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Remittances, Trade Liberalisation, and Poverty in Pakistan: The Role of Excluded Variables in Poverty Change Analysis

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ABSTRACT

This study attempts to assess the impact of two shocks—trade liberalisation and a decline in remittances from abroad—on poverty in Pakistan using a CGE framework. It is found that tariff reduction in the absence of a decline in remittances reduces poverty, as measured by the head count, poverty gap, and severity ratios (FGT indicators) in both the rural and urban areas of Pakistan. In terms of welfare, all households appear to gain. The results show that the gain in welfare is larger for urban households than for rural households. In addition, poverty reduced by a larger percentage in urban households than in rural households. We conclude from this that trade liberalisation reduces the gap between urban and rural households.

In a second set of experiments, it was found that trade liberalisation in the presence of a decline in remittances reduces welfare in urban households but rural households still show an increase over the base year. According to all FGT indicators, poverty increases in urban households but not in rural households. The combined shock is more harmful to households in the urban areas than for households in the rural areas. However, this welfare gain and reduction in poverty level in rural households is less than the welfare gain and poverty reduction in the presence of trade liberalisation only. Aggregate statistics show that the negative impact of remittance decline dominates the positive impact of trade liberalisation in urban areas. On the other hand, in the case of rural areas, the positive impact of trade liberalisation dominates the negative impact of a decline in remittances. It shows that the decline in remittance inflows is a major contributory factor in explaining the increase in poverty in Pakistan.

I. INTRODUCTION

With a view to protect its nascent industries against imports, Pakistan has pursued protectionist trade policies since 1950s. The industries enjoyed quite high levels of protection in the 1950s, 1960s, and 1970s. Only in the 1980s, protection rate started falling. The import regime comprised both the tariff and non-tariff barriers. The latter included outright bans, quota restrictions, and imports allowed to specific users through an elaborate licensing system. These policies led to wasteful use of resources by encouraging import substitution even in those industries where the country did not have even the long-run comparative advantage. Consequently, distortion in the resource allocation adversely affected the country's economic and social conditions. Inefficiency in resource use has been one of the factors in the slow growth of out put that has led to high levels of poverty in Pakistan.[1] This calls for changes in policies and incentives and the market mechanism that help to reduce poverty.

Pakistan adopted trade liberalisation policies in 1981 by reducing quantitative restrictions and rationalising the tariff structure. Removal of the import restrictions has a two-fold impact on poverty.[2] The first effect is that a move towards free trade would increase the returns to the factor of production, which is abundant in the country. In case of Pakistan, labour is abundant factor. Second, the reduction in import duties especially on raw materials and machinery is expected to result in reduced cost of production and a reduction in prices. Similarly, reduction in import duties on consumer goods implies the reduction in the prices of imported finished products and import substitution activities. This would help in increasing real incomes. Tariff reduction, therefore, is expected to help in an improvement in aggregate welfare and reduction in poverty.

The empirical evidence on poverty and income inequality in Pakistan, however, contradicts the optimism of the proponents of globalisation. Pakistan has experienced a rise in poverty and income inequality during the period of trade liberalisation. However, such an outcome may be defensible in the view of the fact that along with the liberalisation in imports, Pakistan has also experienced a slow down in the inflow of remittances. The reduction in remittance inflow reduces the incomes of households and puts a pressure on the exchange rate resulting in reduction in the inflow of imports despite a reduction in import duties. Therefore, without incorporating remittances in the analysis to explore the impact of trade liberalisation on poverty, the results may be biased. In this study, we include decline in remittances in presence of trade liberalisation for poverty change analysis. Poverty is expected to decline if the impact of trade liberalisation dominates the impact of decline in remittances, but would tend to rise if the impact of the reduction in remittances dominates.

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[1] One-third population still lives below poverty line.

[2] The Stopler-Samuelson theorem suggests that the per capita income differentials due to existing factor endowment differentials tend to disappear over time after trade liberalisation [for detail see Krugman and Obstfeld (1994)].

Present study intends to assess the impact of two phenomenons on poverty by exploring the question: whether trade liberalisation or decline in remittances or both are responsible for the increase in poverty and inequality in Pakistan? The examination is done through the computable general equilibrium framework. The model used in this study is closely related to previous CGE Models built in different studies [see Decaluwe, *et al*. (1999)]. This paper presents a similar model that is developed for trade policy analysis in Pakistan under Micro Impact of Macro Adjustment Policies (MIMAP) project by Siddiqui and Zafar (1999) and extended in the latter studies for MIMAP [see Siddiqui, *et al*. (1999) and Kemal, *et al*. (2002)].

The plan of the study is as follows. The next section reviews the economy of Pakistan with particular reference to trade policies, structure of trade, remittance inflow and poverty level in Pakistan. Section III summarises results of the studies focusing on trade liberalisation and remittances. Section IV explores the linkages between trade liberalisation, remittances and poverty levels. Section V presents data for the base year and methodology employed in the study. Section VI elaborates on the model used. The results of the analysis are presented in Section VII and Section VIII concludes the paper.

II. REVIEW OF ECONOMY

(a) Trade Policies

Pakistan has maintained a complex system of trade policy regime since 1952. Import bans, quota, licensing requirements, other restrictions[3] imposed to protect the domestic industry, and high tariffs have introduced serious distortions. The high tariffs imposed for protecting domestic industries and to raise the revenues, have become counter-productive. They have resulted in smuggling and corruption. Neither the revenue nor the protection objectives were achieved. Besides, until the mid 1980s, the non-tariff restrictions have remained binding, as the prices of imported goods, in general, have been higher than the landed cost. In 1981, about 41 percent of industrial value added was protected by import bans and another 22 percent by various forms of import restrictions [Kemal, *et al*. (1994)].

Pakistan has initiated reforms in the trade regime in the early 1980s, with a view to creating an efficient and competitive manufacturing industry through an easy access to raw material, intermediate goods and machinery. The trade policy has been gradually liberalised and the producers have been exposed to the global market as it strives to make the local industry efficient and competitive. In the 1980s quota restrictions were removed and in the 1990s Restricted List was eliminated and those items that were to be restricted due to Health and Safety Requirements and Procedural Requirements have been added to the Negative List. For protecting the industries, tariff is being used instead of quantitative restrictions (QRs). The tariff structure has also been rationalised. During 1983-84 to 1993-94, 724 items were removed from the Negative List. Over all, the number of

[3]Import of capital goods was restricted through licensing, value limit and specificity of importers [World Bank (1989)].

intermediate goods, consumer goods and capital goods on the negative list were reduced from 142 to 16, 32 to 7 and 221 to 107, respectively. At present negative list comprise only 62 products and these mostly on religious, environmental, security and health grounds. Import licensing has gradually declined since 1981. And by the year 1993, it was eliminated. Now only an insignificant portion of total imports is subject to quantitative restrictions (QRs).[4] All these changes resulted in a decline in protection rates.

Table 1 analyses the implicit nominal protection rate (NPRI) that takes into consideration the tariff equivalent of quota and the explicit nominal protection rate (NPRE). It shows that the percentage of industries where NPRI>NPRE fell from 34.4 percent to 2 percent of manufacturing industries over 1981-91 period. This indicates that quota restrictions were almost non-existent in the later period. Table 1 also shows that NPRI fell short of NPRE, i.e., tariffs were prohibitively high, for 71.7 percent of the industries in 1990-91 compared to 57.8 percent in 1980-81 and the percentage of industries where tariffs were the binding constraints have increased from 7.8 percent to 26.3 percent industries over 1981-91. In the presence of non-tariff barriers, the tariffs play a minor role. However, with the removal of non-tariff barriers the protection levels becomes transparent. During the adjustment period tariffs have played a larger role in providing protection to industries.

Table 1

Industries Protected by Tariff and Non-tariff Barriers

	Percentage of Industries	
Nominal Protection	1980-81	1990-91
NPRI > NPRE	34.4	2.0
NPRI < NPRE	57.8	71.7
NPRI = NPRE	7.8	26.3

Source: Kemal, *et al*. (1994).

After reducing QRs, GOP focused on a rationalisation of the tariff structure; reducing tariff rates and their dispersion. During 1988-91, tariffs were reduced on 1134 items and increased on 462 items. The maximum tariff rate was reduced from 225 percent to 100 percent. It was further reduced to 65 percent in June 1995. The number of tariff slabs was reduced from 17 to 10 during the same period. Recently, the maximum tariff rate was reduced to 25 percent except for automobiles and alcoholic drinks and the number of tariff slabs has been reduced to four [Pakistan (Various Issues)].

Tariff rationalisation during 1987-88 to 1997-98, resulted in a decline in tariff rates on all categories of imports. On final capital goods, the tariff rate declined from 19.5 percent to 8.3 percent, on final consumer goods from 24.6 percent to 11.1 percent, on raw

[4]The banned items, on the "Negative List", also include some textiles products such as woven cotton fabrics, woven synthetic fabrics, bed linens, curtains, certain knitted fabrics and apparel items, tents, carpets and textiles floor coverings. However, all of these have been removed in 2001.

material for capital goods from 31.9 percent to 19.3 percent and on raw material for the consumer goods from 19.5 to 16.2 percent. The average tariff rate was reduced by 55 percent, from 22.2 percent in 1987-88 to 11.97 percent in 1999-2000 (see Table 2).

Table 2

Tariff Structure by Commodity Group (Percentages)

	Final Imports of		Raw Material		
Years	Capital Goods	Consumer Goods	Capital Goods	Consumer Goods	Average Tariff Rate
1980-81	32.15	28.42	34.06	13.79	22.06
1984-85	15.02	17.66	94.09	12.94	19.19
1987-88	19.54	24.56	31.92	19.53	22.22
1988-89	18.55	14.32	24.38	18.38	17.37
1989-90	19.77	11.53	23.32	20.12	17.48
1994-95	12.48	13.90	31.56	20.85	17.84
1997-98	8.31	11.10	19.27	16.22	13.30
1999-00	–	–	–	–	11.97

Source: Data on imports and tariff revenue are taken from various issues of *CBR Year book* [Pakistan (Various Issues)] and *Economic Survey* [Pakistan (Various Issues)].

(b) Structure of Trade

Like most of the developing countries, Pakistan is dependent on agricultural-based exports. For a diversification of exports, it has to rely on the imported raw materials, machinery, and capital goods for industrialisation. A comparison of the structure of trade during the eighties and nineties shows that the composition of imports by economic classification has not changed much over twenty years in spite of trade liberalisation. The share of imported capital goods in total imports has increased from 28 percent in 1980-81 to 37 percent in 1985-86, but due to a slow down in the economy especially in the industrial sector, import of capital goods declined to 25 percent by 2000-01. The share of raw materials for consumer goods also shows a declining trend over the whole period, it declined from 50 percent in 1980-81 to 40 percent in 1985-86, but since then it has increased to 55 percent by 2000-01. On the other hand share of imported inputs for capital goods has remained less than 10 percent through out the period. The share of imports of final consumer goods increased from 14 percent to 18 percent over 1980-86 period and in the next 15 years its share has declined to 14 percent (see Table 3).

The structure of exports show significant changes over time. The share of exports of primary goods, in 2001 is less than one-third of the 1980-81 level. The share of exports of semi-manufactured goods has increased from 11 percent to 24 percent over the 1980-81 to 1990-91 period, but declined to 15 percent in the subsequent period. The exports of manufactured goods, however, show a consistently rising trend, its share increases from 45 percent to 72 percent over the 20 years period. (see Table 3).

