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ABSTRACT

This paper explores the effects of tariff reduction on macroeconomic indicators and sectoral output in Bangladesh using a computable general equilibrium approach. The simulation results indicate that a reduction in all tariffs expands gross domestic product and generates employment, which suggests that tariff cuts have a short-run stimulatory effect on economic growth. The industries that experience the greatest positive effects on their output and employment are export-oriented industries. There are also positive effects on the suppliers to these industries. Lightly-protected industries that rely heavily on imported intermediate inputs exhibit robust expansion, benefiting from a cost reduction as a result of the removal of protection. However, highly-protected, import-competing industries suffer a contraction in output and employment as they face increased competition from imports due to the liberalisation of trade.

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I.   INTRODUCTION

There has been much recent debate among economists about the effects of trade liberalisation on economic performance in the developing countries. There is support for the view that trade liberalisation, or decline in protection, leads to faster economic growth and poverty reduction in poor countries (Dollar and Kraay, 2001; World Bank, 2002). On the other hand, there are also studies that have expressed pessimism and found little evidence to support a link between trade liberalisation and economic growth (Grossman and Helpman, 1991; Rodriguez and Rodrik, 2000). Yanikkaya (2002) examined the relationship between import duties and growth for 80 developed and developing countries including Bangladesh over the period of 1970–1997 and showed that trade barriers in the form of tariffs can actually be beneficial for economic growth, especially for developing countries. In view of the above paradoxical findings, it may be worthwhile to re-examine the relationship between tariff cut and economic performance in the context of Bangladesh, which is one of the world's poorest countries where trade policies were dramatically liberalised in the early 1990s.

After gaining independence in 1971, Bangladesh, like other South Asian neighbours, adopted an inward looking import-substitution growth strategy. This was supported by a number of protective and concessionary measures, namely, quantitative restrictions, restricted import licensing, differentiated and high rates

of nominal tariffs, an overvalued domestic currency and subsidised loans to traded goods sectors. These distorted incentives led to allocative and productive inefficiencies and created an anti-export bias. As a result, the economy experienced a low growth rate: gross domestic product (GDP) only grew at an average annual rate of 2.5% between 1970 and 1980 (World Bank, 1991). This prompted policy makers to introduce reforms towards a free market economy and export-led industrialisation in the early 1980s. These reform efforts were subsequently merged into Structural Adjustment Policies in 1986. The reform package included fiscal reform, trade liberalisation, restructuring of the financial sector, exchange rate liberalisation, and reform and privatisation of state owned enterprises. In the early 1990s, trade, investment, financial, fiscal and foreign exchange regimes were further liberalised for the greater openness of the economy. During the 1990s, quantitative restrictions on imports were dramatically reduced (for example, the total number of quantitative restrictions for trade reasons came down from 179 to only 28 between 1990-91 and 1997-02) and the import-weighted average tariff rate was reduced from 24% in 1992-93 to less than 10% in 2001-02 (Fontana et al., 2003 and GOB, 2003a).

In this paper, we use a large-scale computable general equilibrium (CGE) model to undertake a counterfactual policy simulation to examine the short-run impact of tariff reduction on the Bangladesh economy. The remainder of the paper is organised as follows. A brief outline of the CGE model is given in Section II. Details of the simulation and results for macroeconomic variables and for output and employment by sector are discussed in Section III. Section IV provides concluding comments.

II. THEORETICAL STRUCTURE OF THE BANGLADESH CGE MODEL

The theoretical structure of the core CGE model of the Bangladesh economy developed in this paper is based closely on the Australian ORANI model. A complete description including the theoretical structure of the ORANI model is provided in Dixon et al. (1982). The Bangladesh model, like ORANI, is a single country comparative-static CGE model. It is consisting of 86 industries, 94 commodities and three primary factors of production: labour, capital and land. Its main characteristics are listed below:

Assumptions about production structure. (a) Producers are assumed to be price takers who choose their inputs to minimise the cost of producing any given level of output subject to a constant return to scale nested Leontief/constant elasticity of substitution (CES) production functions. CES functions allow substitution between: imported and domestic inputs; labour, capital and land; and occupations. (b) Production functions are assumed to be weakly separable. No substitution is allowed between primary factors and intermediate inputs or between intermediate inputs of different classes. (c) Substitution between imported and domestic inputs is modelled using Armington elasticities i.e., the Armington (1969) assumption that imports are imperfect substitutes for domestic supplies is adopted.

