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Economic impact of trade reforms between India and Latin American countries

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Introduction

Indian economy is now much more linked to the global economy than it was fifteen years ago. In this globalised world individual countries are more influenced by changes in world trade patterns and prices, changes in global capital market conditions and associated investor perceptions, changes in technology etc (GOI, 2008). The impact of globalisation on the Indian economy presents both opportunities and also poses challenges and risks.

Indian economy has achieved an exemplary growth in recent years. Foreign trade is playing a vital role. Imports of goods and services have increased as a percentage of GDP from about 10% in 1990-91 to 26% in 2006-07. There has been corresponding increase in the exports of goods and services, with the ratio as a percentage of GDP moving from 7.3% in 1990-91 to 22.8% in 2006-07(GOI, 2008). As far as trade is concerned, we need to exploit export opportunities opened by access to global markets by expanding our export of goods and services.

Exports in recent periods

The broad composition of exports in India is shown in Table 1.

Table 1 Composition of exports in India during 2002-3 to 2006-7

Commodity	2002-3		2003-4		2004-5		2005-6		2006-7		CAGR
	% share	% growth	% share	% growth	% share	% growth	% share	% growth	% share	% growth	
Agriculture and Allied Products	12.73	13.71	11.8	12.27	10.14	12.5	9.91	20.52	9.91	22.53	16.22
Ores and Minerals	3.78	58.12	3.71	18.67	6.08	114.4	5.98	21.36	5.57	14.11	40.99
Manufactured goods	76.33	20.62	75.95	20.5	72.7	25.24	70.38	19.48	65.51	14.05	19.92
Petroleum products	4.89	21.58	5.59	38.5	8.37	95.87	11.29	66.53	14.69	59.39	54.32
Others	2.27	1.15	2.95	57.37	2.71	20.28	2.44	11.15	4.29	115.4	35.6
Total	100	20.29	100	21.1	100	30.85	100	23.41	100	22.54	23.5

*Source: Directorate General of Commercial Intelligence and Statistics (**DGCI&S**), Kolkata, under the Ministry of Commerce, Government of India*

Total exports grew at about 24% per year but this was largely because petroleum products grew at 54.32%. Manufactured goods recorded an impressive compound annual growth rate of 19.92% and exports of agricultural & allied products also rose at a rate of 16.22%. The share of ores and minerals was stable around 6% during 2003-4 to 2006-7.The textiles & clothing sector grew at a rate of 12.14 % during 2002-3 to 2005-6.

The direction of India's exports is shown in Table 2. America and Europe continued to be important destinations of Indian exports although their combined share declined from 48.62 to 42.12 percent. There was a marginal decline also in the already low share of CIS countries. On the other hand, the share of Asia and ASEAN steadily increased during 2001-2 to 2006-7. Exports to Africa also registered a steady increase. Exports to Latin America are on the rise.

Table 2 Direction of India's Exports (percentage share)

Region	**2002-3**	**2003-4**	**2004-5**	**2005-6**	**2006-7**
Europe	24.17	24.54	23.55	24.16	22.89
Africa	4.65	4.82	5.05	5.27	6.63
North America	21.99	19.19	17.52	17.82	15.85
Latin America	2.46	1.78	2.58	2.90	3.38
Asia	44.39	47.60	49.50	48.38	49.78
CIS &Baltics	1.75	1.63	1.31	1.21	1.17
Unspecified region	0.59	0.44	0.49	0.24	0.27
Total	100	100	100	100	100

*Source: **DGCI&S***

Imports in recent years

Imports recorded a compound annual growth rate of 29.96% in dollar terms during the period 2002-3 to 2006-7. The high growth of imports was mainly on account of increase in oil prices. The broad composition of imports is shown in Table 3. Bulk imports continued to account for a significant share of the total imports during this period mainly

on account of crude oil. The crude oil and petroleum products taken together were the single most important category of imports. This group registered a compound annual

Table 3 Broad composition of imports during 2002-3 to 2006-7

Commodity	2002-3		2003-4		2004-5		2005-6		2006-7		CAGR
	% share	% growth	% share	% growth	% share	% growth	% share	% growth	% share	% growth	
Bulk imports	38.98	20.74	37.44	22.21	38	44.82	40.9	43.96	43.59	36.16	33.17
Petroleum crude and products	28.72	25.99	26.32	16.61	26.76	45.09	29.48	47.31	29.95	29.82	32.45
Other bulk items	10.26	8.13	11.12	37.9	11.24	44.19	11.42	35.98	13.64	52.51	34.85
Non bulk imports	61.01	18.64	62.56	30.48	62.01	41.43	59.1	27.51	56.42	21.94	27.76
Pearls, precious and semi precious stone	9.87	31.16	9.12	17.58	8.45	32.18	6.12	-3.06	3.93	-18.0	10.13
Machinery and project goods	11.26	26.3	12.41	40.24	12.16	39.76	14.96	64.58	18.08	54.42	44.46
Others	39.88	13.99	41.03	30.91	41.4	43.98	38.02	22.86	34.41	15.6	25.0
Of which											
Electronic goods	9.12	48.05	9.60	34.05	8.96	33.13	8.88	32.51	8.37	20.42	33.35
Gold and silver	6.98	-6.42	8.77	59.89	10	62.62	7.59	1.50	7.69	29.40	26.16
Total	100	19.45	100	27.25	100	42.70	100	33.76	100	27.75	29.9

Source: DGCI &S

growth rate of 32.45 per cent during 2002-3 to 2006-7. The share of ‘other bulk items’, which include important commodities like fertilizers, edible oils, nonferrous metals, metal ores & products and iron and steel increased over the period with a compound growth rate of 34.85 per cent. Iron & steel and metalliferrous ores & products are the two most important commodities of imports under the category of ‘other bulk items’. The share of machinery and project goods registered a perceptible increase from 11.3% of total imports in 2002-03 to 18.1% in 2006-07.

The direction of the major imports is shown in Table .4 The major change is that Asia and the ASEAN region recorded a significant increase during this period mainly on account of increase of import share of West Asia due to increase in oil prices. The combined share of imports from America and Europe was steady during the period. The share of imports from Latin America has gone up in 2006-7.