Table 3

Share of Imports by Economic Classification (Percentages)

	Imports of					Exports			
	Capital Goods	Raw Material for		Consumer Goods	Total	Primary	Semi-manufactured	Manufac-tured	Total
Years		Capital Goods	Consumer Goods						
1980-81	28	8	50	14	100	44	11	45	100
1985-86	37	5	40	18	100	35	16	49	100
1990-91	33	7	44	16	100	19	24	57	100
1995-96	35	6	45	14	100	16	22	62	100
1999-00	31	6	47	16	100	12	18	70	100
2000-01	25	6	55	14	100	13	15	72	100

Source: Economic Survey [Pakistan (Various Issues)].

Reductions in quantitative restrictions (QRs), reductions in tariff rates, increase in imports, increase in exports, the sum of exports and imports as a percentage of GDP are the usual indicators used to measure degree of openness. QRs were almost non-existent in 1990s. On average the tariff rate declined by 55 percent during 1981-2001. It is important to note that in spite of the reduction in trade restrictions, imports as a percentage of GDP show a declining trend over the twenty-year period: imports declined from 22.3 percent of GDP in 1980-81 to 19.4 percent of GDP in 2001.[5] However, exports as percentage of GDP show an increasing trend, from 12.8 percent of GDP in 1980-81 to 17.4 percent of GDP in 2000-01.

The most commonly used indicator for openness is the total of exports and imports as a ratio of GDP. In spite of the decline in imports, openness in terms of total imports and exports as percentage of GDP shows a slight increase, from 35.2 percent to 36.8 percent over twenty years. (see Table 4.) This, despite reduction in both tariffs and non-tariff barriers may seem surprising, but it needs to be underscored that during the 1990s because of inadequate foreign exchange reserves, government had to resort to frequent devaluation making the imports expansive. Besides the low economic activity constrained the demand for surplus.

Table 4

Openness in Pakistan (Percentages)

Years	Imports/GDP	Exports/GDP	Openness [(X+M)/GDP]
1980-81	22.33	12.84	35.17
1984-85	22.60	10.57	33.17
1990-91	18.49	16.93	35.42
1994-95	19.26	16.57	35.82
2000-01	19.38	17.40	36.78

Source: *Economic Survey* [Pakistan (Various Issues)].

[5]The following factors are responsible for this decline. First, remittances declined very significantly, from $2.9 billion in 1982-83 to $1 billion in 1999. They were used to finance the trade deficit for a long time. Second, steep devaluation resulted in a lower level of imports. Third, economic activity slowed down in the 1990s.

(c) Remittances

Remittances have played a key role in the growth process of Pakistan. A comparison of remittance inflow with key economic indicators provides an assessment of the importance of remittances at the macro and micro level. During the seventies and early eighties, the inflow of remittances was very large, about $37 billion and they financed 82 percent of the cumulative merchandise trade deficit. In 1983 when remittances were at their peak, at 10.06 percent of GDP, they financed 96.6 percent of the trade deficit and 84.8 percent of the current account balance (see Table 5). Remittances from the Middle East through official channels accounted for 14 percent of the growth in GNP (home country's income) and it was 24 percent when unofficial channels were also included [Burney (1988)].[6] Since the mid eighties, remittances started to decline and reached one third of the amount remitted in 1982-83, i.e., $1.060 billion in 1998-99 from 2.9 billion in 1982-83 (see Figure 1). This led to a rapid depletion of international monetary reserves, which affected the trade deficit financing (see Table 5). This may be the reason for a decline in imports despite trade liberalisation;[7] a sharp decline in remittances retarded the efforts of liberalisation.

Table 5

Contribution of Remittances in Key Economic Indicators (Percentages)

	Financing through Remittances of			
Years	Current Account Balance	Trade Deficit	Remittances/ GDP	Remittances/ Private Consumption
1980-81	67.11	76.56	7.53	9.98
1982-83	84.81	96.55	10.06	13.33
1985-86	67.74	85.31	8.14	10.67
1990-91	45.98	74.43	4.06	5.94
1995-96	24.20	39.44	2.26	3.13
1998-99	30.80	50.84	1.82	2.24

Source: *Economic Survey* [Pakistan (Various Issues)].

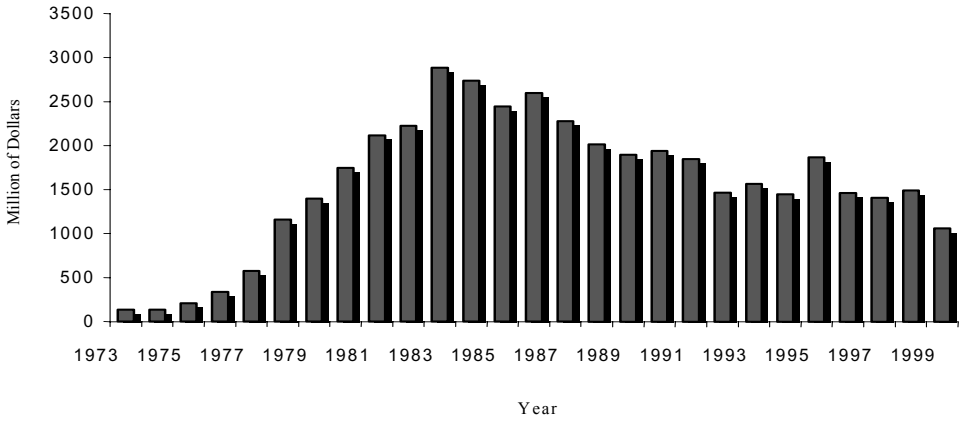
In addition to financing of imports at the national level, remittances have also played an important role at the micro level. Migrants remit a significant amount to Pakistan, on average 78 percent of their total earnings, and thereby increase the income of households. Studies by Burney (1988) and Kazi (1988) indicate that remittance income have been used for current consumption, retiring of debt or for repair of houses.[8] The importance of remittances at the household level can be gauged from the

[6]GNP growth rate declined more than GDP growth rate, 7.9 percent in 1981-85 to 4.1 percent in 1996-00. This may be due to the decline in remittances [Siddiqui and Kemal (2002)].

[7]In a number of LDC's, severe deficits on current and capital accounts have therefore led to a rapid depletion of their international monetary reserves and a slowdown in economic growth.

[8]See Arif (1999). Remittances are not utilised significantly to enhance the capital stock. At the sector level, the only sector, which appears to have benefited from the inflow of remittances, in terms of increased private investment, is ownership of Dwellings.

Fig. 1. Historical Trend of Inflow of Remittances.



fact that remittances were 13 percent of private consumption expenditure. Since 1982-83, the ratio (Remittances to Private Consumption) has showed a declining trend, i.e., 13.3 percent in 1982-83 declining to 2.2[9] percent in 1998-99. The decline in remittance income of households may be an important reason for the rise in poverty in Pakistan.

(d) Poverty

The poverty has increased irrespective of the choice of the measures of poverty; head count, gap, and severity index [see Mehboob-ul-Haq Centre for Human Development (1999)]. The poverty, both absolute and relative, has increased in Pakistan during the nineties (adjustment period) compared to in the eighties (pre-adjustment period). Table 6 presents absolute poverty based on basic need poverty line and Table 7 presents relative poverty based on poverty line of 75 percent of average income in the country. Table 6 shows that number of poor has increased from 29.2 percent in 1987-88 to 35.7 percent in 1993-94 and declined in 1999. The other two ratios, poverty gap and severity index, also show that poverty has increased during the adjustment period. The relative poverty also shows an increase in poverty (Po) from 45.6 percent population to 51 percent over 1987-88 to 1993-94 period. The other two indicators, income gap and severity index increased from 25.9 percent to 31 percent and 4.4 percent to 7.1 percent over 1987-88 to 1993-94 period, respectively. Both the absolute as well as relative poverty indicators show an increase in poverty during the adjustment period though the extent of increment and the numerical magnitudes differ. All the three indicators of poverty for the rural and urban areas show that poverty has increased in both the areas during the adjustment period.

[9]To some extent the decline in remittances at household level is understated. The remittances were also received through hundi system.

Table 6

Poverty Indicators for Pakistan, Urban and Rural Areas
Basic Need Approach (Based on Distribution of Income)

Measure		Pre-adjustment		Post-adjustment			
(Percent)	Area	1986-87	1987-88	1990-91*	1992-93	1993-94	1998-99**
Head Count	Pakistan	28.6	29.2	29.4	35.9	35.7	32.6
	Urban	28.8	28.9	31.3	29.7	29.9	24.2
	Rural	28.1	30.1	29.1	39.1	37.3	35.9
Income Gap	Pakistan	20.6	21.1	26.3	28.9	27.9	7.0
	Urban	21.2	21.7	25.5	26.6	24.1	5.0
	Rural	20.2	20.1	26.1	28.3	27.5	7.9
Severity Index	Pakistan	1.8	1.9	3.1	4.5	4.1	1.51
	Urban	1.9	2.0	3.2	3.4	2.8	2.51
	Rural	1.7	1.9	3.0	4.8	4.2	2.2

Source: MCHD (1999).

* Poverty lines for the year 1990-91 for Pakistan, rural and urban areas are 276.7, 257.6 and 307.9 Rs respectively.

** World Bank (2002) For income gap ratio, they use percentage in total.

Table 7

Relative Poverty Indicators for Pakistan, Urban and Rural Areas

Measure		Pre-adjustment Period		During Adjustment Period		
(Percent)	Area	1986-87	1987-88	1990-91*	1992-93	1993-94
Head Count	Pakistan	47.5	45.6	52.9	51.6	51.0
	Urban	52.5	49.3	57.0	54.2	53.5
	Rural	38.6	37.9	49.6	46.5	43.0
Income Gap	Pakistan	25.9	25.3	33.1	33.0	31.6
	Urban	27.8	26.9	33.4	33.2	32.1
	Rural	22.7	22.2	32.1	30.3	28.6
Severity Index	Pakistan	4.4	4.1	7.9	7.8	7.1
	Urban	5.5	4.9	8.6	8.2	7.4
	Rural	2.9	2.7	7.0	6.2	5.1

Source: MCHD (1999).

* Poverty Line = 75 Percent of the Average Income (Based on Distribution of Income) Poverty lines for the year 1990-91 for Pakistan, rural and urban are 388, 348 and 441 Rs respectively.

III. REVIEW OF LITERATURE

A number of empirical studies[10] have analysed the impact of trade liberalisation on poverty. The results are very sensitive to the country sample, time period and specification of the model.

[10]Guisinger and Scully (1991), Decaluwe, *et al*. (1999), Siddiqui and Zafar (1999), Cockburn (2002), Kemal, *et al*. (2002), etc.

Bourguignon, de Melo, and Suwa (1989) show that devaluation that is pro-trade helps the poor in the low income countries as it encourages export industries, which employ more workers. On the other hand import rationing worsens inequality because the rationing premium accrues to capitalists. Clarete and Whalley (1988) explore the ways in which trade policies and other domestic distortions interact in the small open developing economy. Using a price-taking open economy numerical general equilibrium model of the Philippines, they report that in the presence of import quota and rent-seeking activities, tariff removal makes the country worse off. Another model with special emphasis on distributional issues is developed by Dervis, de Melo, and Robinson (1982) for three archetype economies. They suggest that the distributional implications of an external shock depend on the initial structure of the economy and the choice of adjustment policies.

