An Assessment of the Impact of Trade Liberalisation on Welfare in Pakistan: A General Equilibrium Analysis
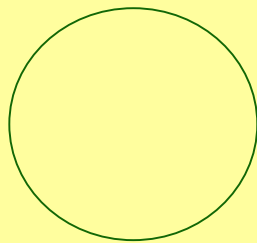
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December 2003

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ISLAMABAD, PAKISTAN**

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I. INTRODUCTION

Until the liberalisation efforts were initiated in the 1980s, Pakistan had very restrictive trade regime, both in terms of tariff and quantitative restrictions (QRs) i.e., bans, quota, value limit etc. The impact of these restrictions on manufacturing industries in Pakistan over 1952–97 period is well documented.[1] During the 1980s and through out the 1990s a series of structural adjustment programmes (SAP) including trade liberalisation in response to structural imbalances in the economy, were implemented by the government. Trade liberalisation started in 1981 by removing quantitative restraints and providing protection through the tariffs. In 1987-88, quota restrictions on imports of consumer goods were completely removed and bans that still existed were almost redundant from the protection standpoint. However quantitative restrictions along with tariff on import of electric and non-electric machinery continued. The restrictive trade regime had an adverse impact on the growth prospects of the economy as a whole.

The welfare consequences of trade liberalisation are rather important especially for a poor country like Pakistan where one-third i.e., 32.6 percent population still lives below poverty line [Siddiqui and Iqbal (2001)]. A few studies focused on the consequences of trade liberalisation on poverty and income distribution in Pakistan[2] concluded that trade liberalisation can have significant impact on employment, productivity and growth.[3] It can help in reducing anti export bias and boost export oriented industries.[4] In turn, income generation through employment creation reduces poverty. Increase in incomes would also result in human resource development as Moore, *et al.* (2000) have pointed out that 55 percent of the variance in human development performance is explained by variation in income. Elimination of quota and tariff reduction affects consumption, production, imports and exports through changes in factor prices as well as goods price. The study identifies the impact of policy change on macro economic variables in general, and on consumption and factor income accruing to different socio-economic groups of households, in particular.

The main objective of this study is to assess the impact of reduction in QR's on all imports on electrical equipment (EE) and non-electric and transport equipment (NETE) and tariff reduction on welfare in both the rural and urban areas of Pakistan. The study specifically tests the hypotheses: *Had the tariff and non-tariff barriers to inflow of imports any adverse impact on individual welfare in Pakistan?* Like many others[5] we use Computable General Equilibrium framework for the analysis. Basic framework of the model is taken from Siddiqui and Iqbal (2001).

[1]Pal (1965), Alamgir (1968), Lewis and Guisinger (1968), Kemal, *et al.* (1981), Naqvi and Kemal (1991), Kemal, Mahmood and Ahmad (1994).

[2]Kemal (1994), Khan (1997) and Mahmood (1999).

[3]Economic theory in the tradition of Hecksher-Ohlin framework.

[4]As exports are labour intensive.

[5]Decaluwe, *et al.* (1999), Shoven and Whalley (1992) and Thorbecke (1991) etc.

Organisation of the study is as follows: Following section presents a historical review of trade and poverty in Pakistan. Third section discusses main features of the Social Accounting Matrix, with special focus on households' income and consumption pattern. Computable General Equilibrium Model is discussed in fourth section. Fifth section presents simulation results and major conclusions are presented in final section of the study.

II. HISTORICAL REVIEW OF TRADE AND POVERTY IN PAKISTAN

Since independence Pakistan has adopted Import Substitution Industrialisation strategy (ISIS). High tariff and non-tariff barriers had been imposed on imports to protect domestic industries particularly the newly established industries. In 1979, the scarcity premium on capital goods including transport equipment was the highest, and it was followed by those on consumer goods and intermediate goods. Average markup on capital goods, consumer goods and intermediate goods were 42.9 percent, 37.5 percent and 25.6 percent respectively [Kemal, *et al.* (1981)]. Due to high tariff rates, quota, and other restrictions (value limit on imports, License requirement, imports through designated importers etc.), Pakistan's import regime had reached its most restrictive stage in 1981. About 41 percent of domestic industrial value added was protected through ban on import, and another 22 percent by various forms of import restrictions [World Bank (1988)]. According to Kemal, *et al*. (1994), Pakistan's tariff structure was such that consumer goods industry enjoyed maximum nominal protection followed by capital goods and intermediate goods and within intermediate inputs, it was maximum for intermediate goods for capital. The tariffs have also been important source of revenue and they accounted for and as much as 45 percent of indirect tax revenue [Iqbal and Siddiqui (1999)].

Since 1981, through open and liberal trade policy, the economy has been gradually exposed to the global market with a view to making the local industry efficient and competitive in the new liberalised world economic environment. Government of Pakistan aimed to remove trade barriers through:

(1) Reduction in non-tariff barriers and increase reliance on tariffs for protection; and
(2) Rationalisation of tariff structure.

Most of the quantitative restrictions on consumer goods imports were done away and the number of commodity categories subject to import licensing value ceilings was reduced from 406 in 1980-81 to 5 consumer goods in July 1983. In the following year, Pakistan reduced many items from the negative list but its reliance on import bans and restrictions to protect its industry continued. Table 1 shows that the incidence of non-tariff barriers in 1986-87 after reduction in quantitative restriction was mainly on the consumer goods. It shows that imports of 26.5 percent products were prohibited and 2.5 percent restricted in 1986-87. Whereas 56.7 percent of consumer goods, 25.1 percent intermediate and 27.3 percent capital goods were either prohibitive or restricted. During this period effort was made to rationalise tariff structure. Nevertheless nominal tariff rates still ranked higher as compared to other countries in the world. Table 2 presents tariff rates on four major groups of imports; consumer goods, capital goods, raw material for consumer and raw material for capital goods. It shows that weighted tariff rates on capital goods, consumer goods, and on raw material for consumer goods have declined

Table 1

Incidence of Non-tariff Barriers

Before SAP 1986-87	Overall	Agriculture	Mining	Manufacturing					
				Total	Consumer		Intermediate	Capital	Textile
					Total	Food			
(i) Prohibitive	26.6	36.2	3.8	26.5	52.2	52.5	21.7	11.3	53.9
(ii) Restricted	7.8	0.9	0.0	8.5	4.5	5.4	3.4	16.0	2.9
(iii) Unrestricted	65.6	63.0	96.2	65.0	43.4	42.1	75.0	72.7	43.2

Source: World Bank (1989).

from 32.15 to 19.54, 28.42 to 24.56, 34.06 to 31.92, respectively over the 1980-81 to 1987-88 period. While on raw material for consumer goods it has increased from 13.79 to 19.53 percent over the same period. These changes did not result in any significant change in average tariff rate . At that time 120 products on the negative list accounted for 10 percent of total commodity categories and 9.1 percent of value added in the large scale manufacturing industries. Similarly 10.6 percent were subject to special procedural requirement. Overall 25 percent of value added in Large Scale Manufacturing was still restricted through import policy [Kemal, *et al.* (1994)].

Table 2

Tariff Structure by Commodity Group

Years	Final Imports of		Raw Material for		Weighted Average Tariff Rate
	Capital Goods	Consumer Goods	Capital Goods	Consumer Goods	
1980-81	32.15	28.42	34.06	13.79	22.06
1981-82	29.64	25.15	34.58	12.69	20.54
1982-83	23.24	20.50	67.00	14.29	20.60
1983-84	20.41	24.17	99.25	12.25	22.32
1984-85	15.02	17.66	94.09	12.94	19.19
1985-86	19.87	21.31	62.79	14.06	20.42
1986-87	17.78	35.31	38.05	23.00	27.59
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
1990-91	16.03	10.68	22.47	16.49	14.91
1991-92	10.17	11.04	20.92	16.31	13.62
1992-93	11.85	12.41	29.68	20.16	16.26
1993-94	11.51	12.61	24.66	20.59	16.60
1994-95	12.48	13.90	31.56	20.85	17.84
1995-96	12.69	14.37	32.71	19.36	17.45
1996-97	10.58	12.27	26.46	16.22	14.41
1997-98	8.31	11.10	19.27	16.22	13.3

The scope of import licensing was reduced further and by 1993 it was completely eliminated. In 1992-93, 57 percent of capital good imports were duty free and 35.1 percent of the total duty free imports were of machinery [Kemal, *et al.* (1994)]. In 1993-94, 157 items were removed from negative list.[6] In 1994 restricted list (products which were importable only through designated importers) and import quotas and other quantitative restriction (value limit) on machinery and millwork was also reduced. A number of import items subject to various restrictions were reduced to 47 from 62 items. Over all, number of intermediate goods, consumer goods and capital goods on negative lists were reduced from 142 to 16, 32 to 7 and 221 to 107, respectively [Kemal, *et al.* (1994)].

At the same time tariff restructuring was taking place; tariff was reduced on some items while on some commodities where there was no import duty, tariffs were imposed. In result, weighted average tariff rate was reduced from 22.22 percent in 1987-88 to 13.3 percent in 1997-98 (see Table 2).

During structural adjustment programme, tariff rates declined from 19.5 percent to 8.3 percent on final capital goods and from 31.9 percent to 19.3 percent on raw material for capital goods during the 1988-98 period; on final consumer goods it has declined from 24.6 percent to 11.1 percent. Import duties on raw material for the consumer goods increased initially but since then have declined to 16.2 percent over the same period. Weighted average tariff rate has reduced substantially, during 1988 to 1998, from 22.2 percent in 1987-88 to 13.3 percent in 1997-98. After reduction in tariff and non-tariff barriers the major increase in imports has been recorded for imports of machinery for textile and garment industry [Kemal (1997)].

Trade structure before and during the adjustment period is presented in Tables 3 and 4. Over the last two decades openness of the economy has increased as share of trade in GDP increased from 29.8 percent in 1980-81 to 33.0 percent in 2001-02. Data reported in Table 3 shows that following a reduction in QRs on imports, share of capital goods increased from 28 to 37 percent and that of consumer goods from 15 percent to 17 percent during 1981-87. During the adjustment period, GOP concentrated on reducing other quantitative restrictions like licensing and specificity of importer and tariff rate was reduced significantly. Consequently the share of capital goods increased further from 37 percent in 1987 to 42 percent in 1992-93. Similar pattern is found in the raw material for consumer goods, its share increased from 39 percent in 1987 to 54 percent in 1999.00. Import of consumer goods shows declining trend, from 19 percent in 1989-90 to 13 percent in 1993-94. But the pattern of import of consumer goods was reversed in the subsequent period. The major increase in imports was in the imports of capital goods and raw material for consumer goods, mainly benefiting the manufacturing sector, especially textile sector, in the country.[7]

Graph 1 to 4 show that imports of consumer goods, capital goods, raw material for consumer goods and raw material for capital goods have increasing trend but both categories of

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[6]During 1983-84 to 1993-94, 724 items were removed from negative list.

[7]As import duties have been reduced specifically on machinery for textile sector.