Assumptions about investment demands. (a) Investors are assumed to be price takers who minimise the cost of creating units of physical capital subject to nested CES production functions. (b) Aggregate investment is normally

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exogenous, but its industrial composition depends on the relative rates of return across industries.

Assumptions about household demands. (a) The representative household is assumed to maximise a nested Klein-Rubin/CES utility function subject to its aggregate budget constraints. (b) Substitution is allowed between commodities and between sources of commodities using a nested Linear Expenditure System (LES)-CES demand system.

Export demands. Export demands are modelled by dividing all commodities into two groups: traditional and non-traditional. For an individual traditional export commodity, foreign demand is inversely related to that commodity's price and for the remaining collective non-traditional export commodities; foreign demand is inversely related to the average price of all collective export commodities.

Government demands. The level and composition of government consumption is exogenously determined.

Prices. Zero-pure-profit conditions and constant returns to scale imply that basic values of outputs are functions only of input prices. Basic prices of imports are the landed-duty-paid domestic currency prices. Purchasers' prices are the sum of basic prices, sales taxes and trade and transport margins.

Market clearing. Commodity markets are assumed to clear. A common short-run assumption that real wage rates are fixed with labour in excess supply is adopted.

The model is solved using the GEMPACK (General Equilibrium Modelling PACKage) software, developed by the Centre of Policy Studies and the Impact Project, Monash University (Harrison and Pearson, 1996). The main source of information for this study is the 2000 input output table for Bangladesh (GOB, 2003b). The elasticity estimates used in this model are assigned on the basis of literature reviews.

III.   SIMULATION EXPERIMENT AND RESULTS

Simulation assumptions

A simulation, in which all tariffs in the year 2000 are completely removed, is carried out to assess the short-run economic impact of the tariff cuts in Bangladesh. The key assumptions underlying the particular simulation are:

- the simulation relates to the short run – current capital stocks in each industry are fixed, with rates of return to capital adjusting endogenously;

- real wages are fixed, with employment adjusting in each industry;

- real domestic absorption is exogenous – real household consumption, real investment, real government demands and real inventory demands are held fixed, allowing the trade balance to move; and

- finally, the nominal exchange rate is the numeraire.

Macroeconomic results

The results of some key macroeconomic variables for a 100% broad-based tariff cut simulation are shown in Table 1. The reduction in tariffs reduces the purchaser's prices of imported goods. This feeds into the consumer price index (CPI), which falls by 3.93%. With an assumption of fixed real consumer wages,

the percentage change in the price paid for labour is equal to the percentage change in the CPI. Thus, average nominal wage rate falls by 3.93%. However, the prices received by producers fall by less than this amount (the GDP at factor cost deflator falls by only 2.67%). With the GDP at factor cost deflator falling by 2.67% and nominal wages falling by 3.93%, the real producer wage falls, causing an increased demand for labour and hence, an increase in the level of aggregate employment. An increased level of aggregate employment leads to more output from industries and therefore, a higher aggregate output for the economy. With fixed capital stock, real GDP rises by a smaller percentage (0.77%) than employment (1.52%).

