Global Financial Crisis, Remittances, Exports and Poverty in Bangladesh

Raihan, Selim

South Asian Network on Economic Modeling (SANEM), Department of Economics, University of Dhaka, Bangladesh

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Selim Raihan[1]

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[1] Associate Professor, Department of Economics, University of Dhaka, Bangladesh. selim.raihan@gmail.com.
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Abstract

This paper explores the impacts of reduced inflow of remittances and export earnings in the face of global financial crisis on the economy of Bangladesh. There is no denying the fact that remittances have emerged as a key driver of macroeconomic stability, economic growth and poverty reduction in Bangladesh. Also, Bangladesh experienced robust growth in export earnings, especially through the remarkable growth in readymade garments, over the last two decades. The study suggests that remittance plays a very important role in with regard to household well being measured by consumption level and their poverty incidence. The results from a CGE model suggest that a negative growth in remittance would result in fall in real GDP. The poorer households would appear to be the major victim of such a negative shock. Also a negative shock on the exports of readymade garments would decline real GDP and would lead to reduction in real return to labor. This would also lead to raise incidence of poverty. There is a growing apprehension in the country that due to global financial crisis, flow of international remittance to Bangladesh may likely to slowdown adversely affecting the economy and the household level welfare. Also, the export sectors might be at risk of facing the reduced world demand. Considering the important role of remittances and exports, appropriate policies by the government is very important to tackle the possible adverse situation.

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Selim Raihan

I. INTRODUCTION

The collapse of the United States sub-prime mortgage market and the subsequent international global financial crisis led economies of many developed and developing countries fall into serious downturn. Bangladesh, though not so much globalized financially, depends a significantly on foreign trade and international remittances. In recent years, the country's trade GDP ratio has been around 45 percent and the remittance-GDP ratio has turned to be 10 percent. 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 likely to have important implications on our export potentials. Similarly, there is likely to a negative impact on the export of Bangladeshi low-skilled manpower following ever declining oil price with potential depression in infrastructural development activities in the Middle-East.

International remittances are increasingly having crucial implications for economic growth and poverty reduction in Bangladesh. Bangladesh has observed a staggering growth in remittances at an average annual rate of 19 percent over the last three decades. Foreign exchange inflows in the form of remittances now exceed other types of foreign exchange inflows, particularly official development assistance and net earnings from exports. These remittances are sent by Bangladeshi migrant workers in different countries, especially in the Middle Eastern countries, USA, UK and other European countries and in the East Asian countries. Bangladesh is the fifth highest remittance-earning country in the world with migrants of about five million, mainly in Saudi Arabia, Kuwait, and Malaysia. A very high growth in remittance inflows in recent years (annual average growth of 27 percent during the financial years 2006 and 2008) has been instrumental in maintaining the current account surplus despite the fact that the trade deficit has increased over the years. This in turn has

helped Bangladesh maintaining a growing level of foreign exchange reserves. However, while the remittance growth in 2008 was an encouraging 37.3 percent, since August 2008 they showed a declining trend, as did the number of workers travelling overseas.

The sharp contraction in international trade activities that occurred as a result of the global financial crisis brought most of the export activities down during 2008 and 2009. 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 had been a decline in export earnings from RMG throughout 2009.

Against this backdrop, one of the objectives of this research is to examine the role of remittances in promoting economic growth, reducing poverty and supporting household income and consumption expenditure in Bangladesh. The examination also considers the impact of the global crisis on the employment of migrant workers and therefore their remittances, as the crisis can put the remittance flows at risk that can have a significant impact to poverty reduction. Therefore, the study examines the impacts of reduced inflows of remittances at the macro, sectoral and household level in the context of the Bangladesh economy using an economy-wide general equilibrium framework. In addition, this research explores the impacts of a negative shock on the exports in Bangladesh in the face of the ongoing global financial crisis. This is also done through a general equilibrium modeling framework.

II. RECENT STUDIES ON REMITTANCES

Raihan et al. (2009) explored the impact of remittances on poverty issues in Bangladesh. The analysis was conducted using two different methodologies: a computable general equilibrium model (CGE) and a micro level analysis of survey data. Under the first approach, the study explored the impact of a reduction in remittances on the poverty headcount ratio, the poverty gap index and the squared poverty gap index. Results indicate that the impact is stronger on the poverty headcount ratio than on the other measures and suggest that 1.7 out of the 9 percentage point reduction in poverty in Bangladesh during 2000-2005 was due to growth in remittances. Using the survey data the study shows that if the household receives remittances, the probability of the household becoming poor decreases by 5.9 percent.

