Chapter 8

Socioeconomic Impacts of Graduation and Compensating Measures

8.1. Introduction and Background

Loss of LDC benefits analyzed in chapters 3 and 6 showed that the macroeconomic effects in terms of loss of export earnings, adverse effects on the balance of payment, external debt and debt servicing can be significant. These macroeconomic losses in turn will have important adverse effects on GDP growth, employment and poverty. Thus, it is important to assess the socio-economic implications of loss of international support measures on Bangladesh to ensure that appropriate mitigating measures are in place.

This chapter focuses attention on the potential adverse socio-economic effects of LDC graduation. A combination of quantitative techniques has been used to examine potential socio-economic impacts of LDC graduation. Partial equilibrium framework and reviews have been used to assess quantitatively the loss of international support measures. The estimated losses of international support measures have then been incorporated into a general equilibrium type modeling system to assess socio-economic impacts. It is important to note upfront that the focus of this chapter is on the socio-economic impact of losses from exports resulting from LDC graduation. As was shown in Chapter 3, export losses are the most significant shock that Bangladesh faces in the wake of the forthcoming LDC graduation. Other dynamic but non-quantifiable effects resulting from the loss of special treatment in the application of full range of WTO provisions discussed in detail in Chapter 3 are not considered here. Those costs in terms of full compliance with all WTO provisions are uncertain and not quantifiable but can be substantial. It is important that Bangladesh adopts relevant mitigating measures discussed in chapters 5, 6 and 7 to the fullest extent possible.

There are three widely used approaches to capture economy wide impacts: (i) fixed price multiplier model based on a input-output table or matrix (IOM); (ii) fixed price multiplier model using a social accounting matrix (SAM) – which is a super set of IOM encompassing activities, commodities, factors of production along with institution; and (iii) fixed price computable general equilibrium (CGE) model – invoking markets (e.g. product market and labour market etc.), behavioral specifications of all agents (e.g. producers and consumers etc.) and closure rules (e.g. defining how the accounts are balanced).

Two scenario simulations have been conducted. First simulation has been a business as usual (BAU) scenario where LDC graduation issue has not been considered. This is the same BAU described in detail in Chapter 5. In the second simulation loss of trade support measures has been considered. Economy-wide impact assessments have been conducted in two steps. First, the impact of loss of support measures on export earnings are considered using the partial equilibrium framework. In the second step, the estimated numerical support measure losses have been incorporated into SAM and CGE modeling systems to assess impacts on:

(i) sectoral prices

(ii) general price level

(iii) sectoral and total domestic output

(iv) sectoral GDP or value added

(v) government revenue and budget

(vi) employment and

(vii) poverty

The rest of the Chapter is composed of five more sections. Section 2 discusses methodology and data. Results of a partial equilibrium approach is presented in section 3 that essentially draws on the analysis done in Chapter 3 on the effects of LDC graduation on RMG exports. Socio-economic impact assessment based on a CGE model is discussed in the next section. Concluding observations are provided in the last section.

8.2. Methodology and Data

Two sets of methodologies have been used to assess the impact of LDC graduation in Bangladesh. First method belongs to a partial equilibrium approach where export loss due to LDC graduation is estimated and the second is a general equilibrium approach to assess the economy wide impacts of LDC graduation. The various components, and the insights they provide, are summarised in Box 8.1.

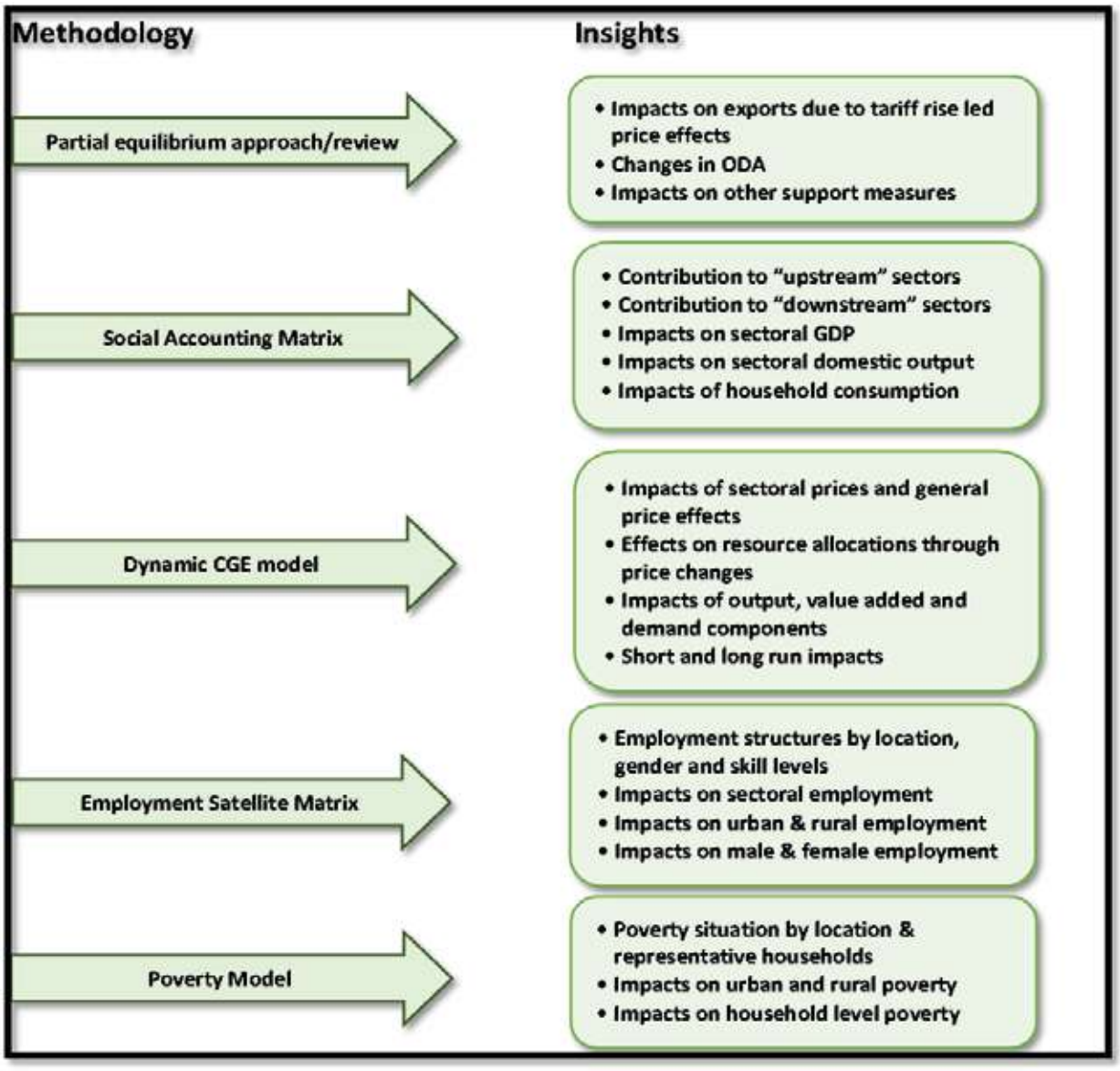
Partial Equilibrium Approach

In the approach a simulation model is used where export price impacts are calculated assuming various values of price elasticity. The commonwealth Secretariat in UK has proposed an analytical framework to study the potential implications of tariffs arising from LDC graduation for a graduating country's exports (Commonwealth Secretariat, 2018). The prescribed partial equilibrium model comprises two steps: first, it estimates the impact on exports due to price changes emanating from forgone tariff preferences in the destination market; second, it estimates the possible increase in demand for goods exported by non-graduates as they become more competitive relative to the graduating country in question.

The advantage of this model is its simplicity – the data requirements are minimum, and the simulation is quite simple. Being a partial equilibrium model means, it only uses one sector while disregarding its interactions with others – a feature that general equilibrium models captures. However, the Commonwealth framework provides a good basis for undertaking an initial assessment in identifying the potential trade-related effects. The potential impact of LDC graduation (or loss of preferences) in this model is transmitted through three ways:

- Price effects – an increase in the price of goods because of graduation which increases tariffs.
- This will result in the potential substitution between exports from graduates and non-graduates.
- The results are dependent on market share elasticities and therefore the extent of price sensitivities;

Box 8.1: Methodological Framework for Quantitative Impact Assessment



The Partial Equilibrium Model

The trade effect of LDC graduation (or tariff rise) can be estimated by comparing the unit price received by the preference-recipient country with that of the MFN exporters.

$$P_k^i = P_k^w (1 + m_k^i) \quad \text{or} \quad m_k^i = \frac{P_k^i}{P_k^w} - 1$$

Where, P_k^i is the unit price of product k received by country i (i.e. preference recipient) and P_k^w is the world unit price of the same product. It is assumed that markets are perfectly competitive and there is no product differentiation. The above equation can be expressed as:

$$P_k^i = P_k^w (1 + T_k^{MFN} - T_k^i) \text{ and } m_k^i = (T_k^{MFN} - T_k^i)$$

Where, T_k^{MFN} is ad valorem equivalent MFN tariff fo r product k and T_k^i is exported weighted - preferential tariff faced by country i. The percentage changes in exports as a result of changes in the price of exports is given by:

$$\frac{\Delta X}{X} = \frac{\Delta P}{P} + \varepsilon \frac{\Delta P}{P}\left[\frac{\Delta P}{P} + 1\right]$$

where X is exports and ε is price elasticity of demand for exports. The formula can be utilized to estimate the effect of abolishing tariff preferences resulting from LDC graduation. As a country graduate from the group of LDCs, its tariff preference regime changes as it would have to pay a higher tariff. The changes in export revenue as a result of graduation can be estimated from the equation below:

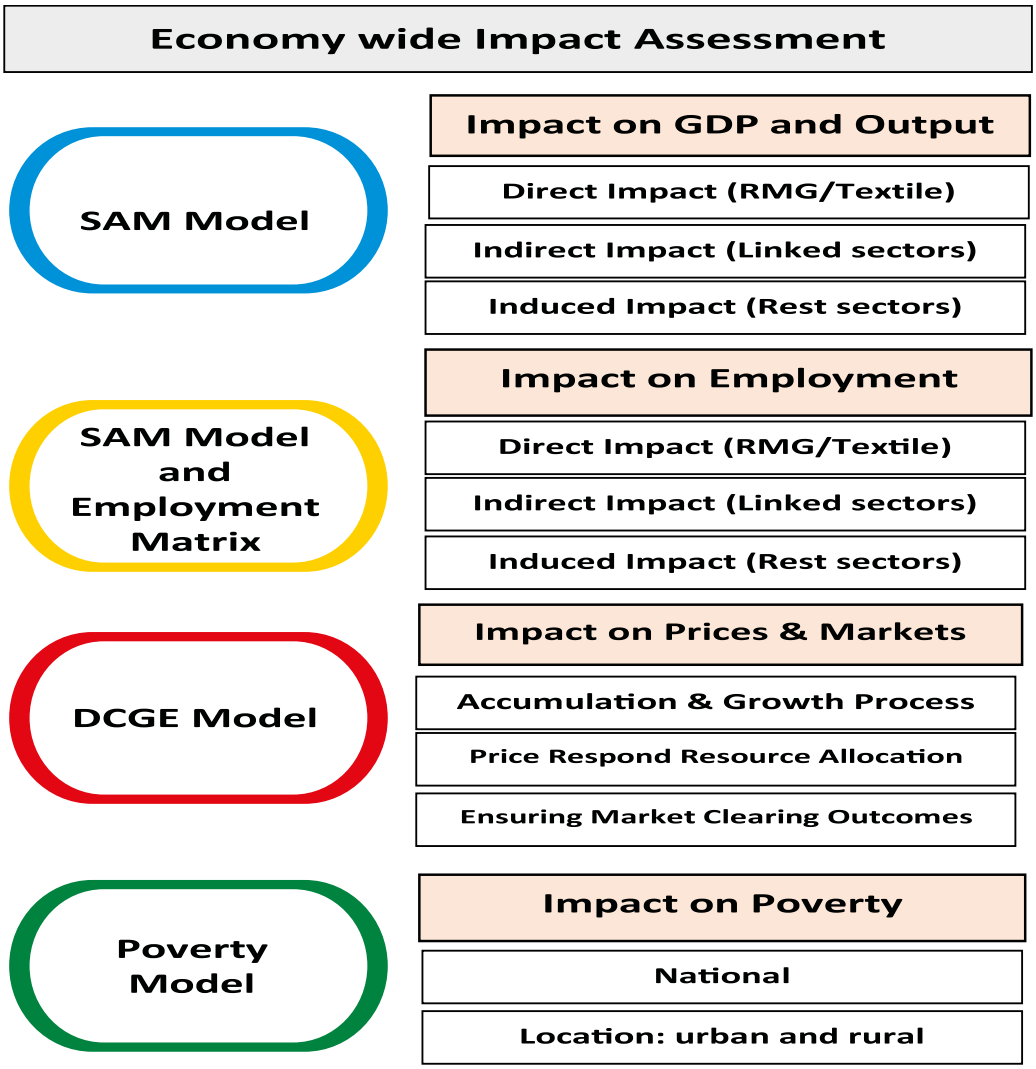
$$\frac{\Delta X}{X} = \theta_k^i \frac{\Delta m_k^i}{1+m_k^i} + \varepsilon\left(\theta_k^i \frac{\Delta m_k^i}{1+m_k^i}\right)\left(\theta_k^i \frac{\Delta m_k^i}{1+m_k^i} + 1\right)$$

Where, $\theta_k^i \frac{\Delta m_k^i}{1+m_k^i}$ indicates the changes in prefe rence margin. The first component in the above equation computes the changes in unit price resulting from changes in tariff preference. The second component calculates the impact on export revenue for the given changes in price. At the second step, in order to compute the trade-shift effects it is assumed that the declining exports from the graduate will be proportionally distributed to the other competitors (i.e. non-graduates) based on their market shares. The implicit assumption here is that there is no product differentiation among the suppliers and non-graduate's exports will increase proportionally (i.e. cross price elasticity of demand is 1). Therefore, the market share approach is used to estimate how other countries' exports will be impacted.

Economy Wide Approach

The economy wide impact is based on three inter-related frameworks (Figure 8.1):

Figure 8.1: Snapshot of the Economywide Impact Assessment Framework



(i) a Social Accounting Matrix (SAM) based multiplier model to capture the effects on domestic outputs, value added, and household consumption. It also captures direct, indirect and induced impacts using the interdependence or linkages of activities and commodities.

(ii) an employment satellite matrix (ESM) to assess employment implications. ESM help assess employment implications by activities, location (urban and rural) and gender (male and female. Moreover, it also assesses direct, indirect and induced employment impacts.

(iii) a dynamic computable general equilibrium (DCGE) model to describe the accumulation of factors and their influence on the process of growth in each year of the intervention period.

(iv) a poverty model to assess poverty impacts. It examines poverty situations by location and representative household groups.

SAM and SAM Model [33]

In the narrower sense, a SAM is a systematic data and classification system. As a data framework, SAM is a snapshot of a country at a point in time[34] . A particular innovation of the SAM approach is to bring together macroeconomic data (such as national accounts) and microeconomic data (such as household surveys) within a consistent framework. This aims to provide as comprehensive a picture of the structure of the economy as possible. A SAM is a generalization of the production relations, and extends this information beyond the structure of production to include: i) the distribution of value-added to institutions generated by production activities; ii) formation of household and institutional income; iii) the pattern of consumption, savings and investment; iv) government revenue collection and associated expenditures and transactions; and v) the role of the foreign sector in the formation of additional incomes for household and institutions. SAMs usually serve two basic purposes: a) as a comprehensive and consistent data system for descriptive analysis of the structure of the economy and b) as a basis for macroeconomic modeling.

The move from a SAM data framework to a SAM model (also known as multiplier framework) requires decomposing the SAM accounts into 'exogenous' and 'endogenous'. Generally, accounts intended to be used as policy instruments (for example, government expenditure including social protection, investment and exports) are made exogenous and accounts specified as objectives or targets must be made endogenous (for example, output, commodity demand, factor return, and household income or expenditure). For any given injection into the exogenous accounts of the SAM, influence is transmitted through the interdependent SAM system among the endogenous accounts. The interwoven nature of the system implies that the incomes of factors, households and production are all derived from exogenous injections into the economy via a multiplier process. The multiplier process is developed here on the assumption that when an endogenous income account receives an exogenous expenditure injection, it spends it in the same proportions as shown in the matrix of average propensities to spend (APS). The elements of the APS matrix are calculated by dividing each cell by the sum total of its corresponding column.

[33] *This section and the following section on DCGE draw on Khondker 2019*
[34] *Pyatt G and Thorbecke E, Planning Techniques for a Better Future, Geneva, ILO, 1976.*

Table 8.1: Description of the Endogenous and Exogenous Accounts and Multiplier Effects

Endogenous (y).	Exogenous (x)
The activity (gross output multipliers), indicates the total effect on the sectoral gross output of a unit-income increase in a given account, i in the SAM, and is obtained via the association with the commodity production activity account i.	
The consumption commodity multipliers, which indicates the total effect on the sectoral commodity output of a unit-income increase in a given account i in the SAM, is obtained by adding the associated commodity elements in the matrix along the column for account i.	Intervention into through activities (x = i + g + e), where i= GFC + ST (GFCF) Exports (e) GovernmentExpenditure (g) Investment Demand (i) Inventory Demand (i)
The value-added, or GDP multiplier, giving the total increase in GDP resulting from the same unit-income injection, is derived by summing up the factor-payment elements along account i's column.	
Household income multiplier shows the total effect on household and enterprise income, and is obtained by adding the elements for the household groups along the account i column.	Intervention via Households (x = r + gt + ct), where Remittance (r) Government Transfers (gt) Enterprise Transfers (ct)

The multiplier analysis using the SAM framework helps to understand further the linkages between the different sectors and the institutional agents at work within the economy. Accounting multipliers have been calculated according to the standard formula for accounting (impact) multipliers, as follows:

$y = A\,y + x = (I - A)\,{-1}\,x = Ma\,x$

Where:

y is a vector of endogenous variables (which is 68 according to SAM 2012 with all accounts showing number with no zero)

x is a vector of exogenous variables (which is also 68 according to SAM 2012 with lots of zero suggesting that policy options are not large)

A is the matrix of average expenditures propensities for endogenous accounts, and

$Ma = (I - A)\,{-1}$ is a matrix of aggregate accounting multipliers (generalized Leontief inverse).

The present multiplier framework has four endogenous accounts, and hence for each account in the SAM we can calculate four types of multiplier measures due to changes in any one of the various exogenous accounts.

The SAM based simulations are done on the basis of the 2012 SAM. That is the latest available SAM for Bangladesh at this time. It will be opportune for the government to consider a new research to update the SAM to a more recent base. However, the conclusions of the report are not materially affected by the use of SAM 2012. The economy-wide impacts of the export shocks have been examined by changing the total exogenous injection vector, especially rest of the world account. More specifically, the total exogenous account is manipulated to estimate their effects on output (through an output multiplier), value-added or GDP (through the GDP multiplier), and household income (through household income multiplier) and commodity demand (via commodity multipliers).

8.3. Dynamic Computable General Equilibrium Model

In addition to the fixed price demand driven SAM model, a dynamic computable general equilibrium (DCGE) model, based on the social accounting matrix (SAM) for Bangladesh for 2012, has been used to estimate macro and sectoral implications of the LDC graduation. The reason for employing a dynamic CGE model is due to fact that a dynamic CGE model is capable of capturing the growth effects of policy reforms. The inability of the static CGE model to account for growth effects make them inadequate for long-run analysis of the economic policies. They exclude accumulation effects and do not allow the study of transition path of an economy where short-run policy impacts are likely to be different from those of the long-run. To overcome this limitation, we use a sequential dynamic CGE model. This kind of dynamics will not be the result of inter-temporal optimisation by economic agents. Instead, these agents have myopic behaviour. It is a series of static CGE models that are linked between periods by updating procedures for exogenous and endogenous variables. Capital stock is updated endogenously with a capital accumulation equation, whereas population (and total labour supply) is updated exogenously between periods. Other variables such as public expenditure, transfers, technological change or debt accumulation are also updated over time. The sequential dynamic CGE model has two major modules: static module and dynamic module. DCGE consists of following five blocks.

