RELATIVE BENEFITS/LOSSES OF INDIA ALIGNING WITH RCEP AND BRICS COUNTRIES UNDER THE CONJECTURE OF FREE TRADE AREA IN GOODS

A
Paper Presentation

By

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Introduction

- The present study works out the relative benefits/losses of India aligning with RCEP and BRICS member countries under the conjecture of free trade area in good trade only;

- RCEP: An emerging partnership among 16 countries of the Asia-Pacific region;

- BRICS: An association of five emerging and diverse economies;

- The study uses partial (SMART model) and general equilibrium (GTAP model) tools for this assessment;

- The main focus in the study is to compare the benefits/losses to Indian economy associated with both policy scenarios;

Preliminary Analysis using Trade Indicators

- For interpretation of the expected benefits from trade, the information on existing trade relations is of utmost importance. This assessment can be done by using some of the statistical ratios known as trade indicators.

- The study uses four main trade indices:
  1. Similarity in merchandise trade structures (Grubel-Lloyd, 1975);
  2. Trade Complementarity Index (TCI) (Michaely's, 1996);
  3. Revealed Comparative Advantage index (RCA); and
  4. Trade Intensity Index (TII).

- The first two indicators, such as trade similarity index (*SI*) and trade complementarity index is used to find out the trade prospect between the partners of proposed FTA. The study uses the value of these indices for each member country from UNCTAD STAT.

Assessment of Proposed Trade Blocs (RCEP and BRICS) using Ex-ante Partial and General Equilibrium Tools

Usage of SMART and GTAP Models

Database and Construction of Simulation Scenarios

- For partial equilibrium analysis, the study has used WITS database, online free database, provided by the World Bank.

- For general equilibrium analysis, the study has utilized the GTAP-8 database provided by Purdue University under Global Trade Analysis Project (GTAP). It is the most suited available database used for the purpose of general equilibrium analysis which provides data for 2007 reference year.

- The simulations have been conducted mainly under two broad categories of liberalization: full and partial trade liberalization.

- Under full trade liberalization scenario, tariff on all the products is assumed to be zero and its effect on member countries has been reported in a post-simulation environment.

- Under partial liberalization, instead of removing import tariffs on all the products, the study considers only specialized products of each member country and assumes zero tariffs only for those products for the simulation purpose.

- The specialized products have been decided on the basis of value of RCA corresponding to that product.

Assessment of Proposed Trade Blocs using SMART Model

- The study has utilized the SMART tool included in WITS software to evaluate the benefits/loses associated with the policy of tariff liberalization;

- This performs simulations of change in tariffs by reporter country (importer) by using required trade and tariff data included in WITS;

- This tool considers only one reporter at one time and assumes the new rate of its import tariffs on goods coming from the partner country or group of partner countries as per the specification in the simulation scenario;

- On the basis of its methodology, given in the following sub-section, it calculates four major effects of a change in tariff rates: trade creation (TC); trade diversion (TD); tariff revenue; and welfare;

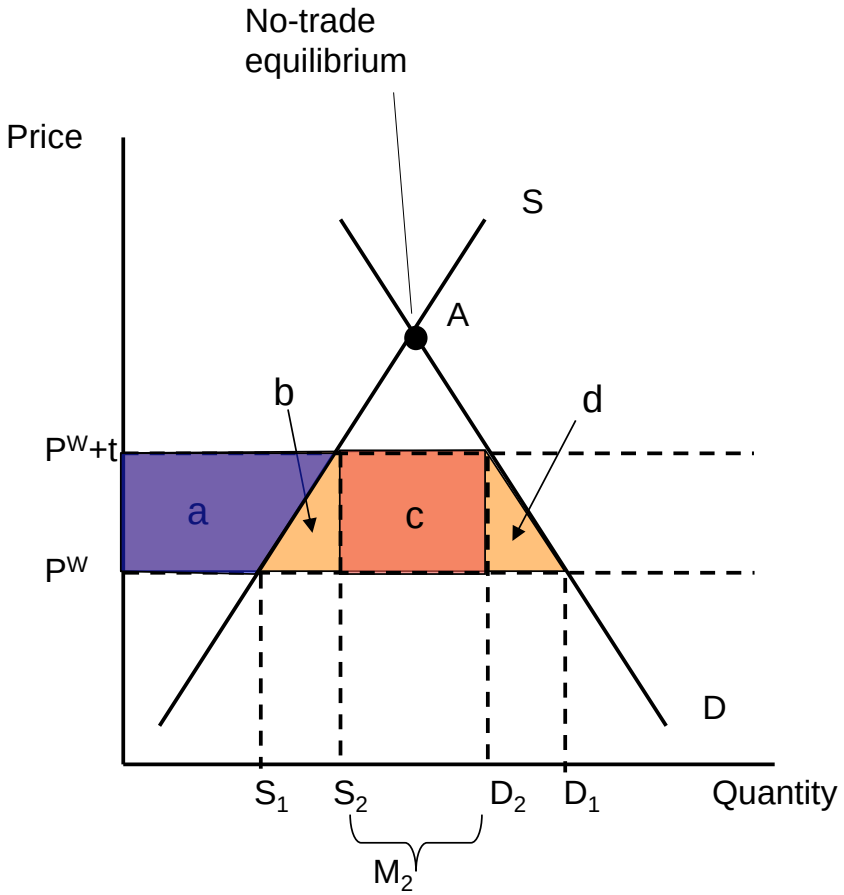
- See Jammes & Olarreaga, 2005 for details on SMART model.