The survey by IOM (2009) generated data from representative sample of 10,926 migrant households in Bangladesh. In general, the migrants were young. The migrants mostly sought low-skilled jobs and were migrated to mainly Middle-East and South East Asia. Generally the migrants were not poor. It was evident that the costs of obtaining the migrant contracts were 5 times the per capita GDP. The migrants were basically from middle class and lower middle class families and they tended to pay the migration cost by selling lands. On average migrants earned Tk 21,363 per month (6 times the GDP per capita in 2008-2009), although the majority (54.3 percent) earned between Tk 10,000 to 20,000 (2.8 to 5.6 times GDP per capita). Migrants saved 62 percent of their income on average and the amount they saved per month constituted 3.7 times the country's monthly GDP per capita. The migrants remitted, on average, Tk. 81,710 per annum, which was 1.9 times per capita annual GDP and 32 percent of migrants' average income. They remitted the money in three to four installments. The average amount remitted constituted 51 percent of migrants' average savings, suggesting a significant part of their savings was not remitted.

Hussain and Naeem (2010) used simple regression to find the key macroeconomic determinants of remittance in Bangladesh. Number of workers finding employment abroad every year, oil price, exchange rate and GDP growth were the key determinants of changes in the level of remittance inflow. The regression results suggest the following: (1) each additional migrant worker brings in $816 in remittances annually; (2) depreciation of exchange rate by one taka increases annual remittance by $18 million; (3) remittances are higher during periods of low economic growth; (4) the impact of oil price increase on Bangladesh's balance of payment is unfavorable. A dollar increase in oil price increases oil import payments by about $26 million whereas it increases remittances by $15 million. Thus the impact of a dollar increase in oil price on the balance of payments is a deficit of $11 million; (5) the amount remitted varies positively by the amount of income migrants earn, the duration of stay, and the level of education. The study also finds that the total local income of recipient households is on average 34 percent lower than non-recipient households. Remittances are mostly sent through banks (73 percent). Only 18 percent migrants reported using informal channels. It takes on average 8.6 days to receive remittances from banks and shorter (4.7 days) through informal channels. 87 percent receiving remittances through formal and informal channels reported not requiring to pay any fee and the other transaction costs (transport) are not very significant.

According to the OXFAM (2010) fears of reduction in remittances and large-scale return of migrants due to global financial crisis have proved largely unfounded. Countries with a high level of female migrants, such as the Philippines, have been particularly resilient. The Overall number of migrants going overseas from Indonesia actually increased by 54 percent (quarter to quarter) between September, 2008 and December, 2008. In Vietnam, some migrants tried to return home but could not find work as farmers because households no longer had sufficient productive land and agricultural incomes were too small. Many of them then returned to the cities. Nonetheless across the region, remittances went down, in part due to drops in male migration (for example, in Indonesia and many parts of the Pacific Islands28), and in part due to the fall in the US Dollar (for example, in the Philippines). For some households, the drop in remittances had a serious impact on their incomes, and consequently on food consumption.

Abella and Ducanes (2009) summarized the experiences from some Asian developing countries. According to their analysis Malaysia had more than 2.1 million registered foreign workers, 53 percent of whom were Indonesians, 15 percent Bangladeshis, 10 percent Nepalese, and 7 percent Indians. The official figures, as of September, 2008, appeared to grossly underestimate the number of retrenched foreign workers at less than 6000. The majority of those retrenched were from the manufacturing sector, which together with the services sector, was expected to be the hardest hit by the crisis. Thailand had some 1.8 million foreign workers mostly coming from neighboring Myanmar, Laos and Cambodia. Many were working in agriculture and fishing, food processing, construction, and various low-skill services. According to the Thailand Development Research Institute (TDRI), foreign workers in manufacturing –particularly factory work and food processing, and in agriculture – especially crop farming and animal husbandry, were the most vulnerable to be laid off. Singapore had about 900,000 foreign workers, about 30 percent of its total workforce. Of these, 143,000 were professionals from all over the world and the rest low-skilled workers mainly from other ASEAN countries and from China, India and Sri Lanka. The financial service company Credit Suisse projected that some 100,000 jobs in the manufacturing and services sectors would be lost in 2009. In Bangladesh, the effect of the crisis did not become manifest until January of 2009. Total reported emigration still rose by 5 percent from 2007 to 2008 to reach an all time high of 875 thousand workers. However the volume of emigration in the first month of 2009 was already 40 percent lower than the

monthly average from January to November 2008. Some of the decline can be attributed to causes other than the global crisis. Deployment to important destination countries like Malaysia, Kuwait and Saudi Arabia actually started declining in 2008 or even earlier for a variety of reasons, but these were more than offset by large worker flows to UAE and to Singapore. In recent years, annual labor emigration from Sri Lanka averaged over 200 thousand per year, with half of those for employment as housemaids. The government was especially concerned with the bleak economic outlook for UAE where an estimated 150 thousands Sri Lankans were employed. Until the end of 2008 the number of Sri Lankans reported to be laid off appeared insignificant, but the government expected the situation to become much worse.