Decaluwe, *et al*. (1999) and Cockburn (2002) explicitly incorporate poverty and income distribution in a CGE framework. Decaluwe, *et al.* (1999) developed a beta-distribution based approach on the basis of parameters chosen according to the characteristics of households and a basic need poverty line determined by quantity of basic need commodities. The change in monetary value of the poverty line with the change in prices is determined endogenously in the model. The study shows that a reduction in tariffs is beneficial to the alleviation of poverty. Cockburn (2002) analyses the impact of trade liberalisation on poverty using micro simulation. He argues that trade liberalisation can only be properly analysed in a CGE model with disaggregated household data, and developed a model for Nepal incorporating all households from a nationally representative household survey. He argued that complex income and consumption effects could not be analysed in an aggregate CGE model. Using micro simulation method, the study shows that urban poverty falls and rural poverty increases and income inequality increase with the rise in income.

The literature related to the "impact of remittances on poverty" explains how the recipients typically use remittances and how they affect economic indicators in the country. Studies show that remittances are mainly used for current consumption; and rest is on the maintenance of dwellings. During the large inflow of remittances, investment in ownership of dwellings increases by higher percentage [Burney (1988)]. Migrants who belong to the low-income class before migration save less and their expenditure on current food and consumer durable as compared to medium and high-income groups. An other study by Kruijk (1987) exploring the sources of income inequality point out that in addition to labour and property income, exogenous factors like migration to the Middle East had played a very important role in reducing poverty during the mid seventies and early eighties.[11]

The direct and indirect effects of remittances suggest remittances are beneficial for trade in goods and services,[12] income growth, and contribute to savings (though a negligible amount). Therefore, it can safely be concluded that remittances can (and do) make important contributions to welfare enhancing and poverty reduction. Remittances have declined sharply in Pakistan, they may be the major factor giving rise to poverty.

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[11]See Irfan (1997), Amjad and Kemal (1993) and Usman, *et al*. (2000).

[12]In addition to providing money for basic needs such as food, clothing, housing improvements, and education, it provides hard currency for consumer goods such as small household appliances.

IV. TRADE LIBERALISATION, REMITTANCES, AND POVERTY LINKAGES

The impacts of trade liberalisation on poverty depends on the nature of the export sector, intensity of factors of production in different activities and interlinkages in the economy, ownership of factors of production as well as the distribution of benefits across the households. The mechanisms through which globalisation may transmit market signals to different social groups in Pakistan is as follows. The reduction in trade restrictions (tariff reduction), leads to change in relative prices that have strong effects on the relative earnings of the factors of production; labour, capital, and land etc. A reduction in tariffs leads to a reduction in the profitability of the protected sectors. Mobile factors move out from previously protected sectors to the more profitable sectors. This reallocation of resources changes the factor rewards depending on the demand and supply of the factors. It leads to the convergence in relative prices of the factors of production[13] and may reduce inequality through increased demand for labour, the most abundant factor in developing countries like Pakistan. The change in factor rewards results in a change in income shares of the households depending on their ownership of factors of production.

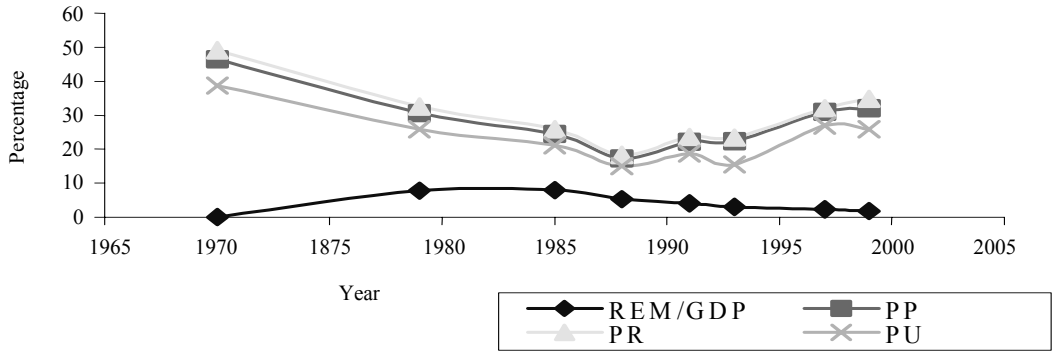
The gain from trade is not only related with changes in income but also in consumption. Restrictions on imports limit the ability of the people to obtain goods from abroad freely and cheaply. Tariff reductions reduce import prices and benefit consumers by supplying cheap consumer goods. Depending on the elasticity of substitution, in presence of trade liberalisation, consumers start to substitute imports for domestically produced goods. Consequently, the demand for domestic goods falls and domestic prices decline further.

The change in relative prices of goods together with a change in income affects households' consumption. In the present exercise, the channels which determine welfare and poverty after trade liberalisation, are via the changes in income and prices. In Pakistan, the decline in the average tariff between the base year economy 1990 and 2001 was 55 percent. Thus at the first stage, we introduce a tariff reduction of 55 percent and find the impact of the shock on poverty by using micro data from Households Integrated Economic Survey [Pakistan (1993)].

Empirical studies indicate that remittances improve the recipients' standard of living. Migrant workers from Pakistan on average received incomes five to eight times higher than they received from employment in their home country, remitting on average 78 percent of their earnings [Burney (1988)]. Therefore, a reduction in the flow of remittances is expected to have a dual impact on poverty. First, it reduces the impact of trade liberalisation by limiting the inflow of imports. Second, it reduces the income as well as consumption of households. Figure 2 shows that remittance inflow increased during 1970-83 and declined thereafter. It also shows that poverty (head count ratio) declined during the period of a large inflow of remittances but increased in the period of declining trend in remittances.

[13]Stolper-Samuelson theorem of price equalisation.

Fig. 2. Poverty and Inflow of Remittances (Percentages).



REM/GDP—Ratio of Remittances to GDP
PP—Poverty in Pakistan
PR—Poverty in Rural area
PU—Poverty in Urban area

V. DATA AND METHODOLOGY

A consistent data set for the year 1989-90, using Input-output table for 1989-90 [Pakistan (1996)], HIES [Pakistan (1993)] and SAM 1989-90 [Siddiqui and Iqbal (1999)], is constructed. To explore the impact of different shocks: a tariff reduction, and a decline in remittances on poverty and income distribution in Pakistan, we need to classify production activities based on their characteristics viz. import competing and exporting orientations. Production activities are classified into four broad categories: agriculture, mining, manufacturing and services. Agriculture is subdivided into the crop and non-crop sectors. The manufacturing sector is aggregated into five activities: food, textiles, chemicals, machinery and other manufacturing. The services sector is classified into three activities, two tradable and one non-tradable sector. The main characteristics of these sectors are as follows: The crop sector provides raw material for exports in particular to the textile industry, the major export supplying sector accounting for 67 percent of total exports. 'Chemicals' and 'Machinery' are the major import competing sectors and the rest sectors have mixed characteristics. The imports account for 30.9 percent and 55.6 percent of the expenditure on chemical and machinery, respectively. The shares of imports of these sectors in the overall imports of the country are 18.4 percent and 37.5 percent, respectively [Siddiqui and Kemal (2002)].

For trade-poverty analysis, we need data on factor ownership of households and their consumption pattern. In addition, other sources of income receipts are also important to examine the impact of external shocks. For example, transfers from the rest of the world. Earlier studies show that large percentage of remittance income accrues to poor households as 81 percent of migrants belong to production workers and only 19 percent to the professionals. SAM-1989-90 provides information on the sources of

household income by income groups. In this study, we classify households by occupation in urban and rural areas as the two areas present different levels of poverty. They are aggregated by occupation of head of households into five categories; professionals (white collar), clerks (blue collar), agriculture skilled workers, production worker and miscellaneous. We identify five sources of household income;[14] labour, capital, dividends from firms, transfers from government and transfers from the rest of the world. The first three sources of income are endogenously determined in the model and are related to changes in government policies. Remittances are used to see the external shock to the economy.

Table 8 reports the share of households' incomes from different sources. In the urban sector, professionals receive 59.5 percent of their income and production workers receive 51.5 percent of their income from labour. The other three groups in the urban area receive higher percentage from capital. All households in the rural area receive a higher percentage of their income from capital except production workers who receive 56.8 percent of their income from labour. In the urban households, the share of remittances in total household income ranges from 1 percent to 14 percent and mean level is 9.95 percent. In the rural area, it ranges 0.3 percent to 7.3 percent with mean of 3.4 percent. It needs to be underscored that the share of remittances in the incomes of professional groups, who are relatively rich in both the urban and rural area is only 1.0 percent and 0.3 percent of their total income, respectively. On the other hand, urban households who are engaged in blue-collar jobs (clerks) receive 13.9 percent of their income from remittances. In the rural area, production workers receive 7.3 percent of their income from remittances. Both the blue-collar and production workers are relatively poor and 31.5 percent and 36.3 percent of households, respectively, are below the poverty line (see Table 9).

Table 8

Sources of Income for Rural and Urban Households (Percentages)

	Wages	Capital	Dividends	Transfers from Government	Remittances	Total
Professional	59.46	24.23	14.81	0.41	1.09	100
Clerks	28.53	38.41	18.86	0.31	13.88	100
Agriculture Worker	13.01	76.42	0.00	0.16	10.41	100
Production Worker	51.52	34.38	5.15	0.18	8.78	100
Miscellaneous	23.52	63.58	1.72	1.72	9.47	100
Urban Total	**33.99**	**45.96**	**9.40**	**0.71**	**9.95**	**100**
Professional	19.18	80.48	0.00	0.05	0.29	100
Clerks	38.95	56.53	0.01	1.45	3.06	100
Agriculture Worker	13.82	81.55	0.43	2.27	1.93	100
Production Worker	56.77	31.22	3.75	0.98	7.29	100
Miscellaneous	16.97	54.37	19.22	4.57	4.87	100
Rural Total	**26.51**	**63.61**	**4.40**	**2.09**	**3.40**	**100**

Source: Social Accounting Matrix, 1989-90.

[14]Income refers to total receipts.

Table 9

F-G-T Indicators of Poverty and Remittances Share (Percentages)

Households by Occupation	Households	Base Year (Pα Measures) Head Count	Poverty Gap	Severity Index	Share of Remittances
Professional	2.71	19.92	4.68	1.15	0.92
Clerks	14.91	31.52	3.77	2.42	35.76
Agriculture Worker	2.12	35.33	7.43	1.44	5.06
Production Worker	13.83	40.08	5.51	1.26	13.62
Miscellaneous	7.11	23.44	9.39	3.25	21.92
Urban Total	**40.68**	**32.44**	**7.27**	**2.36**	**77.28**
Professionals	9.07	25.2	5.2	1.42	0.22
Clerks	2.37	34.25	7.38	2.33	3.31
Agriculture	11.56	28.3	6.43	2.12	4.68
Production Worker	22.29	36.3	7.31	2.22	8.41
Miscellaneous	14.03	23.19	4.58	1.41	6.09
Rural Total	**59.32**	**30.47**	**6.49**	**2.05**	**22.72**

Source: Social Accounting Matrix—1989-90.

For poverty analysis, we use micro data from the national representative Household Integrated Economic Survey [Pakistan (1993)] of more than six thousand households. Using micro data, poverty line on the basis of adult equivalent calorie intake 'basic needs' for the base year is estimated.[15] For the non-food items, we take the average of the expenditure of the households two-percentage points above and below the food poverty line. The poverty lines are estimated separately for urban and rural households.

Poverty estimates for the base year are given in Table 9. In urban and rural areas, production workers are the poorest group of households, where 40.1 percent and 36.3 percent of households respectively live below the poverty line. Table 9 clearly shows that the poor receive a higher percentage and rich households receive a lower percentage of remittances. For example, clerks in the urban area receive 35.8 percent of remittances. In rural area, production workers' share is highest, at 8.4 percent of remittances. The other two groups, agriculture skilled workers and clerks can be classified as poor households where about one-third of households are below the poverty line in both, urban and rural areas. The professionals and miscellaneous groups are classified as rich households (see Table 9) in urban as well as in rural areas. They receive only 0.9 percent and 0.2 percent of remittances.