Table 4 Direction of India's Imports (percentage share)

Region	**2002-3**	**2003-4**	**2004-5**	**2005-6**	**2006-7**
Europe	24.98	24.04	22.98	21.18	23.64
Africa	4.71	3.50	3.02	2.71	5.97
North America	8.16	7.37	6.97	6.96	7.41
Latin America	1.70	1.53	1.84	1.79	3.18
Asia	30.12	35.36	36.18	34.58	57.51
CIS &Baltics	1.37	1.61	1.76	1.98	1.86
Unspecified region	28.96	25.59	27.25	29.82	0.43
Total	100	100	100	100	100

The world economy's momentum drove up the growth of merchandise trade in very recent years resulting in increased trade activity of developing countries.

The trade activity of Latin American countries is also encouraging. This is not only due to the dynamic growth of the world economy, but also due to the emergence of China, India and other developing Asian countries as new global players in the world economy, in particular, in trade and financial flows.

The Latin American and Caribbean countries are becoming increasingly important to a globalizing India in recent years. Several Latin American and Caribbean countries and officials of the Government of India are finding ways of augmenting trade and commerce between India and the LAC countries and have highlighted the fact that the trade relations between India and the region had increased positively over the past years and were encouraging.

With a combined GDP of three trillion USD, Latin America and the Caribbean is the next big destination for Indian Industry. Since the trade between India and these countries has grown the need of the hour is to use this complementary potential in a mutually beneficial manner.

Recently some initiatives have been taken to foster the trade relationship. The initiatives are summarised below (Focus: LAC 2008).

(i) Preferential Trade Agreement (PTA) with MERCOSUR

A Framework Agreement was signed between India and MERCOSUR on June 17, 2003 at Asuncion, Paraguay. The aim of this Framework Agreement is to create conditions and mechanisms for negotiations in the first stage, by granting reciprocal tariff preferences and in the second stage, to negotiate a free trade area between the two parties in conformity with the rules of the World Trade Organisation.

As a follow up to the Framework Agreement, a Preferential Trade Agreement (PTA) was signed in New Delhi on January 25, 2004. The aim of this Preferential Trade Agreement is to expand and strengthen the existing relations between MERCOSUR and India and promote the expansion of trade by granting reciprocal fixed tariff preferences with the ultimate objective of creating a free trade area between the parties.

The India-MERCOSUR PTA provides for five Annexes. These five Annexes have been signed between the two sides on March 19, 2005. The five Annexes are: Offer List of MERCOSUR, Offer List of India, Rules of Origin, Safeguard Measures and Dispute Settlement Procedure. Under this PTA, India and MERCOSUR have agreed to give tariff concessions, ranging from 10% to 100% to the other side on 450 and 452 tariff lines respectively.

The major product groups covered in the offer of MERCOSUR are food preparations, organic chemicals, pharmaceuticals, essential oils, plastics & articles thereof, rubber and rubber products, tools and implements, machinery items, electrical machinery and equipments. The major products covered in India's offer list are meat and

meat products, inorganic chemicals, organic chemicals, dyes & pigments, raw hides and skins, leather articles, wool, cotton yarn, glass and glassware, articles of iron and steel, machinery items, electrical machinery and equipments, optical, photographic & cinematographic apparatus.

(ii) Preferential Trade Agreement (PTA) with Chile

A Framework Agreement to Promote Economic Cooperation between India and Chile was signed on January 20, 2005. The Framework Agreement envisaged a Preferential Trade Agreement (PTA) between the two countries as a first step. The Framework Agreement also provides for a Joint Study Group to go into the issues relating to a Free Trade Agreement between the two sides.

As a follow up to the Framework Agreement, a PTA was finalized after four rounds of negotiations between the two sides. The last round of negotiations was held in New Delhi in November 2005. The PTA has two Annexes relating to the list of products on which the two sides have agreed to give fixed tariff preferences to each other and three Annexes relating to the Rules of Origin, Preferential Safeguard Measures and Dispute Settlement Procedures.

While India has offered to provide fixed tariff preferences ranging from 10% to 50% on 178 tariff lines at the 8 digit level to Chile, the latter have offered us a similar range of tariff preferences on 296 tariff lines at the 8 digit level. The products covered in the mutual offers account for more than 90% of the value of total bilateral trade amounting to US$ 447.54 Million, which took place between the two countries during 2004-05.

The products on which India has offered tariff concessions relate to meat and fish products (84 tariff lines), rock salt (1 tariff line), iodine (1 tariff line), copper ore and concentrates (1 tariff line), chemicals (13 tariff lines), leather products (7 tariff lines), newsprint and paper (6 tariff lines), wood and plywood articles (42 tariff lines), some industrial products (12 tariff lines), shorn wool & noils of wool (3 tariff lines) and some others (7 tariff lines).

Chile's offer covers some agriculture products (7 tariff lines), chemicals and pharmaceuticals (53 tariff lines), dyes and resins (7 tariff lines), plastic, rubber and miscellaneous chemicals (14 tariff lines) leather products (12 tariff lines), textiles and clothing (106 tariff lines), footwear (10 tariff lines), some industrial products (82 tariff lines) and some other products (5 tariff lines). The Agreement has been signed on March 8, 2006.

(iii) **Institutional Mechanisms**

The following institutional arrangements already exist with countries of the Latin American region:

(a) Indo-Argentine Joint Commission

(b) Indo-Argentine Joint Trade Committee

(c) Indo-Mexican Joint Commission

(d) Indo-Brazilian Commercial Council

(e) Indo-Cuban Joint Commission

(f) Indo-Cuban Trade Revival Committee

(g) Indo-Suriname Joint Commission

(h) Indo-Guyana Joint Commission

India's trade with the Latin American countries during the last few years has been growing rapidly. India's trade with the region has increased from US$ 1072.45 million in 1996-97 to US$ 5365.44 million in 2005-06, registering an increase of over 400% in a decade. It is shown in Table 5.

Table 5 India's trade with Latin American countries (Values in US$ million)

Year	Export values	Import values	Total trade	Balance of trade
1996-1997	478.74	593.71	1072.45	-114.97
1997-1998	699.83	580.42	1280.25	119.41
1998-1999	611.31	730.69	1342.00	-119.38

1999-2000	652.46	936.74	1589.20	-284.28
2000-2001	978.42	707.71	1686.13	270.71
2001-2002	1455.71	989.73	2445.44	465.98
2002-2003	1636.36	1044.92	2681.28	591.44
2003-2004	1777.13	1194.13	2971.26	583.00
2004-2005	2160.71	2054.80	4021.51	105.91
2005-2006	2956.01	2409.43	5365.44	546.58

Source: DGCI&S, Kolkata

India's trade with Latin America in 2007 crossed 11 billion dollars, increasing from 9 billion dollars in 2006. India's exports were 5 billion dollars and imports 6 billion dollars. Brazil was the main destination of exports. It exceeded two billion dollars. The second top destination was Mexico with 1127 billion dollars (January -November). Colombia has over taken Argentina as the third largest market for India's exports in 2006 and in 2007. Chile was the top exporter to India with 2.2 billion dollars. It has overtaken Brazil in the last two years. Argentina exported one billion dollars, maintaining its second position. Chemicals and pharmaceuticals were the top exports of India followed by engineering products. Copper accounted for 90 percent of Chile's exports to India. Vegetable oils formed 80 percent of Argentine exports to India.

