

Draft

Implications of the Global Economic Crisis for the Bangladesh Economy

Selim Raihan

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I. Introduction

The world economy has changed spectacularly since September 2008. What began as a slump in the US housing sector is now a global crisis, spreading to both rich and poor economies. Many believe that this may go down in history as the worst crisis since the Great Depression of the 1930s. The triggers of the present global financial crisis were in the US subprime mortgage market the crumple of which engulfed the global financial markets leading to a painful recession of the world economy. Bangladesh, though not so much globalized financially, depends a significantly on foreign trade. More significantly, its exports including readymade garments, shrimps, leather, etc are heavily dependent on the western consumer demand. Therefore, falling employment and hence the declining income of the average consumers in the USA and Europe are likely to have serious impacts on her export potentials. Also there are concerns with respect to fall in remittance income. Against this backdrop this research explores the possible impacts of the current global economic crisis on Bangladesh in an economy-wide modeling framework.

II. Global Economic Crisis and Bangladesh Economy: Channels of Impacts

There can be two major channels through which the global economic crisis may have some significant implications for the Bangladesh economy. They are export and remittances.

2.1. Exports

The sharp contraction in international trade activities that occurred as a result of the global financial crisis has brought most of the export activities down in recent months. The impact on exports in both the value and volume of some major export categories experienced negative growth rates during 2008 and 2009. The ready-made garment (RMG) sector however maintained some positive rates of growth, but there has been a decline in export earnings from RMG since the beginning of the year.

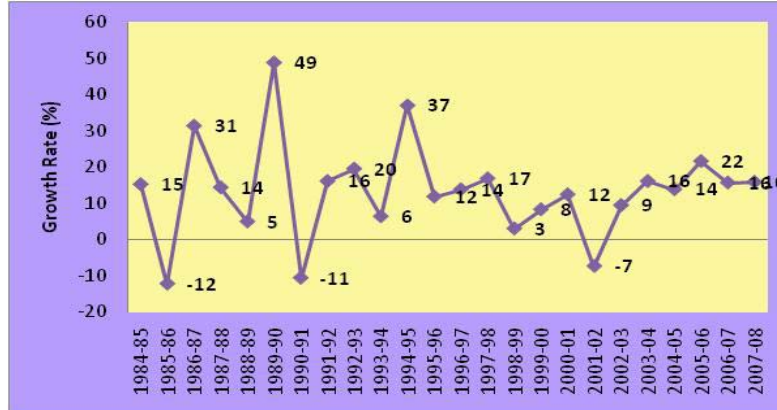
The RMG industry in Bangladesh started its manufacturing since the early 1980s and became the most dominant sector of the economy within a decade or so. While export earnings from the RMG sector were as low as US\$ 32 million in 1983-84, they increased to a staggering figure of around US\$ 10 billion by 2007-08 (Table 1). By now the export basket of Bangladesh is very much concentrated, as only a single sector accounts for more than three-fourth of the country's total export earnings. There has been significant rise in the number of RMG factories over the last three decades. Currently, around two and half million workers are employed in this sector, of which 80 percent are female. Therefore, any negative shock to the RMG sector will have a profound impact on the economy and the human development status, including the gender development status of the country.

Table 1: Importance of RMG exports for Bangladesh

Year	No of Factories	Employment in Million	Export of RMG in Million US\$	% of total Exports	Value Addition (%)
1983-84	134	0.04	31.57	3.89	-
1990-91	834	0.402	866.82	50.47	-
1994-95	2182	1.2	2228.35	64.17	17.7
2000-01	3480	1.8	4860.12	75.15	46.53
2004-05	4107	2.1	6417.67	74.15	64.67
2007-08	4740	2.5	10699.8	75.83	70

Source: Website of BGMEA

Bangladesh's RMG sector managed to benefit from the protectionist's policies pursued in major export markets, most notably in the EU. The MFA quotas not only restricted supplies from the most efficient global producers, but also helped keep prices higher than what would have been possible under the competitive conditions. On the other hand, favorable domestic trade policy reform through the use of a set of generous support and promotional measures for exports have been very instrumental for the expansion of the RMG industry in Bangladesh. Important export incentive schemes available in Bangladesh include, amongst others, subsidized rates of interest on bank loans, duty free import of machinery and intermediate inputs, cash subsidy, and exemption from value-added and excise taxes. Figure 1 shows the year-on-year growth rates of Bangladesh's RMG exporters. It appears that, in general, the growth rate has been on rising trend during the 2000s. Interestingly, the phasing out of ATC did not have any negative impact on the growth of RMG sector in Bangladesh.