[15]Detail is given in Ercelawn (1990) and Ravallion (1994).

For poverty change analysis,[16] the real value of poverty (quantity) is kept fixed in every simulation [see Decaluwe, *et al*. (1999)]. However, poverty analysis approach differ from Decaluwe, *et al*. (1999) in some aspects, it uses micro data form HIES instead of assuming β-distribution. The monetary value of the poverty line is obtained by multiplying the product with their respective prices. If *qi* is the quantity and *Pci* is the price for *i*th good then we define monetary value of basic need poverty (*BNPm*) line for the base year as follows:

$$BNPm = \sum qio*Pcio$$

Prices are determined endogenously in the model. As prices rise or fall after the simulation, the monetary value of the poverty line rises or falls as well. The change in poverty line is determined as follows

$$\Delta BNPm = \sum qio*Pci1 - \sum qio*Pcio$$

Note: o indicates the base year and 1 indicates after the shock.

Changes in prices shift the poverty line and the change in income of the group shifts the density function left or right depending on the negative or positive change in income. These two changes determine the change in poverty after the policy shock in the country. We use Foster, Greer and Thorbecke (FGT) (1984) Pα measures for poverty analysis, Where P0 measures the households below the poverty line, P1 measures poverty gap and P2 measures severity of the poverty.[17] We calculated these indicators before and after the shocks. First, we simulate the impact of tariff reduction in the base year equilibrium. Second, tariff and remittances are reduced simultaneously to see how the impact of trade liberalisation changes in the presence of decline in remittances.

VI. COMPUTABLE GENERAL EQUILIBRIUM MODEL FOR PAKISTAN

This section provides a description of the model, similar in many respects to the MIMAP model, which has been developed to analyse the impact of trade liberalisation on welfare and poverty[18] in Pakistan. In the neo-classical framework, this model contains six blocks of equations; income and saving, production, foreign trade, demand, prices, and market equilibrium.

1. Income and Saving

In the model, we have four institutions: households, firms, government and rest of the world. Households are endowed with labour and capital. The ownership of factors of

[16]For detail see Decaluwe, *et al*. (1999).

[17]$P\alpha = 1/n \; \Sigma\{(Z-Y\iota)/Z\}^{\alpha}$ where *n* is total number of households, *Z* is basic need poverty line, yι is income and $\alpha = 0$ for head count ratio, $\alpha = 1$ for poverty gap measure and $\alpha = 2$ measure the severity of the poverty.

[18]See Siddiqui and Iqbal (1999) and Kemal, *et al*. (2001).

production and their returns determine their factor income. All wage income accrues to households, as they own all labour (L). In addition, households receive income in the form of remittances ($\overline{TR}_{RH}$) from the rest of the world. These are exogenous in the model. Households also receive transfers from firms as dividends (DIV_H) and transfers from government as social security benefits ($\overline{TR}_{GH}$). Transfers from government and rest of the world are exogenous. The effect on income of households due to trade policy shock is determined through changes in the endogenous sources of income: wage income, capital income, and dividends from firms. Total households receipts (Y_H) are defined as follows

$$Y_H = \lambda_{JH}\sum L_i^D + \lambda_K \sum R_i K_i + DIV_H + \bar{e} * \overline{TR}_{RH} + \overline{TR}_{GH} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

λ_{lH} *is* households share in wage income, λ_K is households share in capital income from production activities, L_i^D and K_i are labour demand and capital stock, respectively, in production activities. Capital is fixed exogenously.

Firms pay dividends to households from their capital income. Households' dividends income is defined as fixed share from firms capital income and defined as follows

$$DIV_H = dvr_H * Y_{FK} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Where *dvr(H)* is dividend rate for households.

Households pay taxes to government. After subtracting income tax from the households' total income, we get the disposable income of households (YD_H) as follows

$$YD(H) = (1 - t_{yh}) * Y_H \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Where t_{yh} is income tax rate for *h*th households.

Household savings (S_H) are defined as a fixed share of households' disposable income as follows

$$S_H = aps_H * sav * YD_H \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4a)$$

aps_H is average propensity to save of households and 'sav' is adjustment in the saving rate. While total households saving is defined as follows

$$TS_H = \sum S_H \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4b)$$

The second institution is the firm. Firms receive income from capital and transfers from the government. The 'firms' capital income *(Y_{FK})* is defined by subtracting sum of households capital income from production activities.

$$Y_{FK} = (1 - \sum \lambda_k)\sum (R_i K_i) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

Transfers from the government to firms ($\overline{TR}_{GF}$) are given exogenously. Total firm income *(Y_F)* is defined as follows:

$$Y_F = Y_{FK} + \overline{TR}_{GF} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

Its expenditure includes tax payments to the government (t_k*Y_{FK}), dividends to households, and transfers to the rest of the world ($\overline{TR}_{FR}$). Subtracting all these from the firm's income, we get saving of the firm (S_F)

$$S_F = Y_F - \overline{TR_{FR}} - \sum DIV_H - t_k * Y_{FK} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

The third institution, government (G) receives tax revenue from different sources. Taxes from international trade are taxes on imports and exports. Equations for import taxes are used to see the impact of tariff rate reduction. In addition, there are taxes on production, income tax on households and tax on capital income of the firms. These five types of taxes determine government revenue. Taxes are determined in the model endogenously. Equations for tax revenue are defined as follows.

$$TXS_i = tx_i * P_i * X^S_{i\ i} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

Where TXS_i is taxes on production of ith sector, tx_i is tax rate on ith sector P_i is producer price.

$$TXM_n = tm_n * \bar{e} * P_n^{WM} M_n \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (9)$$

Where TXM_n is tax revenue from tariff on imports, tm_n is tariff rate. This is used as a change in government trade policy.

Export taxes could be negative as rebates

$$TXE_n = te_n * \bar{e} * P_n^{WM} X_n \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (10)$$

Where TXE_n is taxes on exports te_n tax rate on nth exports (X_n)

In addition, government also receives transfers from the rest of the world ($\overline{TR}_{RG}$), which are fixed exogenously. Total government revenue can be defined as follows,

$$Y_G = \sum(ty_H * Y_H) + tk * Y_{FK} + \sum TXS_i + \bar{e} * \overline{TR_{RG}} + \sum TXM_n + \sum TXE_n \quad \ldots \quad \ldots \quad (11)$$

Subtracting transfer payments to households, transfer payments to firms and its final consumption expenditure (C_{Gi}) from government revenue we get government savings (S_G).

$$S_G = Y_G - \overline{TR_{GF}} - \sum \overline{TR_{GH}} - \sum C_{Gi} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (12)$$

The fourth institution is the rest of the world. Its income includes income from sales of imports and transfers from firms, and outlay includes expenditure on exports, remittance income to households and transfers to government. The equations are defined in the trade block.

2. Structure of Production

We assume there are two factors of production, labour (L) and capital (K). Labour is mobile across the sectors, while capital is sector-specific. Domestic production has eleven sectors; ten tradable and one non-tradable. In the tradable sector, every sector has imports and exports. However, we can classify them as major import competing sectors and

major export sectors based on their shares in imports and exports. Chemical and machinery are import competing sectors and textile is the major export sector.[19]

Production functions in the model are specified by a technology in which gross output (X_i^s) has separable production function for value added (VA) and intermediate inputs (IC_i).

$$X_i^S = (VA, IC_i) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (13)$$

Where i is defined over eleven sectors of production.

Leontief technology between intermediate and output and within intermediates is assumed.

Intermediate consumption from ith sector is defined as follows

$$IC_i = io(i) * (X_i) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (14)$$

Where io is Leontief technical coefficients.

Intermediate consumption of ith sector from jth sector is defined by Leontief technology as follows

$$IC_{ij} = a_{ij} * X_i \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (15)$$

Where a_{ij} is the input-output coefficient.

Assuming constant elasticity of substitution (CES), value added is defined by the CES production functions as follows

$$VA_i = B_i[\delta_i K_i^{\sigma}{}_i + (1-\delta_i)(L^D{}_i)^{-\sigma}]^{-1/\sigma i} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad .. \quad (16)$$

Where δ_i is share of capital in value added and $1-\delta_i$, is share of Labour. σ_i is elasticity of substitution between labour and capital.

Assuming perfect competition and market clearing conditions, labour demand function for ith sector is derived from CES production function.

$$L_i^D = \left[\{\delta_i/(1-\delta_i)\}\{R_i/w\}^{1/\rho+1}\right] * K_i \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (17)$$

Capital is sector specific and it cannot move across the sectors. Returns to capital are determined by zero profit condition as follows:

$$R_i = (P_i^{VA} * VA_i - w * L_i^D)/K_i \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (18)$$

Where P_i^{VA} is the price of value added in ith sector

3. Foreign Trade

It is assumed that

(1) The country is a price taker for exports as well as for imports (small country assumption). World prices of exports P_n^{WE} and P_n^{WM} are given.

[19]For detail see Siddiqui and Kemal (2002).

(2) Goods for the domestic market and exports with the same sector classification are of different qualities.
(3) Domestically produced goods sold in the domestic market are imperfect substitutes for imports (Armington assumption).

The Constant Elasticity of Transformation (CET) function describes the possible shift between domestic and external markets as follows.

$$X_n^{\ s} = B^T{}_n\left[\delta_n^{\ T} EX^{\rho_n^{\ T}} + (1-\delta_n^{\ T})D_n^{\ \rho_n^{\ T}}\right]^{1/\rho_n^{\ T}} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots (19)$$

Where X_n^S is supply of traded good, $B^T{}_n$ is shift parameter 'δ_n^T' is share parameter it shows the share of exports in domestic production, and $(1-\delta_n^T)$ is share of domestic demand in total supply.

Import aggregation function presents demand for composite goods (Q_n) (imported and domestically produced goods). It is defined as follows

$$Q_n = B_n^s[\delta_n^s M^{-\rho_n^s} + (1-\delta_n^s)D_n^{\rho_n^s}]^{1/\rho_n^s} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots (20)$$

Where $B^s{}_n$ is shift parameter, $\delta_n^{\ s}$ is share of imports in total demand for *i*th commodity, $(1-\delta_n^{\ s})$ is share of domestically produced good in total demand.

For non-traded good, total demand is equal to total domestic supply and can be defined as follows

$$Q_{NT} = X_{NT} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots (21)$$

Where NT is for non-traded goods.

Profit maximisation or cost minimisation gives desired exports supply (Ex_n) and imports demand (M_n) functions of relative prices (domestic to foreign prices).

$$Ex_n = (P_n^E / P_n^D)^{\sigma_n^T}\left[(1-\delta_n^{\ T})/\delta_n^{\ T}\right]^{\sigma_n^t} * D_n \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots (22)$$

Where $P_n^{\ E}$ is price of exportable good $P_n^{\ D}$ is domestic price of exportable good '$\sigma^T{}_n$' is elasticity of transformation of goods between domestic and foreign markets and $\delta_e^{\ T}$ share of markets for *n*th good and D_n is domestic demand for good *n*.

The import demand function can be defined as

$$M_n = (P_n^D / P_n^M)^{\sigma_n^S}\left[(\delta_n/(1-\delta_n]^{\sigma_n^S} * D_n\right] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots (23)$$

Where $P_n^{\ M}$ is domestic price of *n*th good and $\sigma^s{}_n$ is elasticity of substitution between imported good and domestically produced, δ is used for shares.