There are a number of articles on the Computable General Equilibrium (CGE) and Global Trade Analysis Project (GTAP) framework to address the impact of various trade liberalization mechanisms. Among them JETRO (2003), Park (2006); Lee and Park (2004); Igawa and Kim (2005); Chawin (2006); Scollay and Gilbert (2001); McKibbin, Lee and Cheong (2004); Urata and Kiyota (2003); Ando and Urata (2006); Thierfelder et al. (2007); Strutt and Rae (2007); Antimiani et al. (2008); Adjasi and Kinful (2008); Mukhopadhyay (2008a) and Lochindaratn (2008); deserved mention. Hardly any literature focused on Latin America and India's trade. Long back Ram (1971) raised the scope of India's trade with Latin America. Ramagosa (2008) assesses the potential macroeconomic effects of a future European Union and Central America association agreement (EU-CAAA). Currently many agricultural products from Central America enter duty free to the EU (except banana and sugar). He found that liberalizing the access of these two products will enhance gain to Central America. If trade facilitation mechanisms implemented and allowed more FDI inflows to Central America welfare

gains will improve for all scenarios but are conditional on the level of EU agricultural liberalization.

Recently Lederman et al. (2008) examine the extent to which the growth of China and India in world markets is affecting the patterns of trade specialization in Latin American (LA) economies. The empirical analyses explore the correlation between the RCAs of LA and the two Asian economies. Econometric estimates suggest that the specialization pattern of LA---with the exception of Mexico---has been moving in opposite direction to the trade specialization pattern of China and India. Labor-intensive sectors (both unskilled and skilled) probably have been negatively affected by the growing presence of China and India in world markets, while natural resource and scientific knowledge intensive sectors have probably benefited from China and India's growth since 1990.

The objective of the paper is to study the economic impact of trade reforms between India and Latin American countries using GTAP framework. The paper is organized as follows. Section 1 discusses method of analysis. Section 2 develops the model aggregation, scenario development and macro assumptions for recursive updating process. Section 3 discusses the results. And section 4 concludes the paper.

1. Method of Analysis

In order to undertake an economic assessment of the India and Latin American trade reforms, it is important that the macro economy of each country is represented and that the trade flows between countries are clearly identified. The most widely recognized method to undertake such an analysis is with a Computable General Equilibrium (CGE) model for global trade. The CGE modeling framework that has been chosen to undertake the analysis is produced by the Center for Global Trade Analysis at Purdue University, USA. The database and model is called the Global Trade Analysis Project (GTAP). This applied General equilibrium model is thoroughly documented in Hertel (1997) and in the GTAP database documentation (Dimaranan, 2006). It is a comparative static multi-regional CGE model.

The basic structure of the GTAP model includes: industrial sectors, households, governments, and global sectors across countries. Countries and regions in the world

economy are linked together through trade. Prices and quantities are simultaneously determined in both factor markets and commodity markets. The main factors of production are – skilled, unskilled labour, capital, natural resources and land. Each industrial sector requires labour and capital, while the agricultural sectors require all these factors. Labour and land cannot be traded while capital and intermediate inputs can be traded. It is assumed that the total amount of labour and capital available is fixed.

Producers operate under constant return to scale, where the technology is described by the Leontief and CES functions. Two broad categories of inputs are identified: intermediate inputs and primary factors of productions. In the model firms minimize costs of inputs given their level of output and fixed technology. First, producers use composite units of intermediate inputs and primary factors in fixed proportions following a Leontief production functions. At the second level of the production nest, intermediate input composites are obtained combining imported bundles and domestic goods of the same input output group. Combining labour (skilled and unskilled), capital, natural resources and land primary factor input composites are formed. A CES function is used in forming both types of composite. Finally, imported bundles are formed via CES aggregation of imported goods of the same group from each region. It is also assumed that domestically produced goods and imports are imperfectly substituted. This is modeled using the Armington structure.

Household behaviour in the model is determined from an aggregate utility function. The aggregate utility is modeled using a Cobb Douglus function with constant expenditure shares. This utility function includes private consumption, government consumption and savings. Current government expenditure goes into the regional household utility function as a proxy for government provision of public goods and services. Private household consumption is explained by a CDE (Constant Difference Elasticity) expenditure functions. Household purchase bundles of commodities. These bundles are a CES aggregation of domestic and imported bundles. Then the imported bundles are grouped by a CES aggregation of imports from different regions.

Domestic support and trade policy (tariff and non-tariff barriers) are modeled as ad valorem equivalents. These policies have a direct impact on the production and consumption sectors in the model.

There are two global sectors in the model: transportation and banking. The transportation sector takes into account the difference in the price of a commodity as a result of the transportation of the good between countries. The global banking sector brings into equilibrium the savings and investment in the model.

In equilibrium, all firms have zero real profit, all households are on their budget constraint, and global investment is equal to global savings. Changing the model's parameters allows one to estimate the impact from a countries/region original equilibrium position to a new equilibrium position.

Closure plays a very important role in GTAP modeling. Closure is the classification of the variables in the model as either endogenous or exogenous variables. Closure can be used to capture policy regimes and structural rigidities. The closure elements of GTAP are mainly population growth, capital accumulation including FDI, industrial capacity, technical change and policy variables (tax, subsidies). The macro economic closure of the simulation model assumes constant employment, perfect mobility of skilled and unskilled labour between sectors and none between regions. The number of endogenous variables has to equal the number of equations. This is a necessary but not a sufficient condition for equilibrium. It may be General Equilibrium or Partial Equilibrium depending on the choice of the exogenous variables. The standard GTAP closure is characterized by: all markets are in equilibrium, all firms earn zero profits and the regional household is on its budget constraint.