Table 8.2: DCGE Blocks

Main Model Blocks	Key Features
1. Production and Supply: production arrangements through the use of factors of production (i.e. labour and capital) and intermediate inputs are specified here.	A nested structure for production has been adopted. Sectoral output is a Leontief function of value added and total intermediate consumption. Value added is in turn represented by a CES function of capital and composite labour. The latter is also represented by a CES function of two labour categories: skilled labour and unskilled labour. Both labour categories are assumed to be fully mobile in the model.
2. Income and Expenditure: income generation of various institutions (household and government) and their expenditure patterns are specified in this block.	Households earn their income from production factors – labour and capital. They also receive dividends, intra-household transfers, government transfers and remittances. Household demand is represented by a linear expenditure system (LES) derived from the maximisation of a Stone-Geary utility function. Minimal consumption levels are calibrated by using guess-estimates of the income elasticity and the Frisch parameters. They also pay direct income tax to the government. Household savings are a fixed proportion of total disposal income. Government receives direct tax revenue from households and firms and indirect tax revenue on domestic and imported goods. Its expenditure is allocated between the consumption of goods and services (including public wages) and transfers.
3. International Trade: international trade with Rest of the World in the form of import from and export to is captured in this block.	Foreign and domestic goods are imperfect substitutes. This geographical differentiation is invoked by the standard Armington assumption with a constant elasticity of substitution function (CES) between imports and domestic goods. On the supply side, producers make an optimal distribution of their production between exports and domestic sales according to a constant elasticity of transformation (CET) function. Furthermore, a finitely elastic export demand function that expresses the limited power of the local producers on the world market has also been assumed. In order to increase their exports, local producers may decrease their free on board (FOB) prices.
4. Prices: all types of prices including wages and returns to capital are defined in this block.	Prices are formed through the interaction of supply and demand. The nominal exchange rate is the numéraire in each period.
5. Equilibrium Condition: equilibrium conditions of the various markets; factors and as well as institutions are specified here.	General equilibrium is defined by the equality (in each period) between supply and demand of goods and factors and the investment-saving identity.

Static to Dynamic Transformation

The DCGE model is formulated as a static model that is solved sequentially over a certain period time horizon. The model is homogenous in prices and calibrated in a way to generate "steady state" path. In the baseline all the variables are increasing, in level, at the same rate and the prices remain constant. The homogeneity test[35] generates the same shock on prices, and unchanged real values, along the counterfactual path. This method is used to facilitate welfare and poverty analysis since all prices remain constant along the business as usual (BAU) path.

It is, however, important to note that, in contrast to the static CGE models, which make counterfactual analysis with respect to the base run (generally the initial SAM); a dynamic CGE model allows the economy to grow even in the absence of a shock. This scenario of the economy (without a shock) is termed as the business-as-usual (BAU) scenario. The counterfactual analysis of any simulation under the dynamic CGE model is, therefore, done with respect to this growth path. One of the salient features of the dynamic model is that it considers not only efficiency effects, as also present in the static models, but also accumulation effects. The sectoral accumulation effects are linked to the ratio between the rate of return to the capital stock and the cost of investment goods.

Key Drivers for the Dynamic Model

Accumulation of Capital: In every period capital stock is updated with a capital accumulation equation. It is assumed that the stocks are measured at the beginning of the period and that their flows are measured at the end of the period. An investment demand function to determine how new investments will be distributed between the different sectors is also used. Investment here is not by origin (product) but rather by sector of destination. The investment demand function used here is similar to those proposed by Bourguignon et al. (1989), and Jung and Thorbecke (2003). The capital accumulation rate (ratio of investment to capital stock) is increasing with respect to the ratio of the rate of return to capital and its user cost. The latter is equal to the dual price of investment times the sum of the depreciation rate and the exogenous real interest rate. The elasticity of the accumulation rate with respect to the ratio of return to capital and its user cost is assumed to be equal to case specific values (i.e. it may be any number such as 1.5; 2 or 3). By introducing investment by destination, we respect the equality condition with total investment by origin in the SAM. Besides this, investment by destination is used to calibrate the sectoral capital stock in base run.

Endogenous Labour Supply: The total labour supply is an endogenous variable, although it is assumed to simply increase at the exogenous population growth rate[36]. Note that the minimal level of consumption in the LES function also increases (as do other nominal variables, like transfers) at the same rate. The exogenous dynamic updating of the model includes nominal variables (that are indexed), government savings and the current account balance. The equilibrium between total savings and total investment is reached by means of an adjustment variable introduced in the investment demand function. Moreover, the government budget equilibrium is met by a neutral tax adjustment. Descriptions of the static and dynamic modules of the model are presented in Annex 2.

[35] *For example, a shock on the numéraire – the nominal exchange rate – with the "steady state" characteristics.*

[36] *In static CGE model, labour supply is fixed and exogenous. But in a dynamic CGE model since the labour supply varies with population growth, it is made endogenous.*

Employment Satellite Matrix

Employment satellite matrix (EASM) is developed for 2016 using the sectoral employment characteristics reported in the 2016 Labour Force Survey (LFS). LFS 2016 provides detailed information on employment by location (urban and rural), gender (male and female) and skill categories by LSF activity classifications. The activity classifications adopted in LSF is more aggregated than classification used in the national accounts and in SAM 2012. A mapping scheme has been developed between the LFS activity classification and 2012 SAM classification to assess employment impacts of simulations.

Poverty Module

A Poverty Module has been developed using the information of growth elasticity of poverty reduction of recent years. Household income and consumption generated in the SAM model are linked with this model to assess the poverty situation.

8.4. Impact on Bangladesh Apparel Exports: Partial Equilibrium Analysis

The results presented here are obtained from a recent study on the same subject by Razzaque and Jillur (2018). Potential loss of apparel exports to EU due to LDC graduation (or in other words tariff increase) has been estimated using four alternative price elasticity of demand values 0.5; 1; 1.5 and 2. The model is estimated using a total of 339 CN 8-digit products that were exported to the EU during 2015-17. The EU tariff rates at this level of disaggregation are used in the analysis for individual products. The impact is estimated based on the average exports during the last three years and their shares in total EU imports. Export implications have been estimated using two post-graduation scenarios: Bangladesh's receiving Standard GSP benefits and being subject to MFN tariffs. The results are summarised below.

Table 8.3: Export Losses: Results of Partial Equilibrium Simulations

Price Elasticity of Demand	If Bangladesh gets standard GSP preference (million $)	If Bangladesh faces MFN tariff (million $)
0.5	800.8	1,001.0
1.0	1,601.6	2,002.0
1.5	2,402.4	3,003.0
2.0	***3,203.2***	***4,004.0***

Source: Razzaque and Jillur (2018)

Under the low-price elasticity value of 0.5, loss of export value has been estimated at $ 800 million or 9.5% of average export revenues from the EU during 2015-17. Under the unitary price elasticity value, $ 1.6 billion or 9.5% of average export revenues from the EU during 2015-17. The export loss may likely to rise to $ 2.4 billion when 1.5 price elasticity value is used. On the other hand, under the high-price elasticity of 2, loss of export value has been estimated at $ 3.2 billion.

8.5. Socio-Economic Impact: Economy Wide Modeling Approach

Social Accounting Matrix 2012 for Bangladesh

The 2012 SAM identifies the economic relations through four types of accounts: (i) production activity for 23 activities and commodity accounts for the 23 products and services; (ii) 5 factors of productions with 3 different types of labour, 2 types of capital (including land); (iii) current account transactions among the 3 main institutional agents; household-members and unincorporated capital, government and the rest of the world; and (iv) one consolidated capital accounts capturing the flows of savings and investment. The disaggregation of activities, commodities, factors and institutions in the SAM is given below

Table 8.4: Description of Bangladesh SAM 2012

SAM Accounts	Detailed Sector Classification
Activities (23)	
	Cereal Crop, Commercial crop, Livestock-poultry, Fishing, Forestry, and Other-crop (06)
	Mining, Other Food, Leather, Textile-clothing, Chemical-Fertilizer, Machinery, Petroleum, Other industry, Construction, and Utility (10)
	Trade, Hotel, Transport, Financial Services, Public Administration, Social Services, and Other Services (07)
Commodities (23)	
	Cereal Crop, Commercial crop, Livestock-poultry, Fishing, Forestry, and Other-crop (06)
	Mining, Other Food, Leather, Textile-clothing, Chemical-Fertilizer, Machinery, Petroleum, Other industry, Construction, and Utility (10)
	Trade, Hotel, Transport, Financial Services, Public Administration, Social Services, and Other Services (07)
Factors of Production (04)	
	Labour factor (02): Labour-unskilled; and (iii) Labour-skilled
	Capital factor (02): Land and Capital
Institutions (04)	
	Household
	Government
	Rest of the World
	Savings or Gross fixed capital (consolidated capital)

Source: SAM 2012

Production and Trade Structure – SAM 2012

Production and trade structures of Bangladesh for 2012 are provided in table below. Structures are discussed in terms of three broad sector classification as well as the classification adopted in SAM 2012.