Table 3

Structure of Imports

Year	Imports of		Import of Raw Material for	
	Capital Goods	Consumer Goods	Capital Goods	Consumer Goods
1980-81	28	15	8	50
1981-82	30	14	8	48
1982-83	31	14	6	49
1983-84	32	14	6	48
1984-85	32	16	6	46
1985-86	37	18	5	40
1986-87	37	17	7	39
1987-88	36	14	7	43
1988-89	37	17	7	39
1989-90	33	19	7	41
1990-91	33	16	7	44
1991-92	42	13	7	38
1992-93	42	14	6	38
1993-94	38	13	6	43
1994-95	35	14	5	46
1995-96	35	14	6	45
1996-97	37	15	5	43
1997-98	32	18	5	45
1998-99	31	16	6	47
1999-2000	26	14	6	54

Table 4

Structure of Exports

Year	Primary Commodities	Semi-Mfg	Mfg Goods	Textile	Garments
1980-81	44	11	45	40	3
1981-82	35	13	52	33	5
1982-83	30	13	57	40	6
1983-84	29	14	57	36	8
1984-85	29	17	54	39	7
1985-86	35	16	49	43	8
1986-87	26	21	53	45	12
1987-88	28	20	52	47	11
1988-89	33	19	48	49	11
1989-90	20	24	56	44	13
1990-91	19	24	57	42	13
1991-92	19	21	60	45	15
1992-93	15	21	64	44	16
1993-94	10	24	66	44	16
1994-95	11	25	64	42	16
1995-96	16	22	62	45	15
1996-97	11	21	68	42	17
1997-98	13	17	70	43	17
1998-99	12	18	70	40	18
1999-2000	12	15	73	51	19

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Graphs
Major Imports by Categories
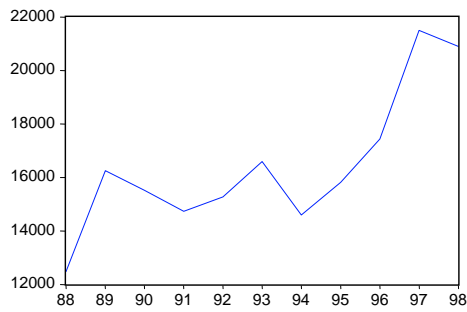
Graph 1: Import of Consumer Goods.
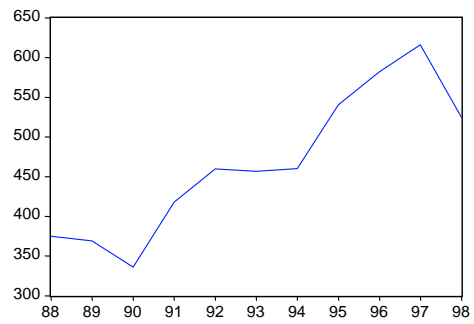
Graph 2: Imports of Capital Goods.
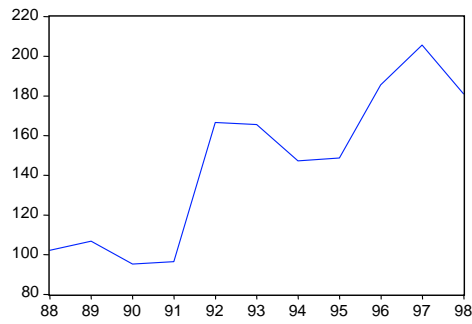
**Graph 3: Imports of Raw Material for
Consumer Goods.**
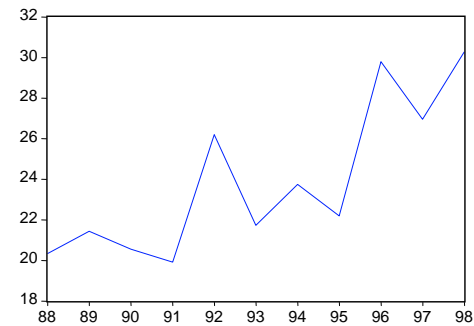
**Graph 4: Imports of Raw Material for
Capital Goods.**
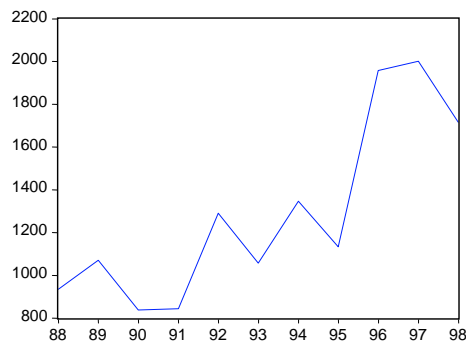
Graph 5: Imports of Electric Equipment.
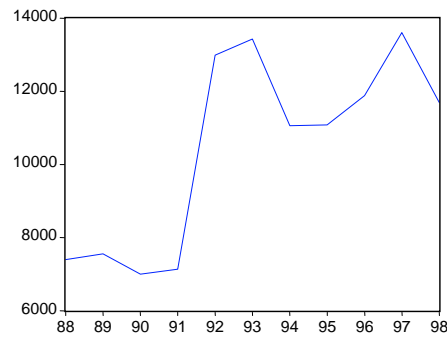
**Graph 6: Imports of Non Electric and
Transport Equipment.**

import of consumer goods increase sharply as compared to imports of capital goods during the liberalisation process.

In late 1980s and during the 1990s the quantitative restrictions on imports of electric machinery and non-electric and transport equipment were reduced. Consequently inspite of fluctuation import of these two groups shows upward trend in post adjustment period (see Graph 5 and 6).

Table 4 presents the percentage share of economic category-wise exports. It shows that in 1999-00 export of primary commodities reduced to one-fourth of the level prevailing in 1981. While share of exports of manufactured goods in total exports increased from 45 percent of total imports in 1980-81 to 73 percent in 1999-00, semi-manufactured exports show a small increase from 11 percent to 15 percent over the same period. It also shows that export share of garments industry increased substantially from 3 percent to 19 percent over the period. The improvement in the share of manufactured goods in the total exports depicted a positive change. Its share in total exports has been increasing constantly, which is indicative of the fact that the industrial activity is picking up in the country and more income will accrue from the export of manufacturing goods. This is the result of successful implementation of trade liberalisation efforts.

Pakistan experienced impressive growth of 6.51 percent during 1981-88. This impressive growth was accompanied by reduction in income inequalities, as Gini coefficient has fallen from 0.37 in 1984-85 to 0.35 in 1987-88 for Pakistan as a whole [MCHD (1999)]. In rural and urban areas of Pakistan, Gini coefficient also shows a declining trend. It declined for rural and urban areas from 0.34 and 0.38 in 1984-85 to 0.31 and 0.37 during the same period, respectively (see Table 5). Since the launching of structural adjustment programme, slower growth of real GDP (4.36 percent during 1989-99) has been accompanied with rising inequality and incidence of poverty. During this period, Gini coefficient varies between 0.40 to 0.41 for Pakistan as a whole and 0.41 to 0.37 and 0.39 to 0.41 respectively for the rural and the urban areas of Pakistan. Overall trend of Gini coefficient shows that income inequality was higher during the adjustment period as compared to in pre adjustment period.

Table 5

Trends in Gini Coefficients and Growth Rates of GDP

Year	Gini Coefficients			Growth Rates		
	Pakistan	Rural	Urban	GDP	Imports*	Exports*
1984-85	0.37	0.34	0.38	8.71	0.3	–7.9
1985-86	0.36	0.33	0.35	6.36	–0.4	19.7
1986-87	0.35	0.32	0.36	5.81	–3.2	18.9
1987-88	0.35	0.31	0.37	6.44	19.5	24.7
				(6.51)[1]		
1990-91	0.41	0.41	0.39	5.57	13.1	19.8
1992-93	0.41	0.37	0.42	2.27	11.7	0.3
1993-94	0.40	0.35	0.40	4.54	–13.6	–1.4
1998-99	0.41	0.37	0.41	3.11	–11.1	–10.2
				(4.36)[2]		

Source: Pakistan Economic Survey, 1997-98, 1998-99. [1]Figures in parentheses are for 1981-88 and [2]For the period 1989-99.
Note: * Figures for 1998-99 are for July to March.

Table 6 shows that in pre-adjustment period poverty (population below poverty line) sharply went down from 24.47 percent in 1984-85 to 17.32 percent in 1987-88 when growth rate of GDP was on average 6.2 percent. During adjustment period proportion of poor has increased from 17.3 in 1987-88 to 23.6 in 1993-94 and further to 32.6 percent in Pakistan as whole. While the poverty incidence was 34.8 percent in rural and 25.9 percent in urban areas of Pakistan. One of the facts for increase in poverty has been the slow growth rate. These estimates show that income inequality and poverty has been rising during adjustment period as compared to in the pre adjustment period. To what extent trade liberalisation policies may have been responsible for this outcome is explored in the paper.

Table 6

Trends in Proportion of Poor (%)

Year	Pakistan	Rural	Urban
1984-85	24.47	25.87	21.17
1987-88	17.32	18.32	14.99
1990-91	22.11	23.59	18.64
1992-93	22.40	23.53	15.50
1993-94	23.6	26.3	19.4
1998-99	32.6	34.8	25.9

Source: Amjad and Kemal (1997) and *Economic Survey 1998-99.*

III. SOCIAL ACCOUNTING MATRIX 1989-90

The benchmark year for the experiment is 1989-90 and the Social Accounting Matrix [Siddiqui and Zafar (1999)] for 1989-90 provides base year data for the model (See (d) in Appendix 1). It develops relationship amongst ownership of factors of production, income generation from production activities and its distribution across the different household groups. It also shows expenditure decisions by households for different commodities.

Production sector is aggregated into thirteen sectors from 82×82 input-output matrix. These thirteen activities can be classified into four broad categories; agriculture, mining, manufacturing, and others. Agriculture sector includes wheat (main staple food)[8], major crops, minor crops, and non-crop sectors. Mining is aggregated into one sector. While manufacturing sector is aggregated into 6 sectors as consumer goods, textile, petroleum, electric equipment, non-electric and transport equipment, and other manufacturing. The three major sectors, i.e., agriculture, mining and manufacturing sectors produce goods for domestic market and foreign markets. The remaining sectors are again grouped into other traded goods and non-traded goods.

Production sector is constructed under the assumption that each sector produces single commodity by employing primary factors of production and intermediate inputs. The expenditure on production includes payments to factors of production, cost of intermediate inputs and taxes to government. All production sectors employ two types of primary factors of

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[8]Rural households use it after grinding, while most of the urban households use flour.

production, viz, labour and capital. Capital includes physical capital, land and human capital. Commodity producing sectors buy primary inputs from households and generate value added by using them in the production process. In exchange for supplying factor services, households receive income as wages (W), and returns to capital (R). The households in turn distribute income between consumption and saving. These production and consumption decisions yield supply and demand in the various product and factor markets. Furthermore, two sectors can be identified where imports are quota restricted viz; electric equipment (EE) and non-electric and transport equipment (NETE). The study explores the impact of domestic import policy change on export, import, and domestic production and consumption i.e., especially on welfare of households. Policy changes have an influence on demand for factor of production, which in turn affect income accruing to different socioeconomic group of households.

The study identifies households by rural and urban areas and in each area households are grouped into five socio-economic groups. In urban areas households are aggregated by employment status of the head of the households, i.e., employer (capitalist households), self-employed, employees (fixed wage earners), agriculture, and others. In rural areas households are identified by land holdings; no land, Lh≤0.5 acres, 0.5<Lh≤12.5 acres, 12.5< land ≤25 acres and greater than 25 acres.[9] This classification of households allows the model to identify the impacts of alternative trade policies on different socio-economic groups in rural and urban areas of Pakistan.

To explore the impact of policy change on income distribution and poverty, we need data on income generation activities, factor ownership of households and households consumption pattern. SAM-1989-90 provides information on generation of income from different activities to factors of production; labour and capital as well as it shows key characteristics of each group, including factor income, transfers, saving, taxes paid and expenditure on different commodities. It identifies five sources of household receipts; wage, rent, dividends from firms, transfers from government, and transfers from rest of the world.

Table 7 reports percentage of households' receipts from different sources. In the urban sector, except for employees, every household group receives higher percentage of income from capital and lower from labour.[10] Employers group of household, in urban areas, receive 73.2 percent of its total receipts from capital and 3.65 percent from labour, self-employed receive 75 percent from capital (as their income from capital is specifically composite income from labour and capital) and 4.36 percent from labour, employees receive 77.9 percent from labour and only 8.0 percent from capital, agricultural households receive more capital income than labour income, i.e. 81.3 percent from capital and 15.8 percent from labour and undefined households category receive 45.6 percent from capital and 21.7 percent from labour.