Figure 1: Growth of RMG Exports from Bangladesh

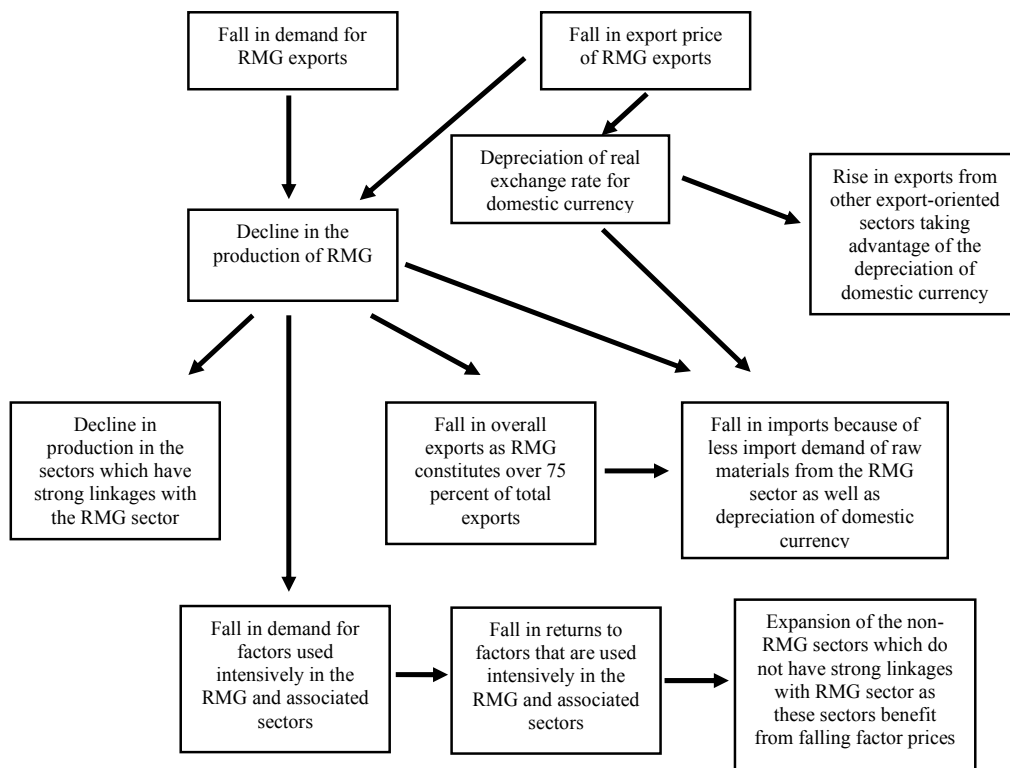
Source: Website of BGMEA

The future of the RMG industry will be critical for Bangladesh's socio-economic development. Although the evidence on trade-growth and trade-poverty relationships as found in academic studies is far from being conclusive, there is no denying that the growth of RMG exports has been associated with the overall economic growth of the country accompanied by a remarkable progress on poverty alleviation by creating massive employment opportunities for mostly unskilled workers. It can be mentioned here that the period covering years 2000 to 20005 experienced fall in head-count poverty by 9 percentage points along with robust performance of RMG sector in Bangladesh. Raihan and Khondker (2008), using a computable general equilibrium (CGE) model find that the growth in RMG

exports contributed to fall in poverty by more than 1 percentage point out of that 9 percentage points fall in head-count poverty.

As mentioned above, the export basket in Bangladesh is highly concentrated and the RMG sector alone constitutes more than 75 percent of total exports. Therefore, the export sector is much vulnerable to any external shock. Current global financial crisis and the resultant economic downturn in the developed countries' markets have raised some serious concerns with respect to falling earnings from RMG exports from Bangladesh. It is also important to note that nearly 90 percent of Bangladesh's RMG exports are destined to markets in developed countries, mostly to US and EU markets. With the ongoing recession in the US and EU, it is likely that exports will be hurt. There are some moderating factors that should be considered. Since the country's RMG exports mainly cater to the low price segment of the apparel market, the current slowdown may create less impact on the country's RMG exports. With incomes falling, even some diversion of demand from the high-end garment segment to low-end may take place. But people may also compensate by not diverting to low-end and just buying far less high-end clothing. Major purchasers of RMG products may move to take advantage of the market situation by negotiating less favorable order contracts for suppliers from LDCs. There are also recent evidences that negotiations for orders are being diverted from India, Turkey, Indonesia, and Cambodia. Latest data from government indicates exports during Jul 2008 - Feb 2009 up about 20 percent from the same period of the previous year. It can however be mentioned that the extent to which the crisis will hurt Bangladesh's RMG exports is still unclear. But, there are concerns that worrying days are ahead if recession prolongs. Therefore, government can't be complacent. So Bangladesh must be prepared to face this crisis. Policy adjustments may have to be made at any time as demanded by the depth of the crisis. A high profile taskforce, in addition to the routine monitoring by technical groups, will have to be functioning continuously to provide necessary guidelines to the policy makers so that there is no scope of complacency and hence inaction in any quarter.

Figure 2: Channels through which RMG Export Shock Affects Sectoral Prices and Output



2.2. Remittances

Remittances play a critical part in the economy. In 2001-02, total remittance flow stood at US\$ 2,503 million. In the next 5 years, total remittance flow has increased on average 19 percent per year and reached to US\$ 5,978 million in 2006-07. Table 2 reveals the yearly total remittances and its growth from 2001-02 to 2006-07. Table 3 also reveals that the total amount of remittances in terms of GDP and export earnings has also increased over the years. In 2000-01, remittances as percent of GDP and export stood at 4.01 percent and 29.10 percent respectively. This increased to 8.83 percent and 49.09 percent respectively in 2006-07. In 2008, Bangladesh received over \$9 billion in remittances. As of 2009, Bangladesh is among the top remittance receiving countries in the world.

