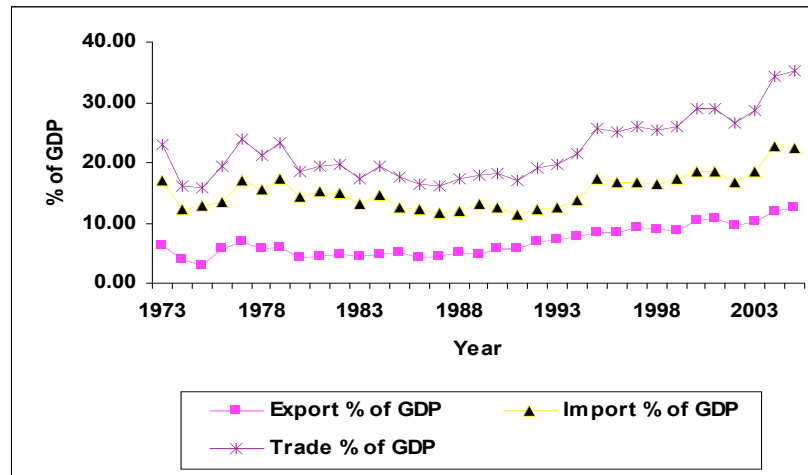


Figure 1: Import orientation, Export Orientation and Trade-GDP ratio in Bangladesh, 1973-2003

Figure 1 shows starting from 6 per cent of GDP in 1973, the ratio of exports of goods and services rose to about 12 per cent in 2005; the ratio of imports of goods and services rose from 17 per cent to 22 per cent; and the rates of trade (exports +imports) to GDP increased from 23 per cent to 35 per cent. Furthermore, all the above measures show large increases

⁴ Bangladesh had practiced a multiple exchange rate regime involving the official pegged rate and a secondary foreign exchange rate associated with the introduction of the wage earner's scheme.

over the extensive trade liberalisation period (1992-onward) than in the initial phases of reform (1976-1991).

The economic performance of post liberalisation era of Bangladesh has been improving gradually. The growth of GDP, which averaged to 3.7 per cent annually during the 1980s, has increased to 5.06 per cent by the second half of the 1990s and increased marginally during the period 2000-05. At the same time, per capita income also grew faster than the growth of overall GDP from 1.3 per cent per annum in the 1980s to 3.26 per cent during the period 2000-05 (IFS, various issues). Growth performance during the post liberalisation period was accompanied by structural change. The relative contribution of agriculture to GDP decreased while the contributions of industry and services increased (Figure2)

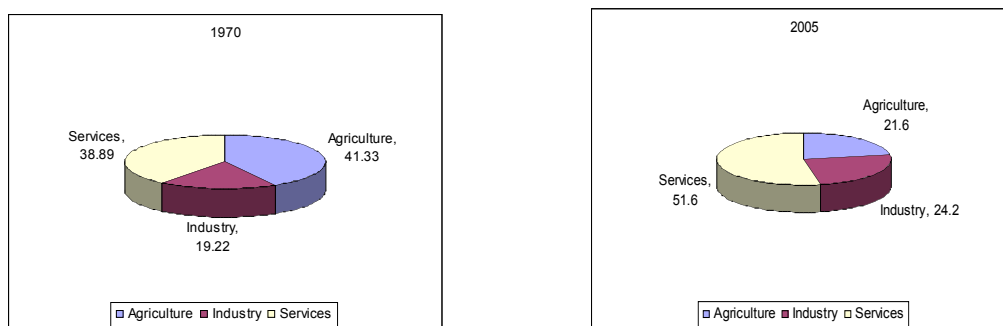


Figure 2: The Sectoral value added during the period 1970 and 2005

Figure 2 shows agriculture, which constituted 41.33 per cent of real GDP in 1970, declined to about 22 per cent in 2005, whereas contribution of service sector increased to about 52 per cent in 2005 compared to about 39 per cent in 1970. Industry sector also shows significant changes in 2005 compare to 1970. Thus over the long term there was a shift of the sectoral composition of GDP away from agriculture towards industry and services.

3. The Theoretical Structure of the CGE Model for Bangladesh:

The model used here is drawn from ORANI-G, a single country comparative static CGE model for the Australian Economy which draws heavily from ORANI, the multisectoral CGE model for Australia. The model has a theoretical structure that is typical of most static models and consists of the following structural components.

- 1) Producers demands for produced inputs and primary factors;
- 2) Producer's supplies of commodities;
- 3) Demands for inputs for capital formation;
- 4) Household demands;
- 5) Export demands;
- 6) Government demands;
- 7) The relationship of basic values to production costs and to purchasers prices;
- 8) Market-clearing conditions for commodities and primary factors;
- 9) Numerous other macro-economic variables and price indices.

There are six types of agents in the model; industry, households, government, investment, export and inventory. Each private agent's behaviour is directed through conventional neoclassical microeconomics. Households maximize utility and producers minimize their cost, which results corresponding demand, and supply equations of the model. All agents are assumed to be price takers, with producers operating in competitive markets. The basic theoretical assumptions made in the model are as follows.

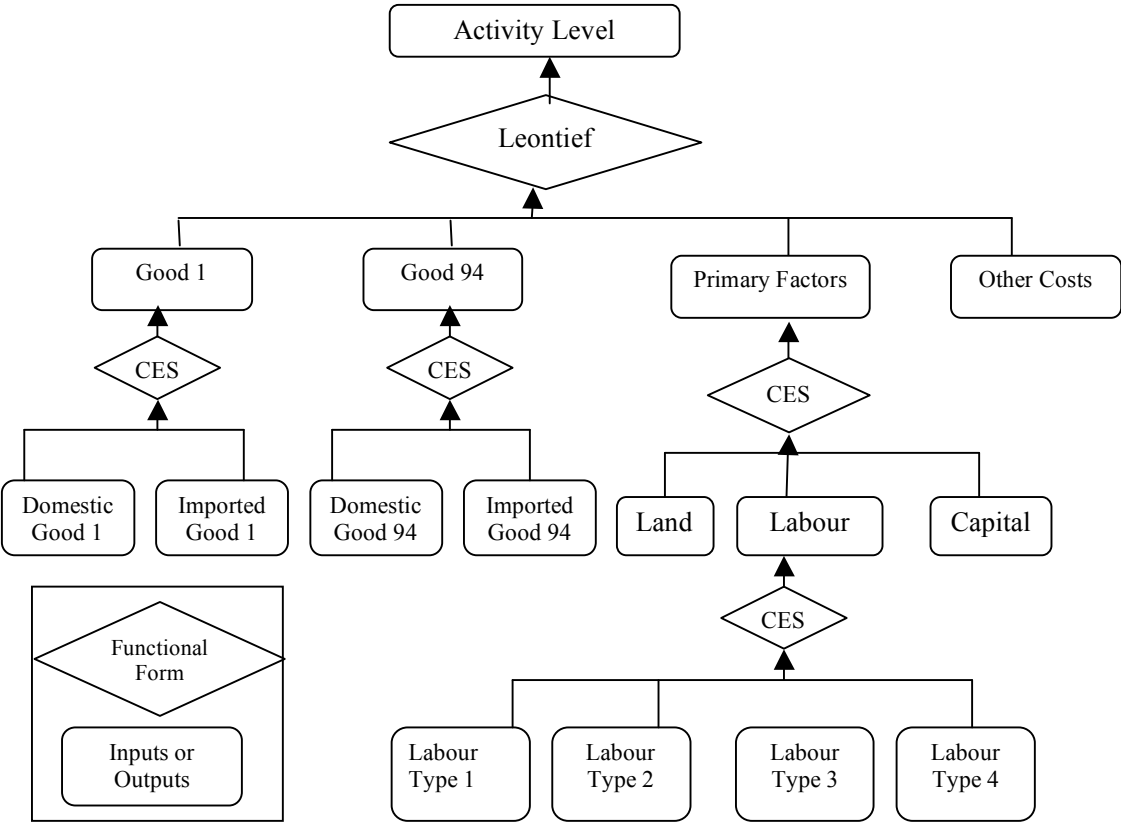
3.1.1 Input demands for production of commodities:

It is assumed that producers minimize their input cost for a given level of output with nested Leontief/Constant returns to scale (CES) production. Producers are constrained in their choice of inputs by a two-level nested production technology. At the top level, intermediate-input bundles, other cost and primary-factor bundles are combined using a Leontief production function. Consequently, they are all demanded in direct proportion to output. At the second level, intermediate input bundles are formed as combinations of domestic goods and the imported

equivalents⁵, the primary factor bundles are formed as combinations of land, capital and composite labour. The composite labour bundle is formed of various occupational labour types. In all cases, the aggregate function follows a Constant Elasticity of Substitution (CES) form. The structure of production in a given industry is depicted in figure 3. In this study, the economy is divided into 86 industries and 94 commodities (as in I-O table 2000 for Bangladesh), which imply some industries can produce several commodities

In this model labour is split into four occupational categories, such as Male low skilled, Male high skilled, female low skilled and female high skilled. These occupational classifications are obtained from the Social Accounting Matrix 2000 for Bangladesh by applying the mapping between sectors of the SAM and the I-O Table 2000 for Bangladesh.

