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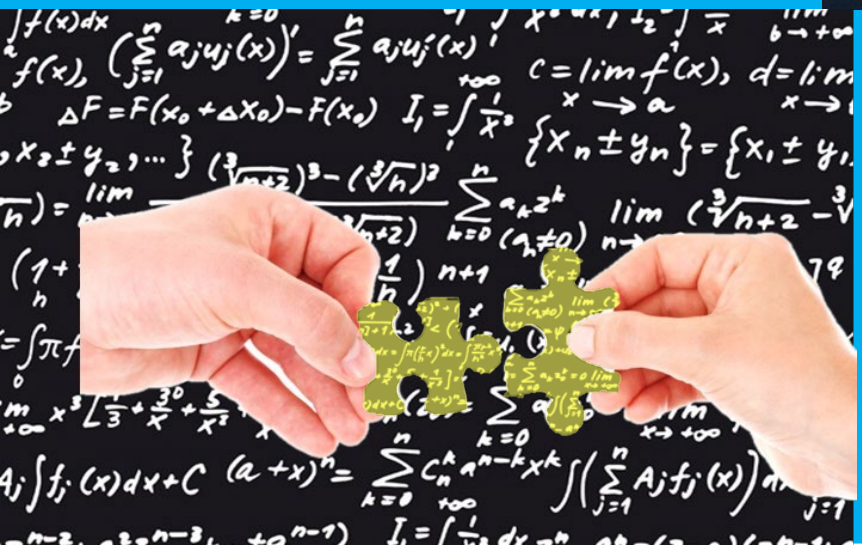
Ex-ante evaluation of India's trade alliance with Indo-Pacific region: A general equilibrium analysis



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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

WORKING PAPER

Ex-ante evaluation of India's trade alliance with Indo-Pacific region: a general equilibrium analysis

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Abstract

This study attempts to analyse the economy wide impact of Indo-Pacific alliance between India and rest of the 45 participating countries. We introduce four simulation scenarios in the general equilibrium model. First scenario is the one in which India bilaterally liberalizes trade in terms of tariffs liberalization alone and then removal of tariffs and reduction of non-tariff barriers together with all the countries of Indo-Pacific region. Second scenario is when India bilaterally liberalizes trade with all the Asian countries of the Indo-Pacific region. Third scenario is when India bilaterally liberalizes trade with all the countries of the Indo-Pacific region but excludes China from the region because of the current geo-political constructs. Fourth scenario is the one when free trade is considered among all the countries in the Indo-Pacific region. The paper uses the GTAP (Global Trade Analysis Project) model simulations for the analysis and the results reveal that for India the welfare gains in terms of equivalent variation and real GDP are maximum in the third simulation scenario. The article suggests a roadmap for maximum welfare gains for India keeping strategic and economic engagements with other member countries and sub-regions.

Keywords: GTAP 10, Welfare Effects, Tariff, Non-Tariff Barriers, VGDP, Sectoral Impacts, Equivalent Variation, Indo-Pacific Alliance

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Contents

Abstract 4

Introduction 6

1. Emerging Indo-Pacific: Stylized facts 7

2. Prevalence of tariff and non-tariff barriers 10

3. Methodology 14

4. Experimental design 16

5. Results and discussion 16

6. Concluding remarks 42

Introduction

The Indo-Pacific region has gained international significance in recent years because of its geopolitical identity with comparatively diverse countries in terms of comparative economic advantage. The emerging region is being contested and does not have any specific geographical construct so far. Presently, the region contains about 46 countries around the Indian Ocean and Pacific Ocean[4]. The geographically diverse countries ranging from the ASEAN region to South Asia, Latin America, North America, North East Asia Pacific, West Asia, Africa and European Union seem to have heterogeneity in terms of the level of economic development and also from the perspective of politics and security. The region has a vast land area of 74.59 million square kilometres with the population of 5.32 billion. The GDP of the region is US$ 64.04 trillion, with total trade in goods of US$ 27.13 trillion and an intra-regional trade of US$ 7.37 trillion. The region has huge potentials to enhance economic welfare of member countries (De and Kumarasamy, 2020). Overall, the region contributes to more than half of the world's GDP and population. Because of the heterogeneous nature of the region, there is the motivation for a bigger bloc in terms of economies of scale and scope. The region contains nations from Sub-Saharan Africa which are rich in natural resources and if India puts capital in African nations, returns to natural capital in India should increase. Further, if we look at the ASEAN countries, their interest lies in the economic alignment but there are diverse categories of issues such as climate change and maritime securities, etc., which motivate countries to form a larger economic block.

In this article, we propose to evaluate the potential welfare impact of India's alliance with Indo-Pacific countries using the Computable General Equilibrium (CGE) model. The present study analyses different trade liberalization scenarios such as bilateral trade liberalization including tariffs and non-tariff measures between India and rest of the Indo-Pacific countries. Next, we analyse the welfare effects when trade is liberalized only between India and the Asian nations of the Indo-Pacific region. Also, an extreme situation is considered when trade is liberalized among all Indo-Pacific nations. We have also analysed India's potential welfare effects where China is excluded from the region. The details about all four scenarios are

[4] The 46 Indo-Pacific nations include Brunei Darussalam, Cambodia, Lao PDR, Myanmar, Malaysia, Indonesia, Singapore, Thailand, Vietnam, Philippines, India, Sri Lanka, Pakistan, Bangladesh, Maldives, Colombia, Chile, Equator, Peru, Canada, Mexico, United States, China, Japan, South Korea, Russian Federation, Australia, New-Zealand, Papua New Guinea, Fiji, Iran, Islamic Rep., United Arab Emirates, Yemen Rep., Oman, Kenya, Somalia, Tanzania, Madagascar, Mozambique, South Africa, Mauritius, Comoros, Seychelles, France and Germany.

provided in experimental design section.

The remaining paper continues with some stylized facts about Indo-Pacific alliance and proceeds with the discussion on the prevalence of tariff and non-tariff barriers. Then the GTAP methodology and the unique properties of GTAP 10 are discussed. The experimental design is discussed thereafter, followed by the results. Conclusion and policy implications are drawn in the last section.

1. Emerging Indo-Pacific: stylized facts

There are several regional (and sub-regional) blocs in the Indo-Pacific region such as ASEAN Free Trade Area (AFTA), Asia-Pacific Trade Agreement (APTA), Asia-Pacific Economic Cooperation (APEC), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS), Common Market for Eastern and Southern Africa (COMESA), Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CP-TPP), Gulf Cooperation Council (GCC), Indian Ocean Rim Association (IORA), South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA), Southern African Customs Union (SACU) and Southern African Development Community (SADC), etc. (NMF, 2019). The development of these regional blocs indicates the trend of growing partnership against the potential welfare gains.

India has also been proactive in economic partnership with several East Asian countries. It has not only built up trade relationships with several developing countries but also has been part of various sub-regional initiatives such as the ASEAN, East Asia Summit (EAS), BIMSTEC, among others.

India being a maritime nation enjoys high strategic position in the Indian Ocean. Its approach towards Indo-Pacific is well defined in the “SAGAR” (Security and Growth for All in the Region). The region contains several other economically powerful countries other than India with differences in their perspectives towards geostrategic issues. The paper by Cossa and Glosserman (2019) documents the critical linkages among economic benefits, governance and security and also defines and refines the concept of Indo-Pacific alliance. Acharya (2019) detailed about ASEAN’s outlook and its engagement towards Indo-Pacific and Indian Ocean regions. The US perspective on Indo-Pacific region supports the ideology of “Free and Open” Indo-Pacific region, while Indonesia supports the ideology of “Open and Inclusive” region. Horimoto (2020) argued that the creation of a free, open, inclusive and

democratic Indo-Pacific would be the way forward. The means should be some mechanisms based on principles of multilateralism, for example, Quad-Plus, not only involving the four countries: like-minded countries should also be included. In this way, we can find a silver lining beyond the COVID-19 pandemic. On the other hand, India supports a “Free, Open and Inclusive” region and launched the Indo-Pacific Oceans’ Initiative (IPOI) in 2019. The ASEAN Outlook on Indo-Pacific (AOIP) intends to promote peace, security and prosperity in the region via improving the quality of infrastructure, following the UN Sustainable Development Goals (SDGs) and economic interdependence.