The GTAP frame work has strength because of theoretical regards, ability to represent the direct and indirect interactions among all sectors of economy and precise detailed quantitative results. "The strength of the multicountry CGE model is that it elegantly incorporates the features of neoclassical general equilibrium and real international trade models in an empirical framework" (Thierfelder et al., 2007). However the analysis reported in this paper are based on the comparative static version of the GTAP model. Thus it contrasts a scenario representing a hypothetical policy change to actual conditions

in a given base year. Both the base year and the policy scenario are represented as static 'snapshots'. There is no provision for gradual adjustment or change over time. The changes in the model induced by reciprocal tariff cuts represent a shift from one equilibrium to another. Here factors of production remain fully utilized. Consumers re-allocate their expenditure to take advantage of the change in relative prices of goods and services resulting from trade liberlisation. Such reallocation of resources leads to income gains. These income gains are referred to as 'static' gains.

While this technique has strengths that other models fail to offer, it also suffers from several weaknesses as mentioned above. For these reasons, the results from CGE analysis should be taken with caution and should not be relied on as the sole source of information [Siriwardana and Yang, 2007].

2. Model aggregation, Scenario development and macro variable assumptions

The GTAP model and database used to undertake the analysis is version 6. This version of the model includes 57 commodities (sectors) and 87 countries (regions). The 57 industrial sectors in the model provide a broad disaggregation of the industrial sectors in each country and region (Annex1). The 87 countries were aggregated into 5 regions and one individual country (Annex 2). This aggregation includes India, Latin America, and rest of Asia, Rest of OECD, the EU and rest of the world (ROW). All 6 regions by 57 industrial sectors are included in the model that will be used to address the study objective.

Scenario Development

Here three scenarios have been attempted: a) Business as Usual, b) moderate tariff reduction –scenario 1, c) high tariff reduction –scenario 2.

We are taking the 2000 model and using our macroeconomic shocks to generate a new economy for 2007, 2012, and 2020. In this analysis the tariff structure for all regions and countries remains as they are in 2000. This Business As Usual (BAU) remains the same throughout the analysis and is the base from which the other scenarios will be compared.

Moderate tariff reduction describes a situation where the timing of the tariffs reductions, is low for the period 2007-2012. This has been done for India and Latin America, while rest of the regions is not under agreement. The rate of reduction is 30% for the agricultural commodities and 40% for non agricultural commodities.

High tariff reduction expresses a situation where reductions occur at a high rate compared to moderate tariff reduction for the period 2012-2020. This has been also been done for India and Latin America, while rest of the regions is not under agreement. In this simulation, tariff barriers were reduced by 40% and 60% for agricultural and non-agricultural commodities, respectively.

Specific commodities have been identified for tariff reduction on the basis of recent proposed agreement with India and Latin American countries and also the trade intensiveness.

The above scenario description required a change in the development of the GTAP model to undertake the analysis. In this case, the up-dating of the model to 2020 would require three discrete steps (2000-2007, 2007-2012 and 2012-2020).

Modifications of the GTAP Model to 2020

In order to undertake the scenario analysis, it was decided that the static GTAP model with a base year of 2000 would be inappropriate. This was because the scenario development required the removal of tariff barriers over time. As a result, the GTAP model of base year had to be up-dated to the year 2020. There are two general approaches to up-dating the model; a recursive process and the use of dynamic GTAP. For the current study we have considered the recursive updating process. The recursive process uses projections of macroeconomic variables into the future to simulate what the various economies would look like in the future. These projections of the macroeconomic variables are taken from reliable sources to predict the future direction and strength of an economy.

Macroeconomic Variable Estimates and Underlying Assumptions

Five primary factors of production are used in the production system: land, natural resources, unskilled labour, skilled labour, and physical capital. The first step in the process was to develop a BAU projection to 2007 from the benchmark 2000 GTAP6 data base. This BAU scenario projection is developed to provide a picture of how the global economy and world trade might look with the current tariff barriers. It provides a baseline to compare the implementation of the trade agreements. The projection of the global economy to 2007 was made with assumptions concerning economic and factor growth rates. Exogenous projections of each region's GDP growth (World Bank, World Development Indicators, 2007) were estimated in addition to estimates of factor endowments such as population, skilled and unskilled labour and capital stock (Dimaranan, et al., 2007, UN2006, World Bank 2007, Mukhopadhyay & Thomassin 2008). The macro estimates are shown in Table 6. Total factor productivity was endogenously determined to accommodate the combination of these exogenous shocks. This approach allows one to predict the level and growth of GDP as well as trade flows, input use, welfare and the wide range of other variables. Instead of considering capital accumulation, we have added the extra change in **It** resulting from trade liberalisation shocks along with the baseline capital forecast for t+1. The resulting forecast provided a projection of the global economy in 2007 that was in equilibrium. This forecasted economy to 2007 provides the starting point for subsequent simulation exercise. Projections for the fundamental drivers of global economic change over the period 2012 and 2020 are also prepared in the same manner.

Table 6 Factor Inputs, GDP, and Population projection during 2000-2020(Cumulative percentage changes)

Population	Rest of OECD	Rest of ASIA	INDIA	LA&CARRIBEAN	EU	ROW
2000-07	114.17	207.08	238.16	160.36	88.20	151.07
2007-12	99.42	157.90	172.90	147.98	66.32	101.29
2012-20	155.43	253.95	259.03	231.98	103.95	168.13
Unskilled Labour						
2000-07	3.86	9.13	10.93	7.94	3.79	6.94
2007-12	5.84	5.87	7.67	9.77	3.74	4.53
2012-20	11.00	9.16	12.14	16.26	6.74	7.09
Skilled Labour						
2000-7	7.38	25.68	31.11	29.22	6.63	13.62

2007-12	6.50	19.39	21.73	24.74	4.04	9.63
2012-20	8.65	27.15	28.45	31.89	3.61	12.30
Capital						
2000-7	24.18	36.91	38.55	21.46	15.17	20.30
2007-12	18.79	28.37	31.14	17.95	13.25	18.53
2012-20	28.26	42.52	46.93	29.05	21.18	28.50
GDP						
2000-7	19.52	31.73	36.80	19.04	17.18	29.44
2007-12	16.05	24.81	28.07	18.62	13.59	17.35
2012-20	25.00	39.12	43.02	29.61	21.03	26.29

3. Discussion of Results

Table 7-12 report selected changes in India and Latin American countries and other four regions resulting from the bilateral tariff cut between India and LAC.