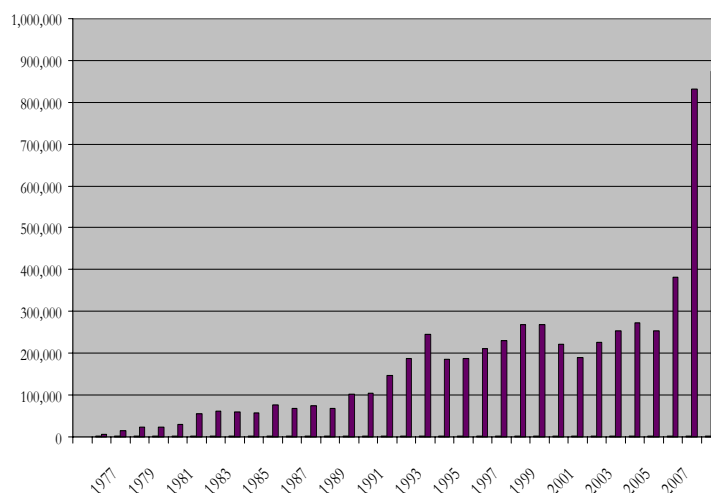
Table 2: Remittance flows in Bangladesh

	Total remittances		Total remittances as % of	
	Million US\$	Growth (%)	GDP	Export
2001-02	2,503	32.8	5.26	41.78
2002-03	3,060	22.2	5.90	46.76
2003-04	3,372	10.2	5.98	44.35
2004-05	3,848	14.1	6.37	44.47
2005-06	4,801	24.8	7.75	45.62
2006-07	5,978	24.5	8.83	49.09

Source: Bangladesh Economic Review, 2007

The majority of remittances originate from the Arabian Gulf countries, followed by the USA, EU region and the Asia-Pacific region (particularly Malaysia and Singapore). Inflows during July 2008 to March 2009 were about 24.5 percent higher than the same period of the last fiscal year, but this was partly due to more money being sent through formal channels as opposed to informal ones. The growth rates of inflows have been on a downward trend since July 2009. The number of migrant workers going abroad each year has increased dramatically in recent years (see Figure 4). But in early 2009 there was a marked drop in monthly outward migration due to the global recession.

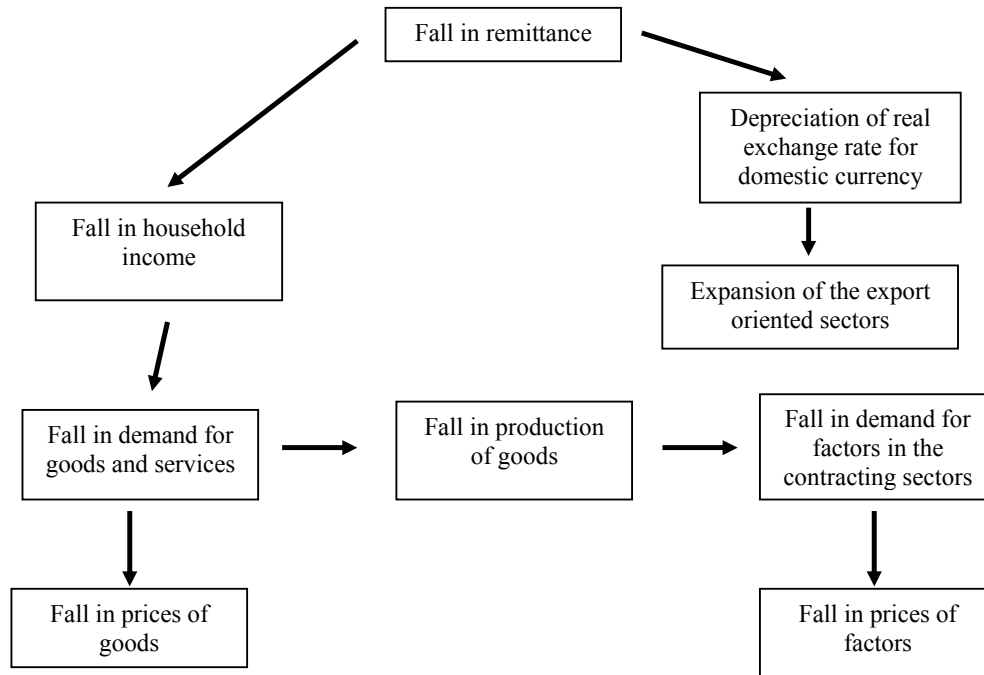
Fig 4: Number of Bangladeshis who migrated temporarily with Job permit: 1976 to 2008



Source: BMET

The channels through which a remittance shock can affect sectoral prices and output are shown in Figure 5. Remittance constitutes important shares in household incomes in Bangladesh. Therefore any negative shock in the inflow of remittance is likely to have important negative implications for household welfare and real consumption which will have adverse effect on the overall economy. It also appears from HIES (2005) that poorer households are more dependent on remittances than the non-poor households, which is likely to have varying impacts on different categories of households.

Figure 5: Channels through which Remittance Shock affects Sectoral Prices and Output



III. Methodology of the study

3.1. Social Accounting Matrix for the Economy of Bangladesh

The Social Accounting Matrix (SAM) 2005 for Bangladesh identifies the economic relations through **eight accounts**: (1) total domestic supply of 23 commodities; (2) activity accounts for 23 sectors (here commodities and activities are synonymous); (3) 9 factors of productions (4 labor types and 5 capital categories); (4) current account transactions between 4 institutional agents; households and unincorporated capital, corporate enterprises, government and the rest of the world; household account includes 8 representative groups (6 rural and 2 urban); and (8) 2 consolidated capital account (domestic and rest of the world) distinguished by public and private sector origin to capture the flows of savings and investment by institutions and the rest of the world respectively. The structure of the Bangladesh SAM is described in Table 3.