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[9]We are thankful to Mr Masood Ishfaq, System Analyst, Computer Section, PIDE for helping us in using HIES data for grouping the households.

[10]This is because income from capital indicates composite income of labour and capital. Especially for self-employed in urban areas and landowners in rural areas for which income of capital cannot be distinguished from labour income.

Table 7

Households Receipts from Different Sources (%)

Households	Wage and Salaries	Rent	Dividends	Transfer from Government	Transfers from ROW	Total
(a) Urban						
Employer	3.65	73.19	5.47	0.26	17.42	100.00
Self Employed	4.36	74.99	2.90	0.10	17.65	100.00
Employee	77.90	8.03	7.29	0.55	6.24	100.00
Agriculture	15.77	81.26	2.11	0.30	0.56	100.00
Others	21.57	45.58	27.34	2.28	3.23	100.00
(b) Rural						
No Land	33.18	55.57	5.58	2.10	3.56	100.00
0< – 0.5	16.42	70.29	4.55	0.50	8.24	100.00
0.51-12.5	11.01	83.94	0.70	3.15	1.20	100.00
12.51-25	6.57	86.83	1.40	0.19	5.01	100.00
25 and Above	1.91	89.09	2.67	0.20	6.13	100.00

In the rural sector most of the income accrues from capital as it includes land, which is the most crucial in the rural economy. As much as 89.1 percent of the income of the households with land holdings exceeding 25 acres came from capital and only 1.9 percent from labour. On the other hand households with no land receive 55.6 percent from capital and 33.2 percent in the form of wages. The receipt of income from capital even for the landless is rather high because most of them are self-employed. Households holding less than 0.5 acres of land receive 70.3 percent from capital and 16.4 percent from labour; and households having land ownership between 0.5 to 12.5 acres received 83.9 percent from capital only 11.0 percent from labour; households with land ownership between 12.5 and 25 acres received 86.8 percent from capital and 6.6 percent from labour. With the increase of land holding percentage of income from capital rises and income from wages and salaries falls.

Table 8 shows consumption pattern of households in rural and urban households of Pakistan. It is quite clear from the table that every household spends higher percentage on manufactured consumer goods except employer who spend higher percentage on other manufacturing. The employee in urban and land less and those owning lands up to 0.5 acres in rural areas allocates highest percentage of their income on consumer goods because they are the poorest. Table also shows the contribution of household to private saving and tax revenues. Saving rate is high of employer, self-employed and other group of households in urban areas. While employees in urban area and first three groups in rural area have negative saving rate.

Table 8

Consumption by Different Group of Households

	Employer	Self-employed	Employee	Agriculture	Other	No Land	0.001-0.5	05-12.5	12.5-25	25+
Wheat	0.42	0.73	0.72	1.470	0.75	5.58	4.93	4.77	5.68	3.63
Major Crop	0.02	0.21	0.18	0.42	0.18	0.83	1.72	1.47	0.82	0.32
Minor Crop	3.95	6.03	9.69	7.38	6.49	10.61	10.36	10.93	7.90	7.32
Non-crop	8.05	11.84	17.91	18.67	12.41	22.89	22.83	20.29	16.48	14.19
Mining	0.02	0.05	0.08	0.05	0.05	0.10	0.12	0.09	0.05	0.03
Consumer Goods	11.73	18.56	29.93	23.28	18.24	31.86	32.35	28.51	19.17	19.71
Textile	1.84	3.12	4.60	4.07	3.58	4.95	4.69	6.54	4.86	5.56
Petroleum	1.97	0.59	1.81	1.06	2.61	0.48	0.28	0.26	0.43	2.10
Electric Equipment	0.03	0.04	0.06	0.05	0.05	0.05	0.04	0.06	0.04	0.06
Non-Electric and Transport Equipment	0.33	0.64	1.19	0.68	1.11	0.98	0.76	0.85	0.84	1.25
Other Mfg.	12.24	4.39	7.41	3.68	4.75	5.46	6.55	6.69	12.79	7.99
Other Traded Goods	7.41	7.49	15.25	7.84	13.44	7.15	6.11	6.42	4.87	3.83
Non-traded Goods	11.66	9.71	20.28	18.02	14.59	13.11	15.85	13.70	10.58	13.06
Taxes	0.36	0.24	0.61	0.29	0.47	0.74	0.14	0.14	0.20	0.20
Saving	39.97	36.36	-9.72	13.02	21.27	-4.79	-6.71	-0.72	15.31	20.76
Total	100	100	100	100	100	100	100	100	100	100

Table 9 shows characteristics of households. On average richest households in urban areas, employers, receive more than double of the income of self-employed in the urban areas. While in rural areas, the income of the richest households, landholders (largest landholders); is more than twice the income of the households with no land.

Table 9

Characteristics of Socio-economic Households Group

	Income Distribution (%)	Average Income per Households	Percentage of Households	Households Below Poverty	Poor Across the Households Group (%)
Urban Households					
Employer	10.22	2.47	4.13	21.5	3.0
Self-employed	30.17	1.18	25.48	33.85	28.4
Employee	35.06	0.70	50.20	30.0	50.9
Agriculture	5.17	0.99	5.22	29.5	5.2
Other	19.38	1.30	14.97	24.8	12.5
Rural Households					
No Land	72.12	0.95	75.62	31.2	82.9
0< – 0.5	1.58	1.08	1.46	32.1	1.6
05–12.5	17.48	0.99	17.62	19.9	12.3
12.5–25	4.81	1.39	3.46	20.0	2.4
25 and Above	4.01	2.19	1.83	11.0	0.7

There is difference in relative prices in rural and urban areas. Two different poverty lines for household group for urban and rural households are defined separately on the basis of per capita expenditure required to satisfy basic needs, food as well as non-food, i.e., Rs 257.6 for rural areas and Rs 307.9 for urban areas on per month basis [MCHD (1999)]. We used these poverty lines in this study. Using these poverty lines, Table 9 presents estimates of percentage of households below poverty line in each group. As many as 20 percent households are below

poverty in employer group of households in the urban area. The incidence of poverty amongst self-employed and employee has been quite high, 33.8 percent and 30.0 percent, respectively. In the rural sector the higher percentage of people who are below poverty line are the ones with no land and with smallest landholders, 31.2 percent and 32.1 percent, respectively. However, 19.9 percent and 21.5 percent households are below poverty in households who owns land between 0.5 to 12.5 acre and 12.5 to 25 acres, respectively. Only 11.0 percent of the population lies below poverty line who owns greater than 25 acres of land.

The last column of the table shows interesting results. Employees group has 50.9 percent of urban poor households and households with no land have 82 .9 percent of rural poor households.

IV. COMPUTABLE GENERAL EQUILIBRIUM MODEL FOR PAKISTAN

The Basic framework of General Equilibrium Model for Pakistan (GEMP), developed here is taken from Siddiqui and Iqbal (2001) and Decaluwe, *et al*. (1996). It is built for welfare assessment of trade liberalisation policies and captures relative price movement of product and factors of production. It shows how resources are reallocated and income and expenditure of households are affected in response to policy shock. Model focuses explicitly on income generation, distribution and on spending pattern to show welfare out come of changes in trade policy, i.e., reduction in quota restrictions and tariff rate. The welfare impact in the model is captured by Equivalent Variation (EV) statistics.

In neo-classical framework, model contains six blocks of equations; production, income and saving, demand for commodities, prices, foreign trade and market equilibrium. It is static in nature. The theoretical background of the equations in each block of CGE model is discussed below. Mathematical equations, specification of variables and symbols are given in Appendix 1.

(a) Structure of Production

As mentioned above, domestic production has thirteen sectors, 12 tradable and one non-tradable sector. Tradable goods sectors in the model include: four branches of agriculture, one mining, six manufacturing and one others. Primary factors, labour and capital, and intermediate inputs produce both, tradable and non-tradable goods. Like most empirical studies, production functions in the model are specified by a technology in which gross output has separable production function for value added and intermediate inputs. Value added is defined by CES production functions. Leontief technology between intermediate and value added and within intermediates is assumed. Equations for gross output, value added (specified as a function of labour (L) and capital (K)) and intermediate demand (aggregate as well as disaggregated) are specified in the production block of the model.

Assuming perfect competition and market clearing, labour demand function for *i*th sector is derived from CES production function. Labour is mobile across the sectors and wage rate is determined by equilibrium condition. Capital is sector specific and it cannot move across the sectors. Returns to capital are determined sector specifically by the change in demand.

(b) Foreign Trade Sector

In this sector, model has separate equations for exports and imports. We have assumed that domestic sales and exports with the same sectoral classification represent goods of different

qualities. Constant Elasticity of Transformation (CET) functions describes the possible shift of sectoral production between domestic and external markets.

For import function, we assume that domestically produced goods sold in the domestic market are imperfect substitute of imports (Armington assumption). Constant Elasticity of Substitution (CES) import aggregation function presents demand for composite goods (imported and domestically produced goods). In addition to these equations for export transformation and import aggregation, profit maximisation/cost minimisation gives desired exports and imports ratios as a function of relative prices (domestic to foreign prices). We retain small open economy assumption as in the most of the literature, i.e., we cannot change world import and export prices.

In the model two tradable sectors are treated as quota restricted; EE and NETE. For the rest of the tradable sector we assume that country is free to import after paying duties and also free to export. Rent from quota-restricted imports goes to the importers i.e., urban employers group of households. Rent (Implicit tariff) is defined as the product of difference between domestic price and border price and quota restricted imports. It is defined mathematically in following equation:

$$Rent = \ (P_m^{D(quo)} - e * P_m^{w} \ (1 + tm)) \ * M(quo) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \text{(a)}$$

Where P_m^{D} is domestic price of imports and P_m^{w} is world import price or border price. Where $M(quo)$ is import facing quota restrictions, e is exchange rate and tm is tariff rate. Quota on imports is defined as follows.

$$M(quo) \leq MO(quo) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \text{(b)}$$

Where MO are benchmark imports, which are quota restricted. If there is no quota or quota is not binding then rent becomes zero. If imports are less than the required or quota is binding then rent is greater than zero. Orthognality condition is added in the model as follows:

$$Orthognality = [(M(quo) - MO(i)) * Rent] = 0 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \text{(c)}$$

If the first term in the parentheses is zero, that implies quota-restricted imports does not increase above the benchmark level, then rent is greater than zero. But if imports after policy shock (M) are greater than benchmark level of imports (MO) that implies imports are not quota restricted then rent becomes zero.

Model also captures the tax revenue from imports (tariff) and exports (subsidies) through equations specified in the model to see the impact of tariff rate reduction.

(c) Income and Saving

Institutions receive income from various sources. The endowment of primary factors and their rental values determine the institutional income from factors of production. Other receipts of institutions include transfers across the institutions, households, government, firms and rest of the world. All incomes of institutions are used for consumption, savings and payment of taxes to government. Relevant equations are given in income and saving block of the model.

Households are endowed with labour and capital. The ownership of factors of production, wage rate and rent determines their factor income. All wage income accrues to households, as

they own all labour. Household wage and rental income comes from labour and capital employed in different production activities. Share in wage and rental income of different household groups depends on the labour and capital they own. They also receive transfers from firms as dividends, transfers from government as social security benefits, and transfers from the rest of the world.