Hong (2018) argued China as a rising powerhouse and discussed its growing influence in almost every continent and in this scenario the US policy of free and open Indo-Pacific cooperation may work to curb China’s ambitions. The policy recommendation is to focus on cooperation among all the Indo-Pacific region rather than slowing down China’s expansion. Kai He (2018) in a paper showed that the realistic face of Indo-Pacific strategy is the balancing act against the dominance of China. In terms of liberalism, the main aim is the new institutional setting, while, in terms of constructivism, the main aim is to promote value based and norm-based diplomacy in the region. All three faces are practically problematic and flawed. The paper argued that the main success of the Indo-Pacific alliance depends upon how China behaves in future. Further, paper by Baogang He (2018) talked about changing Chinese attitude and responses towards the Indo-Pacific.

Article by Kireeva (2020) signified the differences in the Indo-Pacific strategies of US and Japan. The study also defined the Russia’s policy in Asia and several related policies and challenges. The article explained that both the US and Japan viewed the Indo-Pacific as the strategic region and they wished to see it free from China’s dominance. The difference between the two is that the US perceives it as strategic competition while Japan employs stronger economic measures. Utz (2018) discussed the trilateral partnership among Australia, Japan and the USA. A Memorandum of Understanding (MOU) was signed for the establishment of an infrastructure fund to support infrastructure projects in the Indo-Pacific region. The article explored the potential benefits of improved infrastructure for Australian business.

Heiduk and Wacker (2020) discussed the significance, implementation and challenges of moving from Asia-Pacific to Indo-Pacific alliance. For a long duration, the system of order in the Asia-Pacific region is dominated by United States but during the second decade of 21st century, China has become the powerhouse and also changed the regional balance of

power. In response to that many concepts have been developed. The Free and Open Indo-Pacific (FOIP) is one of them. Japan, Australia, India and ASEAN nations have also developed their own concept of Indo-Pacific. China, however, rejects the concept of Indo-Pacific FOIP. It is specified that there is no uniform Indo-Pacific concept till now and there are several issues and challenges related to that.

In a paper, Rahman, Kim and De (2020) analysed the potential economic impacts of Indo-regional economic cooperation and compares the same with Comprehensive and Progressive Trade-Pacific Partnership (CETPP) using Computable General Equilibrium analysis (CGE). The results revealed that a quadrilateral alliance among the United States, Japan, Australia and India would have enormous welfare gains as it would be utilizing an unrealised large proportion of Indo-Pacific trade. In terms of policy suggestions, they emphasised on improvement in infrastructure and connectivity so that the biggest hurdle of transportation costs can be overcome. Further, in analysing the Indo-pacific initiatives, De and Kumarasamy (2020) highlighted huge unrealized potential in the region. These authors indicated various areas of cooperation such as protection of marine resources, environmental protection, promoting connectivity, better disaster management, capacity building, improving infrastructure, maritime trade and transport, boosting digital economy, facilitation of tourism. Furthermore, they also indicated that the several existing regional and sub-regional initiatives such as APEC, ASEAN, BIMSTEC, etc. may further enrich the partnership, but improving the quality of infrastructure are the biggest hurdle on the way to economic engagements.

Walmsley, Ahmed and Parsons (2005) analysed the potential impact of liberalizing the labour mobility in the Pacific region. The paper detailed that although economists have demonstrated huge welfare gains even from small multilateral liberalization on temporary movement of natural persons (Mode 4) yet there was no political consensus at the General Agreement on Trade in Services (GATS). Using the CGE model, the paper quantified the potential benefits of bilateral migration flows in the Pacific region. The findings of the study indicated that if the labour force of Australia and New Zealand increases from elsewhere within the Pacific region, the welfare of both the countries would increase. Further, the Pacific Island economies could gain the most from the movement of unskilled labour and they would have a loss of welfare from the scarce skilled workers. Therefore, agreement regarding the movement of labour should be seriously analyzed as it can have serious policy implications.

Brewster (2016) discussed about India, the US and Australia's engagement in the Indo-Pacific alliance. The role of India is focused as a major security partner. Australia needs to put extra efforts from its normal comfort level of security partnership. Australia and India can together mobilize new partnerships. Australia-India and the US should be involved in security strategic partnership. In other words, the role of QUAD in driving the Indo-Pacific has been well acknowledged.

A recent research article by Park, Petri and Plummer (2021) analyses the economics of conflicts and cooperation in the Asia-Pacific region. The study analyses the ramifications of signing the Regional Comprehensive Economic Partnership (RCEP) which has come after Comprehensive Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the US-China trade war has also aggravated. Using the general equilibrium model, the study analyses the impact of these developments on Asia Pacific countries in terms of income, trade, economic structure, returns to factors of production and overall employment opportunities.

Therefore, there have been several studies which have analysed the positive and negative effects of such alliance from time to time but because of the current world scenario where we need to look at not only the economic alliance but also the geopolitical alliance to access the potential welfare effects for India in different scenarios.

2. Prevalence of tariff and non-tariff barriers

The extent of tariff and non-tariff barriers is discussed in Table 1 and Figure 1. Table 1 exhibits the overall tariff scenario in the Indo-Pacific region. India applies a very high tariff duty of around 35.39 per cent on grains and 42 per cent on processed food and around 12 per cent on textile products' imports from Chile and Peru. Furthermore, if scenario is analysed between India and France-UK, they apply a very high tariff rate of around 22 per cent on grain crops, 10 per cent on meat and meat products, 12 per cent on extraction, 12 per cent on textile products, and very huge rate of around 118 per cent on processed food. While France and the UK apply a much lower tariff rates as compared to India.

Table 1: Average tariff rates between India and Indo-Pacific regions

Products	India-Chile & Peru		India-France & UK		India-Oceania		India-East Asia		India-ASEAN 10	
	Exports to	Import from	Exports to	Import from	Exports to	Import from	Exports to	Import from	Exports to	Import from
Grain Crops	5.6168	35.3860	3.7919	21.5138	0.3176	25.3430	26.8246	24.9264	4.6317	27.2592
Meat & Meat Products	4.7986	1.8771	3.8358	10.3816	1.4532	5.0889	1.7700	22.2374	14.6930	13.1839
Extraction	4.0669	1.9234	0.5124	12.1262	0.3680	3.2537	0.3964	0.9899	3.2482	3.4194
Processed Food	4.2696	42.0045	5.1471	117.7235	1.7317	45.6213	5.8585	35.1448	12.2293	73.6284
Textiles	6.2258	10.9575	8.4278	12.4080	7.0822	11.6822	3.7826	13.0624	3.7581	11.4759
Light Manufacturing	5.4446	5.0432	2.1381	10.0529	9.4509	9.4734	1.5078	9.4988	5.8107	7.9824
Heavy Manufacturing	2.7496	6.5332	1.2658	7.6128	1.8933	8.3175	1.6686	5.5867	1.5506	5.5155