Table 3: Description of Bangladesh SAM Accounts for 2005

Set	Description of Elements
Activities	
Agriculture (7)	Paddy, Grains, Other Crops, Livestock, Poultry, Fish and Shrimp
Industries (9)	Rice Milling, Grain Milling, Other Food, Mill Clothing, Ready Made Garments, Knitwear, Textiles, Petroleum Products, and Other Industries.
Services (10)	Urban Construction, Rural Construction, Public Construction, Utility, Trade, Transport, Housing, Education-Health, Public Administration and Private Services.
Institutions	
Households (8)	Rural: Landless, marginal farmers, small farmers, large farmers, non-farm poor and non-farm non-poor Urban: low educated and high educated
Others (2)	Government, Corporation and Rest of the World
Factors of production	
Labor (4)	Agriculture labor unskilled, agriculture labor skilled, non-agricultural labor unskilled and non-agricultural labor skilled
Capital (5)	Non-agriculture capital, land, water-body, poultry and cattle

The basic structure of the 2005 Bangladesh SAM is summarized in Table 4. Tariff rates vary across the sectors and range from as low as 0 percent to as high as 40.19 percent (food). Other Textile has the highest sectoral import penetration ratio (42.66 percent), followed by Other Industry (39.94 percent). The highest share in total imports is for Other Industry (65.89 percent), followed by Other Textile (17.55 percent). The sectoral export orientation ratio is the highest for Knit RMG (99.32 percent) followed by Woven RMG (80.26 percent). Together Woven and Knit RMG exports account for 76.2 percent of total exports. In the case of value addition, all the service and construction sectors together account for 61.69 percent of total value added in the economy. The aggregated agricultural and the manufacturing sectors constitute 20.4 percent and 17.88 percent of the total value added respectively.

Table 4: Structure of SAM 2005 of Bangladesh

	Tariff Rate (%)	Import Penetration Ratio	Import Share	Export Orientation Ratio	Export Share	Value addition Share
Paddy	0.00	0.00	0.00	0.00	0.00	5.84
Grains	0.00	38.80	2.46	0.00	0.00	0.40
Other Crops	12.18	5.17	3.21	1.12	1.11	7.31
Livestock	0.00	0.41	0.07	0.00	0.00	2.05
Poultry	0.00	0.00	0.00	0.00	0.00	0.42
Shrimp	0.00	0.00	0.00	33.92	4.52	0.89
Other Fish	0.00	0.02	0.01	1.11	0.56	3.51
Rice Mill	9.42	3.34	2.07	0.00	0.00	2.18
Grain Mill	27.99	1.19	0.07	0.00	0.00	0.30
Food	40.19	15.34	6.78	11.06	6.95	2.22
Mill Cloth	0.00	0.00	0.00	0.00	0.00	1.00
Woven RMG	0.00	0.18	0.06	80.26	42.72	2.29
Knit RMG	0.00	8.42	1.84	99.32	33.48	1.26
Other Textile	3.53	42.66	17.55	1.94	0.77	1.54
Other Industry	20.85	39.94	65.89	5.94	9.89	7.09
Urban Construct	0.00	0.00	0.00	0.00	0.00	1.89
Rural Construct	0.00	0.00	0.00	0.00	0.00	5.70
Public Construct	0.00	0.00	0.00	0.00	0.00	0.61
Utility	0.00	0.00	0.00	0.00	0.00	2.09
Trade	0.00	0.00	0.00	0.00	0.00	15.27
Transport	0.00	0.00	0.00	0.00	0.00	10.80
Housing	0.00	0.00	0.00	0.00	0.00	8.39
Edu & Health	0.00	0.00	0.00	0.00	0.00	4.77
Public Admin	0.00	0.00	0.00	0.00	0.00	2.72
Private Service	0.00	0.00	0.00	0.00	0.00	9.44

Source: SAM 2005 of Bangladesh.

The income composition of households, which is derived from SAM 2005, is presented in Table 5. It appears that all the eight household categories receive most of their income from factor remuneration. For the poorer households, such as landless, marginal farmers, rural non-farm poor households, and urban low educated households, unskilled labor appears to be the primary source of their income. In contrast, rural non-farm non-poor and high educated households receive most of their incomes from non-agricultural capital and skilled labor. For the large farmers, earning from land is the principal source of their income. These considerable differences in income sources for different households are expected to generate varying income and welfare effects when different policy shocks are introduced in the model.

Table 5: Shares of Household Incomes by Source, 2005 Estimates

	Labor Agri Unskilled	Labor Agri Skilled	Labor Non-Agri Unskilled	Labor Non-Agri Skilled	Capital	land	Water- body	Poultry	Cattle	Govt Transfer	Remittance	Total
Landless	0.033	0.013	0.295	0.202	0.285	0.031	0.011	0.004	0.013	0.050	0.065	1.000
Marginal Farmers	0.088	0.034	0.303	0.138	0.201	0.082	0.029	0.005	0.015	0.046	0.060	1.000
Small Farmers	0.105	0.041	0.182	0.125	0.184	0.173	0.061	0.004	0.018	0.047	0.061	1.000
Large farmers	0.149	0.058	0.120	0.082	0.004	0.358	0.119	0.003	0.014	0.040	0.052	1.000
Rural Non-farm	0.019	0.007	0.115	0.078	0.601	0.058	0.020	0.005	0.004	0.040	0.052	1.000
Urban Low Education	0.011	0.004	0.618	0.147	0.072	0.025	0.009	0.001	0.003	0.047	0.061	1.000
Urban High Education	0.005	0.002	0.015	0.480	0.369	0.033	0.012	0.001	0.001	0.036	0.047	1.000

Source: SAM 2005 of Bangladesh.

4.2. A CGE Analysis for the Bangladesh Economy

Computable general equilibrium models capture detailed accounts of the circular flows of receipts and outlays in an economy. It satisfies general equilibrium conditions in market simultaneously. Such models are useful to analyze associations between various agents of the economy.