The effect on income of households is determined through endogenous sources of income. Households' wage income, capital income, dividends from firms and scarcity rent (as defined above) are determined endogenously. Transfers from the government and from the rest of the world are assumed to be exogenous. Households pay taxes to government. Subtracting taxes from the households' total income gives us disposable income of households. Households saving are assumed to go to the saving pool, which finances domestic investment. Saving is defined as a fixed share of disposable income.

Firms receive income from capital (operating surplus and transfers from government). Transfers from the government are given exogenously. Its expenditure includes tax payments to the government, dividends to h^{th} households, and transfers to the rest of the world. The residual is saving of the firms.

Third institution is government. Government receives income from the following sources, i.e., direct taxes (income tax from households, corporate taxes from firms), indirect taxes (from production sector), import duties (tariff), export duties, and transfers from the rest of the world.

Fourth institution is rest of the world. It receives income from sale of imports and export to the rest of the world, transfers from rest of the world to household, firms and government is expenditure of the rest of the world. Subtracting its income from expenditure gives foreign saving, i.e., current account balance (CAB).

(d) Demand for Commodities

Domestic demand consists of demand for both domestically produced goods and imports. The household demand is specified by Linear Expenditure System (LES) derived from Stone-Geary utility function. The subsistence expenditure on all consumption items, so defined is without reference to calories and composition of the food basket.[11]

Linear Expenditure System allows maximisation of the utility function implicit in the LES[12] subject to household's budget constraint and demand function for i^{th} good, therefore, is given in following equation

$$C_{h,i} = \{P_{ci}\ \gamma_i + \beta_{h,I}\ (CH_h - \textstyle\sum P_{ci}\ \gamma_i)\}/P_{ci} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (d)$$

Where $C_{h,i}$ is the demand for ith commodity by hth household group. In this function γ_i determines the minimum quantity of each commodity and $P_{ci}\ \gamma_i$ measures subsistence expenditure on the ith commodity by hth households group. Where $\sum P_{ci}\gamma_i$ is total value of

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[11]For example, employer, who is assumed to be rich, has its own perception of minimum requirement of goods as compare to employee group of households.

[12]Maximising $U(X) = \sum f_i(X_i) = \sum \alpha_i.\ Log\ (X_i - \gamma_i)$ st constraint $\sum P_i X_i = Y.$

minimum consumption for household group h. If the term in parentheses which is discretionary income $(CH_h ——P_{ci} \; \gamma_i)$ in numerator is equal to zero, then households are consuming their household specific minimum requirement. The minimum consumption of a good by a household group is derived by using Frisch parameter[13] and income elasticities, which are given in the model exogenously. Homogeneity and Engle aggregation restrictions[14] are tested in calibration process and they are satisfied.

The basic proposition in international trade is: Does free trade improve the welfare of individual households' as well as total welfare? Change in trade policy affect prices, resource allocation as well as production and consumption of any country. To capture the consequences of reforms in terms of household's welfare gain or loss, Equivalent Variation (EV) is used in the model. It measures the welfare gain or loss between benchmark equilibrium and after policy shock equilibria. Living standard of population is captured by the consumption level. This measure is then expressed as percentage of base year household income in order to allow comparison across households.

The Government expenditure includes expenditure on goods and services, transfers to households, and transfers to firms. Government expenditure on ith commodity is given by fixed share in total expenditure. In addition, government transfers to households and to firms also enter the model.

The sum of input requirement by the production sector for each commodity produced determines intermediate demand for that commodity. Demand for goods for investment purposes is determined by $\beta^i ij$ which is fixed value share and the sum of all $\beta^i ij$ is equal to one.

Total consumption expenditure on ith good is the sum of expenditure by different household groups, by government, intermediate use by different production activities and good i for the investment purposes. Exports to rest of the world determine the demand for domestically produced goods in foreign market.

(e) Prices

The model contains different prices associated with each tradable good; producer price, price of composite goods, domestic sale price with taxes and without taxes, domestic price of imports, domestic price of exports, world price of imports, and world price of exports. World prices of exports and imports are exogenously determined (small country assumption). GDP deflator is defined by weighted price index of all goods.

(f) Equilibrium

Final block presents saving-investment equilibrium, goods market equilibrium, and labour market equilibrium.

(g) Closure

We have used external sector closure rule in the model. We assume price-taking behaviour for exports as well as for imports in international market[15] i.e., world export price and world

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[13]For detail discussion of this parameter, see Deaton and Muellbauer (1987).
[14]For these tests, see Deaton and Muellbaur (1987).
[15]Small open economy assumption.

import price index are exogenous to the model. Thus Current Account Balance is exogenous to the model. Nominal exchange rate acts as numerair. Its value is set equal to one. Real exchange rate is implicit in the model calculated as follows.

$$er = e * (P^w/P_d)$$

The main features of the model are summarised as follows:

(1) Labour is assumed to be mobile across the sectors.
(2) Capital is immobile across the sector in short run.
(3) All primary factor supplies are exogenous to the model.
(4) Economy has no impact on international markets, the world prices of imports and exports are exogenous to the model.
(5) Current account balance is fixed.
(6) Nominal exchange rate acts as numerair.
(7) Government consumption and its transfers to households and firms are also exogenous.
(8) Domestically produced goods and imported goods are imperfect substitutes.
(9) Domestically produced goods for domestic production and for export purposes are of different quality.
(10) Model is not dynamic as investment is shown as the demand for goods for investment purposes not as addition to the existing capital stock.
(11) Walras law holds in the economy.
(12) Government consumption is fixed at the benchmark level. Total investment is also fixed at benchmark level by fixing saving of each agent to analyse the welfare impact of households.

Two steps are involved in calibration procedure. Firstly, construction of consistent data set The model utilises base year data from Social Accounting Matrix [Siddiqui and Iqbal (1999)] for the year 1989-90. Second numerical values of behavioural relationships and policy parameters, shift and share parameters in demand and supply equations, are generated from SAM using the calibration techniques. Extraneous elasticities for production, exports, imports and household consumption are used. Some elasticities are taken from Naqvi, *et al.* (1995) and Chaudhary (1999) and some are fixed by discussion. Model is solved using GAMS software package.

V. SIMULATION WITH GROWTH AND ALTERNATIVE TRADE POLICY SHOCKS

Model is simulated by reducing tariff and non-tariff barriers with a view of analysing the impact of trade liberalisation on welfare.

The short run analysis assumes sector specific capital. As a starting point we simulate model with growth. Then model is simulated by tariff reduction on imports in presence and absence of quota restriction. We proceed as follows:

(a) Growth.
(b) Quota Reduction and no change in tariff.

(c) Tariff Reduction and no change in Quota.

(d) Quota Reduction and Tariff Reduction.

The results of simulation are reported in Tables A to E in Appendix 2. Results are presented in percentage changes over the base line values after policy shocks. Firstly, model is simulated by assuming that economy grows at 5 percent per annum. Secondly, model is simulated by relaxing quota restrictions in presence of base line tariff rates to see welfare gain or loss comparing the results with results of A. Thirdly, model is simulated by reducing tariff on all imports with quota on quota restricted imports. Lastly we simulate model by reducing tariff in presence of quota restrictions to see the change in impact. The results of these simulation experiments shows how trade policy shock affect relative prices, resource allocation in an economy represented by general equilibrium model in presence of growth. These changes in turn affect income and welfare of households.

(a) Simulation A: Growth of 5 Percent Per Annum

In this simulation, we keep capital as sector specific and fixed exogenously. We assume economy grows by 5 percent p.a. (which is actual rate of growth for Pakistan). As a starting point we simulated model by increasing labour and capital by 5 percent exogenously and fixing quota-restricted imports and tariff rates at their benchmark level. The results indicate that employer group of urban households receive a large proportion of income as rent from quota restricted imports.

Major results of this simulation are as follows.

Table A in Appendix 2 shows that

(1) Labour demand in every sector increase except in non-electric and transport equipment (NETE) where it declines marginally;

(2) Increase in labour demand is less than increase in labour supply so wage rate fell;

(3) Returns to capital show mixed results in different sectors. Capital is sector specific, so returns to capital changes with the change in capital demand;

Table B in Appendix 2 shows the following results.

(4) Larger increase in demand is for petroleum and other manufacturing goods. Table shows that demand for composite good as well as for domestically produced goods for these two groups goes up more than compared to demand for all other goods.

(5) To fulfil the demand, inflow of import as well as domestic production increases. Imports of these two groups increase by higher percentages 6.05 percent and 6.46 percent, respectively as compared to increase in imports in others sectors.

(6) Output from every sector also increase. But production of petroleum and other manufacturing goods increase by higher percentage; 5.8 percent and 5.84 percent, respectively.

(7) Income of all households increase. Largest increase is in the income of employer group of households who receive scarcity rent from quota restricted imports. Scarcity rent estimated by this simulation is 0.5 percent of GDP. The income of the group of

miscellaneous urban household's (or other households) increase in the following descending order, miscellaneous group of households, employees (poorest group where 50 percent of urban poor), agricultural households, and self-employed. While in rural areas, larger increase is in the income of households with no land and of smallest landholders (Poorer) (See Table D in Appendix 2).

(8) It shows households consumption of every household increase for every commodity. (See Table E in Appendix 2).

(9) It shows that welfare of all households shows improvement. Larger gain of growth accrues to employers in urban region as their income increase by 16.1 percent due large scarcity rent. In rural areas larger welfare gain accrues to poorest group of households with no land (See Table F in Appendix 2).

Results of this exercise are point of departure for the next three simulations exercises. We compare results of simulation B, C and D with it.

(b) Simulation B: Reducing Quota on Imports of Electric Equipment, and Non-Electric and Transport Equipment

In this experiment we remove quota on imports of electric equipment (EE) and non-electric and transport equipment (NETE). Results are compared with base line and the results obtained in simulation A.

Immediate direct impact of reduction in quota restrictions lead to an increase in the inflow of imports by 2.6 percent and 1.7 percent for EE and NETE, respectively, over base line as well as over the imports in simulation A (see Table B). Scarcity rent which accrues to employer group of households becomes zero.

If we compare macroeconomic results with the results of simulation A, we find that labour demand in quota restricted sector, EE, reduces from 2.76 percent increase to 1.78 percent increase over base line labour demand. While in NETE, labour demand rises from –0.42 decline to 0.17 increase over base line (see Table A). The results show that demand for domestically produced goods decreases for EE from 4.07 in simulation A to 3.61 percent in simulation B (see Table B). Labour demand in this sector declines from 2.76 percent increase to 1.78 percent. Demand for composite goods increases 0.83 to 2.85 percent. While composite demand for NETE increases from 1.79 percent to 2.66 percent. In this sector demand for domestic goods also rises. This lead to a rise in demand for labour and rising in gross out put. Post simulation results also show that labour demand in our exporting sector rises from 4.98 in simulation A to 5.26 and from 6.14 in A to 7.27 percent in AgMjC and textile sectors, over base line, respectively. While labour demand in CON, PET, OM, and OT sector declines as compared to in simulation A. This implies that labour moves to export oriented sectors, textile and agriculture major crop sector (AgMjC) after removal of quantitative restriction on imports of EE and NETE. Labour released from EE, FCON, PET, OM and OT is absorbed by AgMjC, TEXT sectors etc. Total increase in labour demand is less than the total decline in labour demand. The net impact is that returns to labour decline further to 0.93 percent from 0.64 percent in A over the base line wage. Returns to capital declines further in all sector except AgMjC, TEXT and NETE sectors as compare to increase in sim A. Change in Labour demand and capital demand lead to change in gross output.

The contribution to GDP has increased from AgMjC, TEXT, and NETE. Exports from most of the sectors increase but the increase is larger for AgMjC, TEXT, and NEMT sectors where output has also increased.