Figure 3: Model Production Structure

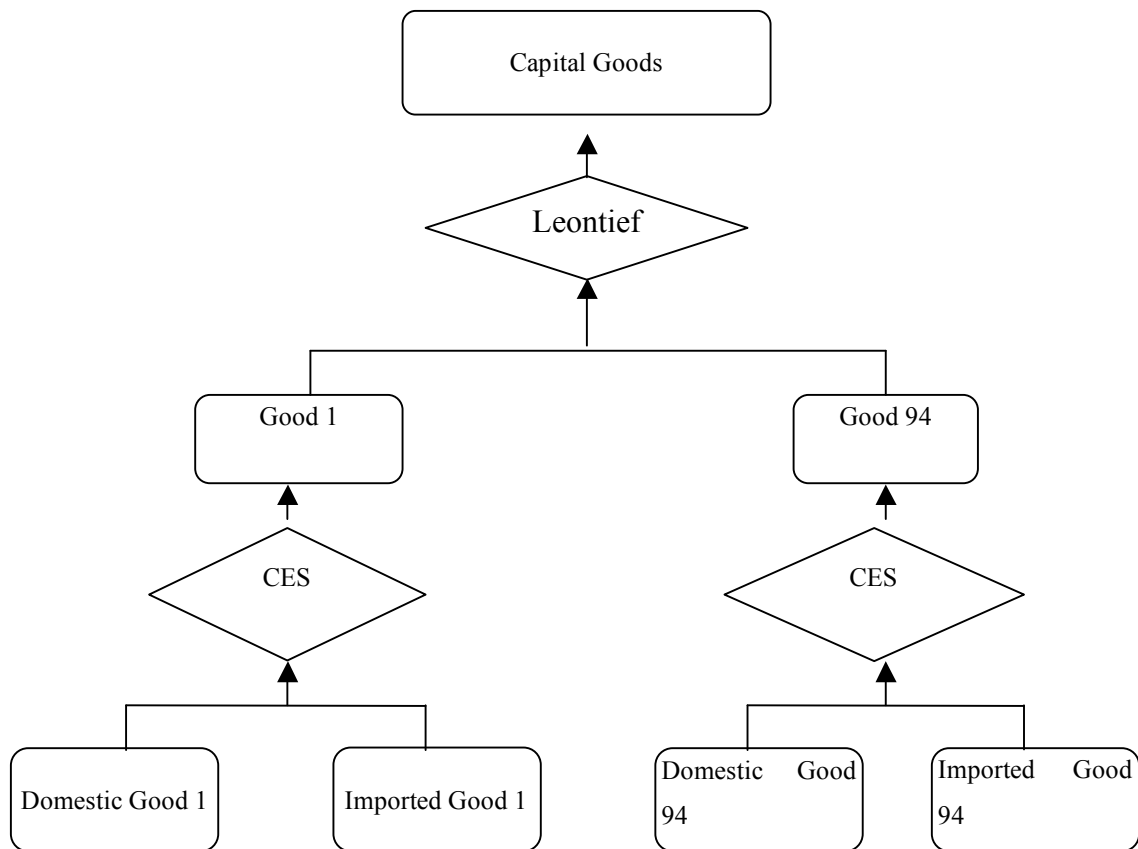


⁵ Substitution between imported and domestic inputs is modeled using Armington (1970) assumption that imports are imperfect substitutes for domestic supplies.

3.1.2 Demands for input to capital creation:

Capital is assumed to be produced with inputs of domestically produced and imported commodities. At the bottom level, the total cost of each imported and domestic commodities is minimized subject to a CES function. At the top level, the total cost of commodity composites is minimized subject to the Leontief production function. Figure 4 shows the nesting structure for the production of new units of fixed capital. Here the production structure is similar with current production; the only exception is that no primary factors are used directly as input to capital formation.

Figure 4: Structure of Investment demand



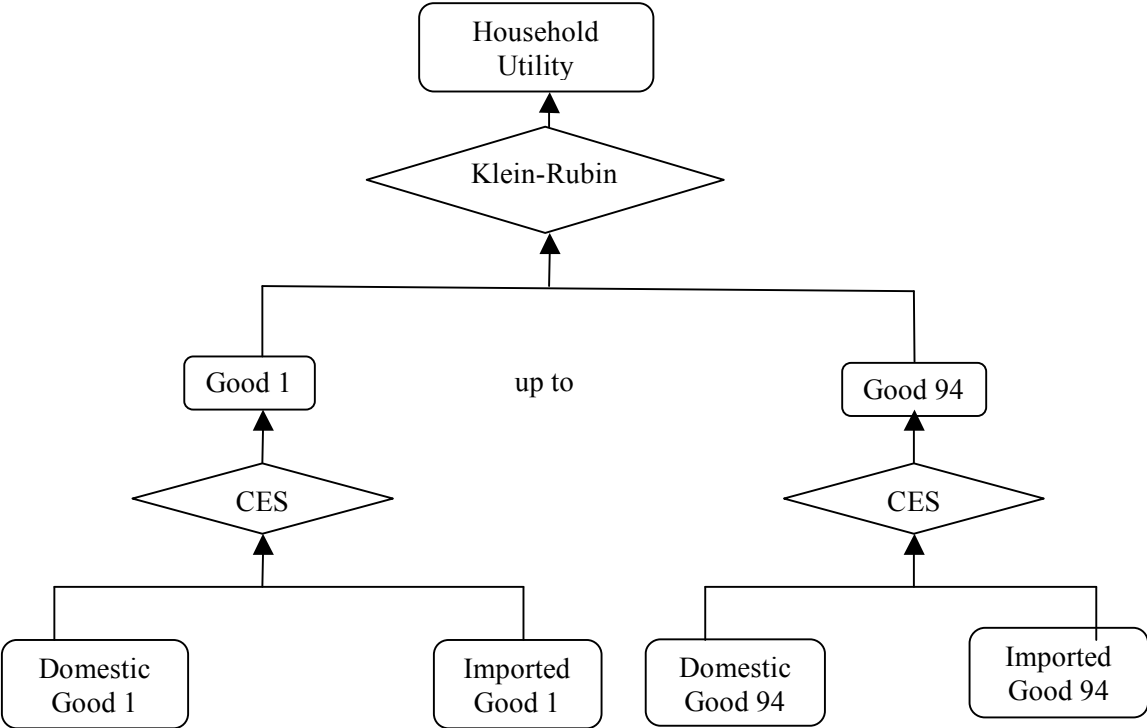
3.1.3 Household demands:

Following multiple household version of ORANI-G (Horridge, 2004), the model has nine household groups which are based on the classification in the 2000 Social Accounting Matrix for

Bangladesh. In SAM 2000, households are decomposed into nine groups in terms of location urban and rural. In case of rural households, depending on occupation and ownership of agricultural land households have five groups: 1) Landless (No cultivable land); 2) Marginal farmers (up to 0.49 acres of land); 3) Small farmers (0.5 to 2.49 acres of land); 4) Large farmers (2.50 acres of land and above); 5) Non-agricultural. On the other hand, on the basis of educational level of the head of the household, urban households are classified as 1) Illiterates (no education); 2) Low education (class1-classIX); 3) Medium education (class X to class XII) and 4) High education (graduation and above).

The nesting structure for household demand is presented in figure 5. Household groups choose their purchases to maximize their utility with an additive nested utility function subject to an aggregate expenditure constraint, which again leads to the Linear Expenditure System (LES). The imported and domestic commodities are substitutes according to a CES aggregation.

Figure 5: Structure of Households demand



3.1.4 Export Demands:

The model's export demand commodities are divided into two groups: the traditional exports and the non-traditional exports. Traditional export comprises the bulk of the exports and the export demand for this type of commodity is represented by a downward sloping function of its price in foreign currency units, while for non-traditional exports goods, exports are assumed to be in direct proportion to the aggregate of the group of non-traditional exports.

3.1.5 Government demand for commodities:

Government spending is assumed to be exogenously determined in the model.

3.2 Model Database:

The present model required an input-output database with separate matrices for basic, margins and tax flows for both domestic and imported commodities. The Input-Output Table 2000 for Bangladesh (GOB 2003) served as the initial solution of the model. However, the required input-output database was not available readily from the I-O table⁶. To convert the I-O table into the format required by this model, some steps were taken which were performed by using GEMPACK (Harrison and Pearson 1996).

At first the original excel format data were converted to Header array files by using the ViewHAR program. Then for each of the database creation, a separate Tablo input file has been written which converts the raw datahar into final modelhar similar to the ORANI-G data input format.

However, the I-O Table for Bangladesh has only one aggregate consumer, with one row for compensation of employees and with no separate data for different skill levels. Therefore to match with the multiple households' equations in model equations, households were classified by taking information from SAM 2000 for Bangladesh (GOB 2003). Similarly, labour cost also has been divided into different skill groups based on SAM 2000 information.

⁶ I-O Table 2000 for Bangladesh consists of a non-symmetric supply and use table, where production activities distinguished from commodities. I-O table 2000 also contains separate tables for taxes on imports and taxes on domestic products by commodities.

In addition to input-output data, the model required various elasticity parameters and behavioural parameters such as the Armington elasticities, the substitution elasticities for labour, the export elasticities, and the substitution elasticities for primary factors and the expenditure elasticities. In the absence of recent useful estimates of the elasticity of substitution between domestic product and imports and household expenditure elasticities for various goods in Bangladesh, this study uses estimates of the expenditure elasticity in GTAP6 database for Bangladesh (Dimaranan 2001). The elasticity of substitution between capital, labour and land was set to 0.5 for all sectors following ORANI (Dixon et al, 1982) and ORANI-G (Horridge, 2003).