Table 8.5: Production and Trade Structure - Bangladesh SAM 2012

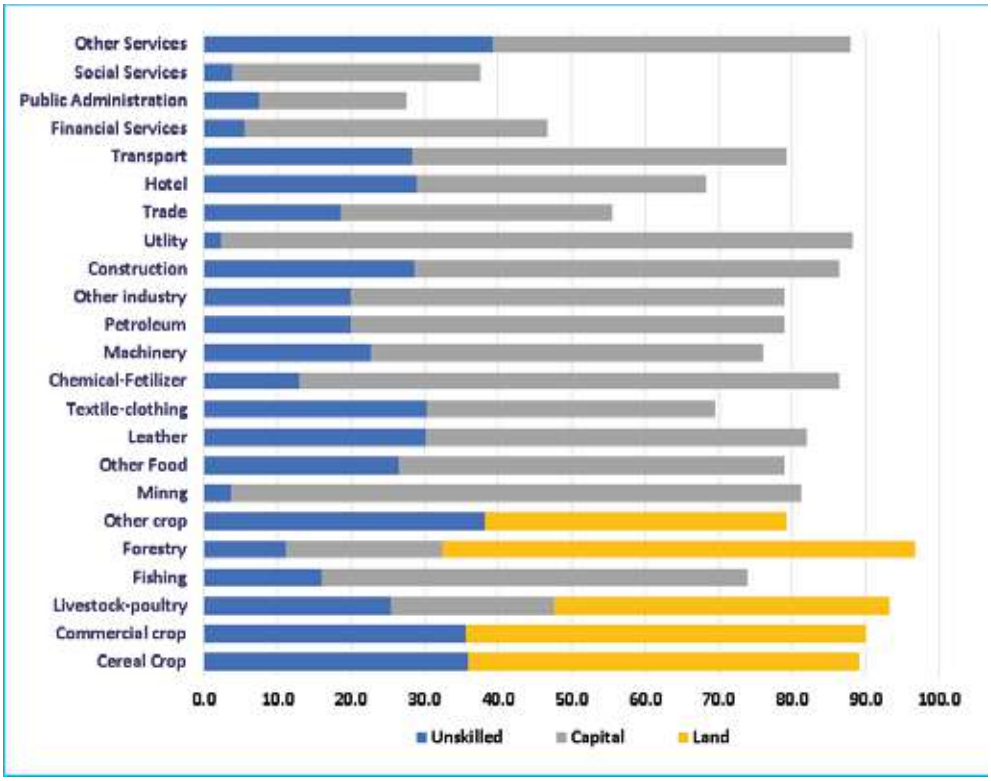
Sector Classification	GDP/Value added	Exports	Imports
Broad Sector Classification (Share in total)	100.00	100.00	100.00
Agriculture	18.37	2.61	4.43
Industry	27.17	91.67	91.56
Manufacturing	16.82	91.60	91.36
Apparel; Textile & Footwear Products	8.20	78.42	13.33
Services	54.46	5.71	4.00
SAM Sector Classification (share in total)	100.00	100.00	100.00
Cereal Crop	6.56	0.45	3.67
Commercial crop	4.27	0.28	0.70
Livestock-poultry	2.53	0.01	0.03
Fishing	3.61	1.82	0.00
Forestry	1.26	0.00	0.00
Other-crop	0.38	0.05	0.03
Mining	0.66	0.07	0.18
Other Food	3.90	0.87	*19.25*
Leather	0.50	2.49	0.25
Textile-clothing	*8.31*	*78.42*	*13.33*
Chemical-Fertilizer	0.87	1.39	*24.39*
Machinery	1.91	3.09	*23.01*
Petroleum	0.15	0.57	1.36
Other industry	1.39	4.77	9.78
Construction	*8.49*	0.00	0.03
Utility	1.34	0.00	0.00
Trade	*14.70*	0.00	0.00
Hotel	0.80	0.00	0.00
Transport	*10.22*	1.61	1.91
Financial Services	1.87	0.23	0.37
Public Administration	2.93	0.76	0.80
Social Services	5.16	0.00	0.00
Other Services	*18.18*	3.11	0.92
Total in Million BDT at current prices	8,644.7	2,125.2	2,949.2

Source: Bangladesh SAM 2012

- The largest income (i.e. GDP or value added) generating activity in Bangladesh is Services contributing about 54.5 percent of total income in 2012. This is followed by industrial activity with a contribution of about 27.2 percent of total income. Contribution of agricultural activity is lowest with 18.3 percent of total income.
- Industrial activity is composed of manufacturing activity, utilities and construction. The contribution of manufacturing activity in total income generation in 2012 has been 16.8 percent. This suggests that more than 62 percent of industrial sector's income (or GDP) has been due to the performance of the manufacturing activity.
- More than 49 percent of the manufacturing income or GDP has been contributed by the apparel activity in 2012. The contribution of the apparel activity in total income generation is 8.2 percent. Among the 23 activities classified in SAM 2012 (which very closely resembles the National Account Sector Classification adopted by BBS in Bangladesh), apparel is the fourth largest income generating activity in 2012 – only lagging behind to construction, trade, transportation and other-services.
- On the basis of current level of income generation by the apparel activity – it is considered an important activity for sustaining growth momentum as well as for its expansion.

In 2012 SAM, the factor market has been represented by two types of labours – classified by skill levels – unskilled labour; and skilled labour. Capital factor which is represented by one category of capital and land. The factor intensities across 23 activities and 4 types of factors are shown in the Figure 8.2 below.

Figure 8.2: Factor Intensities across Activities

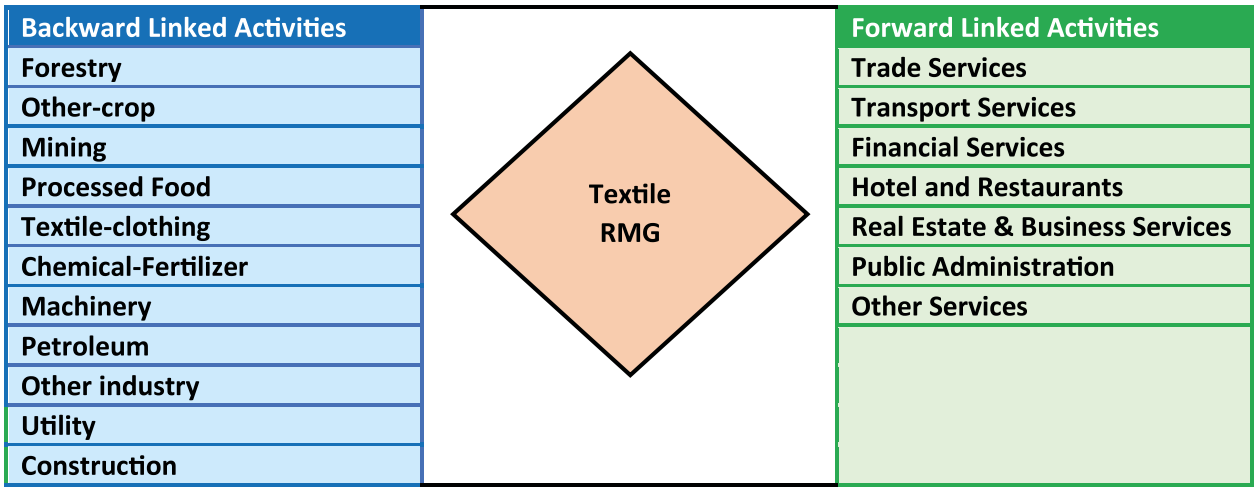


- Factor intensity patterns are diverse. Capital intensities are relatively high in heavy industries. This include mining; chemical-fertilizer; and utility. All of them have capital intensity of 70 percent or more. Few services also have high capital intensity. It is also high in construction, machinery, petroleum and miscellaneous industries.
- Low capital intensity (or relatively high labour intensity) has been found for activities such as crop agriculture, various services and textile. Capital intensity is less than 50 percent in these activities.
- In particular, capital intensity is 39 percent in the textile activity envisaging that combined labour intensity is 61 percent. Moreover, out of this 61 percent the share of unskilled labour is 31 percent and the share of skilled labour is 30 percent. The underlying factor intensity pattern of the RMG/textile activity suggests that reduction on RMG/textile activity would likely to effect workers disproportionately compared to the holders of capital. Furthermore, contraction of RMG/textile activity would have greater impact on the low and medium skilled labourers perhaps with deleterious implication on poverty.

One key advantage of IOT or SAM model is that it captures important element of interdependence of activities and commodities in their production system. Review of activity level input structure (or which is more widely known as the technology structure) identifies the level of linkages. An activity with larger number of inputs would have higher linkages compared to an activity that uses a smaller number of inputs in production. These linkages can be differentiated into backward and forward linkages. Stronger forward and backward production linkages lead to larger multipliers. Backward production linkages are the demand for additional inputs used by producers to supply additional goods or services. For example, when RMG production expands, it demands intermediate goods and services like cotton, fabrics, paper, electricity, and machine parts. This demand then stimulates production in other sectors to supply these intermediate goods and services. The more input intensive a sector's production technology is, the stronger its backward linkages are. The backward linkages provide valuable information about the degree of integration of an activity with the rest of the economy. Using this measure, it is possible to determine which activities contribute most to economic growth as a result of an exogenous increase in final demand, for instance export demand.

Forward production linkages account for the increased supply of inputs to upstream industries. For example, when electricity production expands, it can supply more power to the economy, which stimulates production in all the sectors which use power. Thus, the more important a sector is for upstream industries, the stronger its forward linkages will be. Forward linkages are particularly important for the activities (such as trade, transportation, energy etc.) that provides key input into the majority of other activities in the economy. In other words, forward linkages help us to understand the importance of a commodity for the rest of the economy in terms of intermediate demand. Therefore, a commodity that exhibits high forward linkages it is said to be important to growth since growth in that activity will have knock on effects in other sectors.

Figure 8.3: Linked Activities of the Ready-Made Garment Activity



Source: SAM 2012

Linkage structure of the Textile and Ready-Made Garment activity is shown above. Out of 23 commodities, it requires inputs from as many as 18 commodities. Numbers of backward and forward linked sectors are respectively 11 and 7. Contraction of Ready-Made Garment activity would also contract outputs of these 23 linked sectors. Ready-Made Garment activity has been found one of the most integrated activities in Bangladesh and thus negative impact on the Ready-Made Garment activity would likely to have deleterious effect on the economy by reducing output, factor demand and factor income (or what is also known as the primary income) and household income and consumption expenditure.