SMART ANALYSIS

Rationale for Market Access Analysis

- Despite successive rounds of multilateral, regional and unilateral trade liberalization, some trade barriers (including tariffs) remain highly restrictive in many (both developed and developing) countries.
- For any government, it is crucial to be able to assess or to pre-empt the impact of different trade policy options. Market access analysis is a useful tool that can be used to anticipate the likely economic effects of various policy alternatives.
- Impact of domestic trade reforms. For political economy or social purposes, it is often important to determine the distribution of the potential gains and losses from any contemplated policy changes. This will assist in anticipating any adjustment costs associated with reform implementation.
- Impact of foreign trade liberalization. For instance, when preparing for trade negotiations, market access analysis helps identify the sensitive sectors where negotiating efforts should be focused. Also, it could be useful in the formation of negotiating coalitions in multilateral/regional negotiations.
- The market access analysis tool included in the WITS package allows the researcher to investigate the impact of unilateral/preferential/multilateral trade reforms at home or abroad on various variables including: Trade flows (import, exports, trade creation and trade diversion),world prices, tariff revenue and economic welfare.

Tariff Impact on Small Country and Large Country



Price Effects

- Small Country Case: Overall Effect of the Tariff on Welfare
- The overall impact of the tariff in the small country can be summarized as follows:
- Fall in consumer surplus *-(a+b+c+d)*
- Rise in producer surplus *+a*
- Rise in government revenue *+c*
- **Net effect on Home welfare** ***-(b+d)***
- Large Country Case: The Country is large enough to have impact on prices(terms of trade). The terms of trade improves for the tariff imposing country. The net effect on the welfare of the importing country is ambiguous.
- Loss in consumer surplus-(A+B+C+D)
- Gain in Producer Surplus +A
- Government Revenue + C+E
- Net Effect of Tariff = E-(B+D)

International Trade Agreements

Quantity Effects; Trade Creation and Trade Diversion Effects

Table Cost of Importing an Automobile Part

	U.S. Tariff		
	0%	**10%**	**20%**
From Mexico, before NAFTA	$20	$22	$24
From Asia, before NAFTA	$19	$20.90	$22.80
From Mexico, after NAFTA	$20	$20	$20
From Asia, after NAFTA	$19	$20.90	$22.80
From the United States	$22	$22	$22

The market access analysis tool included in the WITS package allows the researcher to investigate the impact of unilateral/preferential/multilateral trade reforms at home or abroad on various variables including: Trade flows (import, exports, trade creation and trade diversion), world prices, tariff revenue and economic welfare. The total trade effects are worked out by adding up the price effects (terms of trade effect) and quantity effects of trade by adding the trade creation and trade diversion effects. In addition the total welfare effect, consumer surplus effect and revenue effects of tariff reduction are also worked out. James and Olareagga (2005) explains the SMART methodology in the following mathematical notations:

Trade Creation

Domestic prices are given by:

$$p^{d}_{g,c} = p^{w}_{g,c}(1+t_{g,c}) \qquad \ldots \ (1)$$

Where $p^{w}_{g,c}$ is the world Price of good g imported from c, $t_{g,c}$ is the tariff imposed on imports of good g imported from c, and is defined as:

$$t_{g,c} = t^{MFN}_{g}(1-\theta_{g,c}) \qquad \ldots \quad (2)$$

Where t^{MFN}_{g} is the Most Favored Nation (MFN) tariff imposed on good g, and $\theta_{g,c}$ is the tariff preference ratio on good g when imported from country c.