In line with most of CGE models, the model has been solved in comparative static mode and provides an instrument for controlled policy simulations and experiments. Solution of each simulation presents complete sets of socio-economic, meso and macro level indicators such as activity/commodity prices, household incomes and expenditures, factor demand and supplies, gross domestic products, exports and imports, and household poverty situation. The model is calibrated to the SAM to exactly reproduce the base year values¹.

Activities: On the production side it is assumed that in each sector there is a representative firm that generates value added by combining labor and capital. A nested structure for production is 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 different factors. Factors are assumed to be fully mobile in the model. In the different production activities we assume that a representative firm remunerates factors of production and pays dividends to households.

¹ In calibration procedure, most of the model parameters are estimated endogenously keeping the various elasticity values fixed.

Households: They earn their income from production factors. They also receive dividends, intra-household transfers, government transfers and remittances. They pay direct income tax to the government. Household savings are a fixed proportion of total disposable income. Household demand is derived from a C-D utility function.

Firms: There is one representative firm which earns capital income, pays dividends to households and foreigners and pays direct income taxes to the government.

Foreign Trade: It is assumed that foreign and domestic goods are imperfect substitutes. This geographical differentiation is introduced 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 finite elasticity export demand function is assumed. It is assumed that foreign demand for Bangladeshi exports is less than infinite. In order to increase their exports, local producers must decrease their free on board (FOB) prices.

Government: The 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. The model accounts for indirect tax compensation in the case of a tariff cut or subsidy rise.

System Constraints and Equilibrium Conditions: There are four constraints in the system. The real constraint refers to domestic commodity and factor market; the nominal constraint represents two macro balances: the current account balance of the rest of the world and the savings-investment balance. Sectoral supply is a composite of imports and output sold in the domestic market. Composite demand, on the other hand, includes final demands (i.e. private and public consumption expenditure and investment) and intermediate input demand. Variations in the sectoral prices assure equilibrium between sectoral supply and demand. In the case of factor market, it is assumed that total quantities of factors supply are fixed. This specification also implies full mobility of labor factors across producing activities and variations in their returns (e.g. wages) assures equilibrium in the factor market. The inflows (transfers to and from domestic institutions) are fixed but imports and exports are determined endogenously in the model. Foreign savings is fixed in this model and exchange rate acts as numeraire. Finally, for the savings-investment equilibrium, the model treats the investment decision as given and hence savings has to adjust to ensure the equality to the fixed value of investment. The basic approach is to allow the savings propensity of one of the domestic institution to vary.

Simulation Set Up: Several simulations have been considered, and they are:

Simulation 1: **(RMG shock)** Fall in exports of woven and knit RMG from Bangladesh by 20 percent and fall in the export prices of woven and knit RMG by 10 percent

Simulation 2: **(Remittance Shock)** Fall in remittance by 20%.

V. Simulation Results

5.1. Simulation 1: RMG Shock

It has been mentioned before that the export basket in Bangladesh is highly concentrated and the RMG sector alone constitutes more than 75 percent of total exports. Therefore, the export sector is much vulnerable to any external shock. Current global financial crisis and the resultant economic downturn in the developed countries' markets have raised some serious concerns with respect to falling earnings from RMG exports from Bangladesh. Keeping this context in mind here we generate two simulations which entail some negative shock in the RMG sector in Bangladesh:

Table 6: Macroeconomic Effects of RMG Shock (% change from the base year value)

Variable	% change from the base year value
Real GDP	-0.62
Agriculture	0.15
Manufacturing	-2.12
Services	0.54
Consumer Price Index	0.22
Consumption	-0.44
Imports	-8.88
Exports	-14.79
Return to labor agri unskilled	0.45
Return to labor agri skilled	0.79
Return to labor non-agri unskilled	-1.24
Return to labor non-agri skilled	-0.90
Return to capital	-0.68
Return to land	-0.23
Return to water body factor	0.23
Return to poultry factor	1.13
Return to cattle factor	0.45

Note: 1. Real GDP is equal to the sum of consumption, investment, government consumption plus exports less imports in real terms for all sectors in the economy.

2. 2005 is the base year. Simulation outcomes are compared to base values.

Source: Author's calculations based on simulation results.

Macroeconomic effects: The macroeconomic impacts are reported in Table 6. It appears that the simulation results in loss in real GDP compared to the base run. Because of the negative shock in the WOVEN and KNIT RMG exports, the sectors which are predominantly export-oriented, manufacturing sector as a whole suffer from negative growth. On the other hand, agricultural and services sectors register some small positive growth. Consumer price index rises and aggregate consumption falls. Real exchange rate depreciates and imports and exports fall. The wage rates of agricultural labor rise while those of non-agricultural labor fall. Returns to non-agricultural capital and land fall while those for other agricultural capital rise.

Impact on Sectoral Prices and Output: The impacts on sectoral prices and sectoral output are reported in Table 7 and 8 respectively. The fall in export demand for WOVEN and KNIT RMG accounts for decline in the production in these two sectors by almost the similar

margins. This also leads to a decline in the production in the sectors which have strong linkages with WOVEN and KNIT RMG, such as MILL CLOTH and OTHER TEXTILE. It appears that as real exchange rate depreciates the import prices of the importables rise. This rise in import prices leads to fall in imports. Also because of the contraction of WOVEN and KNIT RMG sectors, the demand for imported raw materials decline which also contributes to reduction in import demand. The FOB export prices for WOVEN and KNIT RMG rise which indicate a loss in competitiveness of such exports from Bangladesh. Taking advantage of the depreciation of domestic currency, the exports from other export-oriented industries rise. But, such rise in exports from these sectors is not sufficient enough to increase the overall exports as these sectors have very low shares in the country's total exports. It also appears that there is a contraction of domestic demand for manufacturing and services products which is a result of falling incomes of the households. In such a situation the demand for agricultural and food products increase which lead to a greater production in these sectors.