On the demand side of the economy, with fixed domestic absorption (real household consumption, government consumption and investment are held fixed), an increase in the real GDP must result in the trade balance moving toward surplus. Movements in the components of the international trade balance occur due to activity effects and relative price effects. Changes in domestic demand (with given prices) will tend to change the demand for imports – an activity effect. Hence with real GDP up, so too is the demand for imports (the aggregate import volume increases by 2.25%). The movement in the overall balance of trade towards surplus requires a change in international competitiveness (a change in domestic costs relative to foreign prices/costs in common currency terms) to induce an expansion in exports and to dampen the increase in imports. The nominal exchange rate is the numeraire, hence the improvement in international competitiveness is achieved by a fall in the domestic price level (the GDP deflator falls by 4.11%). This leads to a large

expansion in the aggregate export volume estimated at 8.32%. Taking exports and imports together, net exports (i.e. trade balance) improves significantly. The expansion in export volume causes the export price, and hence the terms of trade, to fall by 0.83%.

INSERT TABLE 1

Sectoral results

Table 2 shows the estimated effects of the tariff cut on output and employment of selected industries. The industries that are affected most favourably are jute fabrication (with an expansion in output of 6.80% and employment rises by 7.70%), baling (6.74% and 17.90%), knitting (5.16% and 8.39%), public administration and defence (4.81% and 5.90%) and ready made garments (4.74% and 7.69%). Except baling, all aforesaid industries are highly export-oriented: the share of exports in the database account for 83% (ready made garments), 74% (knitting), 37% (jute fabrication) and 25% (public administration and defence). In general, export-oriented industries exhibit robust expansion in output and employment results. The expansion in baling output can be explained by the fact that the majority of output in this industry is supplied to the jute fabrication industry, which expanded tremendously.

While most industries expand when the tariff is cut, there are some that contract. For instance, outputs in the glass industry, spice cultivation, fabricated metal product and cement manufacturing contract by 5.36%, 2.71%, 2.60% and 1.94%

respectively. These industries are in the import-competing sector, because of the removal of tariffs, they lose market-share to imports.

INSERT TABLE 2

IV. CONCLUSIONS

This paper presents a computable general equilibrium model of the Bangladesh economy to examine the effects of tariff cuts on macroeconomic indicators, as well as the effects on sectoral output and employment. In the short-run, a 100% broad-based tariff cut simulation is carried out. The simulation results indicate that a reduction in tariffs expands GDP and generates employment, which suggests that trade liberalisation has a short-run stimulatory effect on economic growth. The industries that experience the greatest positive effects on their output are the export-oriented industries. There are also positive effects on the suppliers to these industries. Lightly-protected industries that rely heavily on imported intermediate inputs exhibit robust expansion as they benefit from a cost reduction. On the other hand, highly-protected industries demonstrate contraction.

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Table 1. *Macroeconomic impacts of a 100% broad-based tariff cut*

Description	Percentage changes
Aggregate real household consumption	0
Aggregate real investment expenditure	0
Aggregate real government demands	0
Export volume	8.32
Import volume C.I.F.	2.25
Real GDP	0.77
Aggregate capital stock	0
Aggregate employment	1.52
GDP price index	-4.11
GDP at factor cost deflator	-2.67
Consumer price index (CPI)	-3.93
Exports price index, local currency	-0.83
Real devaluation	4.11
Average nominal wage	-3.93
Average real wage	0
Terms of trade	-0.83

Table 2: *Effect of tariff cut on output and employment of selected industries*

Selected industries	Output	Employment
Jute fabrication	6.80	7.70
Baling	6.74	17.90
Knitting	5.16	8.39
Public administration and defence	4.81	5.90
Ready made garments	4.74	7.69
Jute cultivation	4.17	6.15
Cloth milling	3.40	6.50
Shrimp farming	2.67	5.88
Rural road	2.18	6.31
Toiletries manufacturing	2.16	4.98
Tea cultivation	2.11	4.45
Warehousing	1.91	3.66
Port road railway building	1.74	2.96
Communication	1.60	3.08
Cement manufacturing	-1.94	-5.78
Fabricated metal product	-2.60	-5.28
Spice cultivation	-2.71	-6.20
Glass industry	-5.36	-10.65

Note: all figures are percentage changes.