
Poverty Implications in Pakistan of Agricultural and Non-Agricultural Price Distortions

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Background: Multicountry Study

- **World Bank initiated a research project on nominal protection rates (NPRs) in more than 70 countries**
- **Based on these country NPRs, the World Bank selected 13-15 countries and extended the analysis to examine the poverty implications of reducing trade protection thru global and domestic liberalization**
- **The present paper is a chapter in a forthcoming book on *Agricultural Price Distortions, Inequality, and Poverty*. (Kym Anderson, John Cockburn and Will Martin, eds). Washington DC: World Bank**

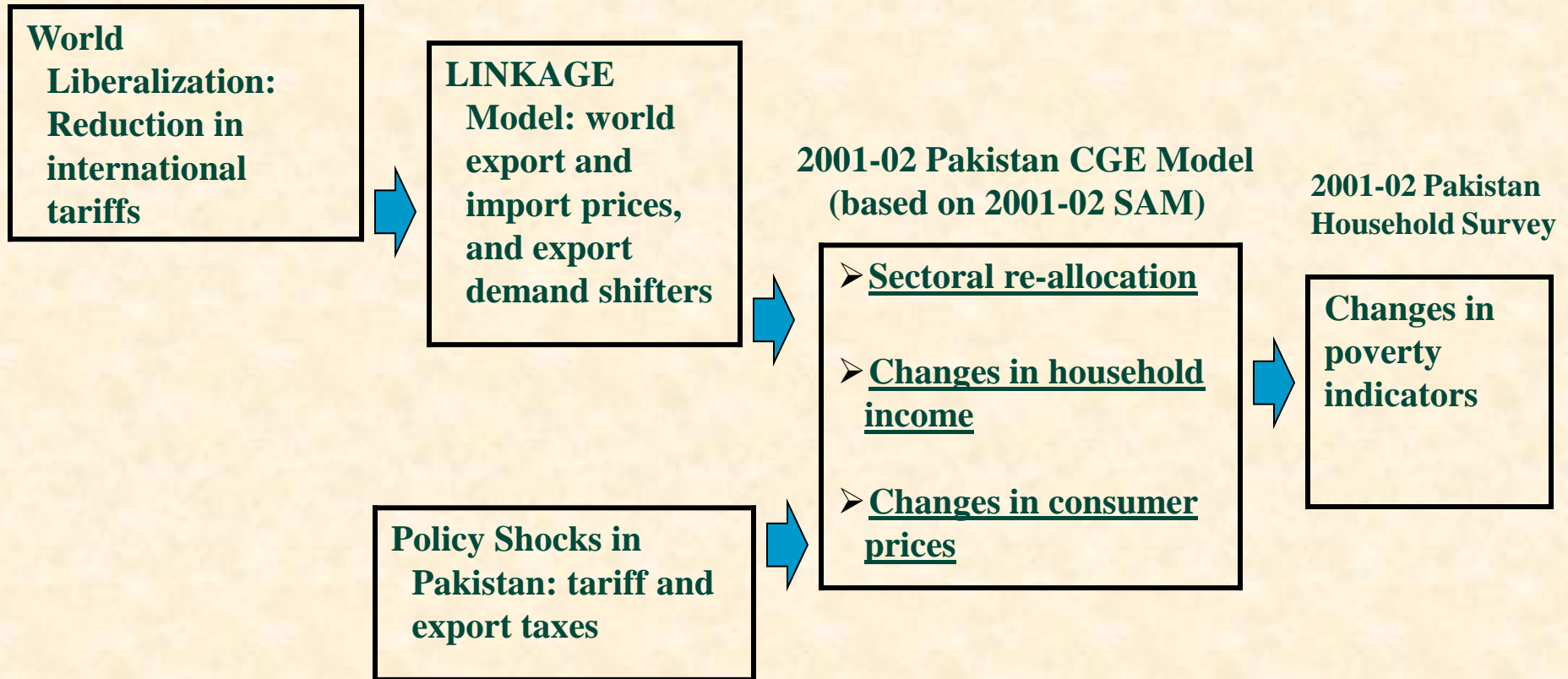
Objective

- **To analyze aggregate, sectoral and poverty implications of removing agricultural and non-agricultural price distortions in the international markets and in the domestic markets in Pakistan**
- **To compare effects among global liberalization, unilateral Pakistan liberalization, and a combination of both**

Methodology

- Utilize LINKAGE (World Bank CGE global model) model results: changes from world trade liberalization scenario without Pakistan
- Utilize new estimates of rate of protection/assistance for Pakistan (Dorosh and Salam: www.worldbank.org/agridistortions)
- Develop international and domestic trade liberalization scenarios using LINKAGE results and the Pakistan CGE model
- Generate economy equilibrium and vectors of household income and consumer prices and apply to 2001-02 national household survey to calculate poverty effects