From equation 2,

$$\theta_{g,c} = \frac{1-t_{g,c}}{t^{MFN}_{g}}$$

ation

tion is defined as the direct increase in imports following a reduction o
n good g from country c.

his, SMART uses the definition of Price elasticity of import demand as:

$$\varepsilon_{g,c} = \frac{dm_{g,c} / m_{g,c}}{dp^{d}_{g,c} / p^{d}_{g,c}} < 0 \qquad \ldots \quad (3)$$

for $dm_{g,c}$ we obtain the trade creation evaluated at world prices and associa

tion on good g when imported from country c.

$$TC_{g,c} = p^{w}_{g,c} dm_{g,c} = p^{w}_{g,c} \varepsilon_{g,c} m_{g,c} \frac{dt_{g,c}}{(1+t_{g,c})} = \varepsilon_{g,c} m_{g,c} \frac{dt_{g,c}}{(1+t_{g,c})} \qquad \ldots \quad (4)$$

defines the extent of trade creation on imports of good g from country c.

uality we simply choose units of all goods so that the world prices are e

en interpret $m_{g,c}$ as import value of good g from country c measured at w

alisation of units is undertaken from now on in order to simplify the exp

presents both imported quantities and value of good g from country c.

es are kept exogenous (i.e., export supply functions are perfectly e

on has no implications for the whole derivation. To obtain the overall le

ross goods or countries one simply needs to sum the equation (4) along

s:

$TC_{g,c}$

$C_{g,c}$ ... (5)

ariff reduction on good g from country c is a preferential tariff r
y to other countries, then imports of good from country c are f
o the substitution away from imports of g from other countrie
e expensive. This is the definition of trade diversión in the SMART
er to measure trade diversión, let us use the definition of th
$_{g,c\neq c}$ across imports of good g from country c and all other countrie

$$\sigma_{g,c\neq c} = \frac{d\left(\frac{m_{g,c}}{m_{g,\neq c}}\right)\Big/\frac{m_{g,c}}{m_{g,\neq c}}}{d\left(\frac{p^d_{g,c}}{p^d_{g,\neq c}}\right)\Big/\frac{p^d_{g,c}}{p^d_{g,\neq c}}} < 0 \qquad \ldots(6)$$

$$\left(\frac{p^d_{g,c}}{p^d_{g,\neq c}}\right)\Big/\frac{p^d_{g,c}}{p^d_{g,\neq c}} = \frac{\frac{p^w_{g,c}dt_{g,c}}{p^w_{g,\neq c}(1+t_{g,\neq c})}}{\frac{p^w_{g,c}(1+t_{g,c})}{p^w_{g,\neq c}(1+t_{g,\neq c})}} = \frac{p^w_{g,c}dt_{g,c}}{p^w_{g,c}(1+t_{g,c})} = \frac{dt_{g,c}}{(1+t_{g,c})} \qquad \ldots($$

by definition of trade diversion

$dm_{g,c} = -dm_{g,\neq c}$, we have:

$$d\left(\frac{m_{g,c}}{m_{g,\neq c}}\right) = \frac{dm_{g,c}}{m_{g,\neq c}} - \frac{m_{g,c}dm_{g,\neq c}}{m^2_{g,\neq c}} = \frac{dm_{g,c}(m_{g,c}+m_{g,\neq c})}{m^2_{g,\neq c}} \qquad \ldots(8)$$

) and (7) into (6) and solving for $dm_{g,c}$ yields the expression for tra

$$= \frac{m_{g,\neq c}m_{g,c}}{m_{g,\neq c}+m_{g,c}}\frac{dt_{g,c}}{1+t_{g,c}}\sigma_{g,c,\neq c} \qquad \ldots(9)$$

Empirical Findings

- ✓ In case of full trade liberalization by India with other RCEP members, South Africa will lose maximum among other BRICS countries in terms of trade diversion effect. However, China will gain maximum because of significant trade creation in a post-simulation environment. Further, in case of India, the loss in terms of tariff revenue is greater than welfare effect.

- ✓ On the other hand, the case of trade liberalization by India on combined specialized products of other RCEP countries show mostly the same trend with less amount of trade and welfare effects. By looking at the total figures of trade and welfare effects, the difference seems to be very meager on the basis of which one may recommend the adoption of this type of policy in future rather than adopting full trade liberalization in all products in one go. Losses to non-member BRICS countries have also reduced in case of specialized scenario.

- ✓ Further, the full trade liberalization with other BRICS countries will provide maximum losses to Republic of Korea and Japan in terms of trade diversion and maximum benefits to China again followed by South Africa and Russia among the member countries in a post-simulation environment. In this scenario, the loss in tariff revenue is again greater than the welfare gain occur due to the decrease in prices.

- ✓ On the other hand, the trade liberalization by India on combined specialized products of other BRICS members also show the similar trend but low value of overall trade and welfare effect.

- ✓ Overall, the comparative figures of SMART simulation results depicts that in terms of welfare effect, India would gain more in aligning with other RCEP countries than with other BRICS countries under the policy of free trade area in goods trade only.