Since households own all labour, change in return to labour affects household's income (see Table D). While change in return to capital affects income received by households as wells as income of firms. Reduction in quantitative restrictions led to zero rent to employers, a significant loss of income to employer group of households. The results of this simulation show that income of employer group increases only by 4.4 percent compared to the increase 16.2 percent in presence of quota. This implies that income of employer group of households decline by 12 percent due to removal of quota. Results also show that increase in income of all other households is less than the increase in simulation A. If we compare the increase in income across the households group. The results show that maximum increase is amongst the miscellaneous group of households (other households). For self-employed and employees it was 3.87 (smallest increase) and 5.1, respectively (see Table D). The price change leads to change in consumption pattern of households; households' consumption for some goods increases while for others it declines as compared to the results of simulation A (see Table E).

Table F shows that households welfare change due to removal of quantitative restrictions. In urban areas, employers, self employed, and undefined households are worse off, while employees and agricultural households are better off relative to results obtained in exercise A. While in rural areas all household groups are better off, the poorest household group (with no land and with 0-0.5 acres land) gains more compared to the largest landholders. The rural households on average gain more as compared to urban households.

(c) Simulation C: Reducing Tariff Rates on Imports

In this experiment, we reduce tariff on all imports but not quota. Tariff rate reduction is given in Table G in Appendix 2. Results are compared with the earlier results obtained in the simulation A and simulation B.

Immediate direct impact of reduction in tariff rates is reduction in import prices and increased inflow of imports. The largest reduction in tariff rate in agriculture sector is for the import of major crops, and in manufacturing sector for import of petroleum. The results show labour demand increase over base line in all sectors. If we compare macroeconomic results with the results of simulation A and simulation B, we find that labour demand in export oriented industries, agriculture major crop sector and textile, increased very significantly over base line labour demand i.e., 6.26 percent and 11.36 percent, respectively. Labour demand in quota-restricted sector, EE, NETE also rises by 5.36 percent and 3.71 percent over base line labour demand. Comparison with the results in simulation A show that increase in labour demand in these four sectors is higher as compared to the increase in demand with growth only. This implies that under trade liberalisation labour moves to export oriented sectors and to quota restricted sectors where returns are still high due to quota existent. While labour demand in all other sectors falls as compared to labour demand in simulation A and in simulation B. The net impact is that returns to labour decline by 1.79 percent over base line. This decline is higher as compared to the decline in two previous simulations, where returns to labour decline by less than one percent.

The return to capital, over base line, declines in all sectors but increases by 4.84 percent in TEXT. Change in Labour demand and capital demand by sector lead to change in gross output in these sectors. The Gross output in AgMjC and TEXT increase by 5.5 and 7.19 percent, respectively over base period values. If we compare these results with A, we see gross out put has increased from 4.99 to 5.5 percent and 5.4 to 7.19 percent in AgMjC and TEXT sectors, respectively. The results show that exports from most of the sectors increase. The largest increase in exports is from major crop sector and textile sector.

The change in income of employer group of households declines from 16.2 percent in A to 12.5 in this simulation. This implies that employer group of household (rich) loose in terms of income by 3.7 percent by reduction in tariff rates. Table D shows that income of all other households' increase over base period. Due to change in consumer prices, consumption pattern of all households changes. For some goods it increases while for others it declines over the results in simulation A (see Table E).

Table F shows households' welfare change. Over the base year every households is better off. The results show that employee group of households where 50 percent of poor live, gain more as compare to other three households group. Whilst in rural areas richest group gains less than the other groups. If we compare the results with the results of simulation A, welfare has improved for employees and agricultural households in urban areas and all households group in rural areas gain over the welfare in simulation A.

(d) Simulation D. Reducing Quota and Tariff Rates on Imports

Immediate and direct impact of reduction in QRs and tariff rates is the fall in import prices and consequently increased inflow of imports. Comparison of results with the results of simulations A, B, and C reveals that labour demand in export oriented industries, AgMjC and TEXT, increased significantly over base line labour demand by 7.08 and 16.04 percent respectively (See Table A in Appendix 2). The table also shows that the increase in labour demand in these sectors is higher than the demand in the previous three simulations. This implies that under trade liberalisation labour demand increases by larger amount in export oriented tradable sectors. Labour demand in quota-restricted sector, viz., EE, NETE also increases by 3.56 percent and 5.31 percent, respectively, over base line labour demand. Even after reduction in tariff, these two sectors still have high returns, labour demand in these sectors increase.[16] While labour demand in all other sectors as compared to increase in labour demand in exercise A falls. Post simulation results show that labour demand declines in AgMnC and PET over the base line. While labour demand in AgW, AgNC, FCON sectors increase over base line but increase is less than the increase in simulation exercises A, B and C. The net impact is that the returns to labour decline by 3.24 percent over base line. This decline is higher compared to the decline in previous two simulations. The return to capital, over base line, declines in all sectors except TEXT where it increases by 8.14 percent. Change in labour demand and capital demand, by sectors, leads to change in gross output. The gross output in AgMjC and TEXT increases by 5.82 and 8.74

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[16]There was very high tariff on these two sectors. Even after reduction in tariff it has high tariff as compare to others.

percent, respectively, over base period values. If we compare results with results in simulation A, gross out put has increased from 4.99 to 5.82 percent and 5.4 to 8.74 percent in AgMjC and TEXT sectors respectively. The results show rise in exports from most of the sectors.

The income of employer group of households declines from +16.2 percent in simulation A and from +4.35 in simulation B to –1.57 in this simulation. This implies that loss of income in employer group of household is very significant. The incomes of all other households also decline over the base period. If we compare the change in income of households in rural and in urban areas we can see that in urban areas, income decline is higher as compared to that in rural areas. Due to change in consumer prices, consumption pattern of all households change. For some product groups it increases while for others it declines relative to the results in simulation A. But the only household group that shows decline in consumption of every commodity, over base line, is undefined group of households in urban areas.

Table F shows change in welfare of households. Relative to the base year, every household is better off except the undefined households in urban areas. The results show that employee group of households, where 50 percent of poor are concentrated gain more compared to all other households. In rural areas households in poorest and richest group gain less than the three medium income groups. If we compare the results with the results of simulation A, welfare has improved for agricultural households in urban areas and small (0<-0.5 acres), medium (0.51-12.5 acres) and large (12.51-25 acres) landholders in rural area. All the other are worse off compared to welfare change in simulation A.

In Table 10 the impacts of sensitivity analyses by reducing quota and tariff on house-holds welfare are reported. We have increased and decreased various elasticities. In the

Table 10

Sensitivity Analysis of Reducing Quota and Tariff Reduction on Households Welfare

	Reducing Elasticities by 50 Percent				Increasing Elasticities by 100 Percent			
	Production	Import and Dom-Good	Export and Domestic Use	Income	Production	Import and Dom-Goods	Export and Domestic Use	Income
Urban Households								
Employer	1.56	2.34	1.27	2.0	2.65	1.91	2.87	2.05
Self-employed	3.03	3.51	2.82	3.28	3.66	3.18	3.81	3.3
Employee	5.33	5.39	5.2	5.36	5.3	5.26	5.42	5.3
Agri-households	5.04	5.35	4.88	5.22	5.42	5.11	5.55	5.21
Undefined	–6.24	–4.37	–7.06	–5.13	–3.75	–5.56	–3.13	–5.06
Rural Households								
Households (NL)	5.31	5.36	5.15	5.34	5.3	5.24	5.43	5.29
0<-0.5 Acres	5.75	5.67	5.64	5.73	5.64	5.69	5.72	5.69
0.51-12.5 Acres	6.64	6.6	6.6	6.64	6.59	6.6	6.60	6.6
12.51-25 Acres	5.31	5.58	5.21	5.49	5.71	5.45	5.78	5.48
25 Acres and Above	4.17	4.62	4.03	4.45	4.82	4.36	4.91	4.46

model we have four sets of elasticities i.e., production elasticities, elasticities of substitution for imported goods and domestically produced goods, elasticities of transformation of domestic use and exports, and income elasticities. We performed two experiments with each set; (i) reducing elasticities by 50 percent, and (ii) increasing elasticities by 100 percent. Results of sensitivity analysis show that higher elasticities mean higher welfare for each group of households for production as well as for elasticities of transformation. But lower elasticity of substitution between imports and domestically produced goods show reverse impact where higher elasticity estimates mean lower welfare gain for all households.[17] Lastly if we increase income elasticities of consumption poor households gain more than rich households.

VI. SUMMARY AND CONCLUSION

The study examines the impact of trade liberalisation on broad macro economic variables and on household's welfare. The households are aggregated by employment status in urban areas and by land holdings in rural areas to show the impact of policy change. A more liberal trade regime is considered where level of intervention has been reduced and importance of trade in the economy has increased. Firstly model is simulated assuming 5 percent economic growth rate. Second simulation is based on elimination of quota restrictions on EE and NETE. Third and fourth simulations are based on the assumption that tariff rates on all imported goods are reduced in presence and absence of quota restrictions, respectively. These changes affect input use in the economy and reallocate the resources. The change in welfare of households is measured by equivalent variation.

Results show that in the presence of quota, the welfare of all household groups improves. Larger gains of growth accrue to employers in urban region as their income increases, by 16.1 percent due to large scarcity rent. In rural areas larger welfare gain accrue to poorest group of households with no land. Table F shows that in the short run when QRs benefit the urban rich class. Income gap between rich and poor increases. However, when we remove QRs, income of urban rich group reduces by a high percentage—reducing the gap between rich and poor. In terms of welfare, employers (rich) loose. The welfare of undefined households group and employees households group in urban areas improves more as compared to other group of households when we reduce quota. But employers, self-employed, and undefined households are worse off. The employees and agricultural households are better off relative to results obtained in earlier case. While in rural areas all household groups are better off, the poorest household group (with no land and with 0-0.5 acres land) gains more compared to the largest landholders. The rural households on average gain more as compared to urban households as all households are better off when quantitative restrictions on imports are removed.

Results of reducing tariff on imports reveal that the employee group of households, which includes 50 percent of poor, gains more as compared to the other three household groups excluding employers who receive scarcity rent. A comparison with the earlier results (simulation A) indicates that the welfare of employees and agricultural households in the urban areas improves whereas all household groups gain in the rural areas.

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[17]Similar results are found in Indian case.

The last simulation depicts the actual situation in Pakistan. The simulation shows that import liberalisation by removing quota and tariff reduction is beneficial for labour class compared to capitalist class as return to capital declines more as compared to wage rate. The results of this exercise show that over the base year every household is better off except the undefined households in urban areas. The results show that employee group of households gain more as compared to all other households. In rural areas poorest and richest gain less as compared to the other three groups. If we compare the results with the results of simulation A, welfare improves for agricultural households in urban areas and for small (0-0.5 acres), medium (0.51-12.5 acres) and large (12.51-25 acres) landholders in rural area. All the other are worse off compared to welfare gain in simulation A.

In the current exercise, we did not endogenise poverty line and did not analyse income distribution effects. However detailed analysis of these issues is part of our future research agenda.