Growth of output

Table 7 records our baseline projection of the global economy from 2007-2012 and 2012-2020 along with the simulated result of the tariff reduction within India and Latin America. An interesting feature is observed. India has shown highest growth (62.41% and 76.23%) followed by Rest of Asia (23.78% and 38.06%). Latin America shows moderate growth rate (17.31% and 28.04%) during this period. On the other hand simulated results of tariff reduction reveal a different picture. A reduction of tariff on import lowers the import price. Domestic users immediately substitute away from competing imports. The cheaper imports results in a substitution of imports for domestic product. The price of imports falls thereby increasing the aggregate demand for imports. It lowers the price of intermediate goods which causes excess profits. This in turn induces output to expand. This expansion effect would impact the demand for primary factors of production resulting in changes in their prices and transmitting the shocks to other sectors in the economies under trade reforms.

Since in our experiment we are considering the bilateral tariff cut on agricultural and non agricultural commodities at different rates between India and LAC the impacts will be different and can be assessed and discussed. These effects are shown in column 4 and 5 in Table 7.

With import tariff reduction in two phases in 2007 and 2012, we do not find any significant changes in the output growth of the six regions. A marginal change is found

in output growth for India and Latin America. Other regions in the world are at the same range of BAU growth due to the bilateral trade cut between India and Latin America.

Table 7 Growth of the output of the different regions

			India and Latin America tariff reduction scenario	
Growth of output	BAU2007-12	BAU2012-20	2007-12	2012-20
RESTOFASIA	23.78	38.06	23.80	37.85
Rest of OECD	7.65	2.44	7.68	2.36
INDIA	62.41	76.23	61.29	76.85
EU	6.03	-0.87	6.07	-0.82
ROW	16.01	23.58	16.08	23.64
LACARIBBEA	17.06	27.86	17.11	28.04
Total	11.08	10.93	11.09	10.90

The outcome is generally expected from the trade creation and trade diversion effects of trade reforms. The magnitude of impacts on the countries and regions differ, depending first on their size and comparative advantage (resource endowments) and also on the other factors such as demand structure, distribution structure and so on.

Change in the growth of the sectoral output

The macroeconomic results, such as, the growth of output do not fully reveal the structural adjustments that may occur in the economy. Especially they do not disclose the impacts of proposed bilateral tariff cut on different production sectors in different regions. Policy makers are interested to know these details to identify how different sectors respond to these trade reduction measures. Some sectors may be adversely impacted while others not. Adversely affected sectors may require special attention from the government.

To provide more insight let us take a look at the changes in the growth of the sectoral output of India and Latin America.

Table 8 explains the percentage changes in output growth due to import tariff reduction in 2012 and 2020 for India and Latin America. Changes in output growth vary across the sectors in 2012 after tariff reduction and 2020 updated scenario. The sectoral output growth has increased for both the scenarios in India for sectors like wearing appearel,

leather products and machinery and equipment. For Latin America, the sectors do vary between the scenarios 2012 and 2020.

It is observed that the sectoral growth will increase for energy commodities and industry in 2020 but industry and agriculture mix is found in 2012 among top seven sectors for LAC.

Table 8 Changes in output for top seven selected sectors for India and Latin America in different trade scenarios (%)

	2012 after tariff reduction				2020 updated - 2020 BAU			
	INDIA		LACARIBBEAN		INDIA		LACARIBBEAN	
1	Meat products nec	19.46	Processed rice	0.041	Fishing	6.260	Vegetable oils and fats	0.416
2	Wearing apparel	1.90	Ferrous metals	0.036	paddy rice	5.982	Wearing apparel	0.057
3	Machinery and equipment nec	0.546	Plant-based fibers	0.034	Wearing apparel	2.715	Wool, silk-worm cocoons	0.035
4	Textiles	0.265	Manufactures nec	0.033	Leather products	2.022	Petroleum, coal products	0.029
5	Chemical, rubber, plastic products	0.226	Leather products	0.030	Gas manufacture, distribution	1.891	Gas	0.025
6	Electronic equipment	0.219	Minerals nec	0.019	Bovine meat products	1.731	Chemical, rubber, plastic products	0.019
7	Leather products	0.177	Wheat	0.017	Machinery and equipment nec	1.199	Oil	0.010

Export growth

If we analyse the performance of total export for India and Latin America as a result of tariff reduction we observed that India's export growth is ahead of Latin American countries in both the periods (under BAU scenario) as reflected in Table 9. Wide variations in the growth of the total export of the six regions are observed under BAU scenarios. Comparison of growth rate under trade reform scenarios shows a decline for India and a positive growth for LAC as observed in table 10 under two scenarios 2012 and 2020 updated. An analysis of the sectoral export growth of India and Latin America (Annex 3) shows that the tariff reduction between India and LAC will impact favourably

the non agricultural in general and manufacturing in particular sectors but not the agricultural sector of both the economies.

A look at the trade diversion resulting from the tariff cut between India and LAC reveals interesting feature (Table 10). It shows that exports of Latin America and India are diverted from other regions and increase within themselves. The results show that the volume of exports of India to the EU falls by 2097 million USD (-4.47%) and rises by 1174 million USD to LAC (25%) in 2012 scenario with tariff. On the other hand India's export with ROW and rest of Asia will decline marginally. Overall, India's export will decline due to tariff reduction at 2012(-1.15%). The 2020 updated compared to 2020 BAU scenario records an increase of 13% of trade with LAC reflecting trade creation for India. This has been made possible by diverting its trade from other regions except ROW. However, total exports of India show a marginal decline (-0.16%).

Normally in bilateral tariff reduction scenario we have seen that both the economies will be benefited within themselves but the impact on other regions may be or may not be favourable (Mukhopadhyay and Thomassin, 2008). In case of India, due to tariff reduction the export to LAC has increased by diverting the export from other regions. The margin of loss is more than the gain from exporting to LAC.

LAC reveals a different picture. It will benefit in all scenarios. Here the gain is more than the loss in export. We observed that the export to India will increase markedly in 2020 updated scenario (23.5%). The most important to note, is its export to the EU which records an increase of 4127 million USD (4.15%). Thus in comparison with India, the tariff reduction scenarios will help LAC to flourish in the EU market also while for India it is not. India is rather diverting its export from the EU market to enter into LAC.

The EU market is promising for both India and LAC. Indian economy is diversified and production is spread over from agriculture to manufacturing and services and so on compared to the LAC. It has its huge domestic demand also. So the specialization in one particular commodity for export in this diversified economy is a question in the long run.