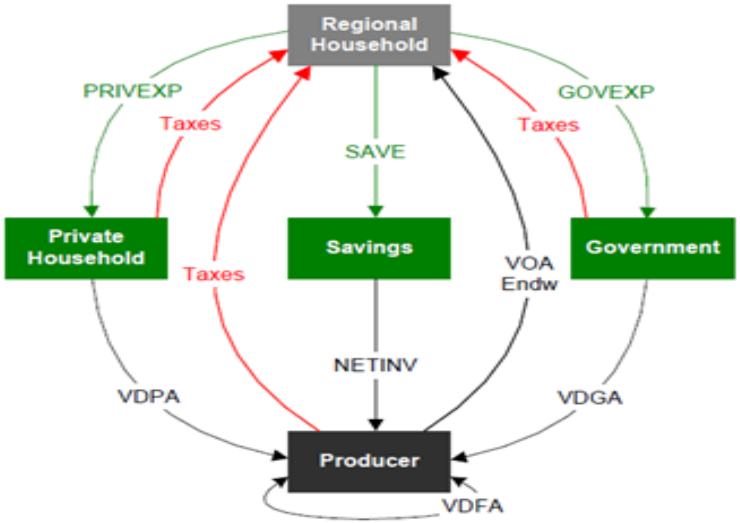
Assessment of Proposed Trade Blocs using GTAP Model

- It is a Multi-region, Multi-sector CGE model;
- Bilateral trade is handled via the Armington Assumption;
- Assumes perfect competition with CRS;
- Demand = Supply in all the markets (Price = Marginal Cost);
- Explicit Treatment of Trade and Transport margins;
- Taxes: wedge between Producer and Consumer Prices;
- Welfare change is due to changes in tax policies;
- Single currency Unit i.e. USD;
- Wide range of Closure Options;
- Global Economy consists of Many regions with same structure;
- Regions are linked through Trade and Investment flows.
- See Brockmeier, 1996, 2001; Hertel, 1997 for details on GTAP model.

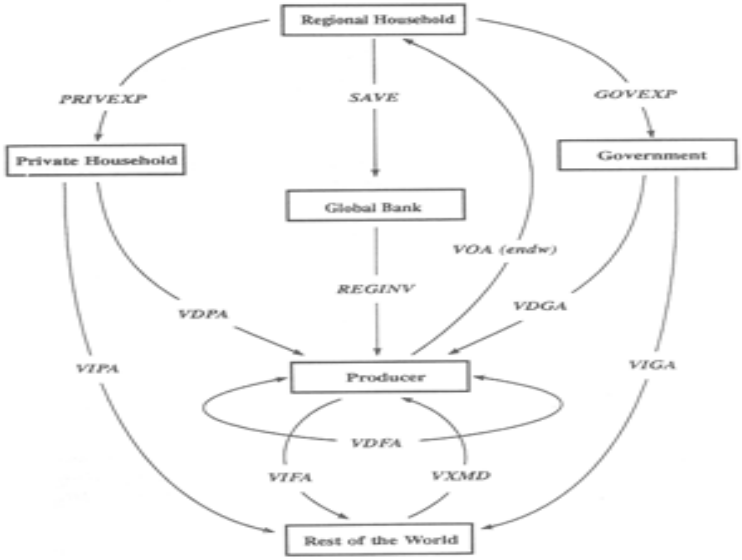
GTAP Analysis: A General Equilibrium Framework

- It is a multi-region, multi-sector CGE model.
- Bilateral trade is handled via the Armington Assumption.
- Demand = Supply in all the markets (Price = Marginal Cost)
- Taxes: wedge between Producer and Consumer Prices.
- Firm Production Inputs: Intermediate & factors.
- Intermediate Demand: Imported /Domestic.
- Factors: Labor, Capital, Land.
- Regional Household: Y = C+I+G+(X-M).
- Private Household Consumption : CDE demand system by Hanoch (1975).
- Global Savings & Investment.

Accounting Relationship in GTAP Model



Source: Badri, 2014



Source : Hertel, 2004

Summary:Global Trade Analysis Project (GTAP) model (Hertel, 1997)

GTAP Model:

•Multi-sectoral, multi-country applied general equilibrium model

•Analyse unobservable equilibrium after policy shocks which are compared with level equilibrium observations

•Single representative regional household maximises utility over private , government consumptions and savings

•Based on interrelations between regional production, consumption and trade. All regional households interlinked through trade and global bank.

Basic assumptions:

•Armington assumption→ distinguish imports by their origin and explains intra-industry trade of similar products

•Factor and product markets characterised by perfect competition.

•Production functions: Constant Elasticity of Substitution , subject to constant returns to scale

Effect of policy change reflected (through new set of world and domestic prices) on:

•National accounts aggregates (consumption, investment, government expenditure, trade):prices and outputs of industrial products, factor inputs and their prices and trade flows.

•Production: reallocation of factors of production (land, labour and capital) among sectors→ changes in production efficiency.