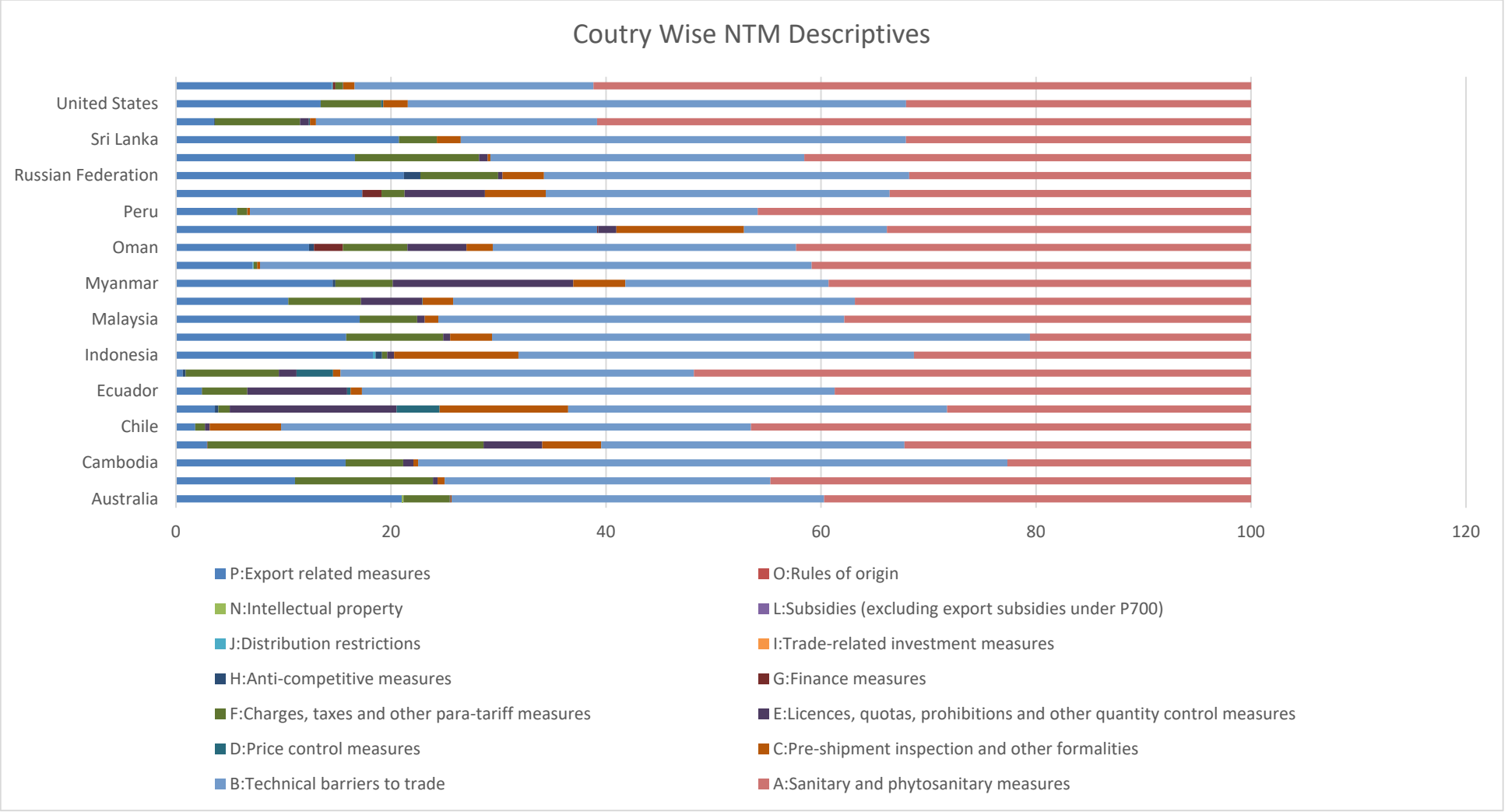
Products	India-Other South Asian Countries		India-MENA Countries		India-Sub-Saharan Africa		India-North America	
	Exports to	Import from	Exports to	Import from	Exports to	Import from	Exports to	Import from
Grain Crops	6.5999	13.1421	10.5430	23.7527	5.7209	18.9022	0.2010	32.9911
Meat & Meat Products	6.1216	3.8573	4.8359	2.8144	4.1765	3.2811	0.7126	14.4015
Extraction	12.2931	13.3748	2.0294	1.0679	1.6531	3.8734	0.0474	4.4547
Processed Food	9.9807	10.5107	15.0092	12.4915	20.3097	26.5611	0.4820	52.7287
Textiles	9.3689	2.4520	7.0895	13.0073	25.1234	7.6307	9.6045	10.5533
Light Manufacturing	7.1520	1.9657	4.7434	9.9016	11.5696	7.2385	1.0549	8.2117
Heavy Manufacturing	7.9749	1.4283	4.2494	6.0961	4.4669	6.9926	0.6327	7.1560

Source: GTAP10

In context of India and Oceania, the tariff rates are quite high as compared to what India imposes. A similar type of scenario can be observed between India and ASEAN-10 and further between India and North American countries where India applies a high tariff rate as compared to ASEAN-10 and North American countries. In context of MENA and other South Asian countries, the tariff rates are not so high. India seems to protect the grains and crops and processed food across the Indo-Pacific regions. Further, future trade liberalization should incorporate tariff and non-tariff liberalization of such sectors for mutual gains. A better strategy could be to shift the comparative advantage in agriculture and processed food sectors by raising its productivity through the use of technology and possibly converting agricultural resources into biofuel and in that process tackle climate change supposedly.

It shows the spread of around 14 types of non-tariff measures. In most of the Indo-Pacific countries, the common non-tariff measures are export related measures, technical barriers to trade and the sanitary and phytosanitary measures. As these measures distort prices of the goods and thus their trade, the reduction in them may lead to correction of prices and thus trade creation effects. Since there are some non-tariff barriers which will remain even if all the barriers are removed, we intend to reduce them and bring them to maximum of two percent in the present study.

Figure 1: NTMs Scenario of Selected Indo-Pacific Countries.



Source: WITS Database

3. Methodology

The present study proposes to use GTAP (Global Trade Analysis Project) as it is a multi-market, multi-regional, multi-agent model. GTAP is a most common modelling technique used for estimating the economic impacts of trade agreements. GTAP model contains constant elasticity of substitution (CES) production and utility functions and assumes perfect competition. Using the GTAP and applying linear and non-linear techniques for the purpose, the paper tries to analyse various simulation scenarios:

1. When India removes tariff and reduces non-tariff barriers bilaterally with all other Pacific partner countries.
2. When all 46 nations in the Indo-Pacific region liberalize tariff and reduces non-tariff barriers among themselves.

Economy wide tariff liberalization signifies promotion of trade and growth as the trade shifts from high tariff countries to low or free trade promoting economies. This further questions about returns to the factors of production. The GTAP model allows for tariff liberalization as well as tariff cuts to be analysed because of one integrated model of production, consumption, equilibrium markets and traded sectors. Elasticities play an important role in realizing the economy wide changes due to shocks in the economy. The GTAP models are identified by model equations, data in input-output format and also the parameters like elasticities. The latter can also be changed.

Non-linear simulation deterministic equations can also be solved to know the economy-wide impact of exogenous variable changes on all endogenous variables. Closure allows us to fix or change the endogenous and exogenous variables. Gragg’s technique with extrapolation shall be favoured over Johansen's strategy. India’s collaborations shall be discussed in terms of trade creation, trade diversion, terms of trade, balance of trade, volume of exports and imports along with developmental gains such as increase in the level of employment, growth, increase in the market share along with other indicators.

We use the GTAP 10 for the analysis. The GTAP 10 version takes into account total 65 sectors, 141 regions, here the regional classification is based on 244 GTAP countries and considers 50 updated I-O tables.