Employment Structure – ESM 2016

Employment structure of Bangladesh has been presented from perspective of activity and location and gender for deeper insight and to understand implication on employment for contraction or expansion of a particular activity. Table below shows employment structure by activities. Employment structure from location (urban vs and rural) and gender (male vs female) perspectives have been presented in Table 8.5.

Table 8.6: Bangladesh Employment Structure by Activities (%)

	National			Rural			Urban		
	Male	**Female**	**Both**	**Male**	**Female**	**Both**	**Male**	**Female**	**Both**
Agriculture	32.5	59.7	40.9	42.3	72.5	52.0	8.9	19.1	11.6
Industry	21.7	16.9	20.3	19.3	11.5	16.8	27.6	34.1	29.4
Mining	0.2	0.0	0.2	0.3	0.0	0.2	0.1	0.0	0.0
Manufacturing	13.6	15.4	14.2	11.7	10.0	11.1	18.5	32.7	22.2
Textile	6.3	11.4	7.9	*5.1*	*6.7*	*5.6*	*9.4*	*26.6*	*14.0*
Other-manufacturing	7.3	4.0	6.3	6.6	3.3	5.5	9.1	6.1	8.3
Utility	0.3	0.1	0.2	0.2	0.0	0.1	0.4	0.1	0.4
Construction	7.6	1.4	5.7	7.2	1.5	5.3	8.7	1.3	6.7
Services	45.7	23.4	38.9	38.4	16.0	31.2	63.5	46.7	59.0
Trading services	19.2	3.4	14.3	16.2	2.7	11.8	26.4	5.6	20.9
Hotel	2.3	1.0	1.9	1.9	0.7	1.5	3.2	1.9	2.9
Transport services	12.0	1.1	8.7	11.1	1.0	7.8	14.3	1.6	10.9
Financial Services	0.7	0.4	0.6	0.2	0.1	0.2	1.9	1.2	1.7
Public Administrative	1.9	0.6	1.5	1.3	0.4	1.0	3.3	1.2	2.7
Social Services	3.6	5.9	4.3	3.0	3.9	3.3	5.1	12.3	7.0
Other Services	6.0	11.0	7.5	4.6	7.3	5.5	9.3	22.9	12.9

Source: ESM 2016

- The largest employer in Bangladesh is the agriculture sector accounting for 41 percent of total employment . The second largest employer is the services sector absorbing about 39 percent of the total work force. Industry provides employment to about 20 percent of total work force. The employment structure is very different for urban activities. About 60 percent of the urban workers are employed in the services sectors. Industry emerged as the second largest employers for the urban work force. Almost 30 percent of the urban work force found jobs in the industrial activities. Understandably, only about 12 percent of the urban work force are in agriculture. In the case of rural work force, the largest employer is agriculture. It provides employment of about 52 percent of the rural work force. The second largest employer is services employing almost 31 percent of the rural work force. The contribution of industrial activities for rural employment is at around 17 percent.
- Manufacturing activity which employs about 17 percent the total work force is still a male dominated activity. Almost 30 percent of the total female work force is employed in the manufacturing activity. Only about 22 percent of total male work force works in the manufacturing activity. On the other hand, services and agriculture are female dominated activity.
- About 11 percent total Bangladesh work force is employed in the textile activity. It accounts for about 56 percent of the total manufacturing employment. An important observation is that almost 27 percent of the total urban female work force is employed in textile activity. While employment of male in RMG is disproportionately low.

Table 8.7: Distribution of Bangladesh Employment by Location and Gender (%)

	Bangladesh				Rural				Urban		
	Male	Female	Both	Rural	Male	Female	Both	Urban	Male	Female	Both
All	69.2	30.8	100.0	72.4	67.7	32.3	100.0	27.6	73.3	26.7	100.0
Agriculture	55.1	44.9	100.0	92.1	55.0	45.0	100.0	7.9	56.1	43.9	100.0
Industry	74.3	25.7	100.0	60.0	77.9	22.1	100.0	40.0	69.0	31.0	100.0
Mining	96.0	4.0	100.0	91.5	96.8	3.2	100.0	8.5	87.5	12.5	100.0
Manufacturing	66.6	33.4	100.0	56.7	71.0	29.0	100.0	43.3	60.8	39.2	100.0
Textile	*55.5*	*44.5*	*100.0*	*51.1*	*61.5*	*38.5*	*100.0*	*48.9*	*49.3*	*50.7*	*100.0*
Other-manufacturing	80.6	19.4	100.0	63.7	80.7	19.3	100.0	36.3	80.4	19.6	100.0
Utility	90.9	9.1	100.0	48.0	92.3	7.7	100.0	52.0	89.7	10.3	100.0
Construction	92.3	7.7	100.0	67.6	91.2	8.8	100.0	32.4	94.8	5.2	100.0
Services	81.5	18.5	100.0	58.1	83.4	16.6	100.0	41.9	78.9	21.1	100.0
Trade Services	92.7	7.3	100.0	59.8	92.6	7.4	100.0	40.2	92.8	7.2	100.0
Hotel	84.0	16.0	100.0	58.5	85.6	14.4	100.0	41.5	81.8	18.2	100.0
Transport Services	96.0	4.0	100.0	65.2	96.0	4.0	100.0	34.8	96.1	3.9	100.0
Financial Services	80.4	19.6	100.0	24.4	79.0	21.0	100.0	75.6	80.8	19.2	100.0
Public Administrative	88.3	11.7	100.0	50.0	88.3	11.7	100.0	50.0	88.3	11.7	100.0
Social Services	58.1	41.9	100.0	55.2	61.9	38.1	100.0	44.8	53.4	46.6	100.0
Other Services	55.0	45.0	100.0	52.5	57.0	43.0	100.0	47.5	52.8	47.2	100.0

Source: ESM 2016

- More than 72 percent of the total work force is employed in the rural activities. The contribution of urban activities in employment generation is thus 28 percent. Agriculture is predominantly a rural activity and hence it draws 92 percent of workers from the rural locations. Industry also draws majority of their workers (i.e. 78 percent of industrial workers) from the rural locations. Services draws workers from both location with similar proportion. Almost 42 percent of the services workers are from the urban location. An important observation is that, RMG –an export-oriented activity– draws about 51 percent of its work force from the rural location.
- In Bangladesh, almost 69 percent of the total workers are male while rest 31 percent are female workers. These patterns between male and female workers also hold for urban and rural locations.

8.6. Socio-Economic Impact of LDC Graduation Under SAM 2012

Simulation Design

A SAM multiplier model based on a Bangladesh SAM for 2012 is used to assess the macro-sectoral impacts. Following simulations have been carried out.

Business as Usual (BAU): A business as usual scenario is generated for 2027 assuming that there are no export demand shocks into the Bangladesh economy. The exogenous account of the SAM model is set up in such a way (i.e. it reflects what is needed to change in all the three elements of the exogenous account – the government expenditure, investment and exports) to exactly match the nominal GDP values projected for 2027 in Bangladesh's "Macro-economic" framework used in the Perspective Plan 2041 and in Chapter 5. BAU scenario also simulate projected employment situation which is consistent with the GDP outcomes of the BAU scenario. Generating the BAU to exactly match the projected GDP values of 2027 is important since the BAU set the bench mark to examine impact of the export demand shocks.

Low Export Shock (LES): If Bangladesh RMG were to face higher tariff due to LDC graduation, RMG exports in 2027 has been estimated to reduce by $ 3.1billion against the price elasticity of -0.5 for Bangladeshi RMG export to EU (based on projected RMG exports of $63 billion to EU in 2027). In this simulation labeled "LES", the estimated RMG exports fall of $ 3.1 billion to EU are considered. This is implemented by reducing 2027 BAU RMG export value by $ 3.1 billion through rest of the world Account and RMG/Textile sector account of the SAM model.

Medium Export Shock (MES): Due to LDC graduation, the RMG exports to EU in 2027 has been estimated to reduce by $ 6.2 billion if the price elasticity of Bangladeshi RMG export to EU is -1. The estimated RMG exports fall of $ 6.2 billion to EU have been included in this simulation labeled as "MES". This is implemented by reducing 2027 BAU RMG export value by $ 6.2 billion through rest of the world Account and RMG/Textile sector account of the SAM model.

High Export Shock (HES): Alternatively, the RMG exports to EU in 2027 has been estimated to reduce by $ 9.3 billion when the price elasticity of Bangladeshi RMG export to EU is -1.5. The estimated RMG exports fall of $ 9.3 billion to EU have been considered in this simulation labeled as "HES", This is implemented by reducing 2027 BAU RMG export value by $ 9.3 billion through rest of the world Account and RMG/Textile sector account of the SAM model.

Table 8.8: Simulation Parameter Assumptions

	BAU	LES	MES	HES
Price elasticity	'…'	-0.5	-1.0	-1.5
Export fall (Billion $)	0.0	3.1	6.2	9.3
Export fall (% of 2027 RMG export to EU)	0.0	4.9 %	9.8 %	14.7 %

Simulation Results

Business as Usual Scenario (BAU)

As mentioned above, a key feature of the **BAU scenario is that it does not consider LDC graduation effects.** Another important feature is that the sectoral GDP estimated under the BAU scenario exactly matches the sectoral GDP reported in the macro-economic framework. The sectoral GDP, gross domestic output, and employment are estimated under the BAU scenario. The BAU outcomes are presented in Table 8.8.