The equilibrium in the foreign market is determined with inflow and out flow of goods and transfers across the border and defined in the following equation.

$$\sum \overline{P_n^{\ WM}} * M_n + (1/\bar{e})\overline{TR_{FR}} - \sum \overline{P}_n^{\ WE} * EX_n - \overline{TR_{RH}} - \overline{TR_{RG}} = \bar{e} * \overline{CAB} \quad \ldots \quad \ldots (24)$$

Here we assume that the nominal exchange rate (*e*) and current account balance (*CAB*) are given exogenously. The real exchange rate is implicit in the model determined endogenously. With *CAB* fixed, trade liberalisation lead to large inflow of imports, i.e., keeping the *CAB* and nominal exchange rate constant, real exchange rate depreciate leading to cheap exports.

4. Demand

In the model, we have four types of demand for goods and services: household consumption, government consumption, intermediate inputs, and demand for goods for investment purposes. Total household consumption (CT_H)is defined as residual after subtracting saving from disposable income

$$CT_H = YD_H - S_H \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (25)$$

Household demand is specified by linear expenditure system (LES). It is derived from maximising a Stone-Geary utility function subject to household's budget constraint.[20] Demand function for *i*th good is given in the following equation

$$C_i\ (h) = \{P_i^c\ \gamma_i + \beta^c{}_{hi}(CT_h - \sum P_c^i \gamma_i)\}/P_c^i \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (26)$$

Where $C_{h,i}$ is the demand for *i*th commodity by *h*th household group. In this function, γ_i determines the minimum quantity of each commodity and $P^c{}_i\ \gamma_i$ measures subsistence expenditure on the *i*th commodity by the *h*th households group. Where $\sum P^c{}_i\ \gamma_i$ is total value of minimum consumption for household group *h*. If the term in the parentheses that is super numerary income ($CT_h\ -\sum P^c{}_i\ \gamma_i$) is equal to zero, then households consume equal to the households' specific minimum requirement. Using the Frisch parameter[21] and income elasticities, which are given in the model exogenously, we derive the minimum consumption of a good by a household group.

Government expenditure includes expenditure on goods and services, transfers to households, and transfers to firms. Government current expenditure (CG_i) on the *i*th commodity is derived by Cobb-Douglas utility function and is defined as fixed share in total expenditure (CT_G).

$$CG_i = \beta^g{}_i CT_G / P_i^c \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (27)$$

Where $\beta^g{}_i$ is the share parameter of *i*th commodity in total consumption P_i^c is consumer price of *i*th commodity. The sum of all $\beta^g{}_i$ is equal to one.

Total private and public consumption (C_i) is defined as follows:

$$C_i = \sum CT_{Hi} + CG_i \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad .. \quad (28)$$

---

[20]Maximising $u(X) = \sum fi\ (Xi) = \sum\ \alpha_i - log(\gamma_i)$ subject to constraint $\sum P_i X_i = Y$.

[21]For detail discussion of Linear Expenditure Systems, see Deaton (1987).

The sum of input requirements *(IC_j)* by the production sector for each commodity produced determines intermediate demand *($INTD_i$)* for *i*th commodity and is defined as

$$INTD_i = \sum a_{ij} IC_j \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (29)$$

Where a_{ij} is the input-output coefficient.

Demand for goods for investment *(I_i)* purposes is determined by β^I_i, which is the fixed value share in total investment (*IT*), and the sum of all β^I_i is equal to one. An equation for demand for investment purposes is defined as:

$$I_i = \beta_i^I * IT / P_i^c \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (30)$$

For welfare analysis, we fixed total demand for investment and government consumption in real terms so that increase in welfare may not be at the expense of government consumption or investment. We deflate current investment demand by its deflator (*Pinv*) and get investment in real term (TI_r). Deflating current government expenditure with its deflators (P_g) gives government consumption in real term (Cgr_i). They are defined in the following two equations.

$$TI_r = IT / Pinv \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (31)$$

$$Cgr_i = CT_G / P_g \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (32)$$

5. Prices

The model contains different prices associated with each good. We retain the small country assumption. World prices of exports (P_n^{WE}) and imports (P_n^{WM}) are given. Domestic price of exports and imports are defined after including taxes, if any. Imports are restricted through tariff barriers and sales tax is also imposed on imported goods so the domestic price of imports *(P_n^M)* and exports (P_n^E) are defined as:

$$P_n^M = (1 + tm_i) * (1 + tx_i) * (1 + adj) * \bar{e} * P_n^{WM} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (33)$$

Where tm_i and tx_i are tariff rate and sales tax on imports, respectively.

'tm_i' is used as policy parameter. We reduce tm to see the impact of trade liberalisation.

$$P_n^E = (1 + te_n) * \bar{e} * P_n^{WE} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (34)$$

Where te_n is export tax rate on exports and can be positive or negative.

Producer price *(P_i)* is the weighted average of the domestic price of goods for the domestic market (Pt_i) and the domestic price of goods for the export market (P_i^E).

$$P_i X_i^S = (Pt_i * D_i^s - EX_i * P_i^E) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (35)$$

The value added price P_i^{VA} is defined as follows

$$P_i^{VA} * VA_i = (P_i * X_i^s) - \sum (P_i^c \, IC_{ji}) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (36)$$

There is a sales tax on all goods, so domestic price P_i^D is determined after including taxes

$$P_i^D = Pt_i * (1 + tx_i) * (1 + adj) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (37)$$

Where P_i^D is the domestic price of good *i* and Pt_i is price before taxes.

Consumer prices (P_n^C) are the weighted average of domestic price and import price of the *n*th commodity for traded goods and defined as follows

$$P_n^C = (D_n / Q_n) * P_n^D + (M_n / Q_n) P_n^M \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (38)$$

For non-tradables it is equal to the domestic price and defined as

$$P_{NT}^C = PD_{NT} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (39)$$

GDP deflator (*Pindex)* is the weighted price index of all goods. It is defined as follows:

$$Pindex = \sum(\beta_i^X * P_i) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (40)$$

β_i^X percentage share of good *i* in total production

We define two deflators for investment goods and government consumption as follows

$$Pinv = \Pi (P_i^c / \beta_I^i)^{\beta_i^I} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (41)$$

$$Pg = \Pi (P_i^c / \beta_I^g)^{\beta_i^g} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (42)$$

6. Equilibrium

The final block presents the saving-investment equilibrium; goods market equilibrium, and labour market equilibrium. Total investment is equal to total domestic saving and foreign savings. Saving-Investment equilibrium is defined as

$$IT = TS_H + S_F + S_G + \bar{e} * \overline{CAB} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (43)$$

Total consumption expenditure on *i*th good (Q_i) is the sum of expenditure by different household groups and government (C_i), intermediate ($INTD_i$) use by different production activities and demand for investment (INV_i) purpose. Walras law holds, if *n*–1 markets are in equilibrium *n* will also be in equilibrium.

$$Q_i = C_i + INTD_i + INV_i \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (44)$$

Total labour demand is equal to labour supply, which is given exogenously.

$$L_S = \sum(L_i^D) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (45)$$

where L_s is labour supply.

We use the external sector closure rule in the model. We assume price-taking behaviour for exports as well as for imports in international market[22] i.e., world export

[22]Small open economy assumption.

price and world import price are exogenous to the model. Current Account Balance (CAB) is exogenous to the model. The nominal exchange rate acts as the numeraire. The real exchange rate is implicit in the model and calculated as follows.

$$er = e^{*} (P^{w} / Pindex)$$

The list of endogenous and exogenous variables is given in Appendix A. The results are presented in percentage changes over the base line values after policy shocks.

7. Calibration

The model described above has been calibrated to the data of the Pakistan economy for the year 1989-90. Policy parameters, all tax rates, savings rates are calculated from the base year data. Shift and share parameters in the demand and supply equations, are also generated from base year data. For the consumption function, household specific income elasticities for each commodity are estimated from micro data from the Household Integrated Economic Survey. Elasticities for import aggregation and export transformation functions are taken from different studies.[23] Elasticities for production function are taken from Kemal (1981) and Malik, *et al*. (1989). The elasticities which were not available are fixed after discussion. The GAMS software package is used to solve and simulate the model.

VII. SIMULATION RESULTS

The results of two simulation exercises are discussed here. First, tariff cut on imports is introduced in the model to examine the impact of trade liberalisation. Second, the effect of an exogenous shock of reduced inflow of remittances in the presence of trade liberalisation is simulated.

Between 1990 and 2001 the average tariff rate declined by 55 percent, while the decline in remittances was 44 percent (see Figure 2). In the first exercise, we reduce tariff rate by 55 percent on all imports to see the impact of trade liberalisation. A reduction in trade barriers has a two-fold impacts on households: (1) a reduction in distortions in domestic prices relative to world prices, results in reallocation of resources from protected sectors to unprotected sectors. In turn, it affects payments to factors of production. This change in factor rewards results in a change in households' incomes depending on their ownership of the factors of production. (2) The consumer reallocates expenditure from expensive goods (domestic goods produced by import competing sectors) to relatively cheaper goods (imports) and reduces expenditure on domestically produced goods.

In the second exercise, we reduce remittances by 44 percent in the presence of tariff reduction of 55 percent. A decline in remittances results in a decline in the income of households depending on their share in remittances. The decline in income affects the household welfare. The tabulated results indicate reallocation of resources, the change in

[23]For detail see Kemal, *et al*. (2002).

factor rewards, welfare and poverty in Pakistan in response to the policy shock of trade liberalisation in the absence and presence of a decline in remittances. It compares the results of two exercises to explore the reasons for the rise of poverty in Pakistan.

Simulation 1. Trade Liberalisation

In the first simulation, we simply reduce the tariff rate by 55 percent across the board on all imports. Table 10 describes the effects on the macro economic variables. The reduction in the tariff rate leads to changes in the relative prices of all imports significantly except in the mining and the other traded sectors, because tariff was zero or very small on these two sectors. With a fall in relative prices, imports become cheaper and consumers substitute imported goods for the domestic goods. Depending on the elasticity of substitution and imports' share in total consumption, demand for all imports increase except mining and other traded sectors (see Table 10). The cut in the tariff rate leads to a large inflow of imports, 4.5 percent increase in total imports over the base year imports. The reduction in domestic costs caused by the tariff cut increase the profitability of the export sectors. This leads to the expansion of output and employment in the export sector notably in 'textiles'.[24] However, the increased inflow of imports is by no means enough to eliminate the import competing sectors, output decline significantly in 'Chemical', 'Machinery' and 'Other Manufacture' sectors by 2.8 percent, 2.0 percent and 2.0 percent, respectively (see Table 10).

Exports from every sector increase but this increase in exports is not fully compensated by the decline in domestic demand. Only the crop and textile sectors show an increase in domestic production after the shock, 0.1 percent and 5.4 percent, respectively indicating trade liberalisation benefits the export sector of Pakistan more. Depending on the elasticity of substitution, elasticity of transformation and share of imports and domestically produced goods in their respective domestic demand, results show that domestic demand for textile sector increase by 3 percent.

The fall in output in a number of sectors leads to a decline in demand for factors of production. Released factors of production from inefficient sectors move towards sectors that are more productive. Labour demand increase in 'crop' and 'textile' sectors by 0.43 percent and 16.3 percent, respectively. Specificity of factors (capital) affects the returns to capital. Returns to capital increase only in 'Textile' sector by 6.1 percent. The expansionary effects in some sectors, mainly in export sectors cannot outweigh the contraction effects in the import competing sectors, chemicals and machinery. Thus, both returns to labour and capital (an index) decline by 0.5 percent and 1.5 percent, respectively (see Table 10).