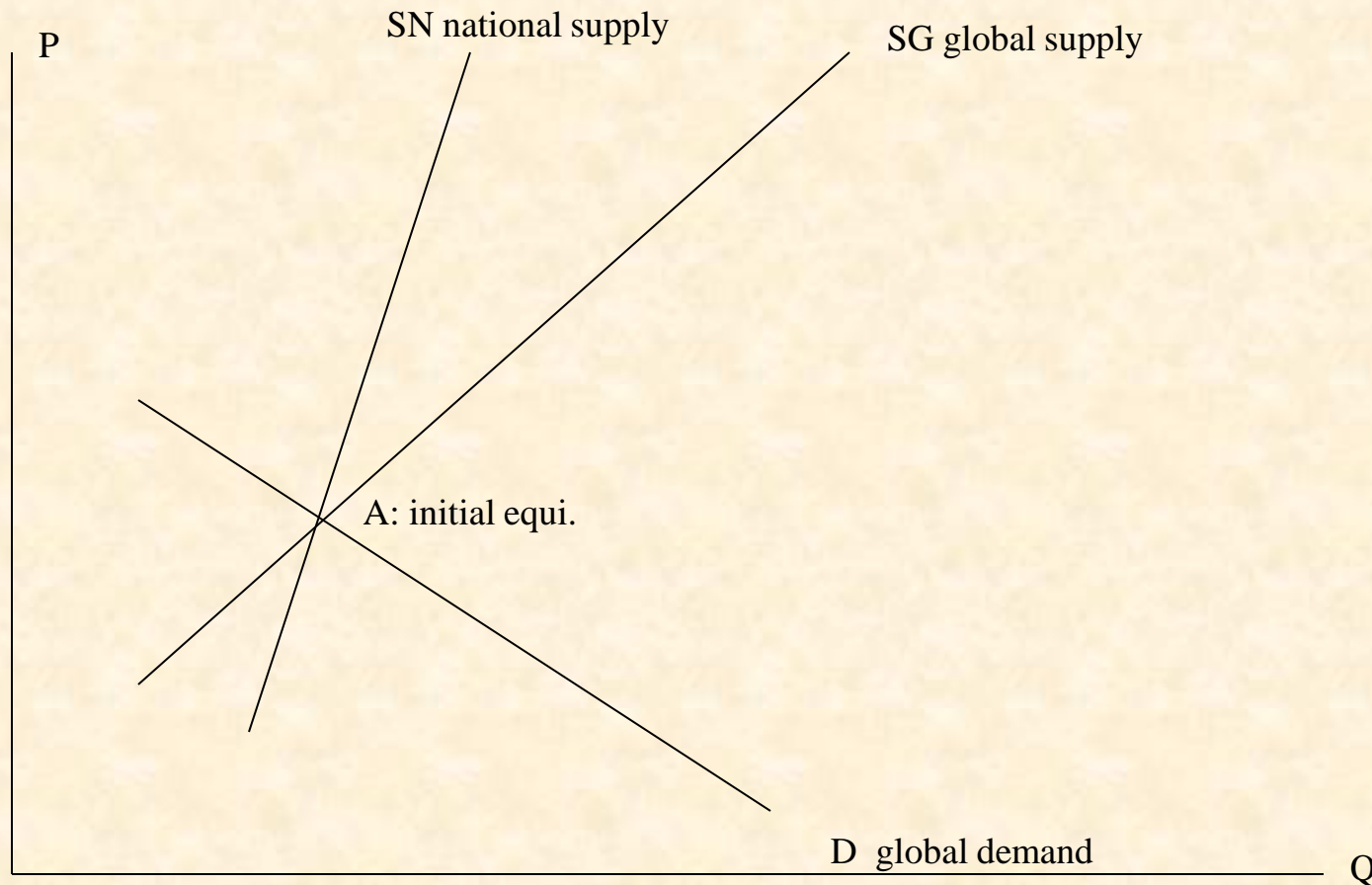
Framework of Analysis



Linking Global with Pakistan Model

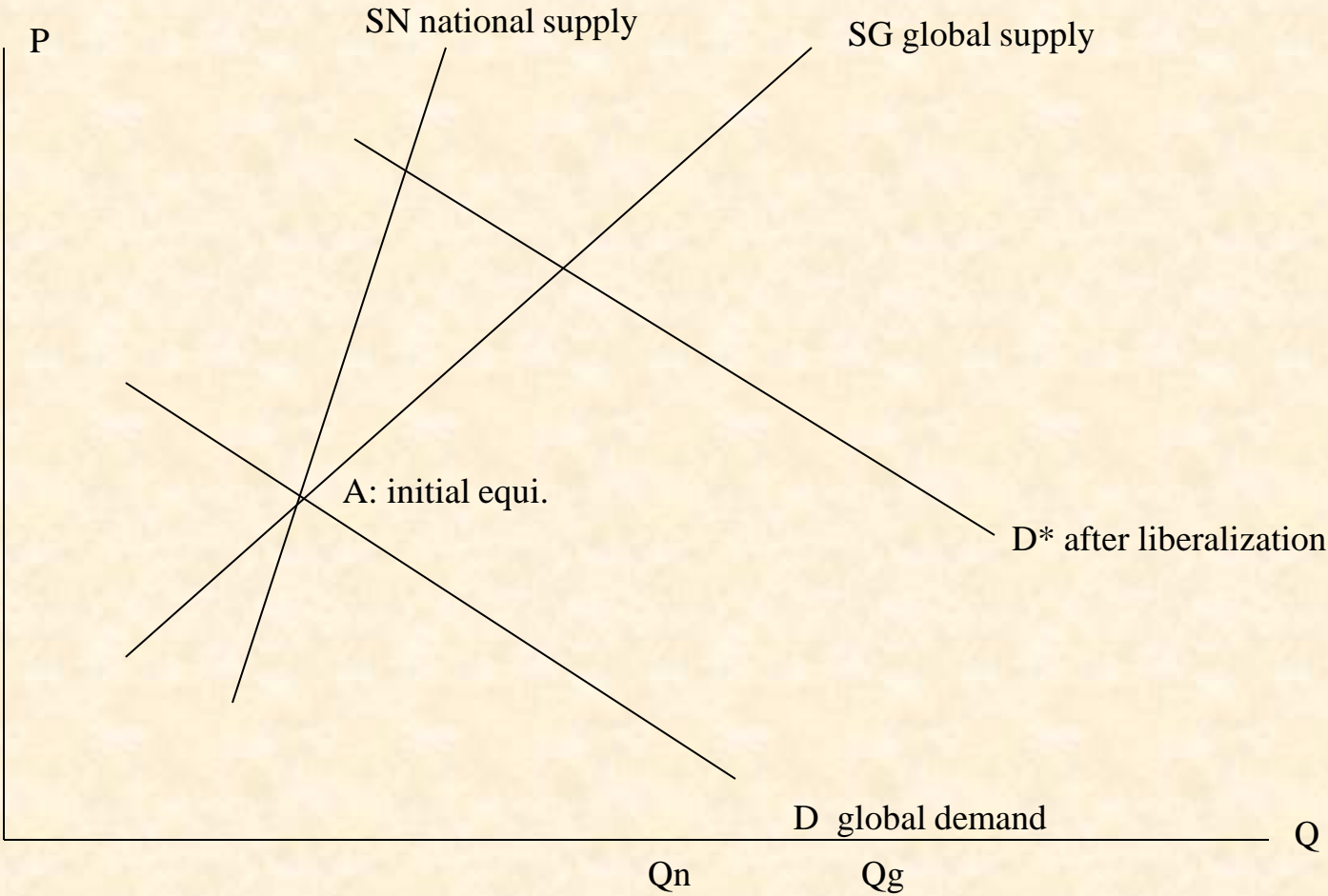
- **Horridge and Zhai (2006)** - an appendix in *Poverty and the WTO: Impacts of the Doha Development Agenda*. Hertel and Winters (2006)
- **Assumption:**
 - **National models of developing countries (national CGEs) have elastic export supply schedules, reflecting domestic constraints on export capacity not captured in the global model.**
 - **Global and national CGE models have the same export demand schedule (same slope)**