III. REMITTANCES AND POVERTY IN BANGLADESH: REFLECTIONS FROM HOUSEHOLD DATA

With the aim of exploring the relationships between remittance and household poverty in Bangladesh the data from the Household Income and Expenditure Survey (HIES), conducted by Bangladesh Bureau of Statistics (BBS), are used. The latest HIES, conducted in 2005, includes comprehensive coverage of different income sources of households compared to the earlier rounds. The HIES 2005 obtained detailed information on household income, expenditure and consumption; poverty profile for both rural and urban; household level information on health status, educational level, standard of living by administrative division and other detailed data on socio-economic characteristics. In HIES 2005, household income in a particular period was defined as the sum of the earnings (wage and salaries, pensions, agricultural activities, land and property, business, professional fees, rent and gifts, remittances and all other types) of all members of the household in cash or kind in the same period of time. The HIES 2005 questionnaire contained nine separate sections. In section 8, under 'Other Assets and Income' the data on remittances were collected. It is found that in the HIES 2005 dataset only 905 households received international remittances among the 10080 household.

3.1. Poor and Non-Poor Households: Impact of Remittances

To examine whether the poor and non-poor households are participating directly in the migration process (and therefore receive remittances), a standard analysis is introduced by splitting the households into two groups, poor and non-poor households by using both the country's official poverty line and the $1.25 PPP poverty line. Table 1 indicates that according to the official poverty line incomes, in 2005 the head-count poverty for the country as a whole was 40 percent. However the rural poverty rate (43.8 percent) was much higher than the national poverty rate. The head-count poverty rates based on $1.25 per person per day appear to be substantially higher than the poverty rates based on national poverty line incomes, and the rural poverty rate is again much higher than the urban one.

Table 1: Head-count Poverty Rates among Rural and Urban Households (HIES 2005)

Official Poverty Line			$1.25 PPP poverty line		
Urban poor	**Rural poor**	**Total**	**Urban poor**	**Rural poor**	**Total**
28.4	43.8	40.0	73.29	90.64	84.31

Source: Calculated from HIES (2005)

For both the poor and non-poor groups, average total expenditure, average consumption expenditure and share of food consumption are compared among the households who received remittances and who didn't. Table 2 provides information for the poor households. Estimates based on the official poverty line incomes suggest that 8.87 percent of the poor households received remittances. The percentage of households receiving remittances is higher among the rural poor than the urban poor. The rural poor households have higher proportion of spending on food compared to the urban poor. It is evident that even among the poor households those who receive remittances, the average total expenditure and average consumption expenditures are much higher than those who do not receive remittances. The differences among these averages between the remittance recipient and non-recipient households appear to be statistically significant. However, the average share of food expenditure in total expenditure appears to be lower for the households who receive remittances compared to the non-recipient households and the differences among these averages also appear to be statistically significant. The crux of the aforementioned analysis points to the fact that remittances play in important role in raising the total expenditure and total consumption expenditure among the poor households. Also, the fact that the share of

food expenditure in total expenditure is lower for the remittance recipients even among the poor households, suggests that remittances have an effect in inducing the non-food expenditure more than the food expenditure among the poor households. Table 2 also provides a comparison among the households based on $1.25 PPP poverty line income. However, there is no uniform pattern of differences between the averages of expenditures for the remittance recipients and non-recipients households. Also, none of the differences in the averages are statistically significant.

Table 2: Expenditure of the Poor households: Impact of Remittances

	Official Poverty Line			$1.25 PPP poverty line		
	Urban Poor	Rural poor	Total	Urban poor	Rural poor	Total
Poor Households who didn't receive remittances						
Average total expenditure (in Taka)	5502	4031	4627	4991	4538	4684
Average consumption expenditure (in Taka)	5403	3969	4509	4927	4471	4618
Average share of food expenditure in total expenditure (%)	58.66	64.16	61.94	61.70	64.94	63.89
Poor Households who received remittances						
% of households receiving remittances	7.78	12.52	8.87	7.86	9.71	9.12
Average total expenditure (in Taka)	5584**	4159**	4660*	4685	4442	4508
Average consumption expenditure (in Taka)	5434**	4008*	4549*	4657	4350	4434
Average share of food expenditure in total expenditure (%)	57.19*	62.89*	60.89*	61.31	64.22	62.70

Note: *, ** and *** indicate whether the averages for the remittance recipient households are different from the averages for the non-recipient households at 10%, 5% and 1% level of significance respectively.