The significant disparity in poverty levels among the different groups of households require an investigation into the variation in the various income sources after the policy shock. The reduction in factors prices, wages and returns to capital, by –0.51 percent and –1.5 percent have a negative impact on the household nominal income. The production

[24]Textile is major exportable sectors, i.e., textile sector exports are 67.7 percent of total exports and 44 percent of total output.

Table 10

Simulation Results: Variation Over Base Year Values (Percentages)

Sectors	Imports	Domestic Demand	Exports	Production	Domestic Price	Producer Price	Import Price	Wage Rate	Returns to Capital	Consumer Price	Labour Demand
Trade Liberalisation (55 Percent Reduction in Tariff on all Imports)											
Crop	1.05	0.08	2.07	0.10	–1.63	–1.62	–2.56	–0.5	–0.02	–1.66	0.43
Non-crop	34.87	–0.58	3.20	–0.38	–2.83	–2.68	–20.70	–0.5	–2.20	–3.30	–2.55
Mining	–3.83	–1.20	1.83	–1.09	–3.70	–3.57	–1.51	–0.5	–4.33	–2.90	–3.47
Food	10.71	–0.64	4.07	–0.37	–3.04	–2.86	–11.39	–0.5	–2.68	–4.11	–1.75
Textile	13.47	3.01	8.34	5.41	–4.12	–2.26	–11.0	–0.5	6.06	–4.42	16.32
Chemicals	6.65	–2.94	4.35	–2.79	–4.71	–4.62	–11.37	–0.5	–12.04	–7.18	–9.39
Machinery	4.07	–2.04	5.43	–1.98	–6.96	–6.90	–12.32	–0.5	–6.81	–10.31	–5.72
Other Manufacturing	8.78	–2.27	6.17	–1.98	–5.37	–5.19	–12.85	–0.5	–8.34	–7.10	–5.58
Other Trade (Sector 1)	–4.18	–0.50	3.36	–0.27	–3.66	–3.45	–0.03	–0.5	–2.21	–3.60	–1.55
Other Trade (Sector 2)	–2.34	–0.81	0.93	–0.81	–1.92	–1.92	0	–0.5	–2.20	–1.56	–0.03
Non Traded Sector	–	–	–	–0.01	–	–2.84	–9.99	–0.5	–	–4.26	–1.2
Total*	4.50	–0.46	6.84	0.20	–3.39	–3.04		–0.5	–1.50		
Trade Liberalisation in Presence of Decline in Remittances (Reduction in Tariff Rate by 55 Percent and Remittances by 44 Percent)											
Crop	–5.70	–0.94	8.35	–0.88	–7.20	–7.15	–2.56	–3.41	–7.58	–7.03	–3.9
Non-crop	22.05	–1.84	9.87	–1.21	–8.31	–7.85	–20.70	–3.41	–8.60	–8.62	–7.96
Mining	–5.59	–0.64	4.06	–0.47	–5.62	–5.41	–1.51	–3.41	–5.02	–4.14	–1.5
Food	0.88	–2.69	11.53	–1.86	–8.69	–8.18	–11.39	–3.41	–13.53	–9.03	–8.48
Textile	8.57	6.92	21.24	13.49	–9.94	–5.35	–11.00	–3.41	11.96	–9.99	41.87
Chemicals	2.77	–3.14	8.42	–2.91	–7.24	–7.09	–11.37	–3.41	–15.04	–8.75	–9.76
Machinery	2.28	–1.64	8.17	–1.56	–8.90	–8.83	–12.32	–3.41	–8.26	–11.03	–4.53
Other Manufacturing	3.24	–2.98	11.01	–2.49	–8.59	–8.28	–12.85	–3.41	–12.88	–9.56	–6.97
Other Trade Sector 1	–8.53	–1.03	7.12	–0.55	–7.46	–7.02	–0.03	–3.41	–6.74	–7.35	–3.12
Other Trade Sector 2	–7.29	–2.74	2.64	–2.74	–5.81	–5.80	0.00	–3.41	–8.90	–4.74	0.07
Non Traded Sector	–	–	–	0.03	–	–5.50	–9.99	–3.41	–	–7.85	–4.02
Total*	0.59	–0.92	17.13	0.75	–7.81	–6.87	–2.56	–3.41	–6.32	–7.03	–

workers suffer the least decline in income in the urban as well as in the rural area, 0.85 percent and 0.81 percent respectively (see Table 11). These are the poorest group of households in their respective regions. This implies that trade liberalisation is relatively less harmful for the poor. However, variation in change in income across the income groups is not very significant.

The change in consumer prices also affects the household specific consumer price index (CPI). Table 11 shows that a decline in the CPI is larger than the decline in income for each household group. These changes lead to an increase in the real income of households.

This exercise shows with a given level of government expenditure and investment demand, trade liberalisation generates a welfare (equivalent variation) gain to every household group in urban and rural areas. In urban areas, the welfare gain to the poorest group (production worker) is not very different from the welfare gain to the rich (professionals), 2.69 percent and 2.68 percent, respectively. While in the rural areas, the welfare gains to the poorest (production worker) is the highest, at 2.6 percent. The aggregate welfare gain is larger for urban households compared to rural households, at 2.6 percent and 2.3 percent, respectively. This indicates a reduction in the gap between urban and rural households (see Table 12).

Table 11

Simulations Results: Variation in Income and Consumer Price Index of Households (Percentages)

	Trade Liberalisation (55 Percent Reduction in Tariff on all Imports)		Trade Liberalisation in Presence of Decline in Remittances (Reduction in Tariff Rate by 55 Percent and Remittances by 44 Percent)	
	Nominal Income	Household Consumer Price Index	Nominal Income	Household Consumer Price Index
Urban Households				
Professional	–0.88	–3.45	–4.97	–7.29
Clerks	–1.00	–3.44	–10.70	–7.66
Agriculture Worker	–1.21	–3.46	–9.85	–7.86
Production Worker	–0.85	–3.43	–8.12	–7.78
Miscellaneous	–1.10	–3.44	–9.09	–7.35
Urban Total	–1.00	–3.44	–9.03	–7.58
Rural Households				
Professional	–1.31	–3.42	–5.87	–7.92
Clerks	–1.04	–3.40	–6.25	–7.94
Agriculture Worker	–1.30	–3.25	–6.50	–7.95
Production Worker	–0.81	–3.36	–7.35	–7.97
Miscellaneous	–1.19	–3.47	–7.37	–8.06
Rural Total	–1.16	–3.34	–6.70	–7.97
Pakistan Total	**–1.07**	**–3.39**	**–7.95**	**–7.77**

Table 12

Decomposition of Welfare Impact (Percentage Change)

Households by Socio Economic Groups	Trade Liberalisation (55 Percent Reduction in Tariff on all Imports)	Total Effect of Trade Liberalisation in Presence of Decline in Remittances (Reduction in Tariff Rate by 55 Percent and Remittances by 44 Percent)	Reduction in Remittance
Urban Households			
Professional	2.69	2.50	–0.19
Clerks	2.60	–3.22	–5.82
Agriculture Worker	2.53	–2.05	–4.58
Production Worker	2.68	–0.38	–3.06
Miscellaneous	2.48	–1.85	–4.33
Urban Total	2.58	–1.56	–4.14
Rural Households			
Professional	2.49	2.56	0.07
Clerks	2.39	1.77	–0.62
Agriculture Worker	2.00	1.56	–0.44
Production Worker	2.61	0.64	–1.97
Miscellaneous	2.39	0.77	–1.62
Rural Total	2.30	1.41	–0.89
Pakistan Total	**2.45**	**–0.19**	–2.64

Central issue in this study is to find the links between globalisation and poverty in Pakistan. The results show that the income of all households declines after the shock of tariff cut. The density function (percentage of individual with given income) shifts to the left (see Figures 3 to 12). This shift in the density function increases the population below the poverty line (old) as more households move towards the lower income bracket if the poverty line does not change. However the results show that the value of the poverty line declines by 3.4 percent for urban households and by 3.3 percent for rural households due to change in consumer prices (see Table 11). As a result poverty line shifts to the left. The shift in the poverty line more than compensates for the fall in income, which results in a reduction of the population below the poverty line in each household group. Table 13 presents FGT indicators ($P\alpha$ - measures) for absolute poverty; head count (Po), poverty gap (P1) and severity (P2).

Density Functions and Shift in the Density Functions after the Shock (Urban Households)

Fig. 3. Density Function (Professional).

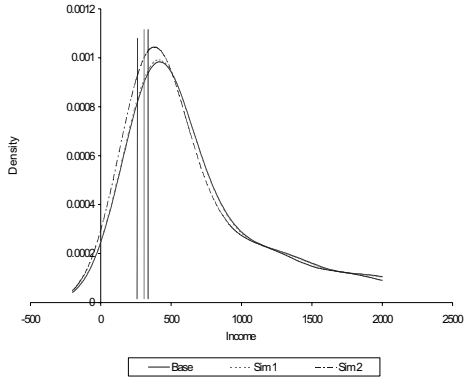


Fig. 4. Density Function (Clerks).

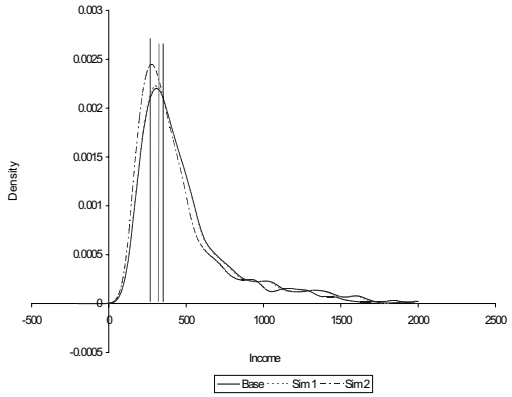


Fig. 5. Density Function (Agriculture).

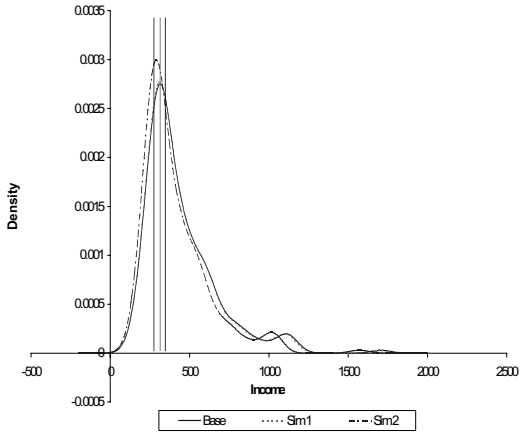


Fig. 6. Density Function (Production Worker).

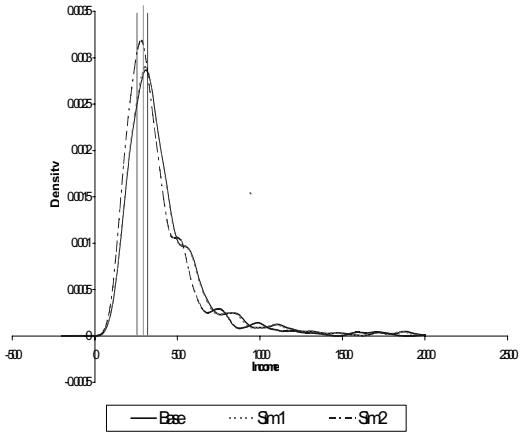
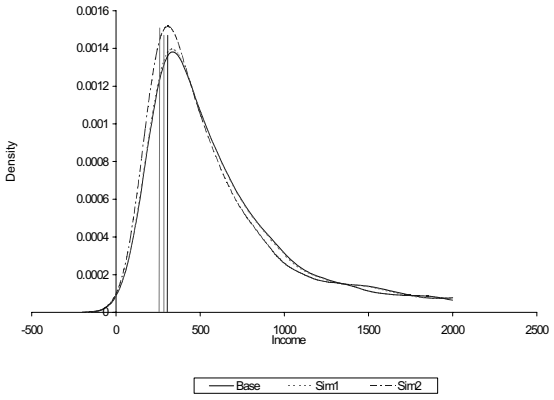


Fig. 7. Density Function (Miscellaneous).