Further, to understand the economy wide impact of tariff liberalization happening in home country, covered in the GTAP model. The tariff decline and hence price of say, land intensive products or skilled labour intensive products or natural resource intensive products lead to

decline in real returns of the factor used intensively in the production of the commodity with magnification effect and rise of real returns of other factors. Price of savings in GTAP models rise, leading to decline in savings and investments in the home country where liberalization takes place. The decline of sector due to tariff decline leads to output increase of the other non-liberalized sectors to non-liberalizing sectors. Consumption of non-liberalized sector goes down due to price rise because of tariff liberalization. The opposite set of forces operate in the exporting country who see a price rise due to decline in tariffs imposed by home country. If the tariff liberalized goods are intermediate products. Profits go up in home country due to decline in tariffs. The sector expands as opposite to the case when tariff decline took place on final product. Now if bilateral tariff liberalization takes place, the opposing economic forces work in the trading nations with Stolper-Samuelson impacts happening in both nations connecting trade with income distribution. The changes in price due to tariff changes brings about production, consumption and price changes in the GTAP models. Partial closure allows us to understand the tariff impact on either prices or outputs. The complementary slackness conditions allow us to remove market conditions for fixing prices. Closures in GTAP model allow us to understand the endogenous and exogenous variables in the system of non-liner equations. GTAP model allows us to understand economy wide impact of shocks given to exogenous shock on all variables in the economy and ROW with parameters values or deterministic elasticities needed to work out the changes using different economic formulas. The impact of the shock in the GTAP model is seen across 140 regions, 65 sectors and across five factors of production.

4. Experimental design

All analyses/simulations are directed with a multi-nation, general equilibrium closure. The general equilibrium closure is fitting for catching the substation in production and consumption that happens among goods and the subsequent changes in trade flows and values. The database going with the GTAP model is appropriate to analyse the results.

The GTAP simulations are done in the following scenarios:

1. Impact of tariff liberalization and then impact of tariff liberalization and reduction in non-tariff barriers - When bilateral trade liberalization is considered between India and Indo-Pacific Region
2. Impact of tariff liberalization and then impact of tariff liberalization and reduction of non-tariff barriers - When bilateral trade liberalization is considered between India and only Asian Countries in Indo-Pacific Region
3. Impact of tariff liberalization and then impact of tariff liberalization and reduction of non-tariff barriers both - When bilateral trade liberalization is considered between India and all Indo-Pacific sub-regions but without China
4. Impact of free trade and then impact of tariff liberalization and reduction in non-tariff barriers - When free trade is considered among all Indo-Pacific nations.

General equilibrium impact of tariff reduction and non-tariff reductions is on economy wide variables is taken from Naman and Mathur (2021) and from Fugazza and Murr (2006), respectively, as the GTAP equations remain the same.

5. Results and discussion

The consequences of all the four scenarios mentioned in the experimental design section are examined. The welfare effects are measured in terms of equivalent variation (measured in US$ million), value of GDP (percent change in the value of GDP, real GDP (quantity change in GDP), trade balance, value of GDP sector wise, real returns to the factors of production and then welfare effects are shown in the decomposed form. The equivalent variation is the adjustments of incomes, before the trade liberalization leading to a decline in prices of goods in future, such that the consumers attain the utility that they would have done so once the trade would have been liberalized.

List of sectors and countries is provided in Appendix 1. This is to be noted that in all the results the EU-26 group and rest of the world countries are not part of the shocks.

Further, Tables 2.1 to 2.5 represent the results in the first scenario in which bilateral trade liberalization is considered between India and Indo-Pacific region. Table 2.1 reveals the equivalent variation results when tariffs are removed and also when tariffs are removed and non-tariff barriers are reduced. The next two columns indicate the value of GDP when tariffs are removed and also when tariffs are removed and non-tariff barriers are reduced. The other columns indicate the change in quantity of GDP in both removed tariff and reduced non-tariff barriers' scenarios. We also show the trade balance in both the scenarios when tariffs are removed and also when non-tariff barriers are reduced also in the last two columns.

Table 2.1: Equivalent variation when bilateral trade liberalization is considered between India and Indo-Pacific region (million dollars)

Country Groups	EV (without tariff)	EV (without tariff and reduced NTBs)	VGDP (without tariff)	VGDP (without tariff and reduced NTBs)	Real GDP (without tariff) per cent Change	Real GDP (without tariff and NTBs) per cent Change	Trade Balance (without tariff)	Trade Balance (without tariff and reduced NTBs)
Oceania	425.82	621.29	0.02	0	86.63	215.50	649.05	771.24
Latin America Indo Pacific	48.51	148.23	-0.1	-0.15	57.44	136.81	-492.84	-390.43
EU Indo-Pacific Alliance	421.29	947.16	-0.05	-0.09	220.50	890.50	9781.17	10069.08
India	14672.43	27836.98	1.75	3.5	9136.63	17054.38	-22276.55	-29760.61
East Asia	-27.46	-168.71	-0.04	-0.09	396.00	1184.00	66881.40	68558.09
South East Asia	2077.88	2861.78	0.15	0.16	530.75	1267.50	1211.48	1348.92
South Asia	-838.36	-662.19	-0.61	-0.63	-86.53	270.84	-5266.94	-5281.89
North America	-599.54	-85.25	-0.08	-0.14	252.00	1674.00	-65877.74	-63780.85
West Asia	404.06	1405.08	-0.1	-0.03	173.00	904.88	449.22	496.92
Sub-Saharan Africa	110.31	476.87	-0.17	-0.14	228.69	616.50	-3068.66	-3180.19
Latin America	-1223.72	-1605.44	-0.24	-0.32	-278.00	-349.00	-8635.37	-8112.92
EU-26	-2740.17	-4259.75	-0.12	-0.19	-546.00	-877.00	-1949.28	-222.10
ROW	-3010.63	-5233.82	-0.19	-0.3	-450.50	-706.50	28595..01	29484.69

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 2.2: Welfare measured by allocative efficiency when bilateral trade liberalization is considered between India and Indo-Pacific Region

	Removed Tariff				Without Tariff and NTBs (reduced)				
	alloc_a1	**Tot_E1**	**IS_F1**	**Total**	**alloc_a1**	**Tech_C1**	**Tot_E1**	**IS_F1**	**Total**
Oceania	87	344	-4	426	99	117	425	-20	621
LAMERICAINDO	57	-3	-6	49	63	74	26	-15	148
India	9137	4974	562	14672	10738	6316	9561	1222	27837
EU-Indo pacific	221	194	6	421	297	594	67	-11	947
East Asia	397	-378	-46	-27	123	1060	-1127	-55	-169
SE Asia	531	1565	-18	2078	570	698	1641	-47	2862
South Asia	-87	-511	-241	-838	-118	388	-659	-274	-662
N America	251	-602	-248	-600	275	1399	-1258	-501	-85
Latin America	-278	-791	-154	-1224	-349	0	-1046	-211	-1605
EU 26	-546	-2156	-38	-2740	-877	0	-3282	-101	-4260
West Asia	173	229	2	404	204	701	516	-15	1405
Sub Saharan Africa	229	-63	-55	110	243	373	-73	-67	477
ROW	-451	-2801	241	-3011	-707	0	-4791	264	-5234
Total	9720	-0	0	9720	10562	11720	-0	0	22282

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 2.3: Quantity index of value added when bilateral trade liberalization is considered between India and Indo-Pacific Region (Only Tariffs)

	Oceania	LAmerica Indo-Pacific	EU Indo-Pacific Alliance	India	East Asia	South East Asia	South Asia	North America	Latin America	West Asia	Sub-Saharan Africa	EU-26	ROW
Grain Crops	0.15	0.03	-0.27	-0.61	-0.18	0.31	-0.03	0.26	-0.12	-1.12	0.22	-0.07	-0.09
Meat Products	-0.73	-0.03	-0.13	1.47	0.02	-1.33	-0.04	-0.09	0.01	0.09	-0.07	-0.04	0.01
Extraction	0.16	0.08	0.01	-1.49	0.05	0.10	0.28	0.04	0.09	-0.01	0.30	-0.02	0.06
Processed Food	-0.14	-0.02	-0.08	-3.68	-0.00	2.36	-0.14	-0.01	-0.45	-0.12	-0.28	-0.06	-0.26
Textile	-0.64	-0.56	-0.35	6.20	-0.44	-1.26	0.91	-0.71	-0.04	-1.34	-2.08	-0.42	-0.11
Light Manufacturing	-0.22	-0.17	-0.04	1.77	-0.03	-0.34	-0.45	-0.03	0.08	0.35	-0.43	-0.07	0.09
Heavy Manufacturing	0.15	0.06	0.08	-0.64	0.07	-0.37	-0.39	0.07	0.14	0.57	0.23	-0.05	-0.18
Utility	0.01	-0.03	-0.03	1.59	-0.03	0.06	-0.02	-0.05	-0.11	0.13	0.24	-0.07	-0.12
TransComm	-0.01	0.02	0.01	0.16	0.01	-0.03	-0.02	0.00	0.01	0.02	-0.03	0.02	0.05
Other Services	0.01	0.01	0.00	-0.93	0.00	-0.04	-0.08	0.00	0.02	0.03	-0.01	0.03	0.05
CGDS	0.01	-0.05	-0.05	2.70	-0.05	0.12	0.07	-0.09	-0.20	-0.15	0.40	-0.15	-0.18