Appendices

APPENDIX 1

(a) Computable General Equilibrium Model for Pakistan

1. Production Block

(1) $X_i^s = VA_i / v_i$ Production

(2) $VA_i = B_i \left[\delta_i + K_i^{\rho_i} + (1 - \delta_i)(L^D_i)^{-\rho_i} \right]^{-1/\rho_i}$ Production Function CES

(3) $IC_i = io(i) * (VA_i / v_i)$ Intermediate Consumption of good i

(4) $ICij = aij * (Xis)$ Intermediate Consumption

(5) $L_i^D = \left[\{\delta_i /(1-\delta_i)\} \{r / w\}^{1/\rho+1} \right] * K_i$ Labour Demand

2. Foreign Trade Sector

(6) $X_e^s = B^T_e \left[\delta_e^T EX^{\rho_e^T} + (1 - \delta_e^T) D_e^{\rho_e^T} \right]^{1/\rho_e^T}$ Export Transformation (CET)

(7) $Q_c = B^s_c \left[{}_c^s M^{-{}_c^s} + (1 - {}_c^s) D_c^{-{}_c^s} \right]^{1/{}_c^s}$ Import Aggregation (Armington) (CES)

(8) $Ex = (P_e / P_e^D)^{\sigma^T_e} \left[(1 - \delta_e^T) / \delta_e^T \right]^{\sigma^T_e} * D_e$

(9) $M_c = (P_c^D / P_c^M)^{\sigma_{s_c}} \left[(\sigma^s_c / 1 - \sigma^s_c)^{\sigma_{s_c}} * D_c \right]$ Import Demand

(10) $Q_{NT} = X_{NT}$ Demand for Non-Tradable Good

(11) $-P_c^{WM} * M_c - (1/e) T_{FR} - P_e^W * EX - TR_H - TR_G = e * CAB$ Current Account Balance

3. Income and Saving

(12) $Y_H(h) = W\lambda_l - L_i^D + \lambda_K - R_n K_n + DIV(h) + e * TR(h) + PINDEX * TR_{GH}(h)$ Household Income

(12.b) $Y_H(eh) = W_l L_i^D + {}_K - R_n K_n + DIV(h) + e * TR(h) + PINDEX * TR_{GH}(h) + Trent$

Household Income receiving including rent from quotas

(13) $YD_H(h) = (1 - ty) * Y_H(h)$ Household Disposable Income

where $h = neh, eh$

(14) $DIV(h) = dvr(h) * YF_K$ Dividends

(15) $\text{Re}\,nt(quo) = (P_m\,(quo)/(1+tx)) - (Pwm(quo)*(1+Itm))*M\,(quo)$

(16) $Trent = \underline{\quad} \; Rent(quo)$

Where quo are quota restricted imports

(17) $S(h) = mps(h) \, {}^* YD_H\,(h)$ Household saving

(18) $Y_{FK} = (1 - \underline{\quad}_K)\underline{\quad} R_i K_i$ Capital Inflows of Firm

(19) $Y_F = Y_{FK} + PINDEX * TR_{GF}$ Firms Total Income

(20) $S_F = Y_F - T_{FR} - \underline{\quad} DIV(h) - tk * Y_{FK}$ Firms Saving

(21) $TXS_i = tx_i * P_i * X_{is}$ Indirect Taxes

(22) $TXM_n = tm_n * e * \prod_n^{WM} M_n$ Taxes on Imports

(23) $TXE_n = te_n * e * \prod_n^{E} EX_n$ Taxes on Exports

(24) $Y_G = \underline{\quad} ty(h) * Y_H(h) + tk * Y_{FK} + \underline{\quad} TXS_i + c * \text{T}_{RG} \underline{\quad} TXM_n + \underline{\quad} TXE_n$ Government Revenue

(25) $S_G = Y_G - PINDEX * TR_{GF} - \underline{\quad} (PINDEX*TR_{GH}) - C_T$ Government Saving

4. Demand of Commodities

(26) $C_i\,(h) == \{P_{ci}\;\;_i + \;\; {}^c{}_{hi}(CTH_h - \underline{\quad} P_{ci\;\;i})\}/P_{ci}$ Household Consumption for Goods i

(27) $CT_H\,(h) = YD_H\,(h) - S_H\,(h)$ Total Household Consumption

(28) $INTD_i = \underline{\quad} a_{ij} IC_j$ Intermediate Demand

(29) $CG_i = \beta^{\Gamma}{}_i CT_G / P_i^c$ Government Consumption

(30) $C_i = \underline{\quad} CT_H(h) + CG_i$ Total Consumption of Good i

(31) $I_i = \beta_i^I * IT / P_i^c$ Investment

(31a) $U(h) = \;\;\;\;\;_i(h) - \;\;_i\,]$ Household Utility Function

(31b) $EV = [(U - Uo)* \prod \{PCO_i / \;_{ci(h)}\} \;_{ci(h)}]/YO(h)$

5. Prices

(32) $R_i = (P_i^{VA}*VA_i - W*L_i^D)/K_i$ Returns to Capital

(33) $PD(i) = Pt_i * (1 + tx_i)$ Value of Output

(34) $P_n X_n = (Pt_n * D_n^s + EX_n * P_n^E)$ Value of Output

(35) $P_n^{VA} *VA_n = (P_n * X_n^s) - \underline{\quad} (P_j IC_{ji})$ Value of Value-added

(36) $P_n^M = (1 + tm_n) * e * P_n^{WM} *(1 + tx_n)$ Import Price

(37) $P_n^E = e * P_n^{WE} / (1 + te_n)$ Export Price

(38) $P_n^C = (D_n /Q_n)* P_n^D + (M_n /Q_n) P_n^M$ Composite Price of Composite Good

(39) $P_{nt}^C = PD_{nt}$ Price of Non-traded Goods

(40) $Pindex = \underline{\quad} (\;_i^X * P_i)$ Price Index

6. Equilibrium

(41) $IT = \underline{\quad} S_H(h) + S_F + S_G + \bar{e}*CAB$ Saving Investment Equilibrium

(42) $Q_i = C_i + INTD_i + INV_i$ Goods Market Equilibrium

(43) $L_s = \underline{\quad} (L_i^D)$ Labour Market Equilibrium

(b) Variables

Endogenous Definition		Variables	Number of Variables
1	C_I	Total Consumption of Good	
2	CG_i	Public final Consumption of Good i	
3	$CH_i(h)$	Household h's Consumption of Good i	
4	$CT_H(h)$	Total Consumption of household h	
5	D_n	Domestic Demand for domestically produced good	
6	$DIV(h)$	Dividends distributed to Households from firms	
7	EX_n	Exports of nth good (FOB)	
8	IC_i	Total Intermediate Consumption of Good by ith sector	
9	ICJ_{ij}	Intermediate Consumption of Good J by ith sector	
10	$INTD_I$	Intermediate Demand of Good i	
11	INV_i	Consumption of Good by I for investment in sector i	
12	IT	Total Investment	
13	L_i^D	Labour Demand in sector i	
14	M_n	Imports of nth good (CAF)	
15	P_n	Producer price	
16	Pt	Domestic price without taxes**	
17	P_i^C	Price of Composite good	
18	P_n^D	Price of domestically produced and consumed good with taxes	
19	P_n^E	Domestic Price of Exports	
20	P_n^M	Domestic Price of Imports	
21	P_n^{VA}	Value Added Price	
22	PINDEX	Producer Price Index	
23	Q_I	Domestic Demand for Composite Good i	
24	R_n	Rate of Return on Capital in branch n	
25	Rent (quo)	Rent from quota	
26	TRENT	Total rent	
27	S_F	Firms Saving	
28	S_G	Government Saving (Fiscal Deficit)	
29	$S_H(h)$	Saving of Household h	
30	TXE_i	Taxes on Imports of nth sector	
31	TXM_I	Taxes on Exports of nth sector	
32	TXS_i	Indirect taxes on ith sector production	
33	U	Utility	
34	VA_i	Value Added of sector i	
35	W	Wage rate	
36	X_i^s	Production of ith sector	
37	$Y_H(h)$	Total Income Household h	
38	$YD_{H|}(h)$	Disposable income of h Households	
39	Y_F	Firms total income	
40	Y_G	Government Revenue	
41	YK_F	Firms Capital Income	

Exogenous Variables

1	CAB	Current Account Balance
2	CT_G	Government final consumption
3	E	Exchange Rate
4	K_n	ith Branch Capital Stock
5	L^S	Total Labour Supply
6	M	Imports quota restricted
7	P_n^{WE}	World Price of Exports
8	P_n^{WM}	World Price of Imports
9	T_{FR}	Firms transfers to the rest of world
10	T_{GF}	Government transfers to Firms
11	T_{GH} (h)	Government Transfers to Households
12	T_{RG}	Foreign transfer payments to the Government
13	T_{RH} (h)	Foreign transfers to Households
14	TXEM(quo)	Tariff on M(quo)

(c) Symbols

Symbols	Variable Names
a_{ij}	Input Output Coefficients
$\beta_i^c(h)$	Percentage share of good i in hth household consumption
β_i^G	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_h	Subsistence expenditure by hth household
λ_l	Household Share of Labour Income
λ_k	Household Share of Capital Income
dvr(h)	Dividend rate for Household h from firms
io_i	Leontief technical coefficients (Intermediate Consumption of good i)
mps(h)	Households h marginal propensity to save
ty(h)	Income tax rate of households
tk	Capital Income tax rate of firms
tx_i	Indirect tax rate on branch ith Production
v_i	Leontief technical coefficients (value added)
σ_I	CES Elasticity of substitution of value added
ρ_I	CES Substitution parameter of value added
δ_I	CES Distributive share of value added
B_i	CES Scale parameter of value added
i	Where I is defined over 13 commodity Producing sectors
AgW	Wheat
AgMjC	Major Crops
AgMnC	Minor Crops
AgNC	Non-crop
MIN	Mining
CON	Consumer
TEXT	Textile
PET	Petroleum
EE	Electric Equipment
NETE	Non-electric Equipment
OM	Other Manufacturing
OT	Other Trade Sector
ONT	Other Non-Trade Sector
H	Households are defined for Urban and Rural Areas Separately in the following way
heru	Employer Households
hseu	Self-employed
heeu	Employee
hagu	Agricultural
hotu	Other undefined Households
hnlr	Households with no Land
hl1r	Households with land holdings 0-0.5 acres
hl2r	Households with land holdings 0.51-12.5 acres
hl3r	Households with land holdings 12.51-25 acres
hl4r	Households with land holdings greater than 25 acres

(d) Social Accounting Matrix for 1989-90

Accounts		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Labour	1																9766
Capital	2																13544
Employer	3	1376	27559	0	0	0	0	0	0	0	0	0	0	2060	99	6558	0
Self Employed	4	4847	83339	0	0	0	0	0	0	0	0	0	0	3223	106	19615	0
Employee	5	100581	10364	0	0	0	0	0	0	0	0	0	0	9408	710	8053	0
Agriculture	6	3000	15463	0	0	0	0	0	0	0	0	0	0	401	57	107	0
Other	7	15401	32538	0	0	0	0	0	0	0	0	0	0	19519	1630	2306	0
Noland	8	75908	127135	0	0	0	0	0	0	0	0	0	0	12775	4796	8149	0
0.001-0.5 acre	9	823	3522	0	0	0	0	0	0	0	0	0	0	228	25	413	0
051-12.5 acre	10	6106	46539	0	0	0	0	0	0	0	0	0	0	390	1748	663	0
12.51-25 acre	11	1004	13260	0	0	0	0	0	0	0	0	0	0	214	29	765	0
25 acre and above	12	243	11335	0	0	0	0	0	0	0	0	0	0	340	25	780	0
Firms	13	0	167430	0	0	0	0	0	0	0	0	0	0	0	45308	0	0
Government	14	0	0	134	269	790	55	334	1686	7	79	30	26	24588	0	11544	427
ROW	15	0	0	0	0	0	0	0	0	0	0	0	0	20713	0	0	0
AgW	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AgMjC	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AgMnC	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AgNC	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIN	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CON	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TEXT	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PET	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NETE	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OM	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OT	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ONT	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AgW	29	0	0	157	809	930	280	537	12775	247	2643	867	462	0	0	0	2055
AgMjC	30	0	0	9	230	238	80	130	1891	86	815	125	41	0	0	0	0
AgMnC	31	0	0	1487	6705	12515	1405	4632	24275	519	6058	1207	931	0	0	0	3133
AgNC	32	0	0	3030	13158	23124	3553	8862	52365	1144	11250	2517	1806	0	0	0	1435
MIN	33	0	0	9	58	100	10	35	220	6	48	7	4	0	0	0	0
CON	34	0	0	4418	20623	38644	4430	13023	72873	1621	15807	2927	2508	0	0	0	5
TEXT	35	0	0	691	3464	5935	775	2556	11330	235	3627	742	707	0	0	0	204
PET	36	0	0	742	658	2339	202	1863	1103	14	142	65	267	0	0	0	175
EE	37	0	0	10	43	80	10	34	124	2	34	6	7	0	0	0	1246
NETE	38	0	0	126	706	1540	130	792	2242	38	474	128	159	0	0	0	15
OM	39	0	0	4610	4880	9571	701	3390	12484	328	3710	1954	1016	0	0	0	7012
OT	40	0	0	2789	8327	19684	1491	9598	16365	306	3559	743	487	0	4284	0	4480
ONT	41	0	0	4389	10792	26182	3429	10419	29998	794	7598	1616	1661	0	116522	0	1773
AgW	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
AgMjC	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0
AgMnC	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1589	0
AgNC	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2270	0
MIN	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	992	0
CON	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8968	0
TEXT	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66927	0
PET	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	0
EE	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196	0
NETE	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255	0
OM	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24726	0
OT	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22395	0
Accumulation	54	0	0	15051	40408	–12556	2477	15189	–10968	–336	–398	2338	2641	118879	–40163	30493	0
Total	55	209289	538484	37652	111130	129116	19028	71394	228763	5011	55446	15272	12723	212738	135176	217919	45270