Source: Calculated from HIES (2005)

Table 3 presents information for the non-poor households, and a comparison is made among the households who received remittances and who didn't. It appears that compared to their urban counterparts, the rural households spent higher proportion of their total expenditure on food. The percentage of households receiving remittances is also higher among the rural households. Figures based on the official poverty line income indicate that the average total expenditure and average consumption expenditures are much higher for those households who received remittances than those who didn't. Like the poor households, in the case of non-poor households, the average percentage share of food expenditure in total expenditure is lower for the households who received remittances than who didn't, indicating to the possibility of the fact the remittances might have increased the non-food expenditure more than the food expenditure for the non-poor households . However, it is important to note that the differences in the averages are statistically significant only for the urban non-poor

households. Similar results are observed for the urban non-poor households based on the $1.25 PPP poverty line income. For the rural non-poor households the differences in the average expenditures based on$1.25 PPP poverty line income are not statistically significant.

Table 3: Expenditure of the Non-Poor households: Impact of Remittances

	Official Poverty Line			$1.25 PPP poverty line		
	Urban Non-poor	Rural Non-poor	Total	Urban non-poor	Rural non-poor	Total
Non-Poor Households who didn't receive remittances						
Average total expenditure (in Taka)	9042	6079	7102	14448	12687	13778
Average consumption expenditure (in Taka)	8699	5880	6854	13736	11777	12991
Average share of food expenditure in total expenditure (%)	55.49	62.43	60.05	40.62	45.44	42.15
Non-Poor Households who received remittances						
% of households receiving remittances	8.19	9.50	9.05	7.85	8.44	8.22
Average total expenditure (in Taka)	10410***	5599	7090	17822**	12452	15880
Average consumption expenditure (in Taka)	9882**	5380	6775	16583**	11039	14578
Average share of food expenditure in total expenditure (%)	53.89*	62.09	59.48	40.13	40.45	40.56

Note: *, ** and *** indicate whether the averages for the remittance recipient households are different from the averages for the non-recipient households at 10%, 5% and 1% level of significance respectively.

Source: Calculated from HIES (2005)

3.2. Impact of Remittances on the Middle Class Households

In the context of the role of middle class as a source of entrepreneurship and engine of growth, this study also tries to explore the impact of remittances on the middle class households. In order to find out the middle class households, the households in the Household Income and Expenditure Survey data are classified into three groups by using the clustering method. The clustering is done by using (i) total expenditure variable and (ii) percentage of food consumption in the total consumption expenditure, i.e. the food share variable. The cluster 2 is supposed to be the middle class in both cases, whereas the clusters 1 and 2 are for the households of lower class and upper class respectively. Table 4 provides an analysis based on the total expenditure variable. Table 4 suggests that the percentage of households receiving remittances is the highest for the middle class households (cluster 2) among the three clusters. Within the middle class households, the average total expenditure and average consumption expenditure are higher for those who receive remittances than those who do not. Also the share of food expenditure in total expenditure is lower for the remittances recipients

among the middle class households. This pattern is also true for households in other two clusters. However, it appears that the differences in the average for total expenditure and total consumption expenditure between remittance recipients and non-recipients are statistically significant only for the households in cluster 1 and cluster 2.

Table 4: Clustering Based on Total Expenditure Variable

	3-Group Clustering		
	Cluster 1	**Cluster 2**	**Cluster 3**
Households who didn't receive remittances			
Average total expenditure (in Taka)	2480	4568	11115
Average consumption expenditure (in Taka)	2462	4503	10668
Average share of food expenditure in total expenditure (%)	67.81	63.56	50.64
Households who received remittances			
% of households receiving remittances	9.31	9.32	8.32
Average total expenditure (in Taka)	2538**	4620*	11825
Average consumption expenditure (in Taka)	2520**	4657*	11118
Average share of food expenditure in total expenditure (%)	67.52	63.32	49.14

Note: *, ** and *** indicate whether the averages for the remittance recipient households are different from the averages for the non-recipient households at 10%, 5% and 1% level of significance respectively.

Source: Calculated from HIES (2005)

However, when the clustering is done based on the share of food consumption in the total expenditure, the average total expenditure appears to be lower for the remittance-recipients than that of the non-recipients within the households in cluster 2. However, none of the differences in the averages appear to be statistically significant.