Table 8.9: BAU Scenario Results

SAM Activity Classification	Macro-Framework		Model Simulation		
	Real Value added* (Billion BDT)	Real Value added (Billion BDT)	Value added (Billion BDT)	Output (Billion BDT)	Employment (Million)
Cereal Crop	202	202	543	950	8.2
Commercial crop	147	147	497	879	6.3
Livestock-poultry	191	191	1,035	2,659	10.3
Fishing	854	854	3,235	6,593	2.5
Forestry	365	365	1,246	3,813	1.6
Other-crop	24	24	99	429	1.0
Mining	520	520	2,862	6,605	1.0
Other Food	1,371	1,371	6,257	26,529	2.6
Leather	123	123	359	1,444	0.2
Textile-clothing	2,048	2,048	8,097	22,874	7.2
Chemical-Fertilizer	179	179	719	3,533	0.7
Machinery	865	865	2,088	9,948	2.1
Petroleum	108	108	181	794	0.0
Other industry	956	956	1,699	7,269	2.4
Construction	1,713	1,713	5,923	14,783	4.1
Utility	435	435	1,071	1,486	0.9
Trade Services	2,716	2,716	6,742	8,398	9.0
Hotel	194	194	765	2,352	3.4
Transport Services	1,875	1,875	3,854	5,653	7.3
Financial Services	948	948	4,687	7,117	2.6
Public Administration	1,148	1,148	7,041	11,554	2.5
Social Services	1,149	1,149	5,833	9,165	4.1
Other Services	1,926	1,926	6,818	9,227	5.2
Total	20,056	20,056	71,650	164,054	85.2

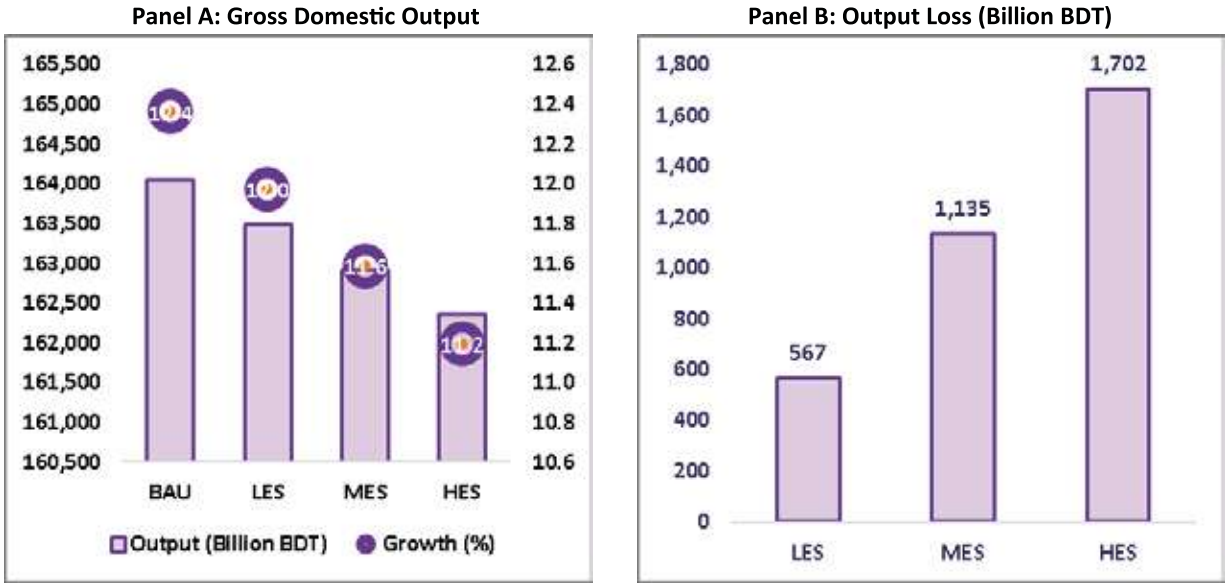
*Note: * As expected and required to test model validation, simulated sectoral GDP or value added in the BAU scenario reproduces the GDP or value added reported in the macro-economic framework.*

Export Shock Scenarios (ESS)

The impacts of the export demand shocks on the economy have been assessed by tracking the movements of the following indicators: (i) gross domestic output; (ii) nominal and real gross domestic product; (iii) employment and unemployment rate; and (iv) poverty rate.

Gross Domestic Output: Gross domestic output combines factors of production (i.e. labour and capital) with raw materials (i.e. domestic and imported) to produce output. Gross domestic output is a comprehensive indicator to assess health of an economy. Impacts on domestic output under the four scenarios are presented in Figure 8.4.

Figure 8.4: Impact on Output

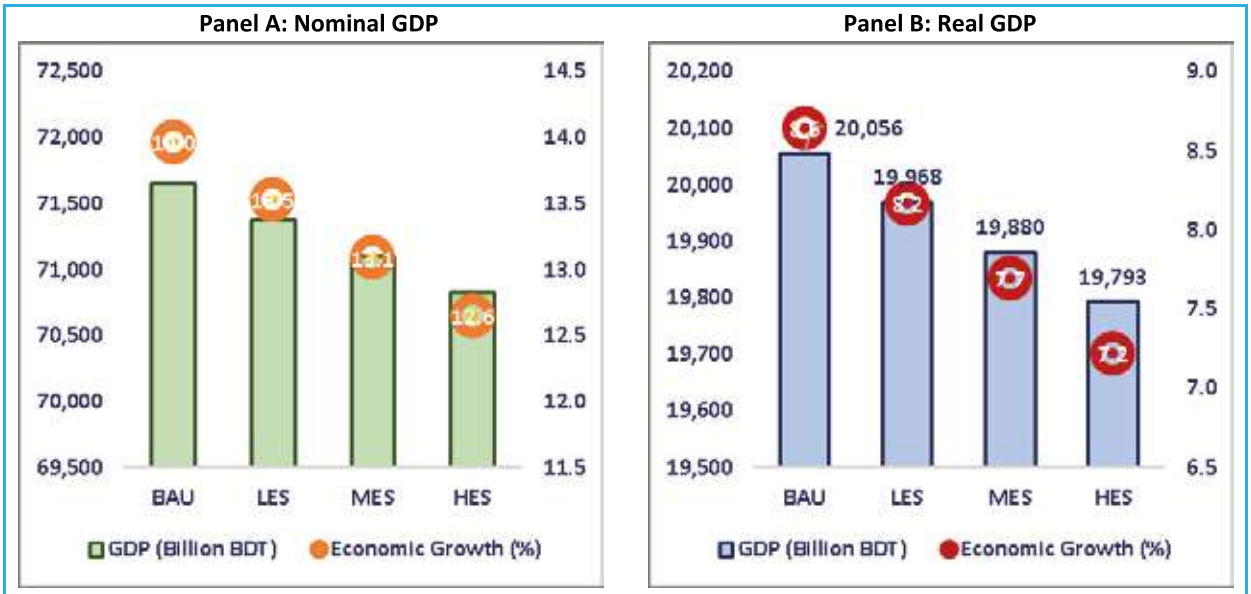


Source: SAM Model

Total value of domestic output under the BAU scenario has been projected to be BDT 164,054 billion in 2027 envisaging a growth rate of 12.4 %. RMG export shocks are likely to exert negative impact on the domestic output. Lowest decline in domestic output has been found in the LES scenario. In this scenario, domestic output drops to BDT 163,486 million implying a growth rate of 12.0 percent. Output decline in highest under the HES scenario due to the higher level of the export demand shock. Output may likely fall to BDT 162,352 million. In comparison to the BAU scenario, output growth reduces by 0.39 percentage points in LES; 0.78 percentage points in MES; and 1.17 percentage points in HES. Size of output loss compared to BAU output may range between BDT 567 billion under LES scenario and BDT 1,702 billion under HES scenario. It also suggests, ceteris paribus, the higher is the export demand shock the larger is the decline in domestic output.

Gross Domestic Product (GDP): Most widely used and accepted indicator to measure economic well-being is GDP. It is the sum of values of all goods and services produced in an economy in a particular time period (e.g. usually a quarter or a year). There are two valuations of GDP – nominal and real. Nominal GDP include the prices of the goods and services. While the real GDP measure exclude the price factor. The simulated impacts on GDP are presented below

Figure 8.5: Impact on GDP



Source: SAM Model

Simulated nominal GDP[37] in 2027 under the BAU scenario has been BDT 71,650 billion. This implies a growth rate of 14.0 % for nominal GDP in 2027. Nominal GDP value likely to drop to BDT 71,374 billion envisaging growth rate of 13.5 % under the LES scenario. Impacts are higher under the other two scenarios. Growths in nominal GDP may likely reduce to 13.1 % under MES scenario and 12.6 % the HES scenario. Thus, in comparison to the BAU scenario, nominal GDP growth rates have been estimated to be reduced by 0.5 percentage points in LES; 0.9 percentage points in MES; and 1.4 percentage points in HES.

Activity level (i.e. Bangladeshi economy is represented by 23 activities) nominal GDP values are deflated using the underlying activity level GDP deflators for 2027 as reported in the "Macro-economic" framework to arrive at activity level real GDP values for 2027. Real GDP in 2027 under the BAU scenario has been simulated at BDT 20,056 billion. This implies a real economic growth of 8.6 percent in 2027. Real GDP value may likely decline to BDT 19,968 billion, implying economic growth rate of 8.2 % under the LES scenario. Under the MES scenario, real GDP value likely to decline to BDT 19,880 billion, resulting a growth rate of 7.7 %. Largest decline in real GDP is found in the HES scenario. In this scenario, real GDP value likely to decline to BDT 19,793 million or to 7.2 % growth rate. In comparison to the BAU scenario, real GDP growth rates have been estimated to be reduced by 0.4 percentage points in LES scenario; 0.9 percentage points in MES scenario; and 1.4 percentage points in HES scenario. Impacts on real GDP are further dissected by broad activity classifications. Table 8.9 captures them.