Density Functions and Shift in the Density Functions after the Shock (Rural Households)

Fig. 8. Density Function (Professional).

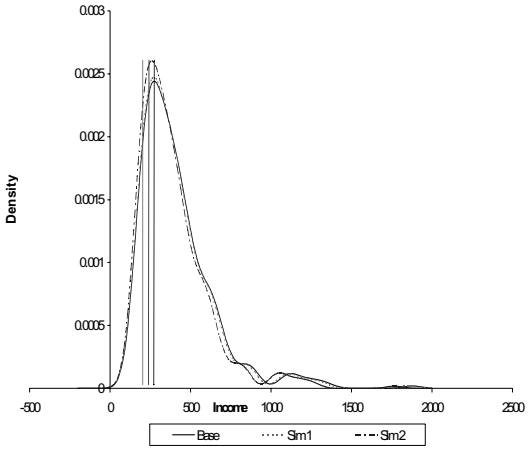


Fig. 9. Density Function (Clerks).

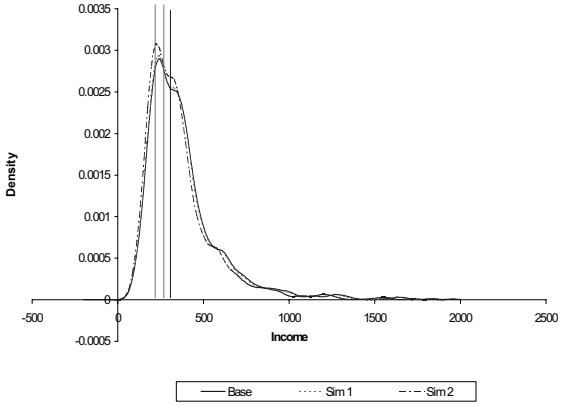


Fig. 10. Density Function (Agriculture).

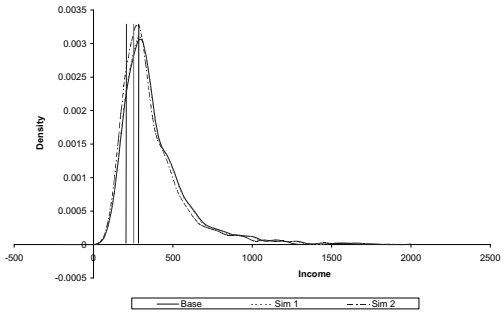


Fig. 11. Density Function (Production Worker).

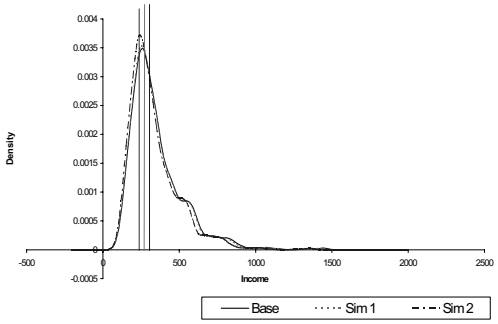


Fig. 12. Density Function (Miscellaneous).

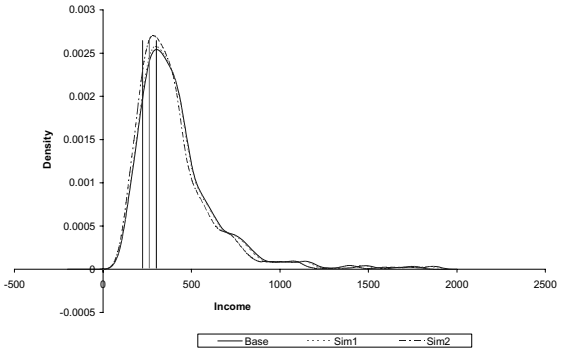


Table 13

Percentage Changes in F-G-T Indicators of Poverty (Percentages)

Households	Head Count				Gap				Severity			
	Base	Tariff cut	Tariff cut and Decline in Remit-tances	Decline in Remit-tances	Base	Tariff cut	Tariff cut and Decline in Remit-tances	Decline in Remit-tances	Base	Tariff cut	Tariff cut and Decline in Remit-tances	Decline in Remit-tances
Professional	19.92	–9.64	2.66	12.30	4.68	–9.81	10.08	19.89	1.15	–9.57	11.30	20.87
Clerks	31.52	–7.30	6.85	14.15	3.77	–7.40	9.02	16.42	2.42	–9.50	11.57	21.07
Agriculture	35.33	–14.44	0.00	14.44	7.43	–12.89	3.09	15.97	1.44	–13.89	3.47	17.36
Production Worker	40.08	–7.09	4.92	12.00	5.51	–7.56	8.63	16.19	1.26	–8.62	10.15	18.77
Others	23.44	–2.35	3.71	6.06	9.39	–9.62	6.84	16.45	3.25	–11.90	9.52	21.43
Urban (Total)	**32.44**	**–7.09**	**5.09**	**12.18**	**7.27**	**–7.98**	**8.39**	**16.37**	**2.36**	**–9.32**	**10.59**	**19.92**
Professional	25.2	–3.57	–3.57	0.00	5.20	–8.46	–8.65	–0.19	1.42	–11.27	–11.27	0.00
Clerks	34.25	–3.42	–3.42	0.00	7.38	–7.86	–8.13	–0.27	2.33	–9.01	–9.01	0.00
Agriculture	28.3	–6.40	–5.55	0.85	6.43	–7.15	–6.22	0.93	2.12	–8.49	–8.02	0.47
Production Worker	36.3	–6.12	–5.92	0.19	7.31	–8.34	–8.62	–0.27	2.22	–9.46	–9.46	0.00
Others	23.19	–9.57	–9.14	0.43	4.58	–8.08	–8.30	–0.22	1.41	–9.22	–9.93	–0.71
Rural (Total)	**30.47**	**–6.01**	**–5.61**	**0.39**	**6.49**	**–7.70**	**–7.55**	**0.15**	**2.05**	**–9.27**	**–8.78**	**0.49**

In the urban and the rural areas, the head count ratio declines between 2.4 to 14.4 percent and 3.4 to 9.6 percent, respectively. The poverty gap and the severity indices have both declined in all households in the urban as well as in the rural areas. From the table we may note that trade liberalisation is more beneficial for urban households as all poverty indicators (Pα-measures) decline more for urban areas (who were relatively poor before simulation) compared to the rural households. We can conclude that the policy shock benefits the poor and reduces the gap between urban and rural households. For the analysis of distributive effects of liberalisation, we draw graphs for variation in the density function for the urban and rural areas before and after a change in government policy; tariff reduction. Variation-1 shows a movement of households from the middle-income bracket (500-1000) towards the lower income bracket (250-500). Figures 13 and 14 show movements of households in urban and rural areas change their income bracket i.e., from higher to lower income brackets. While there is very little variation in the higher income brackets. This suggests that the income disparity has increased after trade liberalisation in urban as well as in rural areas of Pakistan. The overall results show that absolute poverty has declined by all measures in Pakistan in the presence of trade liberalisation. The data on poverty contradicts these findings as poverty rise by all measures during the period of trade liberalisation (see Table 6 and Table 7).

Fig. 13. Variation in Density Function (Urban Households).

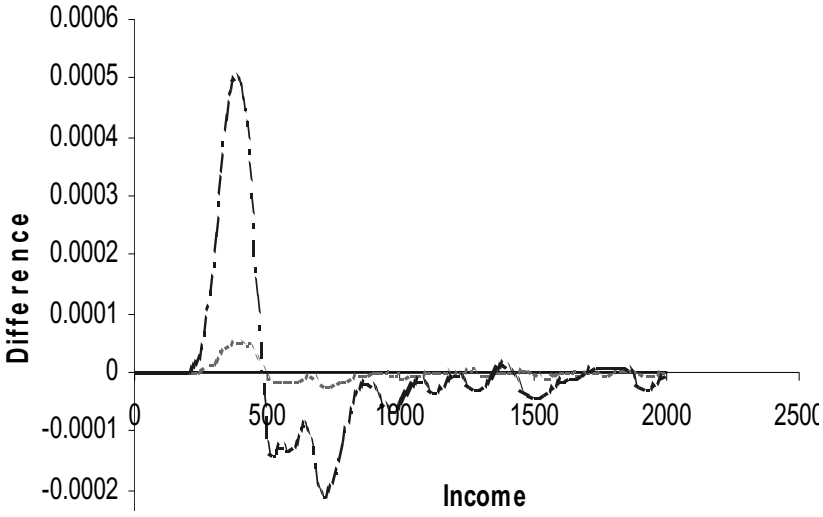
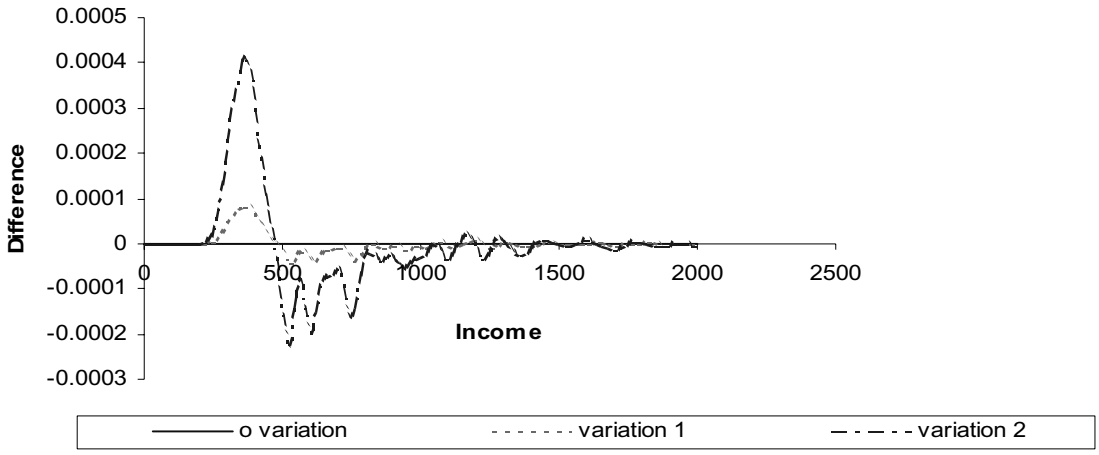


Fig. 14. Variation in Density Function (Rural Households).



Simulation 2. Trade Liberalisation in the Presence of Decline in Remittances

In this section, the results of the combined shock to the economy of a reduction in tariffs and a reduction in remittances are presented. The decline in tariffs and in remittances represents the actual decline over the 1990-2001 period; 55 percent and 44 percent, respectively. This shock to the economy reduces the domestic prices of all imports as well as income of households (see Table 10 and Table 11).