Table 5: Clustering Based on the Share of Food Consumption Expenditure in Total Expenditure

	3-Group Clustering		
	Cluster 1	**Cluster 2**	**Cluster 3**
Households who didn't receive remittances			
Average total expenditure (in Taka)	3854	5032	9553
Average consumption expenditure (in Taka)	3841	4982	9070
Average share of food expenditure in total expenditure (%)	74.53	62.36	44.04
Households who received remittances			
% of households receiving remittances	9.05	8.97	9.02
Average total expenditure (in Taka)	3823	4925	9931
Average consumption expenditure (in Taka)	3812	4663	9247
Average share of food expenditure in total expenditure (%)	74.57	62.23	43.78

Note: *, ** and *** indicate whether the averages for the remittance recipient households are different from the averages for the non-recipient households at 10%, 5% and 1% level of significance respectively.

Source: Calculated from HIES (2005)

IV. POSSIBLE IMPACTS OF THE GLOBAL CRISIS THROUGH A FALL IN REMITTANCES: A CGE SIMULATION APPROACH

In order to have a systematic analysis of the impact of a negative shock on remittances an economy-wide general equilibrium modeling approach is undertaken. The CGE model for the Bangladesh economy uses the Social Accounting Matrix (SAM) 2005 as the base data.

4.1. Social Accounting Matrix for the Economy of Bangladesh

The SAM 2005 for Bangladesh identifies the economic relations through several accounts: total domestic supply of 23 commodities; activity accounts for 23 sectors (here commodities and activities are synonymous); 6 factors of productions (4 labor types and 2 capital categories); current account transactions between 3 institutional agents – households, government and the rest of the world; household account includes 7 representative groups (5 rural and 2 urban); there is one consolidated capital account. The structure of the Bangladesh SAM is described in Table 6.

Table 6: Description of Bangladesh SAM Accounts for 2005

Set	Description of Elements
Activities	
Agriculture (7)	Paddy, Grains, Other Crops, Livestock, Poultry, Shrimp, Other Fish
Industries (9)	Rice Milling, Grain Milling, Other Food, Mill Clothing, Woven Ready Made Garments, Knitwear Ready Made Garments, 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 (7)	Rural: Landless, marginal farmers, small farmers, large farmers, and non-farm Urban: low educated and high educated
Others (3)	Government, Rest of the World
Factors of production	
Labor (4)	Agricultural labor unskilled, agricultural labor skilled, non-agricultural labor unskilled and non-agricultural labor skilled
Capital (2)	Non-agriculture capital and agricultural capital

The basic structure of the 2005 Bangladesh SAM is summarized in Table 7. 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 7: Structure of SAM 2005 of Bangladesh

	Import Penetration Ratio	Import Share	Export Orientation Ratio	Export Share	Value addition Share
Paddy	0.00	0.00	0.00	0.00	5.84
Grains	38.80	2.46	0.00	0.00	0.40
Other Crops	5.17	3.21	1.12	1.11	7.31
Livestock	0.41	0.07	0.00	0.00	2.05
Poultry	0.00	0.00	0.00	0.00	0.42
Shrimp	0.00	0.00	33.92	4.52	0.89
Other Fish	0.02	0.01	1.11	0.56	3.51
Rice Mill	3.34	2.07	0.00	0.00	2.18
Grain Mill	1.19	0.07	0.00	0.00	0.30
Food	15.34	6.78	11.06	6.95	2.22
Mill Cloth	0.00	0.00	0.00	0.00	1.00
Woven RMG	0.18	0.06	80.26	42.72	2.29
Knit RMG	8.42	1.84	99.32	33.48	1.26
Other Textile	42.66	17.55	1.94	0.77	1.54
Other Industry	39.94	65.89	5.94	9.89	7.09
Urban Construction	0.00	0.00	0.00	0.00	1.89
Rural Construction	0.00	0.00	0.00	0.00	5.70
Public Construction	0.00	0.00	0.00	0.00	0.61
Utility	0.00	0.00	0.00	0.00	2.09
Trade	0.00	0.00	0.00	0.00	15.27
Transport	0.00	0.00	0.00	0.00	10.80
Housing	0.00	0.00	0.00	0.00	8.39
Education & Health	0.00	0.00	0.00	0.00	4.77
Public Admin	0.00	0.00	0.00	0.00	2.72
Private Service	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 8. It appears that all the 7 household categories receive most of their income from factor remuneration. For the poorer households, such as landless, marginal farmers and urban low educated households, unskilled labor appears to be the primary source of their income. In contrast, rural non-farm and urban high educated households receive most of their incomes from non-agricultural capital and skilled labor. For the large farmers, earning from agricultural capital 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. It appears that on average remittance constitutes more than 6 percent of the household income. The landless households however have a higher share of remittance (6.5 percent) into their income. In the urban area, the contribution of remittance money to household income is higher for the low-educated households than the high educated ones.

