



Dynamic Effects of Agriculture Trade in the Context of Domestic and Global Liberalization: A CGE Analysis for Pakistan

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Outline

- **Introduction**
- **Methodology**
- **Data**
- **Results**
- **Conclusion**

Domestic Economy

Agriculture in Pakistan's Economy

- It is single largest sector**
- Livelihood for sixty-Six percent of population**
- Accounts for 21 percent of the GDP**
- Employs 43.4 percent of the total work force.**
- More than 80 percent exports are agro based**
- Liberalization of this sector is expected to contribute to growth process significantly.³**

Global Economy

Agriculture and food processing is:

- Less than ten percent of world trade.**
- Less than 4 percent of GDP.**
- Employ 54 percent of the economically active population.**
- Tariff on agriculture protect more than half of all production in developed countries and 44 percent of their agriculture imports.**
- Developing countries exporters face an average tariff of 15.6 % for agriculture.**
- Agriculture policies contribute 63 percent of welfare cost of merchandise trade distortions, whereas 58 percentage points are due to tariff on agriculture imports**

- **This indicates that agriculture trade liberalization can play important role for reduction in poverty as majority of population living in rural areas engaged in production of agriculture goods.**
- **In the past trade in agriculture products was largely excluded from the GATT rules.**
- **It is expected that if agriculture is ignored in policy agenda then losses may be higher than now.**
- **First time, in 1995, agriculture trade was brought under multilateral disciplines through the Uruguay round agreement on agriculture (URAA).**

ISSUE

- **Pakistan undertook significant liberalization measures in its agriculture sector by reducing state intervention and bringing prices closer to world market levels.**
- **The country has not been able to realize its expected benefits due to slow liberalization of agriculture trade in developed countries.**
- **This indicates that global trade liberalization policies are as important as domestic liberalization to reap the benefit.**

Objective

- **The main objective of the study is to quantify the impact of :**
 - **Domestic agriculture trade liberalization**
 - **Global agriculture trade liberalization**

On macro and micro variables in general and on Growth in particular.

The novelty of this paper is that it develops Dynamic CGE for the analysis

Methodology

- **Simulations are conducted in Dynamic Computable General Equilibrium Model for Pakistan to quantify the impact.**

Data-SAM 2002

- **Aggregate from 71X71 matrix to 18x18 sectors.**
- **Five Sectors of Production: Agriculture, Manufacturing(MF1, MF2), Services (ST, SNT).**
- **Two Factors of production: Labor and Capital**
- **Five Institutions: two types of households, rural and urban, enterprises, Government, ROW.**
- **Agriculture is highly protected sector through tariff 11.8%**
- **The protected agriculture sectors constitute 65 percent of agriculture value added and 64 percent of total agriculture imports face tariff.**

Characteristics of SAM-2002

- Agriculture production contribute about 20 percent to GDP
- The share of intermediate input is 42 percent
- 38 %percent of its out put is used as intermediate input in production (14 % in its own production and 24 percent in the production of other goods mainly manufacturing sector.
- Sixty percent used for final consumption.
- Only two percent of its output is directed to foreign market. But manufactured imports are also agro based, which has very high share in total exports.
- Import penetration ratio is higher than export orientation.

Income and Consumption

- Rural households receive larger share of factorial incomes**
- urban households receive larger share of non factor incomes (such as, dividends).**
- Agriculture has larger share in the budget of household in the rural area.**
- Therefore, factor reallocation and change in consumer price index is expected to affect more the rural households.**

Building Blocks of CGE

- **Major building blocks of CGE are**
 - **Production Market**
 - **Factor markets**
 - **Commodity markets**
 - **Institutions**

Main Features of Static CGE Model

- **Production-Cobb Douglas function**
- **Armington approach: CES function for imports and domestic goods assuming they are imperfect substitutes.**
- **Exports and domestic goods are of different quality. They are defined with CET.**
- **Household demand for goods and services: Maximizing Cobb Douglas utility function subject to income constraints**
- **The coefficients such as share and shift parameters are calculated from SAM data.**
- **Elasticities are exogenous and taken from earlier model.**
- **A set of prices and quantities exists such that all excess demands for commodities and services are zero.**

Dynamic Features of the Economy

Dynamic -recursive model.