GTAP Analysis: Macroeconomic Effects

Change in value of GDP(in terms of percentage change)

As the study has assumed fixed endowments in pre and post simulation environment therefore, the change in value index of GDP represents only the shift in the economy's production possibilities frontier owing to the improved allocation of a fixed resource base.

Terms of Trade Effect

Terms of trade of a region is defined as the ratio of price index received for tradable produced in region *r* (*PSW*) to the price index paid for tradable used in the same region (*PDW*).

Welfare Effect

Measured by Equivalent Variation which is the difference between the expenditure required to obtain the new level of utility at initial prices and the initial expenditure. EV is further decomposed into allocative efficiency effect, terms of trade effect and investment savings impact

Trade Balance

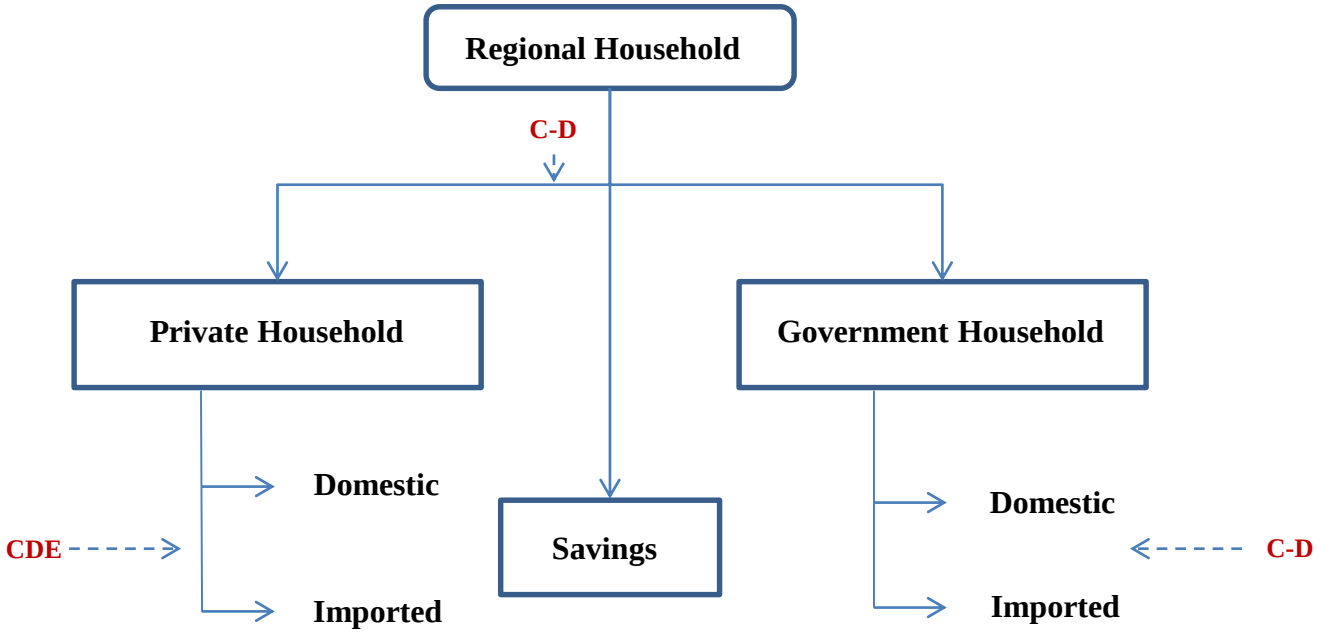
Measures changes in country's exports minus imports giving net trade with foreigners(changes).

Changes in Sectoral Output

Measures the effect on changes in sectoral output in all the regions.