Table 8: Shares of Household Incomes by Source, 2005 Estimates

	Labor Agri Unskilled	Labor Agri Skilled	Labor Non-Agri Unskilled	Labor Non-Agri Skilled	Non-agri capital	Agri capital	Govt Transfer	Remittance	Total
Landless	0.033	0.013	0.295	0.202	0.285	0.057	0.050	0.065	1.000
Marginal Farmers	0.088	0.034	0.303	0.138	0.201	0.13	0.046	0.060	1.000
Small Farmers	0.105	0.041	0.182	0.125	0.184	0.255	0.047	0.061	1.000
Large farmers	0.149	0.058	0.120	0.082	0.004	0.495	0.040	0.052	1.000
Rural Non-farm	0.019	0.007	0.115	0.078	0.601	0.088	0.040	0.052	1.000
Urban Low Education	0.011	0.004	0.618	0.147	0.072	0.04	0.047	0.061	1.000
Urban High Education	0.005	0.002	0.015	0.480	0.369	0.046	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 values[2].

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.

Households earn their income from production factors. They also receive 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.

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.

The government receives direct tax revenue from households 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.

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

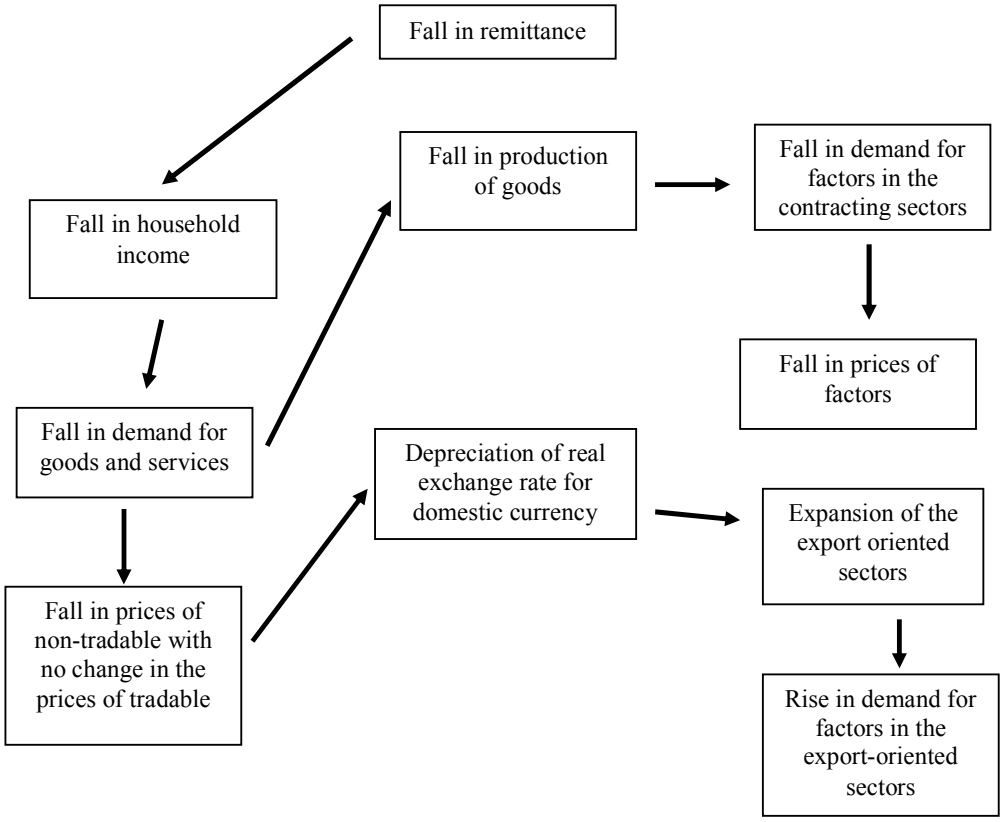
[2] In calibration procedure, most of the model parameters are estimated endogenously keeping the various elasticity values fixed.

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.

4.3. Simulation and Simulation Results

In the face of the global financial crisis, a scenario of a fall in remittance by 20 percent is simulated. It is clearly understood from Table 8 that remittances constitute 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 8 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. The macroeconomic, sectoral and welfare impacts of a fall in remittance by 20 percent are discussed below. The channels thorough which a remittance shock can affect sectoral prices and output are shown in Chart 1.