4. Using the Model to Examine the Effects of Trade Policy Reform:

As stated before, Bangladesh undertook several trade liberalisation programs and associated economic reforms during the eighties and the nineties, which liberalised its external trade and foreign exchange regime. These policy measures have important effects on different macroeconomic variables and the structure of the Bangladesh economy. Although in literature there are a growing number of studies regarding the impacts assessment of tariff liberalisation in Bangladesh economy, very few study concern with long run implications of tariff liberalisation. In this perspective, the main objective of this simulation is to quantify the short run and long run impacts of reduction in import tariffs on various macroeconomic variables, sectoral level variables and household level variables.

Trade liberalisation is simulated in this paper by a complete removal of all tariffs on imported goods and services. Now in order to simulate, the model setting of exogenous variables which defines the closure of the model is necessary. The choices of macro environment places on the economy are important in determining the relative price changes and hence the responses of agents to the effects of the tariff cut. The set of assumptions underlying the short run and long run simulations are given below.

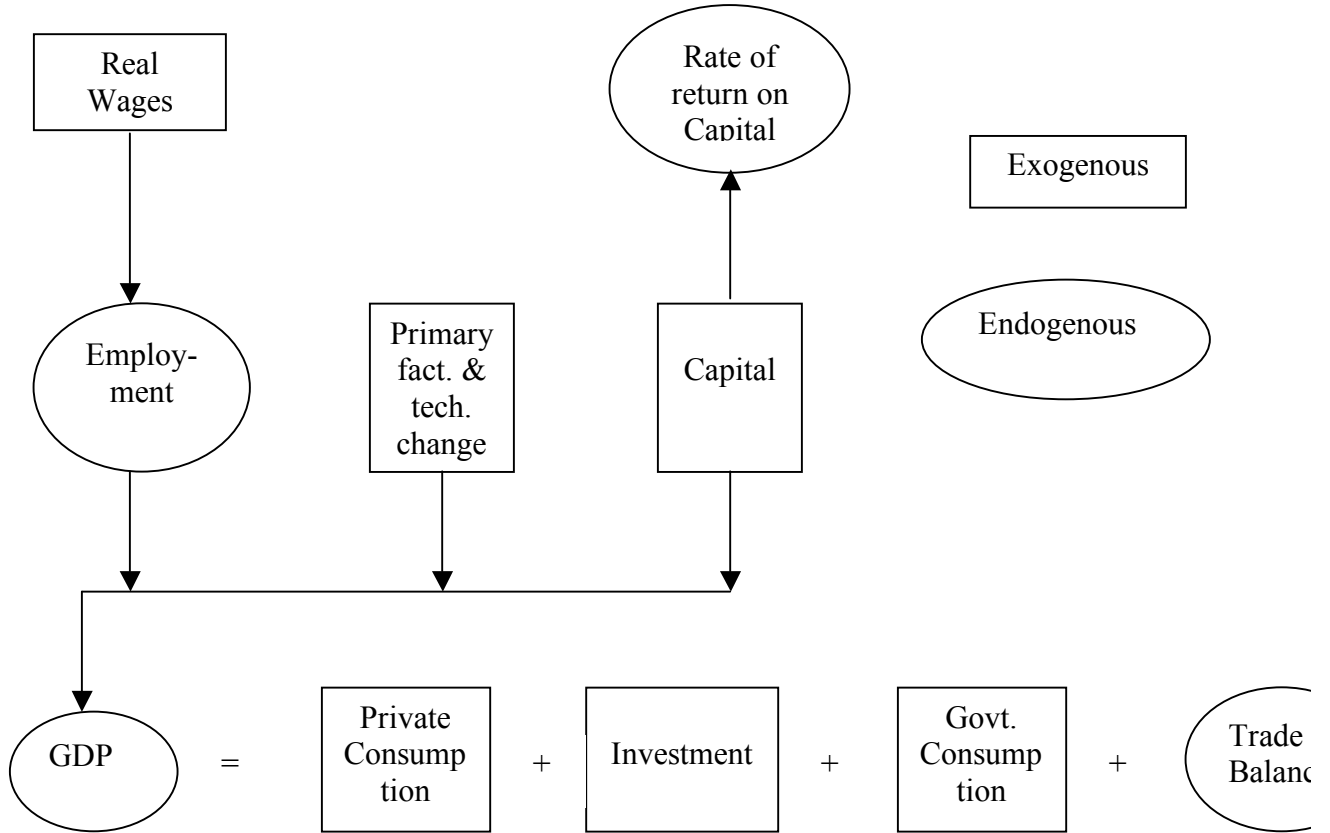
4.1.1 Short run Closure:

The schematic representation of the short run closure is depicted in Figure 6 where the exogenous variables are presented in rectangles while the endogenous variables are presented in ovals. The upper part of the diagram depicts the supply side of the economy while the lower part describes the demand side of the economy. In short run, on the supply side, capital stock and the real wage are held fixed as fixed capital takes time to adjust to economic shocks. Since capital stocks are fixed, industries can change their output level by changing labour inputs. However, the model does not preclude the changes in the allocation of the investment budget among investing industries in response to changes in relative rates of return.

In labour market, it is assumed that, there is an elastic supply of labour at fixed real wage rate, the employment levels will adjust according to the change in labour demand. This situation is in common with the existing labour market situation (unemployment) in Bangladesh. Because of the short run nature of the policy analysis and since ORANI provides little theory about the size and composition of absorption, on the demand side, major domestic absorptions such as real private consumption expenditure, real investment expenditure and real government expenditure have been hold fixed. The trade balance as a fraction of GDP is specified as endogenous, thus, any shock affecting total absorption is borne out by the balance of trade.

Along with these, all technical change variables have been considered as exogenous as this is a long-term phenomenon. Further, all tax rate variables, shift variables and foreign prices of imports, number of households, real demands for inventories are considered as exogenous in the short run. The nominal exchange rate is fixed and serves as a numeraire in this model. This implies that changes in the domestic price level are evaluated relative to world prices.

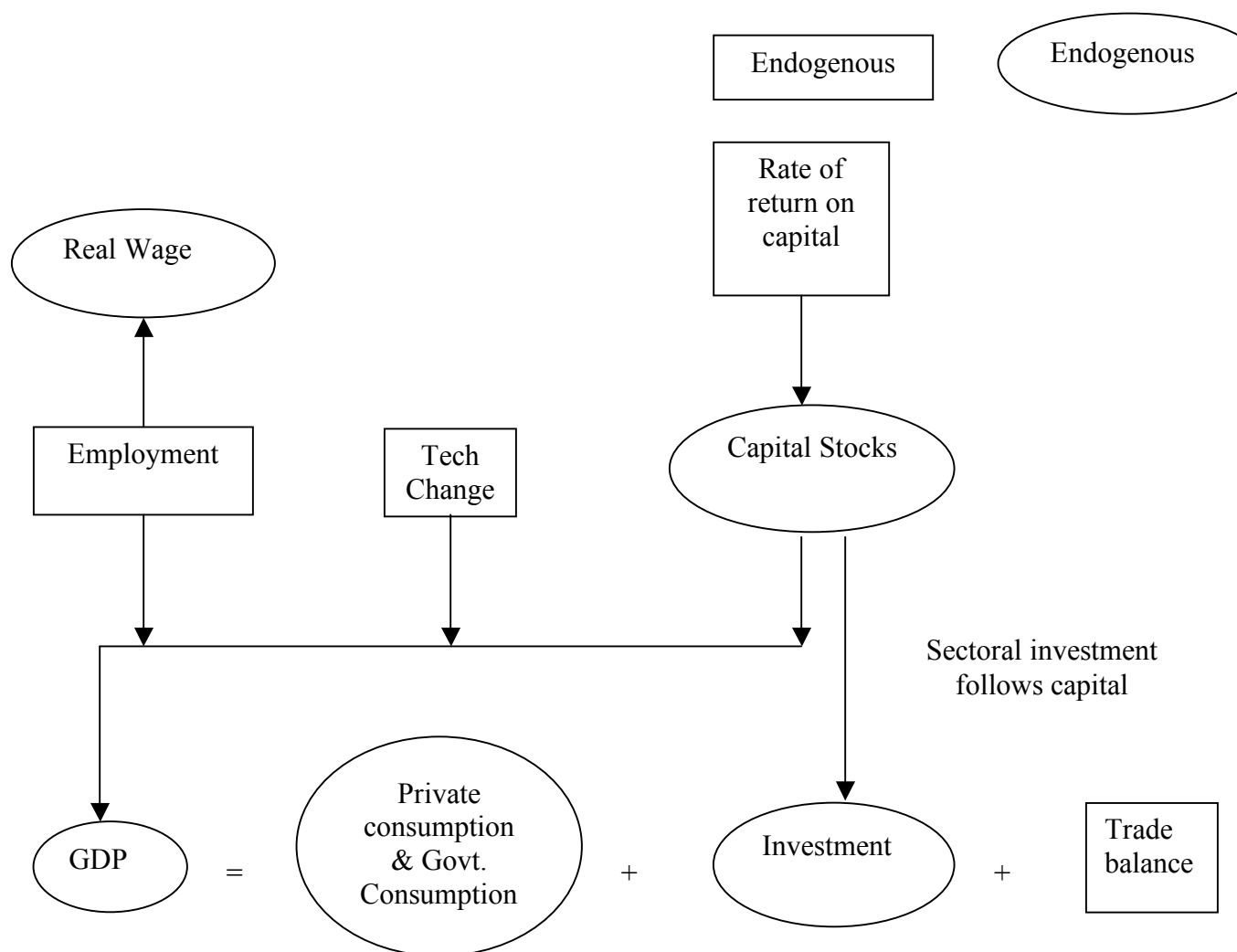
Figure 6: The schematic representation of short run closure



4.1.2 Long run closure:

As opposed to the short run, in the long run it is assumed that capital stocks are free to adjust in such a way that fixed rates of returns (gret) are maintained. An open capital market is implicitly assumed, since there is no link between capital formation and domestic saving (Horridge 2006). The schematic representation of the long run closure is presented in Figure 7.