Behavior Equations in GTAP Model

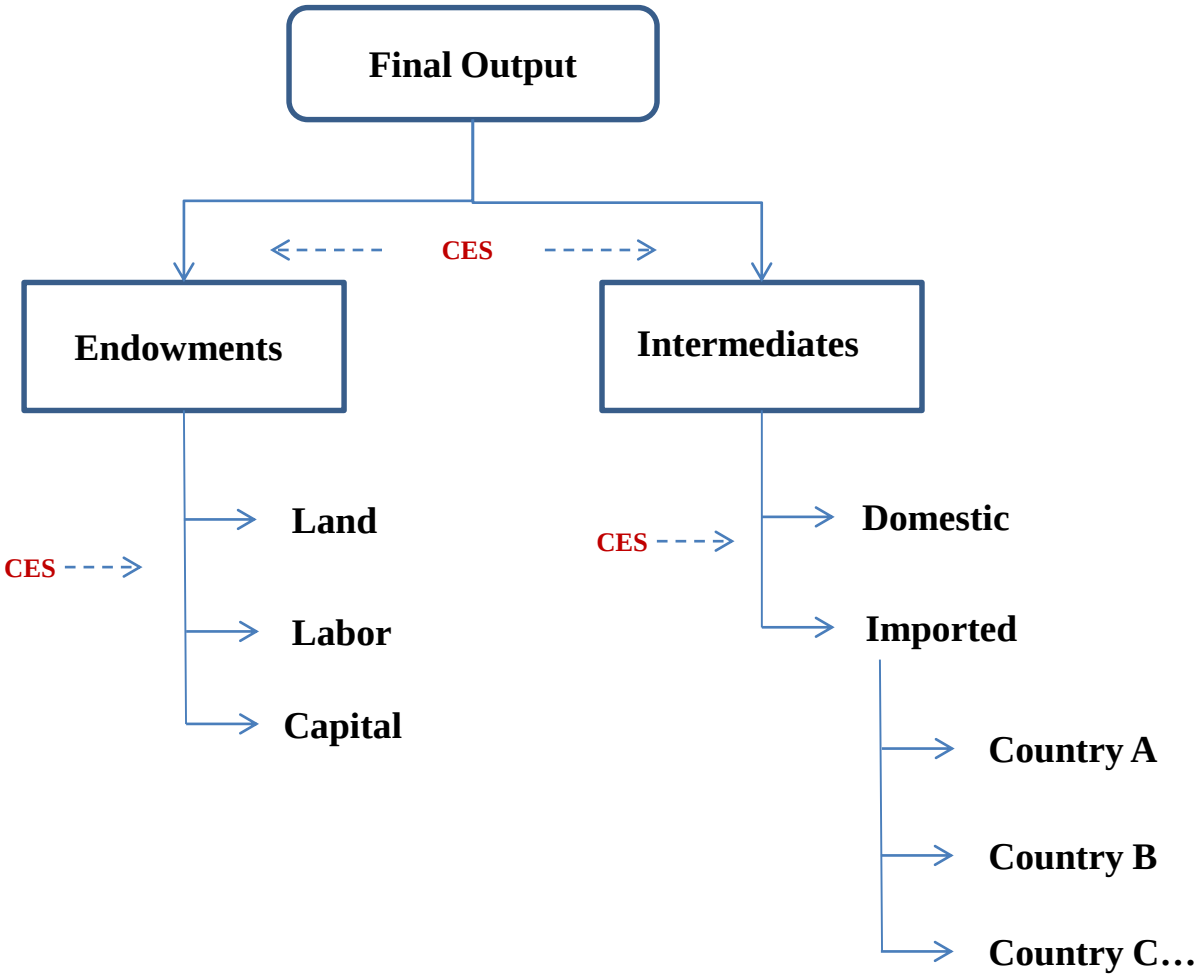
Regional Household Behavior



- ✓ Regional household is govern by an aggregate utility function that allocates the expenditure across private, government, and real savings activities.
- ✓ Government consumption expenditure system is governed by CD utility function.
- ✓ Private consumption expenditure system is modeled by Constant Difference Elasticity (CDE) implicit expenditure system.
- ✓ Savings is a single commodity and exhausted by the investment demand.