Chart 1: Channels through which Remittance Shock affects Sectoral Prices and Output



The macroeconomic impacts are reported in Table 9. A negative shock in remittance appears to have a negative impact on real GDP, where real GDP would fall by 0.1 percent. At the broad sectoral level it would lead to a negative impact both in the agricultural and services sectors. Despite the fall in consumer price index the aggregate consumption would decline. This is a result of decline in nominal returns to all factors of production. The aggregate imports would fall while that of exports would rise. It appears that the wage rates agricultural labor would decline more than those of non-agricultural labor. Also the returns of agricultural capital would fall more than those of non-agricultural capital.

Table 9: 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 agricultural unskilled	-2.10
Return to labor agricultural skilled	-2.10
Return to labor non- agricultural unskilled	-1.70
Return to labor non- agricultural skilled	-1.90
Return to non-agricultural capital	-1.80
Return to agricultural capital	-2.10

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.

The impacts on sectoral prices and sectoral outputs are reported in Table 10 and Table 11 respectively. It appears that fall in household income would lead to fall in demand for most of the goods and services in the economy. This would result 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 would depreciate. This would result in some expansion of the export-oriented sectors. But, except these export-oriented sectors, production in all other sectors would decline. Also, there would be a fall in demand for imports for all importing sectors except other textile; the import of this sector would rise because of some expansion of woven and knit RMG.

Table 10: 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	
Public Administration	-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 11: 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 Construction		-0.86		-0.86	-0.86
Rural Construction		-1.22		-1.22	-1.22
Public Construction		-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
Education & Health		-1.13		-1.13	-1.13
Public Administration		-1.14		-1.14	-1.14
Private 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.

Nominal income of all household categories would fall and the poorer households, both in the rural and urban areas, would experience larger fall in nominal incomes (Table 12). Though the CPIs fall, the decline in nominal incomes are much larger than the fall in CPIs, which would result 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.

Table 12: 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	-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: Author's calculations based on simulation results.

Household headcount poverty on average would rise by 0.64 percentage points compared to the base-run (Table 13). However, urban low education, rural non-farm household and rural marginal farmers would experience higher rise in head-count poverty. Also depth and severity of poverty would rise for all household categories.

Table 13: 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

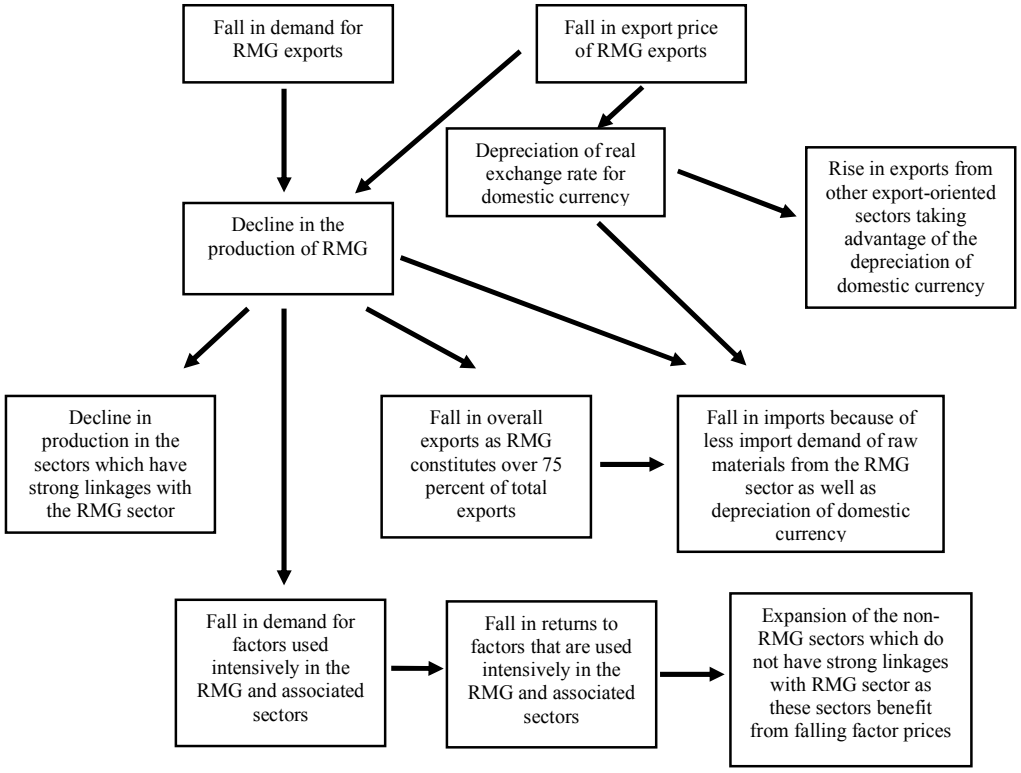
Source: Author's calculations based on simulation results.