Linking Global with Pakistan Model



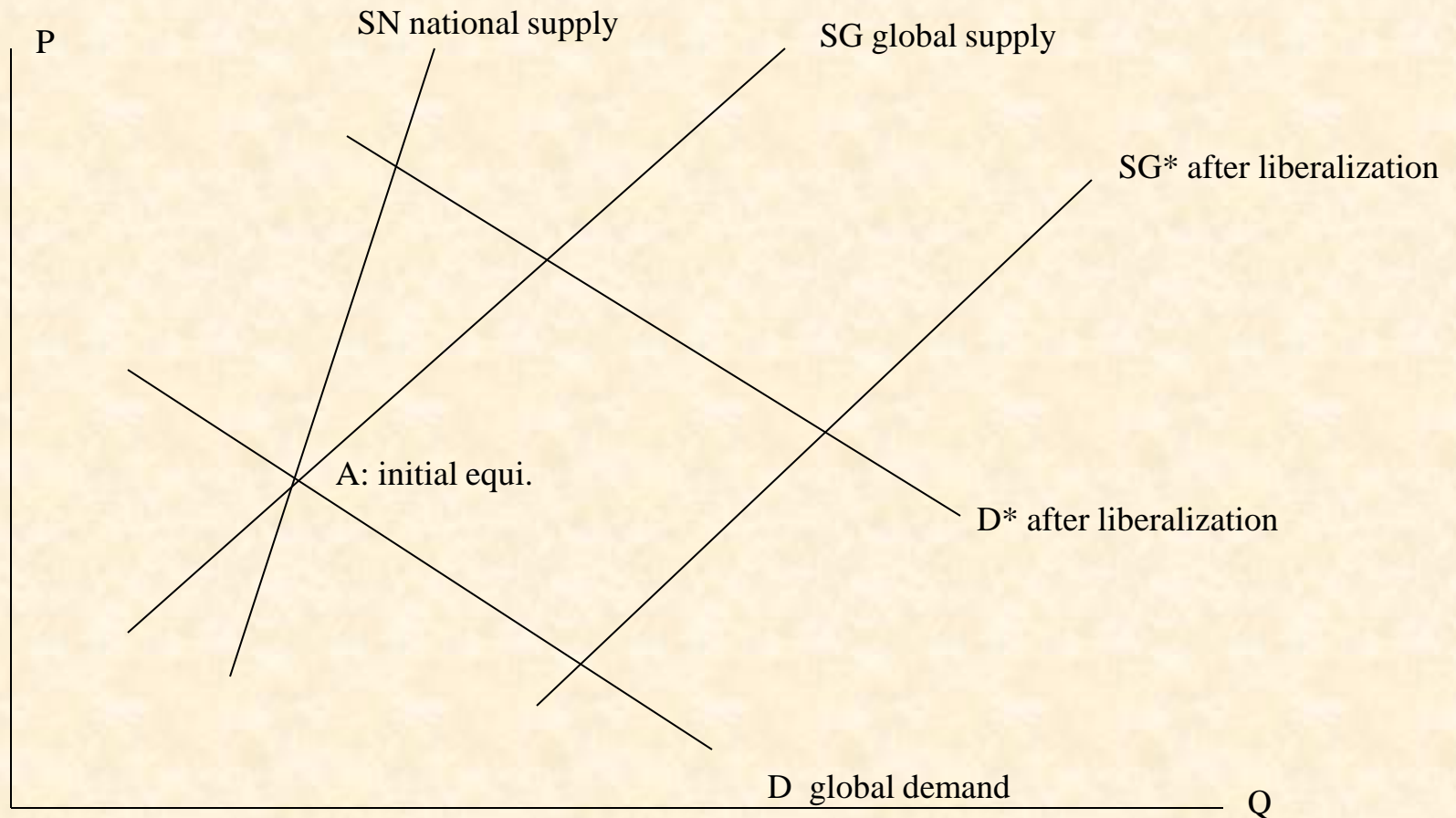
Price and quantity changes in national model different from global model