But for LAC, the commodity specialization occurs because of less diversification in the field of exports. So it will be easier for LAC to specialize in few products which are of high demand in the EU and also common export items in India's export basket.

To get better insight let us dig out the sectoral exports which will throw some light. Let us focus on the sectors which gain or lose while being exported to the EU from India and LAC. From Indian side sectors like paddy rice, crops nec, wool silk warm and cocoon, vegetable oils and fats and manufacturing nec are impacted negatively. On the other hand a little positive impact is also observed for wearing apparel, textile and leather products. From LAC side the major gains observed are from paddy rice, crops nec, oil seeds and vegetables, fruits and nuts. But the negative impact is marginally distributed across several sectors.

Table 9 Export Growth in BAU scenario for six regions

Growth of Export (BAU)	2007-2012	2012-2020
RESTOFASIA	24.82	40.77
Rest of OECD	12.55	8.81
INDIA	107.77	85.19
EU	6.61	-1.33
ROW	18.49	29.53
LACARIBBEA	17.97	31.22
Total	14.01	15.50

Table 10 Direction of total export in LA and India scenarios (million USD)

India	RESTOFASIA	Rest of OECD	EU	ROW	LAmerica& Caribbean	total
2007BAU	14863.24	23451.58	24171.6	14054.01	3038.99	79579.43
2007with tariff	14815.24	23363.9	24108.26	14008.66	3447.33	79743.4
2012BAU	25855.58	38010.55	64681.47	32155.27	4635.92	165338.8
2012with tariff	25855.34	38113.27	61783.93	31866.18	5810.12	163428.9
2020BAU	40758.33	64275.69	161149.9	34295.21	5718.98	306198.1
2020updated	39925.29	62330.47	156621.1	40336.23	6478.67	305691.7
2007tariff-BAU	-0.32294	-0.37388	-0.26204	-0.32268	13.4367	0.206046
2012tariff-BAU	-0.00093	0.270241	-4.47971	-0.89904	25.32831	-1.15514
2020updated-BAU	-2.04385	-3.02637	-2.8103	17.61476	13.28366	-0.16538
L America& Caribbean	RESTOFASIA	Rest of OECD	India	EU	ROW	total
2007BAU	27947.43	270076.9	7621.79	92581.81	20133.95	418361.88
2007with tariff	27947.13	270074.9	7767.85	92572.97	20133.17	418496.02
2012BAU	39484.16	324744.8	8810.78	93645.32	20389.17	487074.23
2012with tariff	39463.94	324625.8	9145.34	94150.28	20423.39	487808.75
2020BAU	63550.65	444511.3	1228.08	99324.04	24026.7	632640.77
2020updated	63090.55	442657	1762.25	103451.9	23755.42	634717.12

2007tariff-BAU	-0.00107	-0.00074	1.916348	-0.00955	-0.00387	0.017565
2012tariff-BAU	-0.05121	-0.03664	3.797167	0.539226	0.167834	0.106364
2020updated-BAU	-0.72399	-0.41715	43.49635	4.155953	-1.12908	0.316903

Welfare effect

Let us now analyse the welfare effect of bilateral tariff cut between India and LCA. In global CGE model each region's representative agent aims to maximize his/her welfare level. When trade policy is changed the agent will calculate a change in his/her income level. The change income level affects the scale of savings and consumption of each commodity so that the marginal utility of consumption is same across the commodities. In this case price variables are used in the decision making process for clearing markets in the model. While the welfare level of representative agents in trade agreement member countries (here India and LAC) would improve, the welfare level of agents in other regions (here four regions) would likely to decline. Since each region's welfare function is different the impact of trade reforms between India and LAC on welfare level of six regions would likely to be different. Table 11 summarizes the results of welfare effect across six regions. Gains or losses are not spread evenly. We observed that in case of tariff reduction the welfare of India and Latin America, responded significantly (million USD 1156 and 1204.9 respectively). Rest of OECD, EU, and rest of Asia will be loser after tariff cut in 2007 and 2012 compared to BAU counterpart. Although global welfare increases by 69million USD in 2007 but reduces marginally in 2012. The last column of table 11 shows significant responses from all the regions compared to BAU 2020. The losers are rest of OECD and the EU in all scenarios. But the maximum welfare is achieved by Latin America ($1204 million) followed by India ($1156 million).

Table 11 Change in Welfare in India-LA different scenarios (million USD)

WELFARE	2007 after tariff reduction	2012 after tariff reduction	2020 with tariff reduction – BAU2020
RESTOFASIA	-4.1	-26.7	287.3
Rest of OECD	-40.8	-57.9	-377.3
INDIA	89.9	82.7	1156
EU	-8	-60.2	-3108
ROW	-2.5	17.3	1183.8

LACARIBBEA	34.6	44	1204.9
Total	69	-0.8	346.7

Effects on factor returns

The trade reforms between India and LAC will have some impact on the factor returns. Trade reforms make trade easier and hence tend to raise the returns to at least some factors of production (Winters, 1996). A simple application of the Heckscher-Ohlin model might lead us to expect India and LAC returns to capital to fall since these two economies are capital-scarce. Since international trade tends to increase the returns to the abundant factor and reduce those to the scarce factor, increased trade might be expected to reduce the returns to capital in India and LAC. However, there are a number of reasons to believe that the basic Heckscher-Ohlin model is too simple for our purposes and one might expect India and LAC to raise the rates of returns on capital in both partners regardless of labour abundance.

First, the standard Heckscher-Ohlin model applies only to a so-called square model with equal numbers of factors of production and goods. The GTAP 6 database identifies five factors of production: land, unskilled labor, skilled labor, capital, and natural resources and 57 commodities. Second, the Heckscher-Ohlin model presumes homogeneous products, whereas experience suggests that many markets are better represented by differentiated products and intra-industry trade. The GTAP model makes Armington assumption with the goods being differentiated by country of origin. In addition, the substitutability of domestic and foreign goods also becomes very important. Third, bilateral tariff cut might affect the rate of return on capital through the price of intermediate capital goods. A reduction in tariffs and trading costs on imports of capital equipment will reduce the prices which industry has to pay for investment goods (Fukasse and Martin, 2000).