[37] *We consider factor price GDP in the SAM framework. Factor price GDP only exclude two items – product taxes and subsidies and finance service charges.*

Table 8.10: Impacts on Real GDP by Broad Activities

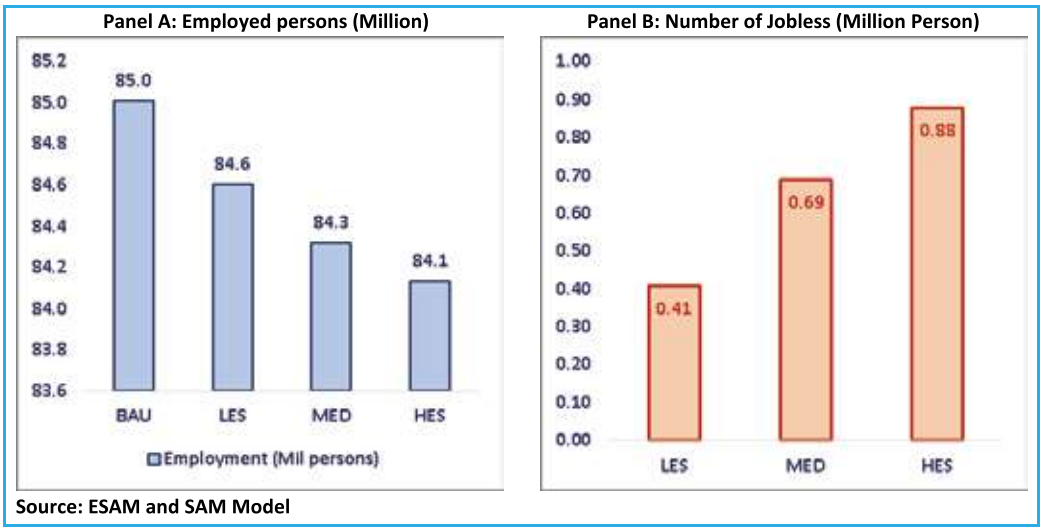
Broad Activity	BAU	LES	MES	HES
Agriculture				
GDP ($ Million)	1,781,932	1,769,468	1,757,004	1,744,540
Growth (%)	2.17	1.852	1.134	0.417
Industry				
GDP ($ Million)	7,882,592	7,858,827	7,835,061	7,811,296
Growth (%)	10.893	10.559	10.225	9.890
Manufacturing				
GDP ($ Million)	5,649,522	5,626,031	5,602,539	5,579,048
Growth (%)	10.86	10.40	9.94	9.48
Textile/RMG				
GDP ($ Million)	1,126,412	1,082,886	1,039,359	995,832
Growth (%)	9.01	4.80	0.59	-3.62
Services				
GDP ($ Million)	10,391,183	10,339,798	10,288,413	10,237,028
Growth (%)	8.07	7.54	7.00	6.47
All				
GDP ($ Million)	**20,056**	**19,968**	**19,880**	**19,793**
Growth (%)	**8.64**	**8.17**	**7.69**	**7.22**

Source: SAM Model

Employment: An important indicator for socio-economic impact assessment is employment. Creating jobs, especially decent jobs is a key priority in most economies. Bangladesh is no exception and hence attaches importance to employment generation. According to the LFS (2016), almost 72% of the total population belong to working age group. Out of them, 61% participate in the labour market – or actively search for a job. Projected population of Bangladesh in 2027 is 184 million. Projected the total working age population in 2027 has been estimated at 126.5 million persons. Number of persons actively looking for jobs is 88.5 million persons. Simulated total number of jobs under the BAU is 85 million persons. This suggests a very low unemployment rate of 4.0 percent.

Activity level outputs simulated under the four simulations are linked to the activity level employment coefficients to derive the employment effects of LDC graduation. The simulated impacts on employment are presented below.

Figure 8.6: Impact on Employment



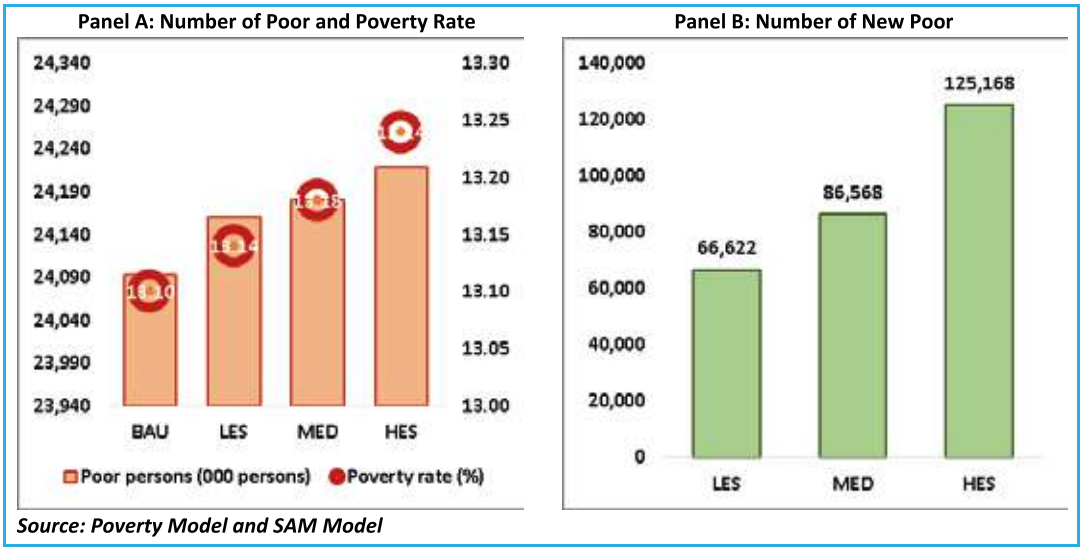
Source: ESAM and SAM Model

Job creation declines to 84.6 million persons under LES scenario compared to 85 million jobs generated in BAU. This translates to a loss of jobs for 0.41 million persons. Number of jobless persons increases to 0.69 million persons under MES scenario. In HES scenario, number of jobless persons jump to 0.88 million. LDC graduation may thus be associated with rise in unemployment in Bangladesh.

Poverty: It is the single most important indicator for welfare assessment. Reduction of poverty and eradication of extreme are key objectives in many economies, especially in a developing economy like Bangladesh. Based on her impressive progress on the poverty front, it may be argued that Bangladesh is winning the fight against poverty. Head Count poverty rate which was 31.5 % in 2010 declined to 24.3 % in 2016 (BBS, 2017). Combination of three factors – high economic growth, job creation and remittances – are key to the poverty reduction success. However, it may be relevant to note gains in poverty reduction remain highly precarious, as most households that escaped poverty did so by only a small margin.

The changes in real income gains the four scenarios are linked to the poverty model to assess poverty impacts. The simulated poverty impacts are presented below.

Figure 8.7: Poverty Impact (upper poverty line)



Source: Poverty Model and SAM Model

With more than 8.5 % economic growth, head count poverty is projected to drop to 13.1 % in 2027 under the BAU scenario under upper poverty line. However, economic contraction due to LDC graduation may likely to cause poverty level to increase in Bangladesh. Number of poor persons likely to increase from 24.09 million under BAU scenario to 24.16 million in LES scenario. This suggest 66,622 new poor persons and the resultant head count poverty rate is 13.14%. As many as 86,568 new persons may turn poor under the MES scenario implying a head count poverty rate of 13.18%. Poverty rate may likely to jump to 13.24% under the HES scenario. Compared to the BAU scenario, number of new poor is 125,168 persons.

Assessing Socio-Economic Impact of LDC Graduation: DCGE Model Approach

Numerical specification of a general equilibrium model to a macro consistent data set is the first but most important step in a CGE exercise. SAM 2012 is a general equilibrium data set. Thus, the dynamic computable general equilibrium (DCGE)[38] model for Bangladesh has been calibrated to SAM 2012. Results of the base run of the DCGE model satisfy the model validation properties – namely the reproduction of the SAM values. Validation of the DCGE also suggests that the model is ready to conduct policy simulations.

Simulation Design

Since SAM model is a fixed price demand driven model, all simulations have been conducted by injecting additional amounts as one-time export demand shocks. In the CGE model (i.e. both static and dynamic), simulations are usually performed by modifying the parameters such as tax rates; subsidy rates; income tax rates and import duty rates etc. Moreover, some of the prices which are exogenous to the system may be also be altered to conduct simulations. This includes world price of imports; world price of exports; and nominal interest rate etc. Furthermore, institutional transfers (also exogenous) and generally policy variables may also be modified to perform simulations. Some of them composed of government transfer to households and corporations; remittances from the rest of the world to households; government expenditure and investment demand.

BAU: two key drivers – namely accumulation of capital and increase in labour supply have been specified to simulate the BAU scenario. The capital accumulation rate (ratio of investment to capital stock) is increasing with respect to the ratio of the rate of return to capital and its user cost. The latter is equal to the dual price of investment times the sum of the depreciation rate and the exogenous real interest rate. The elasticity of the accumulation rate with respect to the ratio of return to capital and its user cost is set equal to two. By introducing investment by destination, we respect the equality condition with total investment by origin in the SAM. Besides this, investment by destination is used to calibrate the sectoral capital stock in base run. Total labour supply is an endogenous variable – it is assumed to simply increase at the exogenous population growth rate.

Export Demand Increase: in the DCGE simulations, world prices of the export commodities in question (i.e. RMG/Textile) are manipulated to reduce export demand amounts to assess their impacts on key macro and sectoral variables.

Simulation Results

In conformity with the standard practice of DCGE model, all outcomes of the export demand reduction simulations are compared with the outcomes derived under the BAU simulation. Simulation using CGE model generate changes in large number of variables including supply side variables – value added (GDP), outputs, and imports; and the demand side – household or private