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 2.4 Quantity index of value added when bilateral trade liberalization is considered between India and Indo-Pacific Region (Tariff +NTBs)

	Oceania	LAmerica Indo-Pacific	EU Indo-Pacific Alliance	India	East Asia	South East Asia	South Asia	North America	Latin America	West Asia	Sub-Saharan Africa	EU-26	ROW
Grain Crops	0.17	0.04	-0.25	-0.93	-0.18	0.32	-0.03	0.30	-0.10	-1.19	0.27	-0.02	-0.05
Meat Products	-0.75	-0.03	-0.14	1.54	0.02	-1.39	-0.03	-0.08	0.02	0.08	-0.05	-0.02	0.03
Extraction	0.21	0.14	-0.04	-2.65	0.05	0.17	0.27	0.05	0.05	0.02	0.40	-0.11	0.04
Processed Food	-0.17	-0.02	-0.08	-3.89	-0.00	2.45	-0.16	-0.01	-0.45	-0.12	-0.29	-0.05	-0.25
Textile	-0.73	-0.61	-0.25	5.66	-0.42	-1.36	0.92	-0.74	-0.00	-1.59	-2.22	-0.32	0.02
Light Manufacturing	-0.28	-0.19	-0.06	1.92	-0.03	-0.39	-0.70	-0.03	0.09	0.31	-0.53	-0.07	0.14
Heavy Manufacturing	0.08	-0.00	0.06	-0.62	0.08	-0.46	-0.59	-0.05	0.17	0.43	0.05	-0.09	-0.23
Utility	-0.00	-0.06	-0.04	2.55	-0.05	0.06	-0.00	-0.07	-0.15	0.17	0.31	-0.11	-0.17
TransComm	-0.01	0.03	0.01	0.34	0.01	-0.03	-0.01	0.00	0.01	0.04	-0.05	0.02	0.06
Other Services	0.01	0.02	0.01	-1.26	0.00	-0.02	-0.06	0.01	0.02	-0.06	0.02	0.04	0.06
CGDS	-0.01	-0.08	-0.07	4.34	-0.08	0.12	0.14	-0.13	-0.25	0.24	0.53	-0.23	-0.27

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 2.5: Real returns to factors of production when bilateral trade liberalization is considered between India and Indo-Pacific region

	Removing Tariffs					Removing Tariffs and Reducing NTBs				
	Land	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**	**Land**	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**
Oceania	-0.72	0.01	0.01	0.03	1.06	-0.72	0.01	0.02	0.04	1.43
Latin America Indo-Pacific	0.07	-0.01	-0.01	0.01	0.56	0.1	0	0	0.01	0.94
EU Indo-Pacific Alliance	-0.54	0.02	0.02	0.02	0.06	-0.53	0.02	0.03	0.03	-0.25
India	1.66	1.9	1.41	1.4	-8.34	1.46	2.69	2.17	2.06	-15.36
East Asia	-0.37	0	0.01	0.02	0.35	-0.37	0.01	0.02	0.02	0.35
South East Asia	0.55	0.12	0.07	0.1	0.81	0.53	0.14	0.1	0.12	1.29
South Asia	-0.07	0.09	0.05	0.06	2.01	-0.04	0.12	0.09	0.1	1.97
North America	0.63	-0.01	0	0	0.32	0.74	-0.01	0.01	0.01	0.37
Latin America	-0.3	-0.05	-0.03	-0.04	0.63	-0.24	-0.05	-0.03	-0.04	0.34
West Asia	-2.61	0.12	0.27	0.31	0.26	-2.74	0.17	0.35	0.38	0.52
Sub-Saharan Africa	0.75	0.19	0.16	0.19	2.28	0.95	0.24	0.21	0.23	3.02
EU-26	-0.16	-0.03	-0.02	-0.02	-0.14	-0.09	-0.04	-0.03	-0.03	-0.75
ROW	-0.31	-0.08	-0.04	-0.05	0.36	-0.2	-0.09	-0.06	-0.08	0.18

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

This analysis exhibits huge welfare gains of US$ 14.67 billion bilaterally in terms of equivalent variation. While this gain increases to US$ 27.83 billion when complete trade liberalization including removal of tariff and non-tariff barriers are considered. Among the 46 nations in the Indo-Pacific alliance, it seems that South Asian, North American and East Asian countries including China, Japan, Korea and Russia loose in terms of their welfare as defined by the GTAP model. Regions outside the Indo-Pacific alliance, which are impacted negatively in terms of welfare, are the Latin American region and the EU-26.

In terms of VGDP, India seems to have growth of 1.75 per cent, when only tariffs are removed and 3.5 per cent VGDP growth when both tariffs are removed and non-tariff barriers are reduced. The other regions who have minor positive VGDP gain are South East Asia, Oceania. All other regions observe a negative growth. Further, the quantity GDP columns show that India gains by 9136.63 per cent in terms of quantity GDP when all tariff barriers are removed. The gains shall increase to 17054.38 per cent in the volume of GDP when all tariff barriers are removed and the non-tariff barriers are reduced to 2 per cent. The real GDP changes are quantity percentage changes. It can be seen that all country groups who are part of Indo-Pacific alliance seem to have gain in terms of volume of GDP while the non-member seem to loose. The trade balance is negative for India either if all tariffs are removed or even non-tariff barriers are removed. This could be because of the fact that India is having import led exports growth (Bhanumurthy and Sharma, 2013). The same changes stand for Chile, Columbia, Ecuador, Peru (countries from Latin America who are part of Indo-Pacific alliance), South Asia, North America, Sub-Saharan Africa and other countries of Latin America and the EU-26, which are not part of Indo-Pacific alliance.

Table 2.2 exhibits the welfare decomposition in the first scenario in which bilateral trade liberalization is considered between India and Indo-Pacific region. The total equivalent variation gains of US$ 14.67 billion can be decomposed into allocative efficiency, terms of trade and investment saving gains. It shows that if all tariffs are removed, there would be correction in the distorted prices and optimal choices. Therefore, because of this correction, there would be US$ 9.14 billion gains in terms of allocative efficiency. The terms of trade gains would bring US$ 4.97 billion gains and US$ 0.56 billion in terms of investment-savings. There are other regions who would also gain but India would be the maximum gainer. The countries which are not part of Indo-Pacific alliance would definitely loose. The gains for India would be even higher when all the tariffs are removed and the non-tariff barriers are reduced to 2 per cent.

Tables 2.3 and 2.4 show the sector wise quantity GDP gains in the scenario when all tariffs are removed and also when tariffs are removed and non-tariff barriers are reduced respectively. Both tables reveal that meat products, textiles, light manufacturing, utility services and domestic investments are at a gain while the sectors which are at a loss are grain crops, extraction, processed food. The major country groups which loose are South Asia in mainly light and heavy manufacturing industries, North America in mainly manufacturing and meat products and South East Asia majorly in meat and meat products, textile and manufacturing products.