Linking Global with Pakistan Model



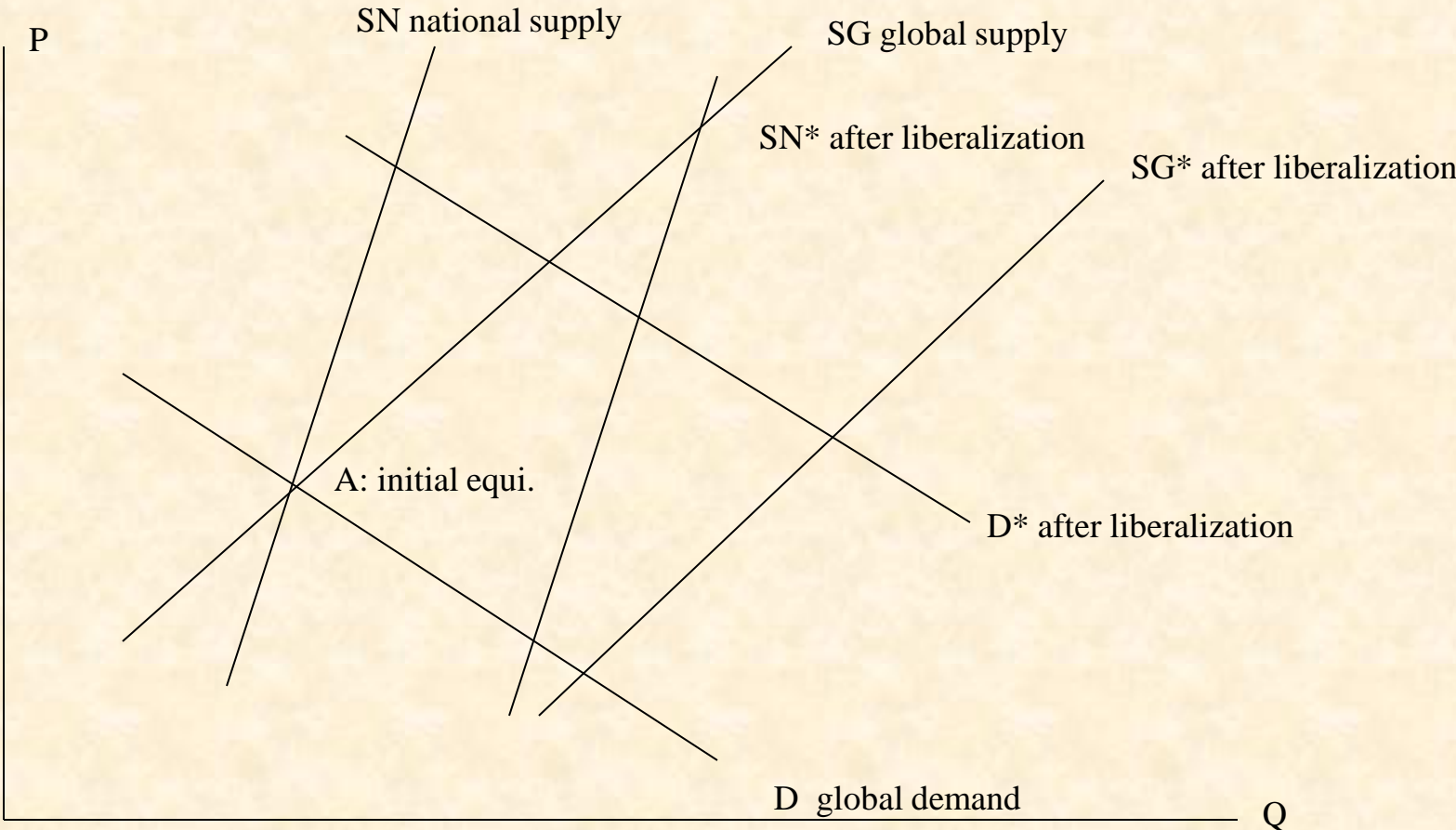
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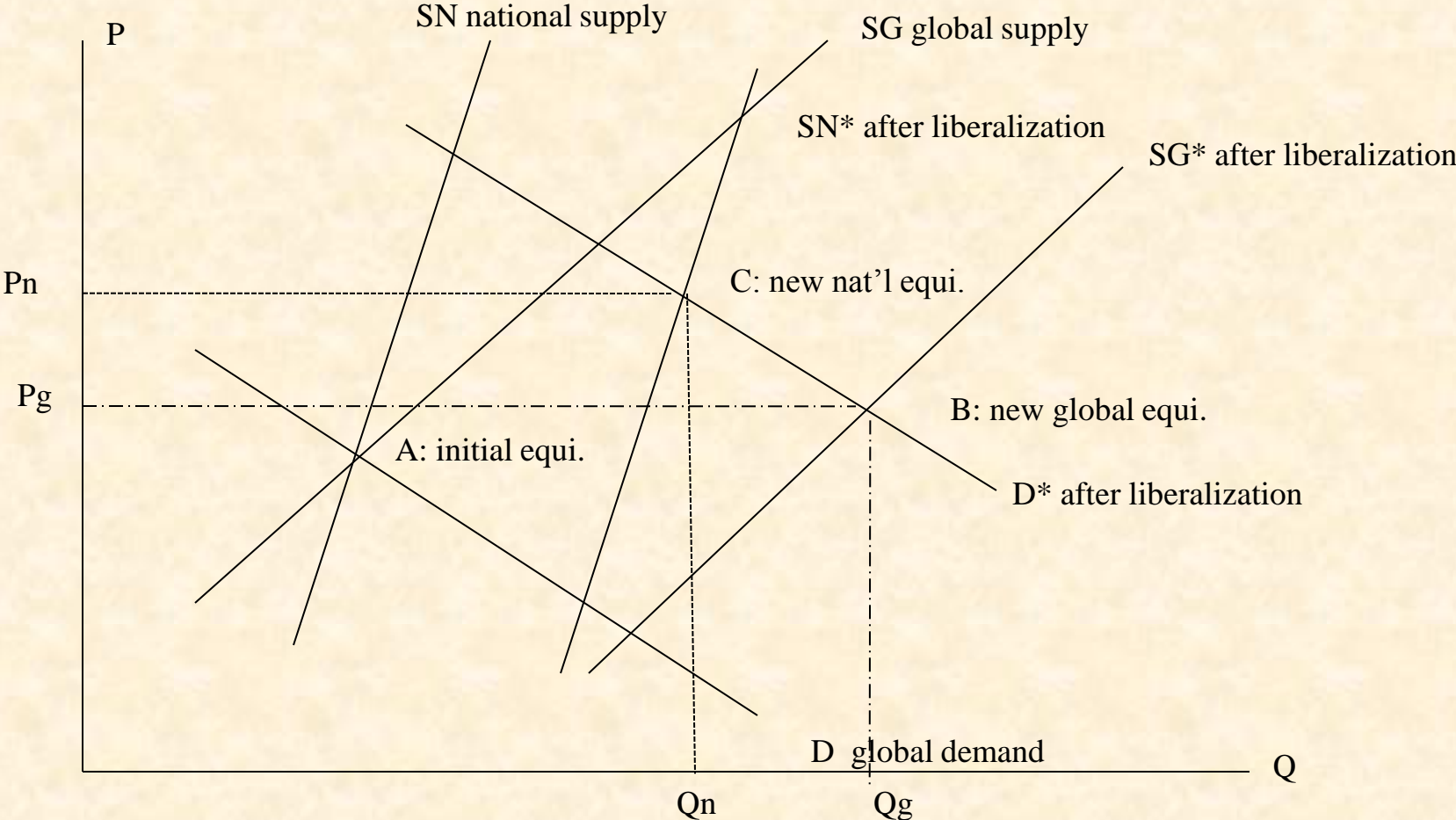
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Linking Global with Pakistan Model



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Linking Global with Pakistan Model