V. POSSIBLE IMPACTS OF THE GLOBAL CRISIS THROUGH A FALL IN EXPORTS

The sharp contraction in international trade activities that occurred as a result of the global financial crisis could have negative implications for the export activities. 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 during the period of the crisis. 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. Therefore, the export sector is much vulnerable to any external shock. Any negative shock to the RMG sector will have a profound impact on the economy and the welfare and poverty of the households of the country. 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 a scenario which entails a negative shock in the RMG sector in Bangladesh. This simulation is conducted using the same CGE model as described in Section IV. The simulation considers a 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. The channel of the impact of a negative shock in the RMG exports is demonstrated in Chart 2.

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



The macroeconomic impacts are reported in Table 14. 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 agricultural would fall.

Table 14: 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 agricultural unskilled	0.45
Return to labor agricultural skilled	0.79
Return to labor non- agricultural unskilled	-1.24
Return to labor non- agricultural skilled	-0.90
Return to non- agricultural capital	-0.68
Return to agricultural -capital	-0.23

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.

The impacts on sectoral prices and sectoral output are reported in Table 15 and 16 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 competiveness 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.

Table 15: Percentage Changes in Prices from the Base-run: RMG Shock

	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	
Public Administration	-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 16: Percentage Changes in Volumes from the Base-run: RMG Shock

	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
Public Administration		-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.

Consumer price indices (CPIs) for all household categories increase (Table 17). 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.

Table 17: Welfare Impact at the household level (percentage changes from the base-run): RMG Shock

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.

Household headcount poverty on average rises by 0.5 percentage point compared to the base-run (Table 18). However, low education and rural non-farm household experience higher rise in head-count poverty. Also depth and severity of poverty rise.

Table 18: Poverty Impact at the household level (percentage changes from the base-run): RMG Shock

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
RMG	63.10	56.70	37.40	17.30	45.70	45.30	11.20	40.60
Percentage point change from the base run	0.50	0.50	0.20	0.20	0.80	0.80	0.60	0.50
Poverty Depth (P1)								
Base	17.10	13.60	7.60	2.70	11.20	10.90	1.90	9.70
RMG	17.40	13.80	7.70	2.80	11.40	11.20	2.00	9.90
Percentage point change from the base run	0.30	0.20	0.10	0.10	0.20	0.30	0.10	0.20
Poverty Severity (P2)								
Base	6.30	4.60	2.10	0.70	3.80	3.80	0.50	3.30
RMG	6.40	4.70	2.20	0.70	4.00	3.90	0.60	3.40
Percentage point change from the base run	0.10	0.10	0.10	0.00	0.20	0.10	0.10	0.10

VI. CONCLUSION AND POLICY IMPLICATIONS

Remittance plays a very important role in Bangladesh with regard to household well being measured by consumption level and their poverty incidence. Analysis using household survey data suggests that the even among the poor households those who receive remittances experience higher level of consumption than the non-recipient households. The results from a CGE model suggest that 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 would appear to be the major victim of such a negative shock. Considering the important role of remittance, appropriate policies by the government is very important to tackle this adverse situation. Bilateral negotiations to find out new markets as well as remove existing negotiation problem is very important. Government announced several stimulus packages to mitigate the adverse impact of global financial crisis. Some of the resources may be used to support the returning migrants of global crisis through financial support, retraining and other technical assistances such that

they would be ready to migrate once the global economic situation is improved. Government may provide extra incentives to the remitters. The government may initiate new programmes to maximize the benefits and reduce the risks of remittances to improve the welfare of migrant workers and their families, especially poor rural households by providing institutional support for the promotion of formal and semi-formal remittance services and other support services taking advantage of Bangladesh's well-established microfinance network. The potential services of such programme may include: (i) encourage increased remittance inflow through formal and semi-formal channels by providing low cost but reliable formal and semi-formal remittance financial services; (ii) enhanced knowledge, awareness and use among the migrant workers and their families about formal and semi-formal remittances and other financial and non-financial services; (iii) promote better investment opportunities for sustainable and productive use of remittance incomes via investment opportunity development, microenterprise development and enterprise development support.

It also 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. The government also announced several stimulus packages for the export sectors. However, the government's stimulus package had some problems. In particular, the RMG sector complained about its complete exclusion from the cash incentives. It is also important to note that majority of the stimulus were short-term fix aimed at ensuring the survival of these sectors rather than enhancing their long-term competitiveness and productivity. It should also be noted that reduced orders for RMG means that smaller firms and in particular subcontracting firms will be the most severely affected. These sub-sectors have not been identified for more focused government aid.

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