Table 2.5 shows the real returns to the factors of production. It shows the percentage change in ration of return to primary factors of production to prices and the table shows that all the factors of production would gain in real terms except the natural resources. Overall observation about factor gains is that natural recourses are at a greater loss in all the four scenarios because we do not protect the sector much. India is a country like China which losses natural resources either because of lack of technology or less number of skilled people.[5]

Tables 3.1 to 3.5 exhibit the scenario when free trade is considered between India and the Asian countries in the Indo-Pacific nations bilaterally.

[5] Based on International Labor Organization (ILO) classification, the skilled labour (professional workers) category is assumed to have managers and administrators, professional and para-professional workers. Trade persons, clerks, sales persons and personal service workers, plant and machine operators and drivers, labourers and related workers and farm workers are considered to be unskilled workers.

Table 3.1 Equivalent variation when bilateral trade liberalization is considered between India and only Asian countries in Indo-Pacific Region (in million dollars)

Country Groups	EV (without tariff)	EV (without tariff and reduced NTBs)	VGDP (without tariff)	VGDP (without tariff and reduced NTBs)	Real GDP (without tariff) per cent Change	Real GDP (without tariff and reduced NTBs) per cent Change	Trade Balance (without tariff)	Trade Balance (without tariff and reduced NTBs)
Oceania	517.65	810.84	0.09	0.11	113.00	263.75	417.28	398.31
Latin America Indo Pacific	-60.53	-122.46	-0.06	-0.1	-9.00	-17.44	-544.21	-493.54
EU Indo-Pacific Alliance	-555.02	-886.16	-0.06	-0.1	-168.00	-265.00	10090.96	10636.90
India	7493.41	13886.02	0.33	1.07	7080.25	11455.13	-14719.47	-18029.72
East Asia	3577.40	5054.67	0.07	0.07	1180.00	2392.00	63023.83	62919.84
South East Asia	2794.89	3938.61	0.25	0.3	669.25	1461.25	756.06	686.79
South Asia	-525.71	-250.58	-0.39	-0.36	-59.91	301.13	-5505.53	-5608.24
North America	-1396.92	-2038.13	-0.06	-0.1	-142.00	-232.00	-66654.96	-65193.75
West Asia	-413.74	-729.47	-0.15	-0.23	-128.25	-169.75	1329.01	1421.19
Sub-Saharan Africa	-157.96	-257.64	-0.13	-0.18	-35.63	-56.31	-2523.17	-2447.84
Latin America	-827.57	-1005.89	-0.16	-0.2	-184.25	-218.00	-9305.41	-9073.28
EU-26	-956.32	-1477.75	-0.06	-0.09	-208.00	-337.00	-3894.87	-3186.07
ROW	-1603.74	-2721.54	-0.1	-0.16	-220.50	-357.00	27530.39	27969.39

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 3.2: Welfare measured by allocative efficiency when quantity index of value added when bilateral trade liberalization is considered between India and only Asian countries in Indo-Pacific region

	Without Tariff				Without Tariff and reduced NTBs				
	alloc_a1	**Tot_E1**	**IS_F1**	**Total**	**alloc_a1**	**Tech_C1**	**Tot_E1**	**IS_F1**	**Total**
Oceania	113	385	19	518	147	117	531	16	811
LAMERICAINDO	-10	-61	10	-61	-17	0	-113	8	-122
India	7080	496	-82	7493	7736	3719	2288	143	13886
Euidopacific	-168	-466	79	-555	-265	0	-687	86	-866
East Asia	1180	2374	24	3577	1331	1060	2740	-76	5055
SE Asia	669	2100	26	2795	764	698	2458	19	3939
South Asia	-60	-280	-186	-526	-87	388	-338	-213	-251
N America	-142	-1093	-161	-1397	-232	0	-1542	-265	-2038
Latin America	-184	-564	-79	-828	-218	0	-689	-99	-1006
EU 26	-208	-808	60	-956	-337	0	-1189	48	-1478
West Asia	-128	-321	35	-414	-170	0	-596	37	-729
Sub Saharan Africa	-36	-107	-16	-158	-56	0	-181	-21	-258
ROW	-220	-1655	272	-1604	-357	0	-2681	317	-2721
Total	7886	0	0	7886	8238	5983	-0	0	14220

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 3.3: Quantity index of value added when bilateral trade liberalization is considered between India and only Asian countries in Indo-Pacific region (Only removing tariffs)

	Oceania	LAmerica Indo-Pacific	EU Indo-Pacific Alliance	India	East Asia	South East Asia	South Asia	North America	Latin America	West Asia	Sub-Saharan Africa	EU-26	ROW
Grain Crops	0.55	-0.08	-0.07	-0.39	-0.21	0.31	0.00	-0.16	-0.13	0.05	-0.09	-0.06	-0.04
Meat Products	-0.94	-0.02	-0.07	1.80	0.00	-1.52	-0.06	-0.02	-0.01	-0.05	-0.03	-0.06	-0.03
Extraction	0.11	0.00	0.02	-0.34	-0.02	0.06	0.03	0.01	0.06	0.06	0.03	-0.02	0.02
Processed Food	-0.15	-0.02	-0.03	-3.93	-0.02	2.36	-0.16	-0.01	-0.45	-0.14	-0.00	-0.06	-0.24
Textile	-0.60	0.07	0.01	0.06	-0.07	-0.55	0.21	0.06	0.21	0.23	0.19	0.02	0.13
Light Manufacturing	-0.20	0.03	-0.00	0.62	-0.02	-0.26	-0.02	0.01	0.10	-0.18	0.09	-0.02	0.08
Heavy Manufacturing	0.24	0.06	0.01	-0.29	0.05	-0.32	0.03	0.04	0.13	-0.27	-0.04	-0.00	-0.09
Utility	0.05	-0.02	-0.03	0.58	0.03	0.13	-0.03	-0.04	-0.06	-0.06	-0.05	-0.02	-0.05
TransComm	-0.01	0.01	0.01	0.06	-0.00	-0.06	-0.01	0.00	0.01	0.04	0.03	0.01	0.03
Other Services	-0.00	-0.00	0.00	-0.14	-0.00	-0.09	-0.00	0.00	0.01	0.07	0.00	0.01	0.02
CGDS	0.07	-0.03	-0.07	1.08	0.04	0.21	-0.07	-0.07	-0.11	-0.09	-0.09	-0.05	-0.08

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 3.4: Quantity index of value added when bilateral trade liberalization is considered between India and only Asian countries in Indo-Pacific region (removed tariffs + reduced NTBs)

	Oceania	LAmerica Indo-Pacific	EU Indo-Pacific Alliance	India	East Asia	South East Asia	South Asia	North America	Latin America	West Asia	Sub-Saharan Africa	EU-26	ROW
Grain Crops	0.47	-0.08	-0.03	-0.44	-0.24	0.29	-0.04	-0.17	-0.14	0.14	-0.09	-0.04	-0.03
Meat Products	-1.00	-0.02	-0.06	1.86	0.00	-1.63	-0.04	-0.02	-0.01	-0.03	-0.02	-0.06	-0.01
Extraction	0.16	-0.02	-0.01	-0.90	-0.03	0.14	0.17	-0.00	0.04	0.06	0.00	-0.07	0.02
Processed Food	-0.20	-0.01	-0.03	-4.11	-0.02	2.39	-0.19	-0.00	-0.47	-0.15	0.01	-0.06	-0.24
Textile	-0.78	0.14	0.03	0.15	-0.21	-2.69	1.10	0.09	0.26	0.39	0.29	0.02	0.18
Light Manufacturing	-0.26	0.04	0.01	0.73	-0.03	-0.31	-1.13	0.02	0.11	-0.12	0.14	-0.03	0.12
Heavy Manufacturing	0.19	0.09	-0.00	-0.43	0.07	-0.38	-0.84	0.05	0.15	-0.37	0.03	-0.03	-0.13
Utility	0.06	-0.04	-0.06	1.13	0.03	0.15	0.08	-0.06	-0.08	-0.10	-0.09	-0.04	-0.09
TransComm	-0.01	0.01	0.01	0.15	-0.00	-0.06	0.03	0.00	0.01	0.05	0.04	0.02	0.04
Other Services	0.00	-0.00	0.01	-0.36	-0.00	-0.07	-0.06	0.00	0.01	0.09	-0.01	0.02	0.03
CGDS	0.08	-0.06	-0.12	2.02	0.05	0.25	0.37	-0.10	-0.14	-0.15	-0.17	-0.09	-0.14