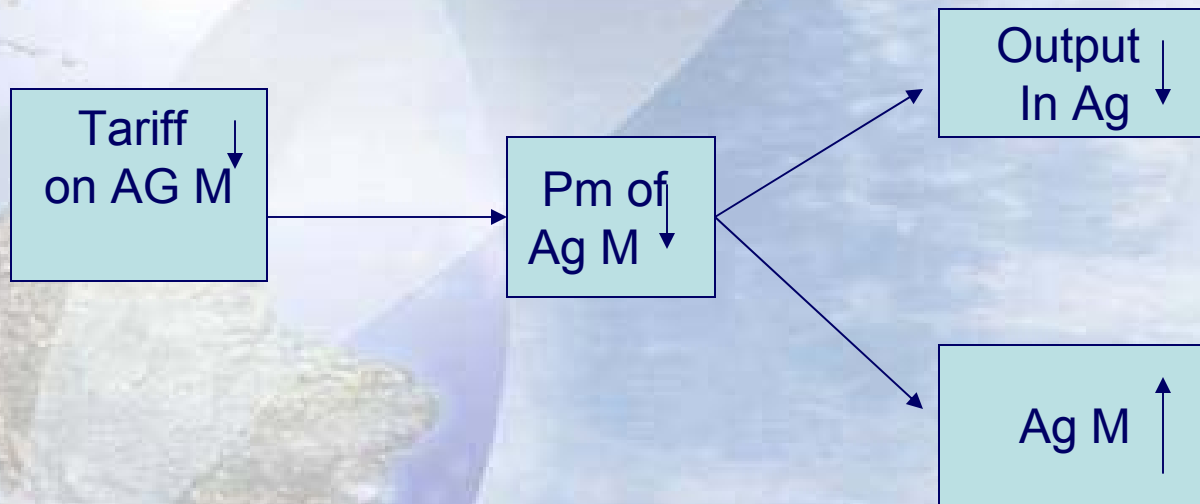
- **Capital stock is updated with a capital accumulation equation on the basis of rate of depreciation and investment.**
- **Investment equation determines the investment among different sectors of the economy after the shock.**
- **Growth in labor force and total factor productivity is exogenous.**
- **All exogenous variables also increases exogenously in subsequent period.**
- **The model is solved for 10 year (without gaps).**

Simulations

- **Five simulations are conducted**
 - **Two simulations in static framework**
 - **Tariff Reduction in domestic economy**
 - **Tariff reduction in domestic economy assuming that Economy grow with 2.5 percent**
 - **Three simulations in dynamic framework**
 - **Base run**
 - **Agriculture Trade Liberalization in Domestic Economy**
 - **Agriculture Trade Liberalization in Global Economy**

Major Finding

Tariff Reduction on Agriculture Imports



Full Agriculture Trade Liberalization in Domestic Economy

Simulation 1 Elimination of tariff on agriculture imports

	Agriculture	MF1	MF2	ST	SNT
Imports	18.38	-0.59	-0.17	0	-
Exports	-0.79	1.96	-0.07	0	-
Openness	9.75	0.29	-0.13	0.00	
Value Added	-0.81	1.96	-0.16	0	-0.12

Simulation 2: Elimination of tariff on agriculture imports with Growth

Imports	13.94	-0.49	0.16	0.37	-
Exports	3.66	1.76	0.07	0.18	-
Openness	9.31	0.28	0.12	0.24	0.56
Value Added	2.76	1.78	0.14	0.36	-0.17

Full Agriculture Liberalization in Domestic Economy and Variation in Income and Consumption