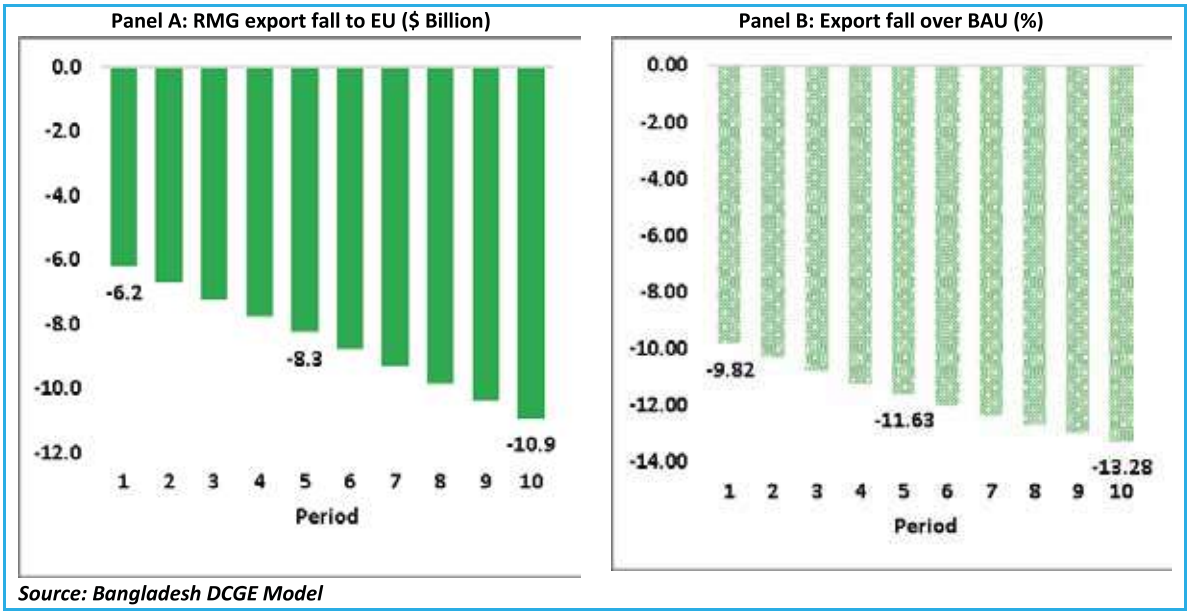
[38] *In effect, the SAM 2012 has been updated to 2027 to be consistent with the terminal year of the tariff imposition on EU on Bangladesh RMG and Textile products.*

consumption; and export demand etc. It also impacts sectoral as well as general price level. Incomes of the institutions (i.e. household, and government) are also affected by simulations. However, the focus is on the impact on selected key variables such as the value of the export demand; GDP at market prices; factor returns and household consumption.

Exports Reduction

Automatic imposition of tariffs due to LDC graduation will certainly affect Bangladeshi exports – especially RMG and textile to EU. Panel A of figure below captures the reduction of RMG exports from EU over a ten period (i.e. 2027 to 2036). It suggests that RMG exports to EU may decline by 6.2 billion USD in year 2027. This accounts for about 9.8 percent of projected exports of $62 billion to EU in 2027 (i.e. please see Panel B). Since this a dynamic model, if there were no tariff imposition on Bangladesh RMG, exports to EU would continue to grow. This phenomenon has been captured under the BAU scenario. Now imposition of tariff in subsequent years (i.e. 2027 onward over the 10 period) may results in higher reduction in exports of Bangladesh RMG. For instance, in 2031 Bangladesh's RMG exports to EU may decline by $ 8.3 billion (or 11.6 percent reduction from the 2031 BAU export). In 2036, the decline may likely to be even higher to $ 10.9 billion (or 13.3 percent reduction from the 2036 BAU export). RMG export reduction may be accompanied with release of resources (i.e. both labour and capital factors) from the RMG activity, which are likely to be employed in other expanding export activities. Overall exports reduction under LDC simulation have been estimated to be only 3 percent over the BAU scenario.

Figure 8.8: RMG Export Reduction

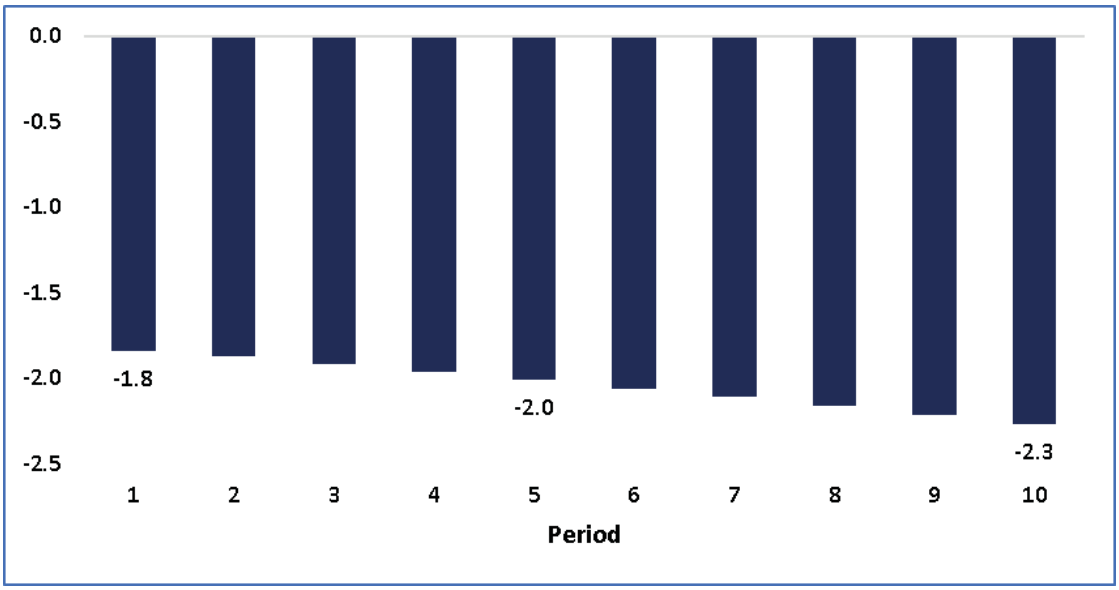


Source: Bangladesh DCGE Model

Income Effect

RMG is an integrated activity, hence reduction of RMG exports would likely to lead to national income loss through the reduction of value addition of the RMG activity itself as well as the fall in the value added of the activities those are linked to RMG. Impacts on real income over the ten-year period has been shown in figure below.

Figure 8.9: Real Income Impacts over the BAU (%)



Source: Bangladesh DCGE model

Simulated income impacts range between -1.8 percent in 2027 to -2.0 percent in 2031 and to -2.3 percent in 2036. Reallocation of released resources from the RMG activity to other activities have recouped the some of the income losses from the RMG export fall in EU.

The major loser from the loss of RMG exports to EU due LDC graduation is labour factor. Labour returns may decline about 5.5 percent under the export loss simulation over the BAU scenario. The impacts on the returns to the capital factor have been found significantly smaller than the impacts on the labour factor. Thus, LDC graduation if not handled properly, it may lead to rise in income inequality.

Table 8.11: Impacts on Factor Returns (% change over BAU)

Period	Low skilled labour	High skilled labour	Labour	Capital
1	-6.23	-5.23	-5.73	0
2	-6.16	-5.23	-5.69	-0.19
3	-6.11	-5.22	-5.67	-0.38
4	-6.06	-5.22	-5.64	-0.56
5	-6.02	-5.23	-5.62	-0.74
6	-5.98	-5.23	-5.61	-0.92
7	-5.95	-5.23	-5.59	-1.10
8	-5.93	-5.24	-5.58	-1.27
9	-5.91	-5.24	-5.57	-1.43
10	-5.89	-5.25	-5.57	-1.59

Source: Bangladesh DCGE model

Impact on household consumption are shown below in Table 8.11 by the representative household groups. As expected, the consumption of all household groups declined in each year of the ten-year period compared to their BAU consumption level due to LDC graduation. Among the five categories of households, urban low educated household has been found the most affected household. Urban high educated households are the least affected group. But it appears that the consumption effect is slightly higher for the rural household than their urban counter part.

Table 8.12: Impacts on Household Consumption (% change over BAU)

Period	Small Farm	Large Farm	Non-Farm	*Rural*	Low educated	High educated	*Urban*
1	-5.58	-5.63	-5.63	*-5.61*	-5.66	-5.42	*-5.54*
2	-5.54	-5.60	-5.59	*-5.58*	-5.61	-5.40	*-5.51*
3	-5.51	-5.57	-5.57	*-5.55*	-5.57	-5.39	*-5.48*
4	-5.49	-5.55	-5.56	*-5.53*	-5.53	-5.39	*-5.46*
5	-5.48	-5.54	-5.56	*-5.52*	-5.50	-5.39	*-5.45*
6	-5.47	-5.53	-5.56	*-5.52*	-5.47	-5.40	*-5.44*
7	-5.46	-5.53	-5.56	*-5.52*	-5.45	-5.41	*-5.43*
8	-5.46	-5.53	-5.57	*-5.52*	-5.43	-5.42	*-5.43*
9	-5.46	-5.53	-5.58	*-5.52*	-5.42	-5.43	*-5.42*
10	-5.46	-5.54	-5.59	*-5.53*	-5.40	-5.44	*-5.42*

Source: Bangladesh DCGE model

8.7. Concluding Observations

Bangladesh is on her way to graduate out of LDC league by 2024. The implications of this graduation may have serious deleterious impacts on the economy and as well as on the societal welfare if not planned appropriately. In order to assess the direction and extent of impacts, an assessment has been carried out using different quantitative techniques.

Partial equilibrium framework using price elasticity has been used to assess export loss (especially apparel export) to EU. Export loss has been estimated under alternative values of price elasticity of demand (i.e. 0.5; 1; 1.5 and 2) for Bangladeshi RMG exports to EU. The estimated export losses are incorporated into a general equilibrium type modeling system to assess impacts on: (i) domestic output; (ii) GDP or value added; (iii) employment; and (iv) poverty. More specifically, four simulations have been conducted. First simulation is a business as usual (BAU) scenario where export shock is not considered. In the second simulation (LES – low export shock with price elasticity of 0.5) export loss of 4.9% of projected RMG exports to EU for 2027 has been considered. Third simulation (MES – medium export shock with unitary price elasticity) refers to a situation where projected RMG exports to EU in 2027 has been reduced by 9.8 %. Last simulation (HES – high export shock with price elasticity of 2) considers 14.7 % drop in RMG exports to EU.

Simulation exercise suggests that depending on the extent of erosion of RMG exports to EU, cost of LDC graduation may not be small. It is important therefore for Bangladesh to adopt proper strategies to offset the export loses. The detailed reforms are discussed in chapters 5-7. In summary, these may include prudent macroeconomic management including flexible management of the exchange rate, trade reforms to promote export diversification; searching for new markets for export items based on bilateral regional free trade agreements; and boosting competitiveness and attracting FDI by reducing cost of doing business, improving infrastructure and human capital. Furthermore, trade policy capacity must be strengthened to prepare Bangladesh to be compliant with all WTO provisions following the expiry of special treatment under LDC and to be able to negotiate bilateral and regional trade agreements.