Figure 7: The Schematic representation of the long run closure



On the supply side, aggregate employment is fixed⁷ while the aggregate real wage determined endogenously. However, labour is freely moving between sectors in the economy according to the change in the labour demand. On the demand side, it is assumed that real private consumption, real government consumption and real investment determined endogenously. While the balance of trade is determined exogenously, it is also assumed that nominal household consumption follows nominal GDP and real government consumption follows real private

⁷ The assumption is that in the long run, employment level is determined by population growth, labour force, participation rates and the natural rate of unemployment.

consumption. In long run with no restrictions on the supply of investment funds at given rates of investment, national capital formation change. Since each industry's capital formation is related with its investment, as a result, nation investment level changes. In line with short run, inventory demands, production technology, land, foreign prices of imports and number of households are held fixed. The numeraire is the exchange rate.

4.2 Simulation Results

4.2.1 Macroeconomic Impacts:

Table 1 contains projections of the effects of the tariff cut on a number of key macro economic variables such as aggregate employment, real GDP, real wages, consumer price index (CPI), aggregate imports and exports, trade balance and aggregate consumption.

Table 1: Projected Effects of a 100 per cent Tariff cut in all Sectors: Selected macro Variables.

Macro Variables	Short run	Long Run
Real GDP (Expenditure side)	0.703	0.821
Aggregate Employment	1.473	0
Aggregate Real Household Consumption	0	0.573
Aggregate real Investment	0	1.123
Real Government Consumption	0	0.573
Consumer Price Index	-3.607	-1.247
Export Volume Index	9.723	6.349
Import Volume Index	1.529	2.695
Terms of Trade	-0.565	-0.298
Average Real Wage	0	3.243
Exports Price Index	-0.565	-0.298
Real GDP at Factor Cost	0.651	0.720
GDP Price Index (Expenditure side)	-4.026	-1.526
Ordinary change to Nominal Trade Balance to GDP ratio	0.004	0
Real Devaluation	4.195	1.550

All the variables have been presented as percentage changes except for the variable delB, which is reported as an ordinary change. It is worthwhile to mention here that we have to rationalize particular simulation results in terms of the model's theoretical framework and underlying closures. In the short run closure, on the supply side of the economy; we fixed the level of capital usage in each industry, technology and real wage. Now with fixed real wage and slack labour market, aggregate employment will be determined endogenously from the model. Table 1 shows in the short run aggregate employment has increased by 1.473 per cent, which is more than the increase in real GDP (0.73 per cent). The reason is our assumption about fixed industry usage of capital and land. With capital and land fixed an increased use of labour reduces marginal productivity of labour as output expands. Hence employment rises more than real GDP.

A consistency check between the aggregate employment result and the national output can confirm the relationship. The percentage change in GDP can be written as a weighted average of percentage change in the employment of primary factors, which is,

$$x0gdp = S_{lab} \cdot employ_i + [S_{cap} \cdot xcap_i + S_{lnd} \cdot xlnd_i] \quad (1)$$

Where $x0gdp$ is the percentage change in real GDP, $employ_i$, $xcap_i$ and $xlnd_i$ are percentage changes in economy wide use of labour, capital and land. S_{lab} , S_{cap} and S_{lnd} are the shares of each factor in GDP at factor cost. In short run simulation, it is assumed that,

$$xcap_i = xlnd_i = 0 \quad (2)$$

The value of S_{lab} in our database is about 0.42 so that equation (1) and (2) suggest a value of GDP of about 0.619 given the value of aggregate employment in Table 1(1.473). Our model result for real GDP is 0.703. Therefore, the change in GDP did not fully explained by changes in labour. Simulation results show an additional factor is at work is indirect tax (0.081) which is responsible for the approximate change $(0.619+0.081)=0.7$ which is very close to our model simulation result of real GDP of 0.703.

Now with real GDP determined from the supply side and domestic absorption (aggregate real household consumption, aggregate real investment and aggregate government spending), the trade balance as a proportion of GDP shows an improvement of 0.004 (Table 1). The projected

increase in import volume index of 1.529 is offset by a 9.723 per cent increase in export which results in a movement towards surplus on the balance of trade. This also can be confirmed with the following consistency check. We can write:

$$\text{gdp} = S_A.a + S_E.e + S_M.m \quad (3)$$

Where gdp is the percentage change in gross domestic product, a is the percentage change in real domestic absorption, e is the percentage change in aggregate exports, m is the percentage change in aggregate imports and S_A , S_E and S_M are the shares of domestic absorption, exports and imports in the GDP. Using the values from Table 1 for e (9.723) and m (1.529), equation (3) gives

$$\begin{aligned} \text{gdp} &= (9.723 \cdot 10) - (1.529 \cdot 183) \\ &= 0.697 \end{aligned}$$

which is very close to our model simulation result of 0.703. This movement of the trade surplus is the result of an improvement in international competitiveness i, e a reduction in domestic costs relative to foreign prices. Table 1 shows our export volume increases by 9.723 per cent in the short run as Bangladesh expands production of commodities in which there is a comparative advantage. The sectors experiencing the largest export expansion are shrimp, leather product, readymade garments, knitting, toiletries manufacturing followed by miscellaneous industries and jute and jute products. Table 1 also shows in the short run consumer prices fall by 3.607 per cent which results in a real exchange rate depreciation of 4.195 per cent. Tariff cut reduces the prices of imported manufactured goods that are used as an input which again reduces the cost structure of industries and wage cost for all sectors (full wage indexation assumption). Thus trade liberalisation helps easing the inflationary pressure on the economy. The decreased price level is also reflected by GDP deflator (-4.026) which stimulates the demand for imports however, decreased domestic prices also causes exports to increase which outweighs the increase in imports.

In contrast to short run, in the long run most macroeconomic variables show a similar directional but changed in different magnitudes. As for example, the percentage changes in the long run GDP is 0.821, which is higher than the short run real GDP of 0.703. The main difference between the short run and the long run simulation is that in the long run, the employment level and capital rates of return are assumed to be fixed, so the variation in the real GDP comes from only the

flexible use of capital inputs. As according in the short run, we can present the back of the envelope calculations in the percentage change in GDP. By following equation (1) with respect to the long run closure, we assume,

$$\text{employ}_i = \text{xInd}_i = 0 \quad (5)$$

The value of S_{cap} in our database is about 0.49 so that equation (1) and (5) suggest a value for GDP of about 0.686 given the value of capital in Table 1(1.339), which again is not equal to the simulation result of 0.821. It is the change in indirect tax (0.132), which will be added to 0.686 to explain the full increase in GDP of 0.818. (close to 0.821). Increased employment of capital and hence increased investment has contributed to this expanded output in the long run compared to the short run. Further, in the long run, we have assumed real absorption is not fixed, so increased GDP from supply side is matched with fixed current account by increasing real absorption. The simulation results show that real aggregate private investment increases by 1.123 per cent and aggregate capital stock by 1.399 per cent. Capital moves to those industries which are capital intensive and have a higher rate of return.

Table 1 also shows in the long run, real aggregate consumption increases by 0.573 per cent which implies aggregate welfare effects of tariff liberalisation. By assumption government consumption demand is also expected to increase by 0.573 per cent. Further, real wage increases by 3.243 per cent which indicates the increased derived demand for labour.

Exports and Imports both register positive growth in the long run, however, the export growth is more pronounced than import growth. Export grows at the rate of 6.349 per cent, which is less than that of the short run figures. Rationalization the results in terms of assumed model closure can verify this. In the short run, with fixed domestic absorption, any increase in real GDP was reflected entirely on the expenditure side by a change in the balance of trade (X-M), in contrast, in the long run with fixed balance of trade assumption, expansion of the economy matched with increase in domestic absorption, less effects happens to exports and imports. As in the short run, in long run also, we observe real exchange rate depreciations by 1.55 per cent and export price decreases by 0.298 per cent which again results in a deterioration of terms of trade.

4.2.2 Sectoral effects:

Appendix Table-1 presents the initial pre-liberalisation situation in Bangladesh in 2000. We first note that the overwhelming concentration of the Bangladesh trade is in the manufacturing sector and in some agricultural commodities. Table-1 also shows Bangladesh's export dependency is higher in the readymade garment industry and knitting industry as more than 75 per cent of their product depends on foreign market. Jute and Jute products are the other export-oriented sectors in which almost 20 per cent and 56 per cent of the output are sold in international market respectively. Besides these, tea cultivation, shrimp, leather product, and fertilizer insecticides are also occupy important role in export categories. On the import side, the sectors with the largest share are machineries and cement as they occupy for about 71 per cent and 67 per cent of total output respectively. Besides these, glass products, chemical products, miscellaneous industries, chemicals and petroleum products are also prominent in import categories. Readymade garment, knitting and petroleum products have both high export and import dependency reflecting the fact that a large percentage of production in these sectors represents processing and assembling products from abroad. The sectoral tariff rate indicates that Bangladesh provides high protection for manufacturing and some final consumption good sectors. In some sectors such as readymade garments and knitting the tariff rate is very small, less than 10 per cent because of the tariff exemptions applied to their imports of intermediate inputs and processed goods trade.