Short Run

	Rural	Urban	Total
Income	-0.37	-0.27	-0.31
Consumption	-0.37	-0.27	-0.31

Long Run

Income	-0.19	-0.89	-0.58
Consumption	-0.19	-0.89	-0.58

Simulation 3: Base Run

- **A dynamic CGE model allows economy to grow in the absence of any policy change.**
- **It takes into account accumulation effect.**
- **The simulation of the model in the absence of any policy shock indicate growth path for 10 years which is referred as BaU path.**
- **This growth path is used as basis for the comparison of the values after shock.**



Simulation 4: Trade Liberalization in the Domestic Economy

Shock: Tariff Elimination on Agriculture Imports in Pakistan

- **Short run is one year and**
- **Long run is 10 years.**

Results in Dynamic Framework

Simulation 4: Trade Liberalization in the Domestic Economy Variation in Output and Trade (percentages)

	Agriculture	MF1	MF2	ST	SNT	Total
	Short Run					
Value Added	-0.13	0.21	0.08	0.00	0.16	0.03
Imports	7.97	-0.18	-0.42	-0.33	-	0.02
Exports	0.07	0.25	0.23	0.15	-	0.22
Openness	4.1	-0.02	-0.11	0.01	-	0.10
	Long Run					
Value Added	0.02	0.54	0.30	0.17	0.35	0.21
Import	16.31	-0.22	-0.76	-0.54	-	0.05
Exports	0.36	0.56	0.56	0.42	-	0.53
Openness	4.86	0.14	0.11	0.23	-	0.31

Domestic Liberalization and Variation in Income and Expenditure (percentage)

Short Run

	Rural	Urban	Total
Income	-0.26	-0.25	-0.25
Consumption	-0.34	-0.40	-0.37

Long Run

Income	-0.57	-0.63	-0.60
Consumption	-0.47	-0.46	-0.47

Simulation 5: Global Liberalization of Agriculture trade

- The impact of Global liberalization is fed into the model through change in World import price, world export price, and export demand.
- These changes are calculated from simulation in GTAP model by removing all trade barriers and domestic support measures on all agricultural commodities in all countries for Siddiqui(2007).
- The change in these variables is aggregated from twenty sectors to five sectors of the economy using imports share as weight.
- These changes in PWM, PWX and EXDo are injected into the model together with tariff elimination on domestic imports.

Global Liberalization of Agriculture Trade and

Short Run analysis

	Agriculture	MF1	MF2	ST	SNT	Total
Value Added	-0.17	-0.15	0.73	-0.06	0.48	0.06
Imports	15.88	-0.68	-1.55	-1.12	-	-0.35
Exports	2.83	-0.96	3.08	0.43	-	0.17
Openness	1.05	0.55	0.35	1.92		1.25
Price Index						-1.09

Long Run analysis

Value Added	1.47	-1.50	3.75	0.54	-0.90	0.74
Import	13.18	-1.38	-3.88	-2.63		-1.43
Exports	15.36	-6.47	14.52	1.59		-0.06
Openness	13.09	-2.28	4.38	0.22		-1.41
Price Index						3.51

Global Liberalization of Agriculture Trade and Variation in Income and Consumption

Short Run

	Rural	Urban	Total
Income	-0.88	-0.86	-0.87
Consumption	-1.11	-1.27	-1.19

Long Run

Income	3.18	3.28	3.24
Consumption	2.50	2.14	2.31

Growth effects of Domestic VS Global Agriculture Trade Liberalization

Domestic Liberalization

Short run

Long run

Growth

0.03

0.21

Gain in Rs
(bIn)

0.94

34.2

Global liberalization

Growth

0.06

0.74

Gain in Rs
(bIn)

2.4

46.9

Conclusion

- **Liberalization of agriculture trade enhance growth process in Pakistan in the short run as well as in the long run in domestic as well as in global liberalization.**
- **Increase Export, Import and Openness when trade liberalized in the domestic economy.**
- **Agriculture liberalization reduce trade from other sectors of the economy.**
- **There is a need of reforms in other sectors of the economy to max benefits from global liberalization of agriculture trade.**



Thank You