With a fall in import prices (Pm), imports become cheaper, but do not result in an increase of imports of every goods. Some sectors show a decline in imports, where tariff was zero or very small, crop, mining, other traded sectors, while the others where the tariff was high in the base period i.e., non-crop, food, textiles, chemicals, machinery and other miscellaneous manufactured imports show an increase. Here the total increase in imports is less than one percent compared to 4.5 percent in first simulation. A decline in remittances restricts the inflow of imports. During the period of a large inflow of remittances, a major part of the trade deficit was financed by foreign remittances. With the CAB constant, decline in remittances is partially compensated by decline in imports and partially by larger increase in exports from each sector. The result is larger exports from Pakistan, 17.1 percent compared to the increase in exports of 6.8 percent in the previous exercise (see Table 10).

Aggregate domestic demand for domestic goods decline by –0.9 percent compared to decline in total demand for domestic goods, 0.46 percent in the previous exercise. The larger change can be attributed, partially to decline in remittances. As the demand for domestic goods declines, the producer of exportable goods diverts a portion of his sales from the domestic to the export market. The largest increase in exports is from textiles. The increase in exports from this sector leads to an increase in output from this sector. However, increase in the exports in all other sectors is not equal the decline in domestic

demand in their respective sectors. Output fell in those sectors. This leads to reallocation of resources including factors of production.

The price of domestically produced goods fell due to the decline in the demand for domestic goods. The change in domestic price of domestically produced good and domestic import price led to a decline in consumer prices, Pc. In this simulation, import prices fell by the same amount as in the first simulation but P_D declined by higher percentage. It seems that due to decline in household income from remittances, households reduced their demand. Due to reduced demand for goods, prices fell by higher percentage.

Now we focus on factor demands and their remuneration. Results show that demand for labour increases only in 'textiles' where domestic production increases. All other sectors show a decline in labour demand. These changes result in fall in wage rate, –3.4 percent. Similarly, returns to capital increase only in the textile sectors. Overall results show that returns to capital decline by 6.3 percent (see Table 10). If we compare the effects on macro variables in this and the previous exercise, it becomes clear that a decline in remittances has reduced the gains of trade liberalisation.

The adverse impact of decline in remittances on households depends on the households' share in total remittances. In addition to the decline in remittances, the fall in factor prices also has a negative impact on the households' nominal income (see Table 11). Households' income declined by 5 to 10 times more when decline in remittances of 44 percent is introduced in the base year economy. In urban areas, the income of clerks declined by 10.7 percent, who receive 35.8 percent of remittances. In rural areas, the decline in income is between (–5.9 percent) to (–7.4 percent). The least decline is in the income of rich households (professionals) who receive only 0.2 percent of remittances (see Table 9 and Table 11).

Consumer prices fell for all commodities by a larger amount in this exercise (see Table 11). Results show that rich households in urban and rural areas, (professionals), gain significantly in terms of EV at 2.5 percent and 2.6 percent respectively. All other households lose in the urban areas. In rural areas all other households groups gain but less than the rich households. However, the gain is less than the gain of trade liberalisation in absence of decline in remittances.

Income of all households shows a larger decline after the shock of 44 percent reduction in remittances in presence of trade liberalisation which shift the density curve to the left.(see Figures 3 to 12, Simulation 2). These figures clearly show that more households shift towards the lower income bracket. Area specific consumer prices index decline by 7.6 percent and 8.0 percent for the urban and rural areas, respectively (see Table 11). The poverty lines on the curves also shift to the left. The shifts in the poverty lines are more than compensated for some households, while for others the opposite is true.

Households' specific poverty effects ($P\alpha$ measures) of trade liberalisation in presence of the decline in remittances are presented in Table 13. In urban area, households below the poverty line increase in all household groups except in agricultural

group of households. In the rural area, poverty indicators still show a decline for each group of households. This suggest that trade liberalisation still benefits rural households in spite of the decline in remittances. An examination of the poverty gap and poverty severity indicators, P1 and P2, gives the same message. All three FGT indicators show that poverty had increased in urban areas and declined in rural areas (see Table 13).

For the analysis of the distributive effects of liberalisation in the presence of a decline in remittances, we draw graphs for changes in the density function after tariff reduction and the decline in remittances. Variation-2 in figures 13 and 14 shows that a movement of households from the middle-income bracket (500-1000) towards lower income brackets is very large in this simulation. This suggests that a decline in remittances enhanced the adverse distributive impact of trade liberalisation and income disparity increased due to the remittance decline.

Decomposition Analysis

In this section we compare the impact of tariff cut and decline in remittance on welfare and poverty in Pakistan. Table 12 shows that trade liberalisation through tariff cuts increases the welfare of urban and rural households compared with the base year. But trade liberalisation in the presence of reduced inflow of remittances reduces the welfare of urban households. Urban households' welfare loss is -1.6percent. However, rural households still gain in terms of welfare by 1.4 percent. The third column shows the impact of the decline in remittances. It shows that welfare is reduced for each household in urban and rural households (except professional in rural areas who receive only 1 percent of remittances), this is contrary to trade liberalisation effect where every household gains. The negative impact of remittance decline on urban households (–4.14 percent) is larger than the negative impact on rural households (–0.89 percent). In terms of total effects, the negative impact of remittance dominates the positive impact of trade liberalisation for urban households. The reverse is true for rural households as they still show a welfare gain.

Percentage changes in FGT-indicators for three effects: tariff cut, tariff cut and decline in remittances and decline in remittances only are presented in Table 13. The table shows that absolute poverty has declined in urban as well as in rural households because of trade liberalisation. However, with the decline in remittances poverty rises according to all $P\alpha$ measures in the both areas, urban and rural. The results of trade liberalisation in the presence of a decline in remittances shows that remittance impact dominates for urban households, but trade liberalisation impact dominates for rural households in terms of the total effect.

VIII. CONCLUSION

The paper explores the links between globalisation and poverty by incorporating a decline in remittances in the analysis of trade liberalisation policies. There is an evidence that remittances have declined due to return of migrants from the Middle East, during the period of trade liberalisation. To analyse the role of decline in remittances we disaggregate households by occupation of head of the households in urban areas and rural areas. A CGE framework has been used for the analysis.

This study analyses the impact of two shocks, trade liberalisation through tariff cut both in the presence and in the absence of a decline in remittances. Poverty estimates based on micro data of HIES [Pakistan (1993)] show that tariff reduction in the absence of decline in remittances reduces poverty by all F-G-T indicators; head count, poverty gap and severity ratios in both the rural and urban areas of Pakistan.

The study comes out with the conclusion that whereas tariff rationalisation is welfare inducing and would result in lower level of poverty. The welfare gain is larger for urban households than for rural households. Poverty is reduced by a larger percentage for urban households than rural households. We conclude from this that trade liberalisation benefits the urban households more and reduces the gap between urban and rural households. The rise in poverty accompanying the trade liberalisation is due to other factors, decline in remittances.

In the second set of experiments, trade liberalisation in the presence of a decline in remittances, there is a reduction in the welfare of urban households although rural households still show an increase over base year. But this welfare gain to rural households is less than the welfare gain in the presence of trade liberalisation only. According to all FGT indicators, poverty increases in urban households but not in rural households. This indicates that the combined shock is more harmful for households in the urban areas than the households in the rural areas. Decomposition results show that poverty increases according to all poverty measures in rural and urban areas of households from a decline in remittances. The negative impact of remittance decline dominates the positive impact of trade liberalisation in urban areas. On the other hand, the positive impact of trade liberalisation dominates the negative impact of a decline in remittances in the rural area. We conclude from this that the decline in remittance inflows is a major contributory factor in explaining the rise in poverty in Pakistan. The results suggest that income inequality increases in both situations. A comparison of first and second simulation shows that the decline in remittances has reduced the economic gains of trade liberalisation.

APPENDIX A

Endogenous Variables		Definition
1	C_i	Total Consumption of Good
2	CG_i	Public final Consumption of Good I
3	CT_G	Government final consumption
4	CH_i	Household h's Consumption of Good I
5	CT_H	Total Consumption of household h
6	D_i	Domestic Demand for domestically produced good
7	DIV_H	Dividends distributed to Households from firms
8	EX_n	Exports of *n*th good (FOB)
9	IC_i	Total Intermediate Consumption of Good by ith sector
10	IC_{ij}	Intermediate Consumption of Good J by ith sector
11	$INTD_I$	Intermediate Demand of Good I
12	I_i	Consumption of Good for investment in sector i
13	IT	Total Investment
14	L_i^D	Labour Demand in sector I
15	M_n	Imports of nth good (CAF)
16	P_i	Producer Price
17	Pg	Price index for government consumption
18	Pinv	Price deflator for investment
19	Pt_i	Domestic price without taxes
20	P_i^C	Price of Composite good
21	P_i^D	Price of domestically produced and consumed good with taxes
22	P_n^E	Domestic Price of Exports
23	P_n^M	Domestic Price of Imports
24	P_i^{VA}	Value Added Price
25	P_{INDEX}	Producer price Index
26	Q_i	Domestic Demand for Composite Good i
27	R_i	Rate of Return on capital in branch n
28	sav	Adjustment in sav
29	S_F	Firms Saving
30	S_G	Government Saving (Fiscal Deficit)
31	S_H	Saving of Household h
32	TS_H	Total Households Savings
33	TXE_n	Taxes on Exports of *n*th sector
34	TXM_n	Taxes on Imports of *n*th sector
35	TXS_i	Indirect taxes on *i*th sector production
36	VA_i	Value Added of sector I
37	W	Wage rate
38	X_i^s	Production of ith sector
39	Y_H	Total Income Household h
40	YD_H	Disposable income of h Household h
41	Y_F	Firms total income
42	Y_G	Government Revenue
43	Y_{FK}	Firms Capital Income
1	CAB	Current Account Balance
2	CT_{GR}	Government final consumption in real terms
3	e	Nominal Exchange Rate
4	IT_R	Total real investment
5	K_i	*i*th Branch Capital Stock
6	L^S	Total Labour Supply
7	P_n^{WE}	World Price of Exports
8	P_n^{WM}	World Price of Imports
9	S_F	Firms Saving
10	TR_{FR}	Firms transfers to the rest of world
11	TR_{GF}	Government transfers to Firms
12	TR_{GH}	Government Transfers to Households
13	TR_{RG}	Foreign transfer payments to the Government
14	TR_{RH}	Foreign transfers to Households
15	Y_G	Government Revenue

APPENDIX B. SYMBOLS

Symbols	Variable Names
a_{ij}	Input Output Coefficients
B_i	CES scale parameter of value added
B_e^T	CES scale parameter of export transformation function
B_c^s	CES scale parameter of Import aggregation function
β_{hi}^c	Percentage share of good *i* in *h*th household consumption
β_i^τ	Percentage share of good *i* in Public consumption
β_i^I	Percentage share of good *i* consumed for investment purposes
β_i^x	Percentage share of good *i* in total Production
γ_i	Subsistence expenditure by *h*th household
λ_l	Household Share of Labour Income
λ_k	Household Share of Capital Income
io_I	Leontief technical coefficients (Intermediate Consumption of good i
mps_h	Households h marginal propensity to save
tk	Capital Income tax rate of firms
v_I	Leontief technical coefficients (value added)
σ_i	CES elasticity of substitution of value added
ρi	CES Substitution parameter of value added
δi	CES Distributive share of value added
σ_e^T	CES elasticity of transformation of export
ρ^T_e	CES Substitution paraméter of export transformation
δ^T_e	CES Distributive share of exports and domestic production
σ^T_c	CES elasticity of substitution of imports
ρ^T_c	CES Substitution parameter of imports
δ^T_c	CES Distributive share of imports and domestically produced goods

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