Continued—

Continued—(d) Social Accounting Matrix for 1989-90

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	15088	11887	8941	6199	6069	12908	162	1386	3787	14904	37972	80220	0	0	0	0	0	0	0	0	0
2	22992	51855	80343	13976	20738	23823	741	1891	8101	30904	178144	91432	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	461	651	19	8322	20918	1806	1100	178	1100	6678	9163	1106	0	4	556	297	431	4552	875	1420	12797
15	0	0	0	0	0	0	0	0	0	0	0	0	8470	22	2945	1071	15453	17296	3330	11739	48797
16	0	0	0	0	0	0	0	0	0	0	0	0	45269	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	62050	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95066	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	152843	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35449	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181951	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97811	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35155	
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16205
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	7977	0	25491	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	1701	0	6171	0	22900	23495	0	0	0	1225	0	0	0	0	0	0	0	0	0	0	0
31	3821	5768	13892	0	7575	1321	0	9	0	678	822	1814	0	0	0	0	0	0	0	0	0
32	1653	1764	877	149	11311	480	0	2	3	9774	5855	91	0	0	0	0	0	0	0	0	0
33	0	1	14	22	39	20	21996	16	12	16962	9265	90	0	0	0	0	0	0	0	0	0
34	3	10	5584	24	9277	520	10	23	73	1342	7270	751	0	0	0	0	0	0	0	0	0
35	329	705	527	22	2635	55579	4	44	33	8570	613	1152	0	0	0	0	0	0	0	0	0
36	271	129	1671	789	1220	696	460	44	108	3211	10598	21400	0	0	0	0	0	0	0	0	0
37	1663	987	266	243	534	561	61	6724	642	507	1822	29751	0	0	0	0	0	0	0	0	0
38	23	17	136	95	350	377	68	478	11664	662	5921	3136	0	0	0	0	0	0	0	0	0
39	9781	5771	736	1174	11765	12442	372	1657	10743	41103	51612	8235	0	0	0	0	0	0	0	0	0
40	2062	14036	22989	1905	42676	21745	8925	882	3596	31230	18462	40298	0	0	0	0	0	0	0	0	0
41	2211	3074	4970	3521	7421	8965	1401	3067	3872	10997	14796	29864	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	62059	96655	155113	36441	190919	164738	35300	16401	43734	178747	352315	309340	53739	62076	98567	154211	51333	203799	102016	48314	77799

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Continued—(d) Social Accounting Matrix for 1989-90

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209289
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	538484
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37652
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111130
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129116
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19028
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71394
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228763
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5011
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55446
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15272
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12723
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212738
14	8329	14441	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135176
15	25168	46558	16357	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217919
16	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	45270
17	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	62059
18	0	0	0	0	0	0	1589	0	0	0	0	0	0	0	0	0	0	96655
19	0	0	0	0	0	0	0	2270	0	0	0	0	0	0	0	0	0	155113
20	0	0	0	0	0	0	0	0	992	0	0	0	0	0	0	0	0	36441
21	0	0	0	0	0	0	0	0	0	8968	0	0	0	0	0	0	0	190919
22	0	0	0	0	0	0	0	0	0	0	66927	0	0	0	0	0	0	164738
23					0	0	0	0	0	0	0	145	0	0	0	0	0	35300
24	0	0	0	0	0	0	0	0	0	0	0	0	196	0	0	0	0	16401
25	43479	0	0	0	0	0	0	0	0	0	0	0	0	255	0	0	0	43734
26		154021	0	0	0	0	0	0	0	0	0	0	0	0	24726	0	0	178747
27	0		329920	0	0	0	0	0	0	0	0	0	0	0	0	22395	0	352315
28	0	0		309340	0	0	0	0	0	0	0	0	0	0	0	0	0	309340
29	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	−1491	53739
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2939	62076
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98567
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	154211
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2399	51333
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2033	203799
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1537	102016
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	48314
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32442	77799
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47699	76976
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9973	215020
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65361	346280
41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	309340
42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1589
45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2270
46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	992
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8968
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66927
49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24726
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22395
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163055
Total	76976	215020	346280	309340	1	9	1589	2270	992	8968	66927	145	196	255	24726	22395	163055	

Source: Siddiqui and Iqbal (1999).

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APPENDIX 2

Table A

Percentage Variation in Factor Demand and Returns*

Variables	Wheat	Major Crops	Minor Crops	Non-Crop	Mining	Consumer Goods	Textile	Petroleum	Electric Equipment	Non-electric and Transport Equipment	Other Mfg.	Other Traded	Other Non-traded
Sim A													
LD	4.08	4.98	2.22	6.61	5.8	6.2	6.14	9.55	2.76	–0.42	7.6	5.21	4.72
R	–1.72	–0.67	–3.92	1.55	0.62	0.78	0.56	5.56	–2.99	–6.33	2.45	–0.4	–0.97
W Rate	–0.64												
Sim B													
LD	4.09	5.26	1.91	5.88	5.87	5.62	7.27	8.03	1.78	0.17	6.97	5.08	4.82
R	–2.01	–0.63	–4.56	0.25	0.44	–0.21	1.44	3.18	–4.31	–5.98	1.39	–0.8	–1.15
W Rate	–0.93												
Sim C													
LD	4.0	6.26	0.64	4.38	4.74	3.84	11.36	0.49	5.36	3.71	4.69	5.66	4.5
R	–2.95	–0.31	–6.86	–2.62	–2.2	–3.15	4.84	–7.76	–1.41	–3.12	–2.15	–0.91	
W rate	–1.79												
Sim D													
LDP	3.31	7.08	–1.23	0.84	5.75	0.54	16.04	–2.15	3.56	5.31	4.57	5.24	4.7
RP	–5.18	–0.84	–10.4	–8.66	–2.08	–8.35	8.14	–12.5	–4.71	–2.92	–3.7	–2.	
W Rate	–3.24												

* W Rate is wage rate valid for returns to labour in every production Sector.

Table B

Percentage Variation in Demand and Supply

Variables	Wheat	Major Crops	Minor Crops	Non-Crop	Mining	Consumer Goods	Textile	Petroleum	Electric Equipment	Non-Electric and Transport Equipment	Other Mfg.	Other Traded	Other Non-traded
Simulation A													
XS	4.61	4.99	4.47	5.16	5.24	5.27	5.4	5.8	4.05	3.24	5.84	5.04	4.87
C	2.95	3.78	3.91	5.14	2.57	5.31	5.58	10.6	6.16	9.73	11.3	9.23	4.8
Q	4.51	4.99	4.35	5.17	5.36	5.25	5.38	5.87	0.83	1.79	6.07	5.02	
D	4.61	4.99	4.44	5.17	5.25	5.26	5.39	5.8	4.07	3.23	5.91	5.03	
M	3.94	4.45	1.79	5.82	5.55	5.14	5.35	6.05	0	0	6.46	4.87	
EX	5.35	5.54	6.41	4.62	5.05	5.4	5.42	5.5	2.3	4.31	5.42	5.19	
Simulation B													
XS	4.62	5.1	4.42	5.09	5.27	5.14	5.79	5.54	3.62	3.43	5.64	5.01	4.92
C	2.93	3.76	3.77	5.04	2.41	5.04	5.34	7.85	9.29	10	8.73	8.38	4.87
Q	4.41	5.1	4.25	5.08	5.19	5.01	5.51	5.45	2.85	2.66	5.58	4.93	–
D	4.62	5.1	4.37	5.08	5.26	5.1	5.54	5.53	3.61	3.42	5.62	4.97	–
M	3.35	3.92	0.99	4.54	5.06	4.37	4.89	5.23	2.65	1.7	5.48	4.28	–
EX	6.01	6.3	6.91	5.54	5.4	5.93	6.14	5.88	4.58	5.21	5.74	5.66	–
Simulation C													
XS	4.58	5.5	4.17	4.94	4.92	4.74	7.19	4.17	5.15	4.59	4.9	5.11	4.76
C	2.72	3.44	3.69	4.98	2.22	5.18	5.28	8.38	3.13	6.84	13.43	7.13	4.63
Q	4.08	5.5	4.16	4.96	6.46	5.14	6.23	5.44	1.04	2.53	6.81	4.88	–
D	4.58	5.5	4.09	4.89	4.85	4.56	5.86	4.16	5.16	4.57	4.45	4.98	–
M	1.47	15.64	6.01	12.74	3.8	9.5	14.81	8.81	0.0	0.0	12.76	2.94	–
EX	8.07	8.71	8.52	7.87	6.75	7.75	9.06	7.56	4.65	7.63	7.53	7.06	
Simulation D													
XS	4.29	5.82	3.8	4.57	5.23	3.97	8.74	3.66	4.39	5.1	4.86	5.04	4.86
C	2.14	2.64	2.96	4.43	1.15	3.74	3.6	1.61	9.6	7.67	7.86	3.54	4.73
Q	3.38	5.82	3.61	4.47	4.24	3.87	6.59	4.42	7.03	7.53	5.83	4.55	–
D	4.29	5.82	3.68	4.45	5.13	3.62	6.33	3.64	4.29	5.06	4.11	4.76	–
M	–1.31	12.99	1.88	6.36	2.74	5.73	12.45	6.45	7.75	10.7	10.1	0.65	–
EX	10.74	11.93	10.93	12.41	7.96	9.98	12.11	9.15	12.04	11.8	9.18	9.04	–