Industry results for the simulation are shown in Table 2. The initial impact of tariff removal is the fall in import prices; as a result increase in imports. In the short run import rises most for fruit cultivation, spice cultivation, milk fat, fish, fish seafood, sugargur, tea product, process food, jute products and china pottery. Facing with lower domestic demand, producers reduce the domestic production of sectors that have shown rise in imports. In the short run, the maximum decline in production is in fruit cultivation, spice cultivation, sweetener industry, food process, petroleum refinery, glass industry and cement manufacturing. These are industries which had high import penetration and higher tariff rate before. Examination of the sales structure (Appendix Table 2) confirm us that for these products households accounts for most of the changes in their imports. As a result their output contract.

Table 2: Projections of Percentage Change in Industry Effects

Industry	Short run		Long run	
	Output level	Employment	Output level	Employment
Paddy	-0.057	-0.096	0.117	-0.38
Wheat	-0.225	-0.375	0.213	-0.262
Othergrain	-0.201	-0.445	0.365	-0.293
JuteCultiv	2.278	3.397	-0.261	-0.683
SugcaneCulti	-0.856	-1.836	-1.02	-1.931
PotatoCulti	-0.033	-0.08	0.138	-0.624
VegCulti	0.333	0.746	-0.92	-1.837
PulseCulti	-0.051	-0.121	0.177	-0.572
OilseedCulti	-0.512	-0.934	-1.969	-2.859
FruitCulti	-1.28	-3.786	-1.799	-3.184
CottonCulti	0.694	1.955	0.503	-0.258
TobaccoCulti	-0.245	-0.494	-0.575	-1.342
TeaCulti	2.161	4.671	0.48	-0.122
SpiceCulti	-2.301	-5.104	-3.541	-4.99
OthcropCulti	0.031	0.07	-0.201	-0.995
LivstockRear	0.054	0.125	0.588	-0.05
PoultryRear	-0.188	-0.448	0.313	-0.404
ShrimFarming	2.683	6.111	2.113	1.819
Fishing	-0.211	-0.557	0.458	-0.287
Forestry	-0.088	-0.26	0.703	-0.038
RiceMilling	-0.057	-0.274	0.041	-1.232
GrainMilling	-0.286	-1.466	0.291	-1.01
FishProcess	0.565	3.261	0.172	-1.151
OilIndustry	-0.499	-2.319	-2.65	-3.884
SweetenerInd	-0.841	-1.003	-0.996	-1.255
TeaProduct	-0.612	-1.017	-0.145	-0.788
SaltRefining	-0.011	-0.017	0.513	-0.006
FoodProcess	-1.051	-2.233	-1.432	-2.28
TannFishing	1.516	4.959	1.265	0.153
LeatherInd	1.739	5.242	1.501	0.43
Baling	7.198	21.699	-0.595	-1.591
JuteFabricat	4.927	5.62	-0.515	-0.703
YarnIndustry	0.982	1.385	0.821	0.354
ClothMill	2.727	5.348	3.074	2.284

HandloomClot	-0.375	-0.497	0.253	-0.141
DyeingBlech	-0.222	-0.36	0.294	-0.325
RMG	4.853	8.128	5.37	4.72
Knitting	5.41	9.092	8.809	8.137
ToiletrieMfg	2.448	5.828	10.56	9.555
CigaretInd	0.108	0.807	0.691	-0.709
BidiIndustry	0.01	0.035	0.458	-0.689
SawPlane	0.075	0.18	0.266	-0.669
Furniturind	0.456	1.093	0.56	-0.378
PaperInd	-0.64	-2.206	-2.46	-3.579
PrintPub	0.432	0.699	-0.17	-0.781
PharmaMfg	0.315	0.728	0.512	-0.402
FertiliseInd	0.649	2.852	3.469	2.193
BasiChemical	0.356	0.776	-0.884	-1.742
PetroleumRef	-2.805	-12.506	-7.013	-8.205
EarthwareInd	0.05	0.223	-0.775	-2.014
ChemicalInd	-0.366	-1.164	-0.279	-1.381
GlassInd	-1.996	-3.888	-4.202	-4.966
ClayInd	0.116	0.269	0.994	0.07
CementMfg	-2.198	-6.282	-4.938	-5.953
BasicMetaMfg	-0.363	-0.723	-0.526	-1.326
MetalMfg	-0.635	-1.285	-0.59	-1.403
MachineEquip	-0.729	-1.083	-3.497	-4.007
TranspoEquip	-0.205	-0.792	-0.936	-2.117
MiscellaInd	1.554	4.145	5.049	4.01
Urbanbuild	0.183	0.51	1.152	0.112
RuralBuild	0.06	0.198	1.068	-0.062
PPlantBuild	-0.011	-0.052	1.155	-0.124
RuRoadBuild	-0.015	-0.044	1.124	0.059
PoRoadBuild	0.406	0.692	1.114	0.446
CaDyothBuild	-0.013	-0.022	1.115	0.416
ElectWatGene	0.292	1.294	0.764	-0.486
GasExtDist	-0.145	-0.503	0.405	-0.745
MinQuarring	-0.164	-0.376	-0.048	-0.817
WholeTrade	0.622	1.433	1.024	0.111
RetailTrade	0.534	1.235	1.01	0.094
AirTransport	1.435	2.231	1.104	0.533

WatTransport	2.981	11.627	1.274	0.099
LanTransport	0.579	1.789	1.073	-0.019
RaiTransport	0.629	0.765	1.016	0.729
OthTransport	1.905	3.717	0.707	-0.067
HousingServ	0.027	0.341	0.505	-0.981
HealthServ	0.116	0.244	0.551	-0.295
EducatServ	-0.013	-0.015	0.196	-0.062
PubAdDefence	5.325	6.605	1.221	0.922
BanInsRestat	0.713	1.128	0.569	-0.021
ProfesioServ	0.893	2.359	0.667	-0.329
HotelRest	0.258	0.493	0.479	-0.288
Entertainmen	0.057	0.109	0.238	-0.527
Communicatio	1.866	3.655	0.506	-0.269
OthServices	0.201	0.243	0.096	-0.184
InfotechEcom	1.427	2.783	0.551	-0.225

Fan decomposition⁸ reveals that both in the short run and long run for majority of the industries, a substitution from domestic goods to a cheaper import variety have led the contraction of their outputs. For other industries such as wheat, other grain, sugarcane cultivation, oilseed cultivation, tea product, handloom cloth and dyeing and bleaching, their shrinking local market effects have contributed to marginal decline in their output whereas for medicines, fertilizer insecticides, chemical products and cement industry, increased import penetration contributed to their decline in output.

On the contrary, the industries, which were less protected before are able to expand their output. In the short run, among agricultural industries, the expanding sectors are jute cultivation, tea cultivation and shrimp farming whereas in the manufacturing sector, readymade garments, knitting, balling, jute fabricate, toiletries, cloth milling, leather industries are the largest winner because of trade liberalisation. The Fan decomposition shows that for most of the expanding manufacturing and agricultural industries, it is the increase in exports which has led this expansion. A decomposition analysis of output price with AnalyseGE (Horridge, Harrison et al.

⁸ The Fan decomposition shows how the change in demand for a locally produced commodity may be split between 1) local market effects –overall increase in local demand; 2) Domestic share effect- Replacement of imported by domestic goods; and 3) Export effect- An increase in exports.

2004)⁹ shows that decrease in the prices of material inputs and the reduction in labour cost have contributed to the significant expansion of the above mentioned export industries. Further, some export oriented industries have reaped the benefit of cheaper inputs such as cheaper fish import has expanded fish process industry where it uses 89 per cent of imported fish. Similarly, increased imports of mill cloth have contributed to expansion in readymade garment industry where 70 percent of mill cloths are used. Along with the expansion of agricultural and manufacturing industries, service sectors also expand because of tariff liberalisation. Transport industries such as water transport, air transport, wholesale trade, retail trade, and public administration defense and communication sectors expand in the short run. Expansions in agricultural and manufacturing sectors have contributed mostly to the expansion of these service sectors.

Similar to short run, in the long run imports are higher for fruit cultivation, spice cultivation, tea product, fish seafood followed by sugarcane, china pottery, process food, milk fat and leather products. However, the increase is greater in the long run compared to the short run. As a result, oil industry, food process, paper industry, petroleum refinery, glass industry, and cement mfg have shown contractions as a result of cheaper import (Table-2). As in the short run, Fan decomposition reveals that these commodities were mainly directed to final consumption. Our simulation result also shows tariff simulation has increased real wage (3.243) and decreased the cost of using capital (-1.295). This increase in real wage can be directly traced as a result of the increased demand for labour for the labour intensive sectors. Since the use of capital in production is more attractive relative to labour, industries that are able to take advantage of the cheaper effective cost of capital are able to expand. As a result, positive output effects of manufacturing industries have become more pronounced in the long run compared in the short run. The industries which expanded in the short run expanded further in the long run. As for example, readymade garment, knitting, toiletries, miscellaneous industries and the shrimp farming are the largest winner in the long run. The rate of increase in the output levels is higher in the long run than in the short run. Increased employment of capital and hence increased investment has contributed to this expanded output in the long run.

⁹ AnalyseGE is a software tool that provides modeler a “point and click” access of the model equations, the data and the simulation results. By quickly moving between these information sources modeler can explain the main mechanism of simulation results.

As opposed to the short run, in the long run jute fabrication and baling industries are expected to contract. Among the agricultural products, it is the contraction of jute output which has led to contraction of these industries. A decomposition analysis by AnalyseGE reveals that increased average input cost, especially increased in the labour cost, has contributed to its production. A decreased output also contributed to decreased volume of exports in the long run compared to the short run. However, in the long run, some domestic agricultural industries such as paddy, wheat, other grain and pulse cultivation have experienced positive gains. Sales decomposition analysis shows that for these commodities intermediate demand increases significantly, both for domestic and imported commodities. Increased output of these commodities have in turn helped increasing output of rice milling and grain milling as they are the main users of these commodities.