Behavior Equations in GTAP Model

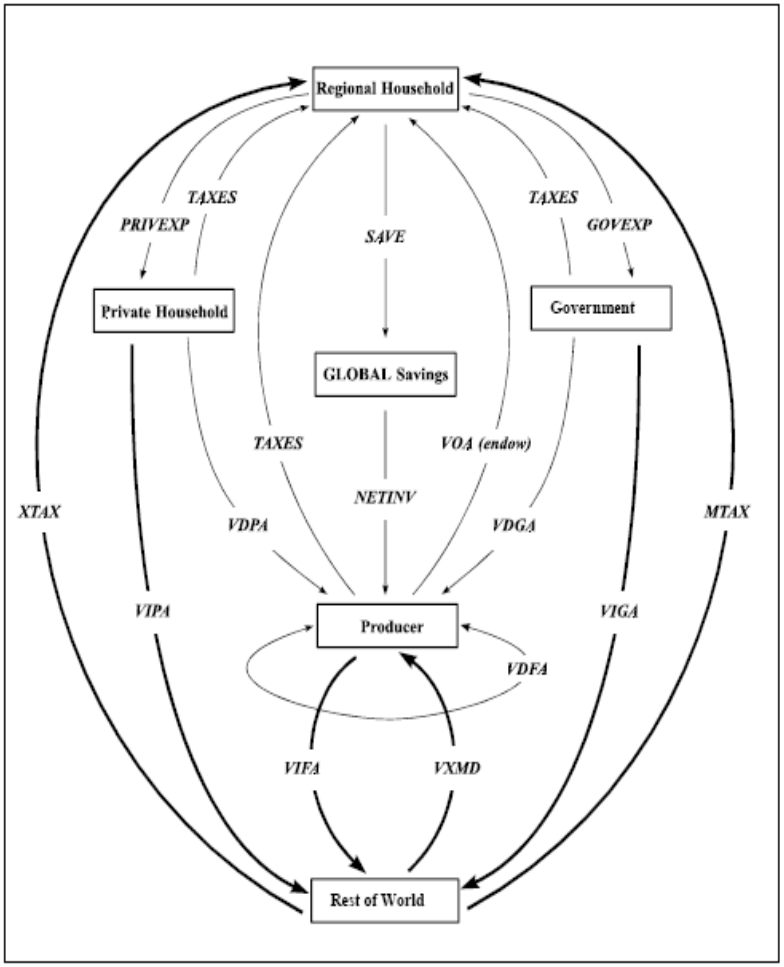
Production Behavior



✓ Producer's behavior is specified by the nested CES function.

Accounting Relationships in GTAP Model

Accounting relationships are defined in such a way that the whole economy remains in balance. These relationships remain same for each region with common producer and consumer behavior.



Source: Fig. 6 in Brockmeier (2001)

GTAP model includes:

- Regional household sector;
- Producer sector;
- Global transportation sector; and
- Global bank.

The policy interventions in the economy can be done by altering:

- Taxes; and
- Subsidies

Implications for Tariff Reform in GTAP Model

- Two Regions : Importer (*s*) and Exporter (*r*); One Composite Good (*i*);
- Reduction in Import Tax by *s*, leads to :
  - Decrease in price of imported good in region *s* which leads to change in TOT.
  - Demand for imports in region *s* from region *r* rises;
  - Encourages agents' in the importing country to alter their sourcing of imports in favor of region *r* due to lower tariffs.
- From exporter side (region *r*), price of exportable rises due to increase in demand, leads to increase in *p(fob)* with border tax remains same.

Methodology

- GTAP model of global trade will used in this paper for general equilibrium assessment.
- It is a multi-region static computable general equilibrium model which includes the treatment of private household behavior using non-homothetic Constant Difference of Elasticities (CDE) functional form, international trade and transport activity and global
- savings/investment relationships.
- In this model, bilateral trade is handled via Armington assumption which states that goods are differentiated by country of origin.

Methodology

- Two countries: r and s. Country s imports commodity i from country r going to country s
- If s reduces tariffs on imports i coming from r then domestic market prices (PMS) of i will decline as shown in the following equation:

pms(i ; r ; s) = tm(i ; s) + tms(i ; r ; s) + pcif (i ; r ; s)

- pms(i ; r ; s) is domestic market prices (PMS) of country r exports.
- tm(i ; s) represents the percentage change in import tax in importing country which is not specic to the partner country.
- tms(i ; r ; s) is the source specific percentage change in the import tax i.e. on imports coming from country r.
- pcif (i ; r ; s) is the world price of tradable commodity i from r to s. It is faced by importer while receiving the goods at his port. It includes insurance cost and freight charges from exporters port to importers port and has to bear by the importer.

Methodology

- This price reduction has two effects. Firstly, it lowers the price of composite imports (PIM) of country s which is shown in the following equation:
- pim(i ; s) =summation MSHRS(i ; r ; s)* pms(i ; r ; s)
- pms (i, r, s) is price of composite imports of country s
- MSHRS (i, r, s) is the market share of source r in the aggregate imports of tradable commodity i in importing country s at market prices.

Methodology

- The second effect is decline in prices of imports from r encourages agents in s to alter their sourcing of commodity i in favor of country r. This alteration depends on elasticity of substitution among imports sigma (M) of that product over different exporters. Following equation shows the percentage change in quantity of exports of tradable commodity i from r to s (qxs(i,r,s)) due to percentage change in quantity of imports of product i in country s (qim(i,s)).

qxs(i ; r ; s) = qim(i ; s)-sigma M(i)* [pms(i ; r ; s) -pim(i ; s)]

Increase the market prices of that commodity (PM)in the exporting country r.

- The following equation shows how the world price (PFOB) will change in response to change in the increase in market price of the commodity.

pfob(i ; r ; s) = pm(i ; r)- tx(i ; r) -txs(i ; r ; s)

Here tx and txs are export taxes.

GTAP Methodology

- The following equation shows how with the addition of transport margin the world price of tradable commodity i from r to s (PCIF).
- pcif (i ; r ; s) = FOBSHR(i ; r ; s) * pfob(i ; r ; s) + TRNSHR(i ; r ; s)* pt

Here PT is price of international transport services, FOBSHR is share of fob price in cif price for tradable commodity i exported from r to s and TRNSHR is the share of transport price in the cif price for tradable commodity i exported from r to s.