Impact on Household Welfare: Consumer price indices (CPIs) for all household categories increase (Table 9). It is also observed that, nominal incomes of all household categories fall. This leads to fall in welfare and real consumption for all households. It appears that poorer households suffer more than the non-poor households.

Impact on Household Poverty: Household headcount poverty on average rises by 0.5 percentage point compared to the base-run. However, low education and rural non-farm household experience higher rise in head-count poverty. Also depth and severity of poverty rise.

Table 7: RMG Shock: Percentage Changes in Prices from the Base-run

	PD	PV	PX	PQ	PE FOB
Paddy	0.24	0.12	0.24	0.24	
Grains	0.64	0.36	0.64	2.17	
Other Crops	-0.24	-0.07	-0.18	-0.29	-0.79
Livestock	0.46	0.81	0.46	0.10	
Poultry	0.49	0.33	0.49	0.49	
Shrimp	-1.86	0.24	0.22	-1.86	-1.47
Other Fish	0.07	0.81	0.13	-0.30	-0.84
Rice Mill	-0.01	-0.75	-0.01	-0.20	
Grain Mill	1.13	-0.75	1.13	0.82	
Food	-0.99	-0.90	-0.26	-0.05	-1.07
Mill Cloth	0.82	-1.00	0.82	0.82	
Woven RMG	16.36	-0.95	1.12	15.84	2.60
Knit RMG	11.58	-0.76	1.13	5.67	2.60
Other Textile	-0.02	-1.07	0.12	2.06	0.78
Other Industry	0.20	-0.87	0.49	2.24	-0.89
Urban Construction	0.23	-0.84	0.23	0.23	
Rural Construction	-0.22	-0.70	-0.22	-0.22	
Public Construction	0.59	-0.97	0.59	0.59	
Utility	-0.53	-0.79	-0.53	-0.53	
Trade	-0.79	-1.02	-0.79	-0.79	
Transport	-0.53	-1.08	-0.53	-0.53	
Housing	-0.66	-0.70	-0.66	-0.66	
Education & Health	-0.56	-0.89	-0.56	-0.56	
Pub Admin	-0.49	-0.92	-0.49	-0.49	
Private Service	-0.68	-0.99	-0.68	-0.68	

Note: 1. PD = Domestic goods price, PV=Value-added price, PX=Aggregate output price, PQ=Price of composite goods, PE_FOB=FOB export price.

2. 2005 is the base year

Source: Author's calculations, based on simulation results.

Table 8: RMG Shock: Percentage Changes in Volumes from the Base-run

	M	X	E	Q	D
Paddy		0.56		0.18	0.56
Grains	-6.29	2.36		-1.05	2.36
Other Crops	-10.87	-0.90	8.25	-1.60	-1.01
Livestock	-7.85	1.00		0.97	1.00
Poultry		-0.33		-0.70	-0.33
Shrimp		8.27	15.85	3.86	4.26
Other Fish	-9.33	0.21	8.75	0.12	0.12
Rice Mill	-8.29	0.29		-0.03	0.29
Grain Mill	-6.85	0.00		-0.12	0.00
Food	-8.06	3.06	11.32	-0.03	2.10
Mill Cloth		-0.77		-1.14	-0.77
Woven RMG	-3.55	-21.42	-23.00	-15.10	-15.20
Knit RMG	-5.42	-22.92	-23.00	-5.88	-12.02
Other Textile	-21.07	-14.84	-7.56	-17.70	-14.98
Other Industry	-4.75	3.04	9.21	-0.72	2.66
Urban Construction		-0.72		-1.09	-0.72
Rural Construction		0.45		0.07	0.45
Public Construction		-0.06		-0.44	-0.06
Utility		-1.06		-1.44	-1.06
Trade		-0.33		-0.71	-0.33
Transport		-0.12		-0.49	-0.12
Housing		0.47		0.09	0.47
Education & Health		0.54		0.16	0.54
Pub Admin		-0.02		-0.40	-0.02
Private Service		0.33		-0.05	0.33

Note: 1. M =Imports, X=Domestic Output, E=Exports, Q= composite goods, D=Domestic Sales.

2. 2005 is the base year

Source: Author's calculations, based on simulation results.

Table 9: RMG Shock: Welfare Impact at the household level (percentage changes from the base-run)

Households	CPI	Nominal Income	EV	Real Consumption
Landless	0.26	-0.32	-0.50	-0.17
Marginal farmers	0.20	-0.15	-0.45	-0.14
Small farmers	0.21	-0.02	-0.46	-0.14
Large farmers	0.20	-0.20	-0.41	-0.11
Rural non-farm	0.22	-0.29	-0.45	-0.12
Urban low education	0.16	-0.57	-0.45	-0.13
Urban high education	0.08	-0.40	-0.27	-0.05

Note: CPI = Consumer Prices Index; EV = Equivalent Variation

Source: Author's calculations based on simulation results.