Price and quantity changes in national model different from global model

Key Features of Pakistan Model

- **34 production sectors**
 - **17 agriculture (12 primary agriculture and 5 lightly processed food)**
 - **17 non-agricultural (mining, manufacturing, other industry and services)**
- **5 factors of production**
 - **skilled labor (mobile across non-agriculture and lightly processed food)**
 - **unskilled workers (mobile across all sectors)**
 - **farm labor (mobile across primary agriculture)**
 - **land (use can shift across agriculture)**
 - **sectoral capital (fixed)**

Key Features of Pakistan Model

- **19 household groups:**
 - ▶ **2 Urban: poor and non-poor**
 - ▶ **17 Rural: farm and non-farm**
 - **2 rural non-farm: poor and non-poor**
 - **15 farmers and agricultural workers**
 - **by major province and size of land holdings**

Key Features of Pakistan Model

- **Total savings is invested**
- **Fixed government fiscal balance (for Pakistan liberalization we compare direct income tax and indirect tax replacement of lost tariff revenue)**
- **Private savings are endogenous**
- **Foreign savings is fixed**
- **Pindex (weighted value added price) - numeraire**
Nominal exchange rate - endogenous

Pakistan – Production and Trade Structure (2001-02 SAM)

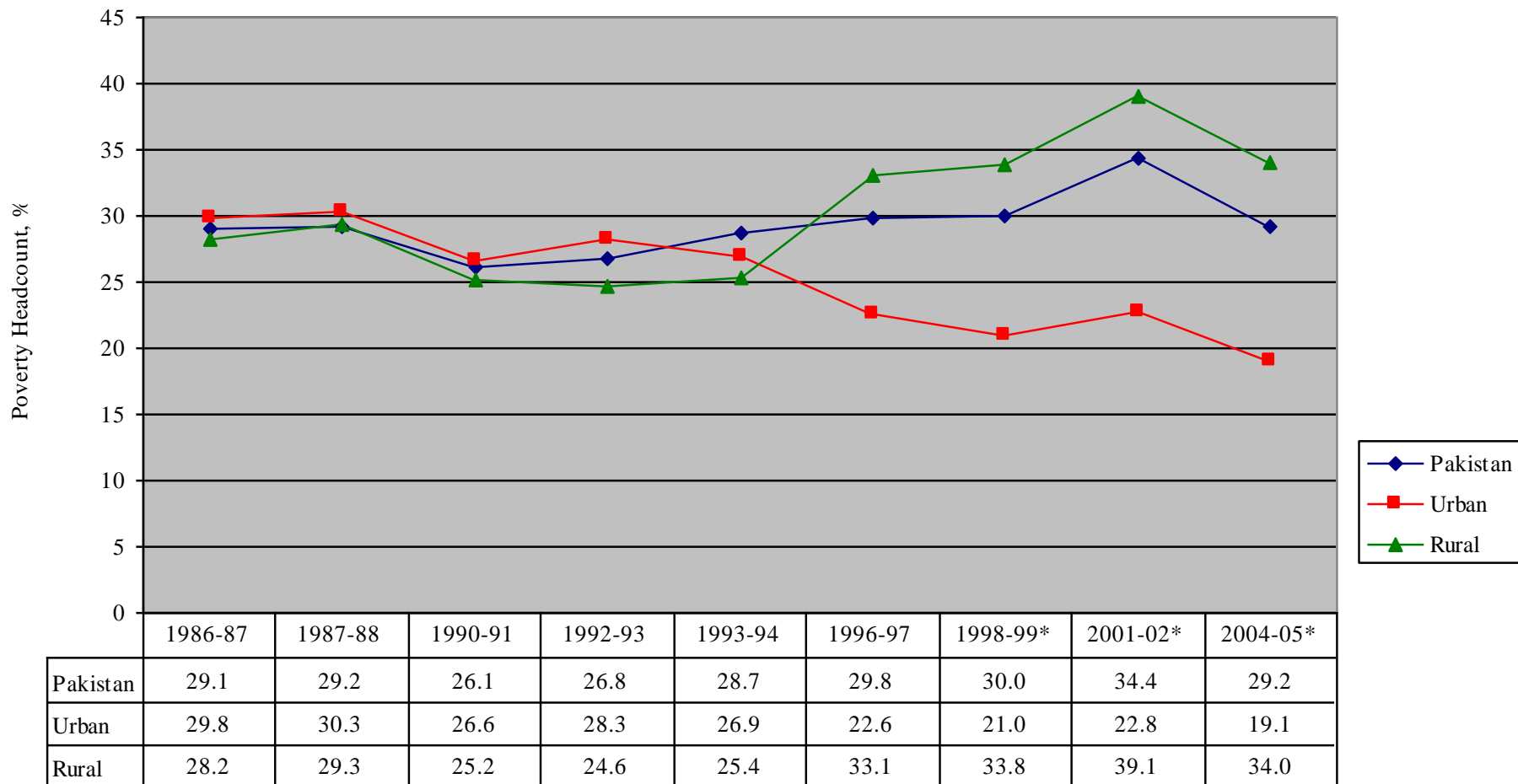
Sectors	Share (%)			Exports (%)		Imports (%)	
	Output	Value-added	Employment	Share	Intensity	Share	Intensity
Agriculture	27.7	26.8	12.6	8.5	3.1	6.6	3.6
Primary Agriculture	20.1	23.2	10.7	3.9	1.9	3.1	2.4
Lightly Processed Food	7.6	3.6	1.8	4.6	6.0	3.4	6.8
Non-Agriculture	72.3	73.2	87.4	91.5	12.7	93.4	18.4
Mining and Manufacturing	24.2	13.2	7.9	74.1	30.6	88.2	44.4
Other Industry	6.6	6.6	7.2	0.0	0.0	0.0	0.0
Services	41.5	53.5	72.4	17.5	4.2	5.2	2.0
Total	100	100	100	100	10.0	100	14.5