Along with the expansion of most agricultural and manufacturing industries many service sectors also experience output gains. Except mining and quarrying, all service sectors have shown positive responses in the long run. This may be the result of increased output for both agricultural and industrial industries which increases activity in wholesale trading, retail trading as well as in other services.

4.2.3 Effects on Households:

4.2.3.1 Employment Effects:

As shown earlier, tariff elimination induces reduction in import prices which are passed on to domestic producers and consumers prices. This in turn changes factor prices. Simulation results show (Table 3) in the short run that the decrease in wage rate is greater than the decrease in rental rates of capital. This induces producers to increase the demand for labour categories due to slack labour market. In the long run, aggregate employment is held fixed but labour is allowed to move between sectors. As expected, the results indicate that labour moves from contracting sectors to expanding sectors. As a result, nominal return to labour increased by 1.955 percent however, rental rate of capital decline by 1.295 per cent (Table 3). Table 4 shows that among occupational labour categories, the female low skill categories gain most in the short run followed by male high skill category.

Table 3: Factor prices in the short run and long run

	Short run	Long run
P1lab_i	-3.607	1.955
P1cap_i	-1.240	-1.295
P1lnd_i	-3.532	0.994

Our database for Wage Bill Matrix shows that in most expanding readymade garments and knitting sector female low skilled category constitutes about 63 percent followed by low skilled male category which constitute about 26 per cent. As a result, female low skilled experienced a higher employment. Male low skilled are highly concentrated in the contracting paddy sector (about 87 per cent), however, the decreased unemployment has been offset by the increased employment in expanding service sectors such as urban building, rural building, whole sale trade, retail trade, land transport and other transport.

Table 4: Employment by Occupation

Occupational Group	Short run	Long run
Male low skilled	1.182	-0.154
Male high skilled	1.811	0.019
Female low skilled	2.531	0.991
Female high skilled	1.089	0.142

In the long run, unskilled female category benefited most whereas the benefit to high skilled male is marginal. The worst case is for male low skilled where their employment has decreased by 0.154 per cent. Our simulation result shows that in the long run employment in these industries have seriously contracted, where they substitute cheap capital instead of expensive labour. (Table 2). As a result, this labour category experienced a contraction in employment.

4.2.3.2 Consumption Effects:

Tariff removal has decreased the prices of imports which has led the aggregate consumption price index to decline by 3.607 per cent in the short run and 1.247 per cent in the long run. However, across the households, the variation in the drop in consumer prices is not uniform. In the short run, the highest drop is seen in urban high educated household (-3.637) and Illiterate household (-3.625) followed by Non agricultural household (-3.615) where as in rural areas for landless household, the decreases in CPI is 3.610 followed by marginal farmer household and small farmer household. The same pattern is also seen in the long run. Thus tariff liberalization benefited those households groups whose consumer basket is dominated by goods with declining prices as a result of the tariff reform. Table 5 shows the comparative households results on prices, and nominal and real consumption for various household groups. On average, in the long run, nominal consumption declines for all household groups; the landless is the most affected group. The results change significantly when these are expressed in real terms.

Table 5: Households consumption effects

Household groups	Consumer prices		Long run	
	short run	long run	Nominal consumption	Real consumption
Landless HH	-3.610	-1.211	-0.879	0.337
Marginal farmer HH	-3.593	-1.191	-0.819	0.377
Small farmer HH	-3.588	-1.193	-0.719	0.480
Large farmer HH	-3.560	-1.182	-0.665	0.523
Non-agricultural HH	-3.615	-1.241	-0.561	0.689
Illiterate HH	-3.625	-1.270	-0.868	0.407
Low educated HH	-3.615	-1.282	-0.764	0.524
Medium educated HH	-3.599	-1.299	-0.576	0.733
High educated HH	-3.637	-1.324	-0.340	0.997

The relatively larger reduction in consumer prices offset the overall decline in the nominal consumption. In the long run, real consumption has increased for all the household groups. This implies that tariff reduction has welfare enhancing impact on households. However, the increase

is more prevalent in urban households groups. Rural landless achieve the least. This also means that policy change benefits urban rich more than the rural poor. Our simulation results show that trade liberalisation brings the largest price falls in fruit cultivation, tobacco, milk fat, fish seafood, tea product, process food, wooden furniture, petroleum products, china pottery, cement, fabricated metal products and transport equipments. Consumption shares for different commodities by households groups (Appendix Table 3) confirm that these products contribute more to the expenditure baskets of urban households than rural households. As a result, the real effect is greater on urban groups than on rural groups.

5. Conclusion:

In the Bangladesh economy, removal of tariff could increase domestic production, raise employment and enhance exports both in the short run and in the long run. The sectors with initial high protection rates tend to loose while the export oriented labour intensive manufacturing and agricultural sectors turned to be the biggest winners. Capital availability has made the output and employment impacts more pronounced in the long run compare to short run. Expansion of service sectors have become a regular phenomenon both in short run and long run. Female low skilled category gained most both in the short run and long run which is the result of expanding export oriented readymade garments and knitting industry. Real consumption of households has increased for all household groups in the long run mainly because of the decline in consumer prices of food and manufacturing products, indicating welfare gains of tariff liberalisation. However, the increase is more for urban households as compared to ruralones.

References

Ahmed, S. and Z. Sattar (2004). "Trade Liberalisation, Growth and Poverty Reduction: The case of Bangladesh." Washington, D.C, World Bank.

Dimaranan, B. V. (2001). "The GTAP 6 Data Base." Centre for Global Trade Analysis, Purdue University.

Dixon, P. B., P. B. R, et al. (1982). ORANI:A Multisectoral Model of the Australian Economy, North-Holland Publishing Company, Amsterdam, New York.

GOB (2003). "Social Accounting Matrix 2000 for Bangladesh." General Economic Division, Sustainable Human Development Unit, Planning Commission, Bangladesh.

GOB (2006). "Bangladesh Economic Review." Economic Advisor's Wing, Finance Division, Ministry of Finance.

GOB (2003). "An Input-Output Table for Bangladesh Economy 2000." General Economic Division, Sustainable Human Development Unit, Planning Commission, Bangladesh

Harrison, W. J. and K. R. Pearson (1996). ""Computing Solutions for Large general Equilibrium Models Using GEMPACK"." Computational Economics Springer, Vol.9(May, 2): 83-127.

Horrige, M. (2003). "ORANI-G:A General Single-Country Computable General Equilibrium Model." Edition prepared for the Practical GE Modelling Course, June 23-27, Centre of Policy Studies and Impact Project, Monash University, Australia.

Horrige, M. (2006). "ORANI-G: A Generic Single-Country Computable General Equilibrium Model." Edition prepared for the Practical GE Modelling Courses, held in Hunan, Sao Paulo and Melbourne, Centre of Policy Studies and Impact Project, Monash University, Australia.

Horrige, M. (2004). "Multiple Households version of ORANIG03"
" Centre of Policy Studies and Impact Project, Monash University, Australia. **Available at**
[:http://www.monash.edu.au/policy/oranig.htm](http://www.monash.edu.au/policy/oranig.htm).

Horrige, M., W. J. Harrison, et al. (2004). "Using analyseGE to examine an ORANI-G tariff cut simulation." Centre of Policy Studies and Impact Project, Monash University, Australia.

IFS "International Financial Statistics." International Monetary Fund (various issues).

Appendix

Table 1: Base data-Tariff rates, Export share and Import shares.

Commodity	EXPSHR	IMPSHR	TARFRATE
1 Paddy	0	0	0
2 Wheat	0	0.3416	0.0321
3 Othergrain	0	0.0067	0
4 JuteCultiv	0.1966	0	0
5 SugcaneCulti	0	0	0
6 PotatoCulti	0	0.0033	0.05
7 VegCulti	0.0324	0.2754	0.038
8 PulseCulti	0	0	0
9 OilseedCulti	0	0.3034	0.0467
10 FruitCulti	0	0.0691	0.2107
11 CottonCulti	0	0.6579	0
12 TobaccoCulti	0.0283	0.174	0.1075
13 TeaCulti	0.4493	0	0
14 SpiceCulti	0	0.1146	0.2317
15 OthcropCulti	0.003	0.104	0.0268
16 Meat	0	0.0264	0.0005
17 MilkFat	0	0.509	0.316
18 Animaldraft	0	0.0161	0.003
19 Manure	0	0.0159	0
20 HidesSkins	0	0.0224	0.0061
21 PoultryMeat	0	0.0103	0
22 PoutryEggs	0	0.0043	0.1014
23 Shrimp	0.3487	0	0
24 Fish	0	0.0001	0.1137
25 Forestry	0	0.0005	0.0797
26 RiceflorBran	0	0.0184	0.0159
27 FlourBrafeed	0	0.0121	0.1184
28 FishSeafood	0.0955	0.0337	0.1616
29 EdiNoedOil	0	0.508	0.0585
30 SugGuMolass	0	0.0552	0.1818
31 TeaProduct	0	0.0124	0.2049
32 Salt	0	0.0275	0.1142