Table 10: RMG Shock: Poverty Impact at the household level (percentage changes from the base-run)

Scenarios	Landless	Marginal Farmer	Small Farmer	Large farmer	Non-agriculture	Low education	High education	All
Head-Count Poverty (P0)								
Base	62.6	56.2	37.2	17.1	44.9	44.5	10.6	40.1
RMG	63.1	56.7	37.4	17.3	45.7	45.3	11.2	40.6
Percentage point change from the base run	0.5	0.5	0.2	0.2	0.8	0.8	0.6	0.5
Poverty Depth (P1)								
Base	17.1	13.6	7.6	2.7	11.2	10.9	1.9	9.7
RMG	17.4	13.8	7.7	2.8	11.4	11.2	2	9.9
Percentage point change from the base run	0.3	0.2	0.1	0.1	0.2	0.3	0.1	0.2
Poverty Severity (P2)								
Base	6.3	4.6	2.1	0.7	3.8	3.8	0.5	3.3
RMG	6.4	4.7	2.2	0.7	4	3.9	0.6	3.4
Percentage point change from the base run	0.1	0.1	0.1	0	0.2	0.1	0.1	0.1

5.2. Simulation 2: Remittance Shock

It is clearly understood from Table 11 that remittance constitutes important shares in household incomes in Bangladesh. Therefore any negative shock in the inflow of remittance is likely to have important negative implications for household welfare and real consumption which will have adverse effect on the overall economy. It also appears from Table 9 that poorer households are more dependent on remittances than the non-poor households, which is likely to have varying impacts on different categories of households.

Table 11: Importance of Remittance in Households' Income

Household Categories	% of Remittance in Total Households Income
Landless	6.5
Marginal Farmers	6.0
Small Farmers	6.1
Large farmers	5.2
Rural Non-farm poor	6.4
Rural Non-farm non-poor	5.2
Urban Low Education	6.1
Urban High Education	4.7

Source: SAM 2005 of Bangladesh

With a view to explore the likely impacts of fall in inflow of remittance on Bangladesh economy we consider a scenario of a 20 percent fall in inflow of remittance. The macroeconomic, sectoral and welfare impacts are discussed below.

Table 12: Macroeconomic Effects of Remittance Shock

Variable	% change from the base year value
Real GDP	-0.10
Agriculture	-0.32
Manufacturing	1.50
Services	-0.85
Consumer Price Index	-1.61
Consumption	-1.17
Imports	-1.26
Exports	7.41
Return to labor agri unskilled	-2.10
Return to labor agri skilled	-2.10
Return to labor non-agri unskilled	-1.70
Return to labor non-agri skilled	-1.90
Return to capital	-1.80
Return to land	-1.80
Return to water body factor	-2.30
Return to poultry factor	-2.50
Return to cattle factor	-2.30

Note: 1. Real GDP is equal to the sum of consumption, investment, government consumption plus exports less imports in real terms for all sectors in the economy.

2. 2005 is the base year. Simulation outcomes are compared to base values.

Source: Author's calculations based on simulation results.

Macroeconomic effects: The macroeconomic impacts are reported in Table 12. A negative shock in remittance appears to have a negative impact on the growth of real GDP. At the broad sectoral level it leads to a negative growth both in the agricultural and services sectors. Despite the fall in consumer price index the aggregate consumption declines. This is a result of falls in nominal returns of all factors of production. The aggregate imports fall while that of exports rise. It appears that the wage rates agricultural labor decline more than those of non-agricultural labor. Also the returns of agricultural capital fall more than those of non-agricultural capital.

Impact on Sectoral Prices and Output: The impacts on sectoral prices and sectoral outputs are reported in Table 13 and Table 14 respectively. It appears that fall in household income leads to fall in demand for most of the goods and services in the economy. This results in fall in domestic prices of all goods and services. However, because of fall in factor prices the FOB export prices fall for all export-oriented activities both in agricultural and manufacturing sectors. Also the real exchange rate depreciated. This results in some expansion of the export-oriented sectors. But, except these export-oriented sectors, production in all other sectors decline. Also, there is a fall in demand for imports for all importing sectors except OTHER TEXTILE; the import of this sector rises because of the expansion of WOVEN and KNIT RMG.

Impact on Household Welfare: Nominal income of all household categories fall and the poorer households, both in the rural and urban areas, experience larger fall in nominal incomes (Table 15). Though the CPIs fall, the decline in nominal incomes are much larger

than the fall in CPIs, which results in welfare loss and fall in real consumption for all categories of households. Because of larger importance of remittance in their total income, the poorer households suffer more than non-poor households both the rural and urban areas.

Impact on Household Poverty: Household headcount poverty on average rises by 0.64 percentage points compared to the base-run. However, urban low education, rural non-farm household and rural marginal farmers experience higher rise in head-count poverty. Also depth and severity of poverty rise.

Table 13: Remittance Shock: Percentage Changes in Prices from the Base-run

	PD	PV	PX	PQ	PE_FOB
Paddy	-1.76	-1.95	-1.76	-1.76	
Grains	-1.66	-2.04	-1.66	-1.02	
Other Crops	-1.78	-1.89	-1.77	-1.68	-0.31
Livestock	-1.91	-2.19	-1.91	-1.91	
Poultry	-1.90	-2.47	-1.90	-1.90	
Shrimp	-2.55	-2.06	-1.81	-2.55	-0.39
Other Fish	-1.98	-2.27	-1.96	-1.98	-0.24
Rice Mill	-1.72	-1.77	-1.72	-1.65	
Grain Mill	-1.28	-1.77	-1.28	-1.26	
Food	-1.87	-1.78	-1.66	-1.49	-0.21
Mill Cloth	-1.23	-1.79	-1.23	-1.23	
Woven RMG	-4.07	-1.77	-1.30	-4.03	-0.63
Knit RMG	-5.78	-1.79	-1.15	-0.41	-1.12
Other Textile	-1.50	-1.80	-1.49	-0.84	-0.76
Other Industry	-1.47	-1.78	-1.39	-0.81	-0.17
Urban Construction	-1.43	-1.77	-1.43	-1.43	
Rural Construction	-1.61	-1.77	-1.61	-1.61	
Public Construction	-1.30	-1.75	-1.30	-1.30	
Utility	-1.70	-1.80	-1.70	-1.70	
Trade	-1.74	-1.80	-1.74	-1.74	
Transport	-1.61	-1.76	-1.61	-1.61	
Housing	-1.74	-1.77	-1.74	-1.74	
Education & Health	-1.72	-1.85	-1.72	-1.72	
Pub Admin	-1.70	-1.85	-1.70	-1.70	
Private Service	-1.73	-1.82	-1.73	-1.73	

Note: 1. PD = Domestic goods price, PV=Value-added price, PX=Aggregate output price, PQ=Price of composite goods, PE_FOB=FOB export price.