Pakistan – Sources of Income (%)

(2001-02 SAM)

Households	Labor						Direct tax, %
	Farm	Unskilled	Skilled	Capital	Land	Others	
Large farmers - Sindh	13.2	0.3	-	31.4	49.8	5.3	-
- Punjab	8.6	0.5	-	43.3	42.2	5.4	-
- Other Pakistan /a/	9.8	0.2	-	52.4	32.3	5.4	-
Medium farmers - Sindh	14.5	3.1	-	39.6	37.4	5.3	-
- Punjab	10.8	4.3	-	52.3	27.2	5.4	-
- Other Pakistan	14.9	2.9	-	38.2	38.4	5.5	-
Small farmers - Sindh	6.8	9.0	-	57.9	20.4	5.8	-
- Punjab	7.9	14.2	-	51.8	20.3	5.8	-
- Other Pakistan	6.0	11.6	-	63.6	12.5	6.2	-
Small farm renters and landless - Sindh	11.6	18.7	-	48.5	15.6	5.7	-
- Punjab	9.0	20.5	-	48.7	16.1	5.8	-
- Other Pakistan	10.1	14.5	-	55.0	14.7	5.7	-
Rural agri. workers and landless - Sindh	-	51.0	-	42.8	-	6.2	-
- Punjab	-	49.3	-	45.2	-	5.5	-
- Other Pakistan	-	18.7	-	76.0	-	5.4	-
Rural non-farm - non-poor	-	43.0	-	49.9	-	7.2	-
- poor	-	29.7	-	63.4	-	6.9	-
Urban - non-poor	-	11.9	33.3	10.6	-	44.2	8.4
- poor	-	76.2	-	18.0	-	5.8	-

Background: Poverty Trends in Pakistan



Source: Pakistan Economic Survey 2002-03; World Bank 2007

*From World Bank 2007 "Pakistan Promoting Rural Growth and Poverty Reduction" 2004-05 are estimates of the World Bank

Scenarios

- **Scenario 1: World Trade Liberalization (without Pakistan)**
 - Full trade liberalization
 - Agricultural trade liberalization
- **Scenario 2: Unilateral (Pakistan only) Trade Liberalization**
 - Full trade liberalization
 - Agricultural trade liberalization
- **Scenario 3: Combined Full Trade Liberalization**
 - World and domestic trade liberalization

Inputs in Various Scenarios

Sector	Trade taxes in Pakistan		Full Trade Liberalization without Pakistan	
	Tariff, %	Export Tax, %	World Import Price, % change	Export Demand Shifter, %
Wheat	-4.9	0.0	2.41	0.0
Paddy	0.0	4.0	0.00	20.7
Cotton	4.9	0.0	4.44	13.8
Sugarcane	4.3	0.0	0.00	0.0
Other major crops	15.3	0.0	-1.91	-3.4
Fruits and vegetables	16.5	0.0	-2.93	-4.5
Livestock, cattle and dairy	55.4	0.0	4.41	-3.9
Poultry	10.8	0.0	-8.00	-4.3
Forestry	14.3	18.1	-0.14	5.4
Fishing Industry	14.3	18.1	-0.14	5.4
Vegetable oil	23.7	0.0	1.78	5.4
Wheat milling	24.9	0.0	0.00	-7.0
Ricemilling	0.0	4.0	8.21	1.9
Sugar	59.0	0.0	1.62	6.5
Mining	14.3	18.1	-0.14	-4.0
Other food	24.9	0.0	0.00	2.0
Cotton lint and yarn	19.9	1.1	-0.68	1.7
Textiles	19.9	1.1	-0.68	1.7
Leather	19.9	1.1	-0.68	1.7
Other manufacturing	16.6	5.4	-0.38	0.0
Energy	0.0	0.0	-0.22	-1.3
Services	0.0	0.0	-0.22	-1.3

Trade Liberalization Under Alternative Tax Replacement

- **Tax replacement to hold government savings fixed:**
 - **Direct Income Tax**
 - **Indirect tax**

Full Liberalization: Real Income Effect

(% difference from base level; direct income tax replacement)