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Table C

Percentage Variation in Prices

Variables	Wheat	Major Crops	Minor Crops	Non-crop	Mining	Consumer Goods	Textile	Petroleum	Electric Equipment	Non-Electric and Transport Equipment	Other Mfg.	Other Traded	Other Non-traded
Simulation A													
PD	−0.64	−0.35	−2.31	0.52	0.23	−0.13	−0.03	0.19	1.69	−1	0.58	−0.2	0
P	−0.64	−0.35	−2.27	0.51	0.23	−0.12	−0.02	0.19	1.67	−1	0.5	−0.2	0.01
PVA	−1.27	−0.66	−3.31	1.33	0.23	0.46	0.14	4.43	−2	−4.55	1.43	−0.4	−0.82
PC	−0.54	−0.35	−2.23	0.51	0.15	−0.11	−0.03	0.13	4.89	0.38	0.41	−0.2	0.01
PM	0	0	0	0	0	0	0	0	5.74	2.16	0	0	–
PE	0	0	0	0	0	0	0	0	0	0	0	0	–
Simulation B													
PD	−1.2	−0.75	−2.95	−0.43	−0.16	−0.77	−0.56	−0.22	−0.91	−1.65	−0.1	−0	
P	−1.2	−0.75	−2.9	−0.42	−0.15	−0.73	−0.33	−0.22	−0.9	−1.64	−0.1	−0.6	
PVA	−1.56	−0.75	−3.89	0.13	0.02	−0.37	0.6	2.43	−2.89	−4.4	0.63	−0.9	−1.05
PC													
PM	−1.01	−0.75	−2.85	−0.42	−0.1	−0.68	−0.54	−0.16	−0.19	−0.93	−0.1	−0	
PE	0	0	0	0	0	0	0	0	0	0	0	0	–
Simulation C													
PD	−2.94	−1.98	−5.08	−2.73	−2.22	−.29	−2.9	−2.12	0.48	−2.76	−3.57	−2.1	–
P	−2.94	−1.98	−4.99	−2.69	−2.14	−2.75	−1.7	−2.12	0.47	−2.75	−3.05	−2.02	
PVA	−2.47	−0.9	−5.93	−2.53	−2.07	−2.84	2.47	−6.71	−1.57	−2.7	−2.03	−1.0	
R	−2.95	−0.31	−6.86	−2.62	−2.2	−3.15	4.84	−7.76	−1.41	−3.12	−2.15	−0.91	
PC	−2.48	−1.98	−5.13	−2.78	−1.92	−3.49	−.32	−3.04	4.49	−0.85	−5.93	−2.0	
PM	0.0	−7.8	−6.64	−8.4	−1.4	−7.75	−9.8	−5.36	5.56	1.63	−11.43	−0.01	–
PEP	0	0	0	0	0	0	0	0	0	0	0	0	
Simulation D													
PD	−5.31	−3.68	−8.11	−7.01	−3.27	−5.67	−5.1	−3.4	−6.79	−5.86	−5.8	−4	
P	−5.31	−3.68	−7.97	−6.91	−3.15	−5.36	−2.97	−3.38	−6.7	−5.82	−4.9	−4.0	
PVA	−4.37	−1.8	−9.07	−8.13	−2.43	−7.21	4.01	−10.9	−4.09	−3.02	−3.6	−2	
R	−5.18	−0.84	−10.4	−8.66	−2.08	−8.35	8.14	−12.5	−4.71	−2.92	−3.7	−2	
PC	−4.49	−3.68	−8.05	−7.02	−2.58	−5.92	−5.3	−3.95	−9.13	−8	−7.5	−4	
PM	0	−7.8	−6.64	−8.4	−1.4	−7.75	−9.8	−5.36	−9.72	−10.6	−11	−0	
PE	0	0	0	0	0	0	0	0	0	0	0	0	–

Table D

Percentage Variation in Households Income

	Urban Households by Employment Status					Rural Households by Land Holdings				
	Employer	Self-employed	Employee	Agr.	Undefined	No Land	0-0.5 Acres	0.51012.5 Acres	12.51-25 Acres	25 Acres & Above
Simulation A	16.19	4.35	5.54	4.94	9.77	5.36	5.06	4.5	4.62	4.83
Simulation B	4.35	3.87	5.1	4.4	8.88	4.83	4.53	3.98	4.1	4.29
Simulation C	12.46	2.14	2.23	2.72	0.34	2.27	2.28	2.67	2.64	2.49
Simulation D	−1.57	−0.63	−1.32	−0.15	−9.25	−1.3	−1.06	0.15	−0.02	−0.53

Table E

Percentage Variation in Households' Consumption by Commodity

Variables	Wheat	Major Crops	Minor Crops	Non-crop	Mining	Consumer Goods	Textile	Petroleum	Electric Equipment	Non-Electric and Transport Equipment	Other Mfg.	Other Traded	Other Non-traded
Simulation A													
Employer	8.61	12.24	11.62	19.11	9.66	19.45	16.98	36.2	31.53	28.8	33.5	31.6	
Self-employed	2.66	4.19	3.89	5.58	2.88	5.88	5.11	7.27	6.76	10.6	9.85	9.59	10.19
Employee	2.13	2.87	3.13	4.05	1.98	4.33	4.04	5.01	3.79	7.25	6.74	6.66	7.04
Agri-Households	3.11	3.11	2.88	4.5	2.33	4.78	4.74	5.89	4.88	7.97	7.38	7.8	8.86
Undefined	6.18	7.34	6.7	9.38	4.78	9.68	10.84	12.1	13.85	18.9	15.3	15.8	18.04
Households (NL)	3.06	3.6	3.59	4.38	2.28	4.39	5.23	7.42	4.43	7.78	8.31	7.66	8.68
0<-0.5 acres	2.76	3.24	3.26	3.92	2.04	4.21	4.69	5.17	3.7	6.97	7.43	6.88	7.79
0.51-12.5 Acres	2.11	3.61	3.15	3.73	1.95	4.02	4.48	4.93	3.12	6.63	7.08	6.57	7.43
12.51-25 Acres	2.27	4.45	3.39	4.38	2.42	4.66	4.31	6.12	4.61	8.28	7.66	8.12	9.21
25 Acres and Above	2.32	5.33	4.01	5.28	2.91	5.6	4.44	7.37	5.55	9.27	7.82	9.74	8.86
Simulation B													
Employer	2.58	3.62	3.76	5.65	2.76	5.76	4.99	10.4	10.41	8.79	9.66	9.37	10.9
Self-employed	2.6	4.08	3.86	5.67	2.76	5.8	5.01	7.01	10.43	11.1	9.66	9.43	10.26
Employee	2.21	2.96	3.27	4.42	2.01	4.54	4.21	5.11	7.61	8.21	7.04	6.95	7.58
Agri-Households	3.1	3.09	2.92	4.7	2.28	4.82	4.75	5.78	8.61	8.63	7.4	7.83	9.15
Undefined	5.93	7.03	6.5	9.22	4.53	9.34	10.43	11.5	17.07	18.9	14.7	15.2	17.63
Households (NL)	3.11	3.63	3.69	4.69	2.26	4.51	5.33	7.4	8.57	8.63	8.49	7.83	9.15
0<-0.5 acres	2.81	3.28	3.37	4.22	2.03	4.34	4.81	5.17	7.7	7.8	7.63	7.06	8.26
0.51-12.5 Acres	2.14	3.64	3.23	4	1.93	4.12	4.56	4.9	6.81	7.42	7.22	6.71	7.85
12.51-25 Acres	2.26	4.4	3.43	4.57	2.36	4.68	4.31	5.98	8.32	8.96	7.66	8.13	9.49
25 Acres and Above	2.29	5.22	4.01	5.43	2.81	5.56	4.39	7.13	9.21	9.85	7.73	9.64	9
Simulation C													
Employer	7.63	10.74	10.65	17.61	8.57	18.01	15.61	33.29	26.06	24.86	33.95	27.9	
Self-employed	2.35	3.6	3.77	5.53	2.56	5.88	5.02	7.14	4.2	8.63	12.45	8.42	8.67
Employee	1.96	1.78	3.2	4.3	1.84	4.64	4.23	5.26	1.98	6.01	9.61	6.06	6.17
Agri-Households	3.14	3.26	3.16	5.17	2.38	5.51	5.37	6.68	3.69		7.48	7.85	8.65
Undefined	1.62	3.12	2.33	2.71	1.18	3.02	3.25	3.57	–0.27		3.82	3.92	4.16
Households (NL)	2.87	4.07	3.72	4.74	2.15	4.78	5.57	7.91	2.52		6.63	7.11	7.78
0<-0.5 Acres	2.75	4.6	3.57	4.54	2.07	4.89	5.34	5.9	2.37		6.34	6.82	7.45
0.51-12.5 Acres	2.45	4.94	3.89	5.04	2.31	5.4	5.91	6.53	2.99		7.19	7.62	8.37
12.51-25 Acres	2.41	2.02	3.88	5.31	2.61	5.65	5.14	7.31	3.86		8.21	8.6	9.49
25 Acres and Above	2.22	3.44	4.16	5.7	2.8	6.07	4.73	7.85	3.83		8.18	9.23	8.15
Simulation D													
Employer	0.88	1.06	1.95	3.04	0.64	2.58	2.04	3.37	7.38	5.18	5.64	3.05	3.7
Self-employed	1.66	2.39	3.13	5.04	1.45	4.49	3.67	4.47	11.48	10.4	9.21	5.91	6.57
Employee	1.66	2.04	3.1	4.75	1.24	4.21	3.68	3.89	10.27	9.25	8.18	5.14	5.73
Agri-Households	2.76	2.57	3.09	5.65	1.77	5.1	4.8	5.25	12.61	10.8	9.54	6.91	8.2
Undefined	–3.28	–4.15	–2.48	–4.35	–2.95	–4.75	–5.59	–6.87	–6.68	–7.97	–6.8	–8	
Households (NL)	2.37	2.55	3.53	5.1	1.43	4.24	4.73	5.74	11.7	9.84	10	5.89	7.03
0<-0.5 Acres	2.43	2.62	3.55	5.15	1.49	4.59	4.82	4.57	11.73	9.9	10.1	6.04	7.19
0.51-12.5 Acres	2.47	3.97	4.24	6.24	2	5.66	6.01	5.89	12.91	11.8	12.1	7.74	9.17
12.51-25 Acres	2.16	3.96	3.84	5.88	1.99	5.32	4.69	5.88	13.01	11.9	10.6	7.73	9.16
25 Acres and Above	1.73	3.66	3.73	5.66	1.8	5.07	3.8	5.46	11.82	10.7	8.65	7.2	6.85

Table F

Policy Change Impact on Welfare

Households	A	B	C	D
Urban				
1. Employer	16.14	4.77	14.95	2.1
2. Self-employed	4.43	4.41	4.27	3.33
3. Employee	5.65	5.99	5.73	5.33
4. Agriculture	5.02	5.13	5.46	5.22
5. Other	9.82	9.53	2.75	–5.02
Rural				
1. No Land	5.5	5.72	5.75	5.3
2. 0.001-0.5	5.22	5.45	5.84	5.68
3. 05-12.5	4.68	4.87	6.10	6.6
4. 12.5-25	4.71	4.78	5.73	5.5
5. 25 and Above	4.92	4.94	5.22	4.47

Table G

Tax Rates Reduction

Imports	Tariff Rates	Ranking
AGW	–46 percent	6
AGMJ	–51 percent	2
AGMN	–42 percent	8
AGNC	–39 percent	9
MIN	–52 percent	1
FCON	–37 percent	10
TEXT	–47 percent	5
PET	–50 percent	3
EM	–47 percent	5
NEMT	–43 percent	7
CLOMF	–48 percent	4
OTR	–47 percent	5

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ABSTRACT

Using Computable General Equilibrium Model, this paper assesses the impact of import liberalisation on macro aggregates and on the welfare of households. It uses benchmark data from Social Accounting Matrix for the year 1989-90 and simulates the impact of (i) removal of quota restrictions on imports of electric and non-electric equipment and transport equipment, (ii) reduction in import tariffs, and (iii) reduction in quota and tariff restriction in the presence of economic growth. The results of these simulation exercises indicate that reduction in quantitative restrictions on imports improves welfare of employees' group of households in the urban areas. Welfare gain is the highest for the poorest group of households in the rural areas. Similarly, tariff reduction benefits employees more and (in the rural areas) than it does the medium-size landholders.