2. 2005 is the base year

Source: Author's calculations based on simulation results.

Table 14: Remittance Shock: Percentage Changes in Volumes from the Base-run

	M	X	E	Q	D
Paddy		-1.10		-1.10	-1.10
Grains	-3.30	-0.34		-1.50	-0.34
Other Crops	-2.75	0.48	3.18	0.26	0.45
Livestock	-3.99	-0.59		-0.60	-0.59
Poultry		-0.99		-0.99	-0.99
Shrimp		1.34	3.98	-0.04	-0.04
Other Fish	-4.31	-0.77	2.40	-0.80	-0.80
Rice Mill	-3.76	-1.05		-1.15	-1.05
Grain Mill	-3.25	-1.24		-1.27	-1.24
Food	-3.51	-0.27	2.15	-1.16	-0.55
Mill Cloth		-1.59		-1.59	-1.59
Woven RMG	-3.55	5.64	6.57	1.75	1.80
Knit RMG	-2.73	11.86	11.91	-2.21	5.10
Other Textile	4.77	6.87	7.90	5.93	6.85
Other Industry	-2.13	0.02	1.76	-1.01	-0.08
Urban Construc		-0.86		-0.86	-0.86
Rural Construc		-1.22		-1.22	-1.22
Public Construc		-1.46		-1.46	-1.46
Utility		0.03		0.03	0.03
Trade		-0.62		-0.62	-0.62
Transport		-0.85		-0.85	-0.85
Housing		-1.02		-1.02	-1.02

Edu & Health		-1.13		-1.13	-1.13
Pub Admin		-1.14		-1.14	-1.14
Pri Service		-0.93		-0.93	-0.93

Note: 1. M =Imports, X=Domestic Output, E=Exports, Q= composite goods, D=Domestic Sales.

2. 2005 is the base year

Source: Author's calculations, based on simulation results.

Table 15: Remittance Shock: Impact at the household level (percentage changes from the base-run)

Households	CPI	Nominal Income	EV	Real Consumption
Landless	-1.57	-2.91	-1.20	-1.20
Marginal farmers	-1.60	-2.87	-1.17	-1.18
Small farmers	-1.61	-2.91	-1.16	-1.17
Large farmers	-1.61	-2.82	-1.15	-1.17
Rural non-farm poor	-1.59	-2.93	-1.17	-1.18
Rural non farm non poor	-1.61	-2.67	-1.16	-1.17
Urban low education	-1.60	-2.79	-1.17	-1.18
Urban high education	-1.57	-2.62	-1.18	-1.16

Note: CPI = Consumer Prices Index; EV = Equivalent Variation

Source: Authors' calculations based on simulation results.

Table 16: RMG Shock: Poverty Impact at the household level (percentage changes from the base-run)

Scenarios	Landless	Marginal Farmer	Small Farmer	Large farmer	Non-agriculture	Low education	High education	All
Head-Count Poverty (P0)								
Base	62.60	56.20	37.20	17.10	44.90	44.50	10.60	40.10
Remittance shock	63.20	56.88	37.64	17.42	45.82	45.18	11.12	40.74
Percentage point change from the base run	0.60	0.68	0.44	0.32	0.92	0.68	0.52	0.64
Poverty Depth (P1)								
Base	17.10	13.60	7.60	2.70	11.20	10.90	1.90	9.70
Remittance shock	17.50	13.92	7.80	2.86	11.44	11.30	2.02	10.18
Percentage point change from the base run	0.40	0.32	0.20	0.16	0.24	0.40	0.12	0.48
Poverty Severity (P2)								
Base	6.30	4.60	2.10	0.70	3.80	3.80	0.50	3.30
Remittance shock	6.70	4.96	2.34	0.78	4.08	4.04	0.54	3.54
Percentage point change from the base run	0.40	0.36	0.24	0.08	0.28	0.24	0.04	0.24

VI. Conclusion

This study examines the impact of different economic policy simulation on Bangladesh economy in general and agricultural sector in particular using an economy-wide simulation model. The Social Accounting Matrix (SAM) of year 2005 has been used as the benchmark data base and a comparative static CGE model for Bangladesh economy has been employed to simulate for different policy scenarios. The results of the simulation exercises, in brief, are as follows:

A negative RMG export shock, incorporating both volume and a price shocks, was carried out. It appears that a negative shock in RMG exports, through fall in demand and fall in export price, would lead to a negative growth manufacturing sector as a whole as well as in real GDP. However, the agricultural sector experiences some expansion because of falling factor prices. The welfare, real consumption and poverty effects on households are negative and poorer households suffer most.

A negative growth in remittance would result in fall in real GDP. Agricultural sector as a whole would also suffer because of falling demand for agricultural commodities as a result of

fall in household incomes. The export-oriented sectors, however, would experience some expansion because of depreciation of real exchange rate as well as fall in FOB export prices. The poorer households appear to be the major victim of such a negative shock.