33 ProcessFood	0	0.1095	0.1724
34 TaningLethr	0	0.0003	0.0161
35 LethrProdt	0.3465	0.0084	0.1441
36 Baling	0	0	0
37 JuteProduct	0.5611	0.0003	0.0968
38 Yarn	0	0.317	0.0337
39 MillCloth	0	0.2902	0.0192
40 HandlmCloth	0	0	0
41 DyeingBlech	0	0.0293	0
42 RMG	0.7585	0.3885	0.0044
43 Knitting	0.7529	0.0629	0.0777
44 ToiletrieMfg	0.2532	0.2089	0.121
45 CigaretteInd	0	0.0093	0.0204
46 BidiIndustry	0	0	0
47 BasicWProdt	0	0.0282	0.1761
48 WoodnFur	0	0.0082	0.2332
49 PulpPaBoard	0	0.4229	0.0734
50 PrintPub	0	0.1276	0.0306
51 Medicines	0	0.2584	0.0115
52 FertzInsec	0.224	0.45	0.0093
53 Chemicals	0	0.7946	0.0851
54 PetroProduct	0.0198	0.6111	0.2443
55 Chinapottery	0.064	0.0906	0.2675
56 ChemProdt	0	0.5213	0.0482
57 GlassProdt	0	0.6466	0.1667
58 BricTCProdt	0	0.0223	0.0762
59 Cement	0	0.6736	0.1663
60 IronStBasic	0	0.3574	0.0534
61 FabMetProdt	0	0.2877	0.153
62 Machinery	0.0266	0.7108	0.0589
63 TransEquipmt	0	0.4779	0.0885
64 MiscellaInd	0.4618	0.5042	0.0672
65 UrbanBuild	0	0	0
66 RuralBuild	0	0	0
67 BldgMantence	0	0	0
68 PlantConst	0	0	0
69 RuRoads	0	0	0

70 PortAirRlwy	0	0	0
71 CaDyothBuild	0	0	0
72 InfrastrMtn	0	0	0
73 ElectWater	0	0	0
74 GasExtDist	0	0.022	0.0734
75 MinQuarring	0	0.1001	0.0798
76 WholeTrade	0	0	0
77 RetailTrade	0	0	0
78 AirTransport	0.0411	0	0
79 WatTransport	0.1242	0	0
80 LanTransport	0	0	0
81 RaiTransport	0	0	0
82 Warehousing	0	0	0
83 HousingServ	0	0	0
84 HeathServ	0	0	0
85 EducatServ	0	0	0
86 PubAdDefence	0.2513	0.0413	0
87 BanInsurance	0.0146	0.0201	0
88 ProfesioServ	0.0208	0.0141	0
89 HotelRest	0	0	0
90 Entertainmen	0.001	0.0003	0
91 Communica	0.1276	0.0213	0
92 Othservices	0	0	0
93 InfTechServ	0.0356	0.0158	0
94 Waste	0	0.7168	0.0705
Total	5.2385	12.692	5.158

Table 2: Sales structure of imported commodities

Commodity	Short run				Long run			Government
	Intermediate	Investment	House hold	Government	Intermediate	Investment	House hold	
1 Paddy	0	0	0	0	0	0	0	0
2 Wheat	85.158	0	0	0	85.158	0	0	0
3 Othergrain	0.0102	0	0	0	0.0102	0	0	0
4 JuteCultiv	0	0	0	0	0	0	0	0
5 SugcaneCulti	0	0	0	0	0	0	0	0
6 PotatoCulti	0.866	0	3.6538	0	0.866	0	3.6538	0
7 VegCulti	14.6919	0	302.5171	0	14.6919	0	302.5171	0
8 PulseCulti	0	0	0	0	0	0	0	0
9 OilseedCulti	-42.4663	0	0	0	-42.4663	0	0	0
10 FruitCulti	54.6003	0	607.7607	0	54.6003	0	607.7607	0
11 CottonCulti	23.9726	0	0	0	23.9726	0	0	0
12 TobaccoCulti	31.9301	0	12.4495	0	31.9301	0	12.4495	0
13 TeaCulti	0	0	0	0	0	0	0	0
14 SpiceCulti	30.2662	0	153.0092	0	30.2662	0	153.0092	0
15 OthcropCulti	39.3374	0	69.0956	0	39.3374	0	69.0956	0
16 Meat	29.4395	9.4154	0.5057	0	29.4395	9.4154	0.5057	0
17 MilkFat	16.2915	0	747.3499	0	16.2915	0	747.3499	0
18 Animaldraft	-6.435	0	0	0	-6.435	0	0	0
19 Manure	-3.8718	0	0	0	-3.8718	0	0	0
20 HidesSkins	14.039	0	0	0	14.039	0	0	0
21 PoultryMeat	-0.0716	0	-0.8518	0	-0.0716	0	-0.8518	0
22 PoutryEggs	1.1949	0	9.4222	0	1.1949	0	9.4222	0
23 Shrimp	0	0	0	0	0	0	0	0
24 Fish	0.4859	0	4.5576	0	0.4859	0	4.5576	0
25 Forestry	1.8124	1.9683	0.8378	0	1.8124	1.9683	0.8378	0
26 RiceflorBran	10.1711	0	137.7563	0	10.1711	0	137.7563	0
27 FlourBrafeed	46.2842	0	10.7895	0	46.2842	0	10.7895	0
28 FishSeafood	10.6762	0	174.0471	0	10.6762	0	174.0471	0
29 EdiNoedOil	472.6918	0	594.2473	0	472.6918	0	594.2473	0
30 SugGuMolass	10.723	0	569.4907	0	10.723	0	569.4907	0
31 TeaProduct	1.3018	0	12.3064	0	1.3018	0	12.3064	0
32 Salt	0.1195	0	0	0	0.1195	0	0	0
33 ProcessFood	46.0732	0	494.9099	0	46.0732	0	494.9099	0
34 TaningLethr	0.2367	0	0	0	0.2367	0	0	0
35 LethrProdt	1.6661	0	27.1418	0	1.6661	0	27.1418	0
36 Baling	0	0	0	0	0	0	0	0
37 JuteProduct	0.0215	0	0.3871	0	0.0215	0	0.3871	0
38 Yarn	512.9019	0	0	0	512.9019	0	0	0
39 MillCloth	206.8199	0	0	0	206.8199	0	0	0
40 HandlmCloth	0	0	0	0	0	0	0	0
41 DyeingBlech	0.3204	0	0	0	0.3204	0	0	0
42 RMG	46.1049	0	11.33	0	46.1049	0	11.33	0
43 Knitting	9.1406	0	4.9347	0	9.1406	0	4.9347	0
44 ToiletrieMfg	27.809	0	118.0825	0	27.809	0	118.0825	0
45 Cigarettlnd	0.0245	0	0.0654	0	0.0245	0	0.0654	0

46 BidIndustry	0	0	0	0	0	0	0	0
47 BasicWProdt	1.1809	0	0	0	1.1809	0	0	0
48 WoodnFur	0.2475	0	2.1904	0	0.2475	0	2.1904	0
49 PulpPaBoard	307.0362	0	88.2678	0	307.0362	0	88.2678	0
50 PrintPub	24.9394	0	0	0	24.9394	0	0	0
51 Medicines	2.0198	0	27.4149	0	2.0198	0	27.4149	0
52 FertzInsec	6.8709	0	0.8581	0	6.8709	0	0.8581	0
53 Chemicals	136.2397	0	0	0	136.2397	0	0	0
54 PetroProduct	1156.2866	0	1385.973	0	1156.2866	0	1385.973	0
55 Chinapottery	53.392	0	103.7666	0	53.392	0	103.7666	0
56 ChemProdt	3.1044	0	29.733	0	3.1044	0	29.733	0
57 GlassProdt	1.6862	0	259.1806	0	1.6862	0	259.1806	0
58 BricTCProdt	2.1562	0	0	0	2.1562	0	0	0
59 Cement	280.3798	0	0	0	280.3798	0	0	0
60 IronStBasic	91.5427	0	0	0	91.5427	0	0	0
61 FabMetProdt	37.5117	0	867.5758	0	37.5117	0	867.5758	0
62 Machinery	980.0635	744.0771	156.9542	0	980.0635	744.0771	156.9542	0
63 TransEquipmt	58.5243	519.1638	0	0	58.5243	519.1638	0	0
64 MiscellaInd	418.3527	0	12.7366	0	418.3527	0	12.7366	0
65 UrbanBuild	0	0	0	0	0	0	0	0
66 RuralBuild	0	0	0	0	0	0	0	0
67 BldgMantence	0	0	0	0	0	0	0	0
68 PlantConst	0	0	0	0	0	0	0	0
69 RuRoads	0	0	0	0	0	0	0	0
70 PortAirRlwy	0	0	0	0	0	0	0	0
71 CaDyothBuild	0	0	0	0	0	0	0	0
72 InfrastrMtn	0	0	0	0	0	0	0	0
73 ElectWater	0	0	0	0	0	0	0	0
74 GasExtDist	0.1216	0	1.6125	0	0.1216	0	1.6125	0
75 MinQuarring	69.6879	0	59.6267	0	69.6879	0	59.6267	0
76 WholeTrade	0	0	0	0	0	0	0	0
77 RetailTrade	0	0	0	0	0	0	0	0
78 AirTransport	0	0	0	0	0	0	0	0
79 WatTransport	0	0	0	0	0	0	0	0
80 LanTransport	0	0	0	0	0	0	0	0
81 RaiTransport	0	0	0	0	0	0	0	0
82 Warehousing	0	0	0	0	0	0	0	0
83 HousingServ	0	0	0	0	0	0	0	0
84 HeathServ	0	0	0	0	0	0	0	0
85 EducatServ	0	0	0	0	0	0	0	0
86PubAdDefence	8.8823	0	0.7792	15.5246	8.8823	0	0.7792	15.5
87 BanInsurance	3.8305	0	2.3332	0	3.8305	0	2.3332	0
88 ProfesioServ	6.0683	0	-0.1194	0	6.0683	0	-0.1194	0
89 HotelRest	0	0	0	0	0	0	0	0
90 Entertainmen	0	0	-0.0178	0	0	0	-0.0178	0
91 Communica	0.8868	0	-0.0645	0	0.8868	0	-0.0645	0
92 Othservices	0	0	0	0	0	0	0	0
93 InfTechServ	0.1731	0	-0.0019	0	0.1731	0	-0.0019	0
94 Waste	0.4902	0	25.5336	0	0.4902	0	25.5336	0
Total	5346.0127	1274.6245	7090.129	15.5246	5346.0127	1274.625	7090.129	15.5