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 3.5: Real returns to factors of production when bilateral trade liberalization is considered between India and only Asian countries in Indo-Pacific region

	Removing Tariffs					Removing Tariffs and Reducing NTBs				
	Land	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**	**Land**	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**
Oceania	-0.42	0.02	0.02	0.03	0.75	-0.57	0.03	0.03	0.05	1.11
Latin America Indo-Pacific	-0.27	-0.01	0	0	0.02	-0.26	-0.01	0	0	-0.14
EU Indo-Pacific Alliance	-0.18	-0.01	-0.01	-0.01	0.1	-0.13	-0.02	-0.01	-0.01	-0.05
India	2.09	0.97	0.85	0.78	-2.3	2.27	1.32	1.21	1.08	-4.84
East Asia	-0.44	0.03	0.04	0.04	-0.09	-0.49	0.04	0.05	0.05	-0.21
South East Asia	0.44	0.17	0.1	0.14	0.58	0.31	0.2	0.14	0.18	1.16
South Asia	0.05	0.16	0.11	0.12	1.42	0.01	0.22	0.2	0.19	1.35
North America	-0.49	-0.01	-0.01	-0.01	-0.17	-0.48	-0.01	-0.01	-0.01	-0.04
Latin America	-0.34	-0.03	-0.02	-0.02	0.41	-0.34	-0.03	-0.02	-0.03	0.24
West Asia	0.07	-0.08	-0.05	-0.07	0.36	0.23	-0.1	-0.08	-0.1	0.34
Sub-Saharan Africa	-0.37	-0.04	-0.02	-0.02	0.18	-0.31	-0.05	-0.04	-0.04	-0.02
EU-26	-0.17	-0.01	-0.01	-0.01	-0.17	-0.16	-0.02	-0.01	-0.01	-0.48
ROW	-0.18	-0.04	-0.02	-0.03	0.16	-0.13	-0.05	-0.03	-0.04	0.08

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 3.1 shows that here also India gains in terms of equivalent variation by US$ 7.49 billion and by US$ 13.88 billion when removal of tariff and reduction of non-tariff barriers both is considered.

Apart from India, Oceania, East Asia, South East Asia also gain but rest of the country groups loose. India again seems to be the largest gainer either the tariffs are removed only or both the tariffs are removed or non-tariff barriers are also reduced.

In terms of VGDP, presented in next two columns in Table 3.1, the gains of India are lower at only 0.33 per cent VGDP growth with the removal of tariffs and 1.07 per cent with both the removal of tariffs and reduction of non-tariff barriers. The other countries which have gains in terms of equivalent variation, also have gains in terms of value of GDP but the gains are lower as compared to the first scenario.

For the quantity GDP, Table 3.1 shows that free trade (all tariffs are removed) is considered between India and the Asian countries in the Indo-Pacific nations bilaterally and results seem to be same as above. India is again a largest gainer and the other gainers and losers are same as the groups in terms of VGDP. Trade balance is again negative for India in any of the scenarios.

Table 3.2 shows the decomposition of welfare gains in terms of equivalent variation. The welfare gains of US$ 74.93 billion can be attributed to US$ 7.08 billion for the allocative efficiency, US$ 0.49 billion for terms of trade gains and investments-saving is negative as US$ 0.08 billion when tariffs are removed. Further, when all tariff barriers are removed and non-tariff barriers are reduced, the welfare gains are US$ 13.88 billion where US$ 7.73 billion can be attributed to allocative efficiency, US$ 3.71 billion to technical efficiency, US$ 2.28 billion to terms of trade gains and US$ 0.14 billion for investment-savings gains.

Tables 3.4 and 3.5 summarize the sector wise impact of tariff removal and tariff removal with reduced non-tariff barriers on quantity index of value added respectively. The gainers and the gaining sectors are same as the first scenario but gains are much lower now. In the third scenario, free trade is considered between India and the Indo-Pacific countries but China is omitted from the list. The results are shown in Tables 4.1 to 4.5.

Table 4.1: Equivalent variation when bilateral trade liberalization is considered between India and all Indo-Pacific regions but without China (in million dollars)

Country Groups	EV (without tariff)	EV (without tariff and reduced NTBs)	VGDP (without tariff)	VGDP (without tariff and reduced NTBs)	Real GDP (without tariff) per cent Change	Real GDP (without tariff and reduced NTBs) per cent Change	Trade Balance (without tariff)	Trade Balance (without tariff and reduced NTBs)
Oceania	526.43	775.46	10.05	10.05	112.13	253.00	515.83	578.32
India	15210.48	26536.82	11.93	13.52	8833.00	15259.00	-20246.02	-26759.22
China	-4937.44	-6833.68	9.79	9.69	-1388.00	-1907.00	48633.67	50521.59
East Asia	682.09	693.94	9.98	9.94	362.00	665.00	19914.44	20337.23
South East Asia	2400.48	3322.77	10.19	10.21	557.75	1310.25	1015.08	1062.56
South Asia	-796.12	-603.11	9.43	9.42	-66.25	295.53	-5308.34	-5342.01
North America	64.04	868.05	9.94	9.90	384.00	1860.00	-67305.80	-65857.74
Latin America Indo	71.17	191.16	9.91	9.88	62.75	145.13	-531.49	-448.93
EU Indo Pacific	723.02	1411.50	9.97	9.95	324.00	1044.50	9296.54	9338.58
West Asia	607.75	1722.69	9.97	10.07	265.38	1025.38	343.94	348.24
SSA	171.51	574.91	9.88	9.93	252.69	650.69	-3129.39	-3272.49
ROW	-6002.05	-9615.55	9.87	9.80	-978.00	-1556.00	16801.43	19493.84

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 4.2: Welfare measured by allocative efficiency when bilateral trade liberalization is considered between India and all Indo-Pacific Regions but without China (only removing tariffs)

	Without Tariffs				Without Tariffs and NTBs				
	alloc_a1	**Tot_E1**	**IS_F1**	**Total**	**alloc_a1**	**Tech_C1**	**Tot_E1**	**IS_F1**	**Total**
Oceania	112	440	-26	526	136	117	567	-44	775
India	8833	5615	763	15210	10477	4782	9875	1403	26537
China	-1388	-3752	203	-4937	-1907	0	-5067	140	-6834
East Asia	362	438	-118	682	143	522	188	-159	694
South East Asia	558	1901	-58	2401	612	698	2106	-94	3323
South Asia	-66	-503	-226	-796	-93	388	-641	-258	-603
North America	385	-66	-255	64	461	1399	-506	-486	868
Latin America Indo	63	24	-16	71	71	74	72	-26	191
EU Indo Pacific	324	440	-41	723	451	594	436	-69	1411
West Asia	265	366	-24	608	324	701	743	-46	1723
SSA	253	-30	-51	172	277	373	-15	-60	575
ROW	-979	-4873	-140	-6002	-1557	0	-7758	-300	-9615
Total	8721	-0	0	8721	9396	9648	-0	0	19045

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 4.3 Quantity index of value added when bilateral trade liberalization is considered between India and all Indo-Pacific regions without China (only with removed tariff barriers)