Households	World	Pakistan only	Combined
Large farmers - Sindh	0.02	2.08	1.96
- Punjab	0.23	2.35	2.47
- Other Pakistan	0.43	2.57	2.90
Medium farmers - Sindh	0.05	2.00	1.94
- Punjab	0.28	2.33	2.52
- Other Pakistan	0.20	2.33	2.40
Small farmers - Sindh	0.25	2.08	2.28
- Punjab	0.23	2.28	2.44
- Other Pakistan	0.36	2.19	2.52
Small farm renters and landless - Sindh	0.16	2.14	2.25
- Punjab	0.27	2.42	2.64
- Other Pakistan	0.35	2.29	2.59
Rural agri. workers and landless - Sindh	0.37	2.96	3.33
- Punjab	0.39	3.02	3.40
- Other Pakistan	0.58	2.28	2.87
Rural non-farm - non-poor	0.63	3.63	4.25
- poor	0.53	2.58	3.11
Urban - non-poor	0.31	-4.06	-3.69
- poor	0.37	3.94	4.28
Pakistan	0.40	1.30	1.69

Full Liberalization: Poverty Effect

(% difference from base level; direct income tax replacement)

Households	Poverty Incidence in 2001-02	2001-02 Pop. Dist., %	% change from 2001-02 index		
			World	Pakistan only	Combined
Pakistan	31.2		-1.3	-5.2	-6.4
Urban	19.9	29.7	-1.5	2.3	0.4
Rural	38.2	70.3	-1.2	-7.6	-8.6
Large and Medium Farmers	22.8	4.0	0.0	-7.9	-7.9
Small Farmers and Agri. Workers	37.4	30.6	-1.4	-8.3	-8.7
Rural Non-Farmers	39.9	35.7	-1.1	-7.2	-8.5

Agriculture Liberalization: Real Income Effect

(% difference from base level; direct income tax replacement)

Households	World	Pakistan only	Combined
Large farmers - Sindh	-0.16	-1.34	-1.51
- Punjab	-0.11	-1.17	-1.29
- Other Pakistan	-0.04	-1.08	-1.12
Medium farmers - Sindh	-0.11	-0.93	-1.06
- Punjab	-0.06	-0.71	-0.77
- Other Pakistan	-0.07	-1.22	-1.30
Small farmers - Sindh	-0.06	-0.19	-0.25
- Punjab	-0.04	-0.06	-0.10
- Other Pakistan	0.01	0.16	0.18
Small farm renters and landless - Sindh	-0.06	0.03	-0.03
- Punjab	-0.02	0.05	0.03
- Other Pakistan	0.01	-0.05	-0.04
Rural agri. workers and landless - Sindh	0.03	0.95	0.98
- Punjab	0.03	0.97	1.00
- Other Pakistan	0.09	0.71	0.82
Rural non-farm - non-poor	0.04	0.41	0.47
- poor	0.06	0.73	0.80
Urban - non-poor	0.01	-0.13	-0.12
- poor	0.03	0.90	0.93
Pakistan	0.02	0.27	0.29

Agricultural Liberalization: Poverty Effect

(% difference from base level; direct income tax replacement)

Households	Poverty Incidence in 2001-02	2001-02 Pop. Dist., %	% change from 2001-02 index		
			World	Pakistan only	Combined
Pakistan	31.2		-0.1	-1.6	-1.8
Urban	19.9	29.7	-0.1	-2.4	-2.7
Rural	38.2	70.3	-0.1	-1.4	-1.5
Large and Medium Farmers	22.8	4.0	0.0	3.4	3.4
Small Farmers and Agri. Workers	37.4	30.6	0.1	-0.9	-0.9
Rural Non-Farmers	39.9	35.7	-0.2	-1.9	-2.1

Combined Full Lib.: Poverty Effects

(% diff. from base; direct income vs. indirect tax replacement)

Households/Poverty Index	Index in 2001-02	2001-02 Pop. Dist., %	Combined full	
			Direct Tax	Indirect Tax
Pakistan	31.2		-6.4	0.5
Urban	19.9	29.7	0.4	0.0
Rural	38.2	70.3	-8.6	0.6
Large and Medium Farmers	22.8	4.0	-7.9	2.2
Small Farmers and Agri. Workers	37.4	30.6	-8.7	1.5
Rural Non-Farmers	39.9	35.7	-8.5	0.0

Insights for Policy (1)

- **Because domestic distortions are larger than international distortions, full reduction in domestic trade distortions creates significant price and quantity effects compared to full reduction in international market distortions.**
- **Income and poverty effects of agricultural trade liberalization only (both in world and in Pakistan) are smaller than full trade liberalization because of smaller share of agricultural trade to overall exports and imports in Pakistan.**

Insights for Policy (2)

- **Income and poverty effects depend on how tax replacement is implemented:**
 - ◇ **Direct income tax replacement generates significant drop in poverty**
 - ◇ **Indirect tax replacement increases consumer prices and reduces the benefits from reduction in trade distortions.**