Table 12 Real returns to the factors of Production in 2012 and 2020 after tariff cut compared to BAU case

	2012		2020	
pfactreal	INDIA	LACARIBBEA	INDIA	LACARIBBEA
UnSkLab	0.0533	0.0054	-1.8606	-0.3109
SkLab	0.0626	0.0049	-1.1329	-0.2961
Capital	0.0995	0.0053	-1.3026	-0.3752

Table 12 shows the simulation results of the changes in returns to the factors of production in India and LAC. If we compare the different scenarios 2012 is showing favourable return for three factors of production. India is a labour abundant country, it is expected that returns to labour will be higher. But labour returns are lower than capital returns in India. While in case of Latin America the returns to unskilled labour are more than that to capital. So the comparative advantage theory is supporting the case of LAC not India in 2012. But in 2020 returns to factors fall for both the economies. It seems that high tariff reduction is not beneficial to achieve good returns to factors of production in the long run. In case of India the decline is more in case of unskilled labour compared to capital. While in case of Latin America we find it opposite.

4. Conclusion

Indian economy has achieved an exemplary growth in recent years. Foreign trade is playing an important role. Imports of goods and services have increased as a percentage of GDP from about 10% in 1990-91 to 26% in 2006-07. There has been corresponding increase in the exports of goods and services, with the ratio as a percentage of GDP moving from 7.3% in 1990-91 to 22.8% in 2006-07. As far as trade is concerned, we need to exploit export opportunities opened by access to global markets by expanding our export of goods and services. In this context the paper explores the impact of trade reforms between India and Latin American countries. The GTAP model and database used to undertake the analysis is version 6. The 87 countries were aggregated into 5 regions and one individual country and 57 industrial sectors are included in the model. Three scenarios have been attempted in the paper. Results show that India would achieve highest growth (62.41% and 76.23%) followed by Rest of Asia (23.78% and 38.06%). Latin America would increase by 17.06% and 27.86% under BAU scenario. On the other hand simulated results of tariff reduction reveal a different picture. With import tariff reduction a marginal change is noted in output and export growth for India and Latin America. Other regions in the world are at the same range of BAU growth due to the trade agreement between India and Latin America. Changes in output growth vary across the sectors in all these scenarios.

The export growth records a dismal picture for India after bilateral tariff cut. India shows a negative growth (-1.15% and -0.16%). On the other hand LAC would gain. The total exports would increase by 0.11% and 0.32 % after tariff cut. Both the economies would increase their bilateral trade by considerable amount.

More interesting feature observed from the result is the diversion of trade. While India's trade with the EU would fall, LAC would increase.

The paper also analyses welfare changes due to tariff reduction between India and Latin America. We found that the welfare of India and Latin America responded significantly, for other regions the picture is not rosy.

The impacts on factor returns resulted from the tariff reduction between India and LAC show variations on returns to labour (both skilled and unskilled) and capital and do not conform to the prediction by the trade theory

A vigorous strategy for promoting exports is an important part of our strategy for managing the balance of payment to achieve rapid growth of the Indian economy in the years ahead. We need to diversify the direction of trade. Here a very hopeful picture is not emerging from the findings of the paper. LAC would be benefited in terms of growth of output, exports and welfare, India would in terms of output and welfare and not in terms of exports though the trade between the two economies would expand. The findings of our analysis suggest the importance of this strategy. This is more important in the context of recent global economic crisis. The suitable strategy will be to expand the trade in a new direction keeping the existing market intact. However, the policy makers should keep in mind that expansion of trade in new direction might cause loss of existing market in the long run.

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Annex 1

Old sector at left, corresponding new sector on right

pdr	Paddy rice	& pdr
wht	Wheat	& wht
gro	Cereal grains nec	& gro
v_f	Vegetables, fruit, nuts	& v_f
osd	Oil seeds	& osd
c_b	Sugar cane, sugar beet	& c_b
pfb	Plant-based fibers	& pfb
ocr	Crops nec	& ocr
ctl	Cattle,sheep,goats,horses	& ctl
oap	Animal products nec	& oap
rmk	Raw milk	& rmk
wol	Wool, silk-worm cocoons	& wol
frs	Forestry	& frs
fsh	Fishing	& fsh
coa	Coal	& coa
oil	Oil	& oil
gas	Gas	& gas
omn	Minerals nec	& omn
cmt	Meat: cattle,sheep,goats,horse	& cmt
omt	Meat products nec	& omt
vol	Vegetable oils and fats	& vol
mil	Dairy products	& mil
pcr	Processed rice	& pcr
sgr	Sugar	& sgr
ofd	Food products nec	& ofd
b_t	Beverages and tobacco products	& b_t
tex	Textiles	& tex
wap	Wearing apparel	& wap
lea	Leather products	& lea
lum	Wood products	& lum
ppp	Paper products, publishing	& ppp
p_c	Petroleum, coal products	& p_c
crp	Chemical,rubber,plastic prods	& crp
nmm	Mineral products nec	& nmm
i_s	Ferrous metals	& i_s
nfm	Metals nec	& nfm
fmp	Metal products	& fmp
mvh	Motor vehicles and parts	& mvh
otn	Transport equipment nec	& otn
ele	Electronic equipment	& ele
ome	Machinery and equipment nec	& ome
omf	Manufactures nec	& omf
ely	Electricity	& ely
gdt	Gas manufacture, distribution	& gdt

wtr	Water	& wtr
cns	Construction	& cns
trd	Trade	& trd
otp	Transport nec	& otp
wtp	Sea transport	& wtp
atp	Air transport	& atp
cmn	Communication	& cmn
ofi	Financial services nec	& ofi
isr	Insurance	& isr
obs	Business services nec	& obs
ros	Recreation and other services	& ros
osg	PubAdmin/Defence/Health/Educat	& osg
dwe	Dwellings	& dwe