Table 3: Consumption shares for 94 commodities by Household groups

Commodity	Landless	Marginal	Small	Large	Nonagr	Illiterate	Loweredu	Mediumedu	High
1 Paddy	0	0	0	0	0	0	0	0	0
2 Wheat	0	0	0	0	0	0	0	0	0
3 Othergrain	0	0	0	0	0	0	0	0	0
4 JuteCultiv	0.54	0.56	0.58	0.71	0.59	0.5	0.63	0.79	0.85
5 SugcaneCulti	0.15	0.15	0.15	0.14	0.14	0.13	0.12	0.1	0.09
6 PotatoCulti	1.29	1.28	1.24	1.18	1.18	1.12	1.01	0.86	0.77
7 VegCulti	2.46	2.44	2.38	2.26	2.25	2.15	1.93	1.65	1.47
8 PulseCulti	1.6	1.59	1.55	1.47	1.47	1.4	1.26	1.07	0.96
9 OilseedCulti	0	0	0	0	0	0	0	0	0
10 FruitCulti	3.05	3.03	2.95	2.8	2.79	2.66	2.39	2.04	1.82
11 CottonCulti	0	0	0	0	0	0	0	0	0
12 TobaccoCulti	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02
13 TeaCulti	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
14 SpiceCulti	0.37	0.36	0.35	0.34	0.34	0.32	0.29	0.25	0.22
15 OthcropCulti	1.47	1.46	1.42	1.35	1.35	1.29	1.15	0.99	0.88
16 Meat	2.64	2.62	2.55	2.42	2.41	2.3	2.06	1.77	1.58
17 MilkFat	0.46	0.45	0.44	0.42	0.42	0.4	0.36	0.31	0.27
18 Animaldraft	0	0	0	0	0	0	0	0	0
19 Manure	0	0	0	0	0	0	0	0	0
20 HidesSkins	0	0	0	0	0	0	0	0	0
21 PoultryMeat	1.23	1.22	1.19	1.13	1.13	1.08	0.97	0.83	0.74
22 PoutryEggs	1.43	1.42	1.38	1.31	1.31	1.25	1.12	0.96	0.85
23 Shrimp	1.21	1.2	1.17	1.11	1.1	1.05	0.95	0.81	0.72
24 Fish	17.1	16.98	16.53	15.69	15.65	14.93	13.39	11.46	10.2
25 Forestry	0.85	0.75	0.75	0.64	0.96	1.16	1.19	1.23	1.39
26 RiceflorBran	26.16	25.98	25.29	24	23.94	22.84	20.49	17.53	15.6
27 FlourBrafeed	1.62	1.61	1.57	1.49	1.48	1.41	1.27	1.09	0.97
28 FishSeafood	0.7	0.69	0.67	0.64	0.64	0.61	0.55	0.47	0.42
29 EdiNoedOil	2.5	2.48	2.42	2.3	2.29	2.18	1.96	1.68	1.49
30 SugGuMolass	3.62	3.59	3.5	3.32	3.31	3.16	2.84	2.43	2.16
31 TeaProduct	0.21	0.18	0.2	0.18	0.25	0.3	0.29	0.21	0.21
32 Salt	0	0	0	0	0	0	0	0	0
33 ProcessFood	1.79	1.77	1.73	1.64	1.63	1.56	1.4	1.2	1.07

34 TaningLethr	0	0	0	0	0	0	0	0	0
35 LethrProdt	1.71	1.7	1.83	1.98	1.88	1.72	1.85	1.92	1.71
36 Baling	0	0	0	0	0	0	0	0	0
37 JuteProduct	0.9	0.94	0.97	1.19	0.98	0.84	1.06	1.32	1.42
38 Yarn	0	0	0	0	0	0	0	0	0
39 MillCloth	0	0	0	0	0	0	0	0	0
40 HandlmCloth	3.41	3.39	3.63	3.93	3.75	3.42	3.67	3.82	3.41
41 DyeingBlech	0	0	0	0	0	0	0	0	0
42 RMG	0.38	0.38	0.41	0.44	0.42	0.38	0.41	0.43	0.38
43 Knitting	0.09	0.09	0.1	0.11	0.1	0.09	0.1	0.1	0.09
44 ToiletrieMfg	0.39	0.42	0.4	0.49	0.42	0.38	0.42	0.51	0.48
45 CigaretInd	0.57	0.49	0.53	0.49	0.67	0.8	0.77	0.56	0.56
46 BidiIndustry	0.12	0.1	0.11	0.1	0.14	0.17	0.16	0.12	0.12
47 BasicWProdt	0	0	0	0	0	0	0	0	0
48 WoodnFur	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02
49 PulpPaBoard	0.16	0.17	0.18	0.22	0.18	0.15	0.19	0.24	0.26
50 PrintPub	0	0	0	0	0	0	0	0	0
51 Medicines	0.43	0.47	0.45	0.54	0.47	0.42	0.46	0.57	0.53
52 FertzterInsec	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
53 Chemicals	0	0	0	0	0	0	0	0	0
54 PetroProduct	0.87	0.76	0.77	0.65	0.98	1.19	1.22	1.26	1.42
55 Chinapottery	0.27	0.29	0.3	0.36	0.3	0.26	0.32	0.4	0.44
56 ChemProdt	0.21	0.22	0.21	0.26	0.22	0.2	0.22	0.27	0.25
57 GlassProdt	0.19	0.2	0.21	0.25	0.21	0.18	0.23	0.28	0.3
58 BricTCPProdt	0	0	0	0	0	0	0	0	0
59 Cement	0	0	0	0	0	0	0	0	0
60 IronStBasic	0	0	0	0	0	0	0	0	0
61 FabMetProdt	1.31	1.37	1.42	1.74	1.43	1.22	1.55	1.93	2.08
62 Machinery	0.57	0.6	0.62	0.76	0.62	0.53	0.67	0.84	0.91
63 TransEquipmt	0	0	0	0	0	0	0	0	0
64 MiscellaInd	0.03	0.03	0.03	0.04	0.04	0.03	0.04	0.05	0.05
65 UrbanBuild	0	0	0	0	0	0	0	0	0
66 RuralBuild	0	0	0	0	0	0	0	0	0
67 BldgMantence	0	0	0	0	0	0	0	0	0
68 PlantConst	0	0	0	0	0	0	0	0	0
69 RuRoads	0	0	0	0	0	0	0	0	0

70 PortAirRlwy	0	0	0	0	0	0	0	0	0
71 CaDyothBuild	0	0	0	0	0	0	0	0	0
72 InfrastrMtn	0	0	0	0	0	0	0	0	0
73 ElectWater	0.76	0.67	0.68	0.58	0.86	1.05	1.07	1.11	1.25
74 GasExtDist	0.09	0.08	0.08	0.07	0.1	0.12	0.13	0.13	0.15
75 MinQuarring	0.61	0.53	0.54	0.46	0.69	0.83	0.85	0.88	1
76 WholeTrade	0	0	0	0	0	0	0	0	0
77 RetailTrade	0	0	0	0	0	0	0	0	0
78 AirTransport	0.04	0.04	0.05	0.06	0.06	0.05	0.06	0.08	0.08
79 WatTransport	0.05	0.05	0.06	0.08	0.08	0.07	0.08	0.1	0.11
80 LanTransport	0.72	0.78	0.95	1.21	1.27	1.11	1.29	1.61	1.71
81 RaiTransport	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
82 Warehousing	0.13	0.14	0.17	0.22	0.23	0.2	0.23	0.29	0.31
83 HousingServ	3.82	4.15	4.53	4.73	5.29	9.35	11.5	15.27	16.96
84 HeathServ	0.45	0.51	0.45	0.53	0.49	0.46	0.43	0.52	0.36
85 EducatServ	0.53	1.03	1.39	1.93	1.66	1.31	2.59	4.45	6.99
86 PubAdDefence	0.21	0.22	0.23	0.28	0.23	0.2	0.25	0.31	0.33
87 BanInsurance	0.31	0.31	0.32	0.38	0.34	0.32	0.37	0.42	0.45
88 ProfesioServ	1.17	1.18	1.22	1.44	1.29	1.2	1.41	1.6	1.71
89 HotelRest	2.1	1.8	1.93	1.79	2.47	2.92	2.81	2.04	2.06
90 Entertainmen	0.9	0.91	0.94	1.11	1	0.92	1.09	1.23	1.32
91 Communica	0.62	0.65	0.67	0.83	0.68	0.58	0.74	0.92	0.99
92 Othservices	3.22	3.24	3.38	3.96	3.57	3.3	3.9	4.41	4.71
93 InfTechServ	0.09	0.09	0.1	0.12	0.1	0.08	0.1	0.13	0.14
94 Waste	0.06	0.06	0.06	0.07	0.06	0.06	0.07	0.08	0.08
Total	100	100	100	100	100	100	100	100	100