Methodology

- This also has effect on second level of production in which demand for intermediate products and factor inputs changes.
- Decline in domestic production of commodity i decreases the demand for the intermediate products in that sector and it also releases factor inputs which may be better utilized in other sectors.
- The following equation shows relationship between demand for intermediate good i (QF) and quantity produced in sector j (QO) in percentage form.
- qf (i ; j ; s) + af (i ; j ; s) = qo(j ; s) - ao(j ; s)
- Here af is the percentage change in composite intermediate input I augmenting technical change in sector j of region s; ao is the output augmenting technical change in sector j of region s.

Methodology

- The tariff reduction also impacts third level of production in which the demand for composite intermediate good i used in sector j by country s changes from imports (qfm) and domestic production (qfd).
- qfm(i ; j ; s) = qf (i ; j ; s)-sigmaD(i) * [pfm(i ; j ; s) -pf (i ; j ; s)]
- qfd(i ; j ; s) = qf (i ; j ; s) -sigma D(i) * [pfd(i ; j ; s)- pf (i ; j ; s)]

Here sigmaD is the substitution parameter between domestic and composite imported commodities in the Armington production structure of sector i in all the regions.

Welfare Effect

- Welfare effect: Suppose there are two policy options, the existing one with prices p0 and income m0 and a policy shock after which the price becomes p1 and income becomes m1 then the equivalent variation can be expressed as:
- EV = mu(p0; p1;m1)-mu (p0; p0;m0) = mu(p0; p1;m1)- m0
- Here mu(p0; p;m) is money metric indirect utility function. It measures how much income the consumer would need at prices p0 to be as well he would be facing price p1 and having income m

Methodology

- EV associated with a perturbation to the GTAP model as follows: EV = YEV - Ybar
- Here YEV is the expenditure required to obtain the new level of utility at initial prices, that is equal to (p0; p1;m1) whereas Ybar is the initial expenditure.
- Differentiating the above equation we get:
- dEV = 0:01YEV yEV Here yEV is the percentage change in YEV required to achieve the current actual utility level, in which the prices are fixed.

Empirical Findings: Welfare Effect

- ✓ In GTAP model, measurement of economic welfare depends upon household's own consumption expenditure, government consumption expenditure (government spending on public goods and services) and net national savings which will benefit his future consumption. Any distortion in the model has an effect on these variables and thus, affects economic welfare of a region. The estimation of GTAP model provides the regional equivalent variation (*EV*) measure in monetary terms which represent the welfare effect in this model (Huff and Hertel, 2000).

- ✓ The results reveal that it would be beneficial for India to align with other RCEP member countries under the policy of free trade area in goods trade. The welfare effect becomes negative in case India joins BRICS FTA assuming free trade on all goods. But, with reciprocal specialized goods trade, India's welfare effect becomes positive which depicts that if India wants to join BRICS FTA in the near future then it must negotiate for the entry of its own specialized products into the markets of member countries. In reciprocity, it should allow the entry of their specialized products in to the domestic market.

Empirical Findings: Quantity Index (GDP)

- ✓ In GTAP model, the percentage change in quantity index can be easily calculated by subtracting percentage change in price index of GDP (*pgdp*) from percentage change in value index of GDP (*vgdp*). The increment in quantity index of GDP represents the shift in the economy's production possibility frontier. With the assumption of fixed endowments, the shifting will be due to the improved allocation of resource base. The results show that India will gain in terms of positive change in GDP quantity index. Again the results corresponding to India depict the same conclusion that aligning with RCEP improves more GDP than aligning with BRICS under the policy of trade liberalization in goods trade only.

Empirical Findings: Sectoral Analysis

- ✓ Sectoral results are shown with the help of figures on changes in output, imports, exports and trade balance of India under each simulation over 15 aggregated GTAP sectors used for the study purpose.

- ✓ The results depict that the percentage change in sectoral output is higher in case of trade liberalization in specialized products than trade liberalization in all products.

- ✓ The simulation results also present an interesting result that on an aggregate, the percentage change in output of India is greater in case if India would be a part of BRICS FTA (either full or partially with specialized products).

- ✓ The results also reveal that in total, changes in India's imports will be greater than changes in its exports which further push our trade balance towards trade deficit.

- ✓ The joining of RCEP will also beneficial for Indian services sector which may expand by exporting more to the member countries and positively contribute to the trade balance.

Conclusions

- ✓ The comparative figures of SMART simulation results depicts that in terms of welfare effect, India would gain more in aligning with other RCEP countries than with other BRICS countries under the policy of free trade area in goods trade only.

- ✓ The general equilibrium analysis also reveals the same result.

- ✓ However, if India wants to join BRICS FTA in the near future then it must negotiate for the entry of its own specialized products into their markets and in reciprocity, it should allow the entry of their specialized products in to the domestic market.

- ✓ The results are in favor to make free trade area between RCEP countries which is more beneficial for India relative to make BRICS FTA.

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Thank You

Comments and Suggestions