Annex -2

Old region at left, corresponding new region on right

aus	Australia	& restofOECD
nzl	New Zealand	& restofOECD
xoc	Rest of Oceania	& RESTOFASIA
chn	China	& RESTOFASIA
hkg	Hong Kong	& RESTOFASIA
jpn	Japan	& restofOECD
kor	Korea	& restofOECD
twn	Taiwan	& RESTOFASIA
xea	Rest of East Asia	& RESTOFASIA
idn	Indonesia	& RESTOFASIA
mys	Malaysia	& RESTOFASIA
phl	Philippines	& RESTOFASIA
sgp	Singapore	& RESTOFASIA
tha	Thailand	& RESTOFASIA
vnm	Vietnam	& RESTOFASIA
xse	Rest of Southeast Asia	& RESTOFASIA
bgd	Bangladesh	& RESTOFASIA
ind	India	& INDIA
lka	Sri Lanka	& RESTOFASIA
xsa	Rest of South Asia	& RESTOFASIA
can	Canada	& restofOECD
usa	United States	& restofOECD
mex	Mexico	& LACARIBBEA
xna	Rest of North America	& LACARIBBEA
col	Colombia	& LACARIBBEA
per	Peru	& LACARIBBEA
ven	Venezuela	& LACARIBBEA
xap	Rest of Andean Pact	& LACARIBBEA
arg	Argentina	& LACARIBBEA

bra	Brazil	& LACARIBBEA
chl	Chile	& LACARIBBEA
ury	Uruguay	& LACARIBBEA
xsm	Rest of South America	& LACARIBBEA
xca	Central America	& LACARIBBEA
xfa	Rest of FTAA	& LACARIBBEA
xcb	Rest of the Caribbean	& LACARIBBEA
aut	Austria	& EU
bel	Belgium	& EU
dnk	Denmark	& EU
fin	Finland	& EU
fra	France	& EU
deu	Germany	& EU
gbr	United Kingdom	& EU
grc	Greece	& EU
irl	Ireland	& EU
ita	Italy	& EU
lux	Luxembourg	& EU
nld	Netherlands	& EU
prt	Portugal	& EU
esp	Spain	& EU
swe	Sweden	& EU
che	Switzerland	& EU
xef	Rest of EFTA	& EU
xer	Rest of Europe	& EU
alb	Albania	& EU
bgr	Bulgaria	& EU
hrv	Croatia	& EU
cyp	Cyprus	& EU
cze	Czech Republic	& EU
hun	Hungary	& EU
mlt	Malta	& EU
pol	Poland	& EU
rom	Romania	& EU
svk	Slovakia	& EU
svn	Slovenia	& EU
est	Estonia	& EU
lva	Latvia	& EU
ltu	Lithuania	& EU
rus	Russian Federation	& ROW
xsu	Rest of Former Soviet Union	& ROW
tur	Turkey	& EU
xme	Rest of Middle East	& ROW
mar	Morocco	& ROW
tun	Tunisia	& ROW

xnf	Rest of North Africa	& ROW
bwa	Botswana	& ROW
zaf	South Africa	& ROW
xsc	Rest of South African CU	& ROW
mwi	Malawi	& ROW
moz	Mozambique	& ROW
tza	Tanzania	& ROW
zmb	Zambia	& ROW
zwe	Zimbabwe	& ROW
xsd	Rest of SADC	& ROW
mdg	Madagascar	& ROW
uga	Uganda	& ROW
xss	Rest of Sub-Saharan Africa	& ROW

Annex 3 Change in exports (million USD)

	INDIA		LA	
	2007TMS-12TMS	2012TMS-2020	2007TMS-12TMS	2012TMS-2020
1 pdr	-331.94	344.158	-669.616	-31.4807
2 wht	-704.79	212.4522	25.87256	151.6389
3 gro	-82.7357	481.0089	71.52521	140.0716
4 v_f	-185.27	-554.263	103.6757	215.6517
5 osd	-302.144	225.5825	88.76143	157.14
6 c_b	-631.102	117.6299	9.28382	153.6408
7 pfb	-159.859	279.4682	57.98862	-73.488
8 ocr	-633.59	142.1676	44.37184	130.9529
9 ctl	-500	-475	42.86531	94.274
10 oap	-145.1	156.8351	30.9613	57.11655
11 rmk	-618.823	782.6547	-173.543	-784.675
12 wol	-942.1	-48.1873	-48.1993	-474.972
13 frs	139.4152	123.1463	-9.50777	-28.8778
14 fsh	-22.3796	-84.9292	42.64603	8.073064
15 coa	32.86299	36.428	33.31505	49.17439
16 oil	118.5185	91.52542	21.89742	31.00242
17 gas	300	2487.5	7.913528	-17.0295
18 omn	24.97343	33.87257	15.08026	16.06428
19 cmt	109.6834	260.1299	-36.0369	-18.9004
20 omt	-258.89	112.8917	-53.9401	-137.844
21 vol	-517.367	-470.552	21.79864	-169.096
22 mil	-447.012	693.207	-12.5771	-55.3039
23 pcr	42.7052	290.3591	130.3016	191.483
24 sgr	-261.337	-0.52252	19.04703	-16.8629
25 ofd	-147.799	-100.07	28.29339	11.98128
26 b_t	22.24184	19.25943	26.24133	24.42256
27 tex	-108.625	-174.73	21.77114	4.652419
28 wap	-2.91309	-101.24	22.57582	25.82923

29 lea	11.82327	52.0864	47.50027	56.53978
30 lum	108.9642	70.99384	3.312489	-6.23656
31 ppp	53.96771	-38.1839	9.025236	3.880277
32 p_c	33.19373	28.53245	26.76491	34.56496
33 crp	10.38456	-106.47	11.31062	2.543692
34 nmm	70.44598	-2.70088	9.345937	8.822412
35 i_s	105.8605	57.01798	9.318891	6.40209
36 nfm	135.3063	78.60572	7.361904	7.024509
37 fmp	134.7547	66.73483	5.727041	-3.75739
38 mvh	101.607	53.14994	12.84685	11.92387
39 otn	128.7802	44.7671	11.09626	15.08889
40 ele	135.4808	41.94473	-4.45513	-34.6504
41 ome	151.4376	75.08652	6.749142	2.770446
42 omf	103.9468	62.1222	4.584231	5.454792
43 ely	91.85682	29.45429	6.205826	7.422014
44 gdt	-100	0	-13.5431	-8.47284
45 wtr	122.6519	80.14888	-2.45009	-15.7395
46 cns	24.68085	-56.9625	9.499095	10.96345
47 trd	50.39409	-15.3731	-2.95839	-19.6983
48 otp	26.23591	-42.3733	11.91991	10.16251
49 wtp	21.65577	-45.8071	17.46728	23.02389
50 atp	19.96322	-52.6758	17.66734	19.8832
51 cmn	109.9316	99.31436	5.687866	-1.27723
52 ofi	116.7407	127.1722	6.497154	-2.44207
53 isr	113.1699	113.9728	5.237968	-17.4157
54 obs	19.1204	-45.2464	1.208599	-8.00635
55 ros	25.66816	-40.006	8.737209	14.82193
56 osg	72.21701	52.14462	13.13563	3.982989
57 dwe	0	0	0	0
Total	104.9434	87.04883	18.07802	31.49842