	Oceania	India	China	East Asia	South East Asia	South Asia	North America	Latin America Indo	EU Indo Pacific	West Asia	SSA	Row
Grain Crops	0.12	-0.80	0.04	-0.60	0.31	-0.04	0.27	0.01	-0.29	-1.16	0.20	-0.10
Meat Products	-0.67	1.73	-0.03	0.05	1.34	-0.03	-0.09	-0.02	-0.14	0.10	-0.05	-0.01
Extraction	0.14	-1.51	0.14	0.03	0.09	0.28	0.04	0.09	0.02	-0.03	0.29	0.04
Processed Food	-0.15	-3.72	0.01	0.04	2.36	-0.13	-0.01	-0.00	-0.09	-0.14	-0.29	-0.22
Textile	-0.79	6.35	-0.35	-0.24	-1.23	0.85	-0.75	-0.63	-0.39	-1.48	-2.22	-0.31
Light Manufacturing	-0.25	1.63	0.01	-0.08	-0.33	-0.40	-0.04	-0.17	-0.06	0.44	-0.47	-0.00
Heavy Manufacturing	0.14	-0.39	0.05	0.05	-0.37	-0.38	0.05	0.04	0.07	0.72	0.27	-0.05
Utility	0.03	1.39	-0.12	-0.02	0.09	-0.01	-0.03	-0.02	-0.01	0.16	0.27	-0.07
TransComm	-0.01	0.16	0.02	0.01	-0.04	-0.02	0.00	0.02	0.00	-0.00	-0.04	0.02
Other Services	0.01	-0.86	-0.00	0.01	-0.04	-0.08	0.01	0.01	0.01	-0.10	-0.01	0.04
CGDS	0.04	2.31	-0.16	-0.03	0.16	0.09	-0.05	-0.03	-0.01	0.24	0.44	-0.14

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 4.4 Quantity index of value added when bilateral trade liberalization is considered between India and all Indo-Pacific regions without China (without tariffs + reduced NTBs)

	Oceania	India	China	East Asia	South East Asia	South Asia	North America	Latin America Indo	EU Indo Pacific	West Asia	SSA	Row
Grain Crops	0.12	-1.10	0.07	-0.61	0.31	-0.05	0.30	0.02	-0.29	-1.26	0.24	-0.06
Meat Products	-0.72	-1.83	-0.02	0.05	-1.41	-0.02	-0.09	-0.02	-0.15	0.09	-0.04	0.00
Extraction	0.20	-2.63	0.18	0.03	0.16	0.27	0.05	0.15	-0.03	-0.01	0.39	0.00
Processed Food	-0.18	-3.92	0.02	0.04	2.45	-0.12	-0.01	-0.01	-0.10	-0.14	-0.30	-0.21
Textile	-0.94	5.90	-0.26	-0.24	-1.35	0.85	-0.82	-0.72	-0.35	-1.82	-2.41	-0.25
Light Manufacturing	-0.32	1.80	0.02	-0.09	-0.38	-0.65	-0.05	-0.20	-0.08	0.40	-0.59	0.01
Heavy Manufacturing	0.07	-0.11	0.04	0.06	-0.44	-0.56	0.02	-0.04	0.06	0.62	0.11	-0.07
Utility	0.03	2.23	-0.17	-0.03	0.10	0.02	-0.04	-0.04	-0.01	0.21	0.35	-0.11
TransComm	-0.01	0.31	0.03	0.01	-0.04	0.00	0.00	0.03	0.01	0.02	-0.06	0.03
Other Services	0.01	-1.18	-0.00	0.01	-0.02	-0.06	0.01	0.02	0.01	-0.09	0.03	0.04
CGDS	0.04	3.71	-0.22	-0.06	0.19	0.17	-0.08	-0.05	-0.01	0.31	0.60	-0.20

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 4.5: Real returns to factors of production when bilateral trade liberalization is considered between India and all Indo-Pacific regions but without China

	Removing Tariffs					Removing Tariffs and Reducing NTBs				
	Land	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**	**Land**	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**
Oceania	-0.7	0.02	0.02	0.04	0.99	-0.76	0.02	0.03	0.05	1.37
India	1.22	1.71	1.26	1.27	-8.6	0.99	2.41	1.91	1.86	-15.51
China	0	-0.06	-0.06	-0.05	0.97	0.06	-0.08	-0.08	-0.07	1.25
East Asia	-1.41	0.02	0.03	0.03	0.28	-1.41	0.02	0.03	0.04	0.25
South East Asia	0.55	0.14	0.09	0.11	0.77	0.51	0.17	0.12	0.14	1.24
South Asia	-0.09	0.09	0.06	0.07	2	-0.07	0.13	0.11	0.12	1.99
North America	0.64	0	0	0.01	0.32	0.74	0	0.01	0.01	0.38
Latin America Indo	0.03	0	0	0.01	0.61	0.06	0	0	0.02	1.01
EU Indo Pacific	-0.59	0.02	0.03	0.03	0.13	-0.58	0.03	0.04	0.04	-0.14
West Asia	-2.69	0.15	0.3	0.34	0.1	-2.86	0.21	0.39	0.43	0.33
SSA	0.71	0.19	0.17	0.2	2.2	0.87	0.25	0.23	0.25	2.96
ROW	-0.26	-0.04	-0.02	-0.03	0.23	-0.18	-0.05	-0.03	-0.04	-0.02

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

The results are interesting as there seem to be huge gains for India when seen in terms of equivalent variation of US$ 15.21 billion (with only tariff liberalization) and of US$ 26.53 billion when trade is completely liberalized from tariff and non-tariff barriers are reduced. If we observe the results in Table 4.1, the gains for India in terms of welfare are US$ 7.89 billion when only tariffs are removed and US$ 18.47 billion when both tariff and non-tariff barriers are removed. The gains for India are maximum in third scenario where trade barriers are removed bilaterally between India and Indo-Pacific nations and China is omitted.

Now looking at the value of GDP gains/losses as presented in Table 4.1, results reveal maximum positive gains When China is not there in the group. There would be 1.93 per cent growth in VGDP in case of tariff liberalization and 3.52 per cent in case of both when tariff barriers are removed, and non-tariff barriers are reduced. Even the quantity GDP gains are huge as in other scenarios. It seems that the Indo-Pacific alliance is geopolitical strategic alliance which is giving India, ASEAN and Oceania, the economic benefits along with addressing containment of the Chinese expansionist design through the Belt and Road Initiative of the Chinese government.

The results of sector wise value GDP gains are presented in Tables 4.3 and 4.4. Analysis shows that meat products, textiles, light manufacturing, utility services and domestic investments are at gain for India and the gains are huge for those sectors in which both India and China have the comparative advantage. It can be notices that main gaining sectors are textiles and light manufacturing when tariffs are removed and the non-tariff barriers are removed. The sectors which are at a loss are grain crops, extraction, processed food. The major country groups which loose are South Asia in mainly light and heavy manufacturing industries, North America in mainly manufacturing and meat products and South East Asia majorly in meat and meat products, textile and manufacturing products.

Table 4.5 illustrates the factor wise gains or losses in terms of real returns to the factors of production. The results are similar to the earlier scenarios.

Similarly, Tables 5.1 to 5.5 indicate the scenario when free trade is considered among all Indo-Pacific Regions.

Table 5.1: Equivalent variation when free trade is considered among all Indo-Pacific regions (in million dollars)

Country Groups	EV (without tariff)	EV (without tariff and reduced NTBs)	VGDP (without tariff)	VGDP (without tariff and reduced NTBs)	Real GDP (without tariff) per cent Change	Real GDP (without tariff and reduced NTBs) per cent Change	Trade Balance (without tariff)	Trade Balance (without tariff and reduced NTBs)
Oceania	3266.31	11602.84	11.01	10.24	1643.38	7841.13	-3381.80	-5935.73
Latin America Indo Pacific	-485.65	3663.11	9.13	8.73	584.25	3863.50	-633.59	-1029.05
EU Indo-Pacific Alliance	25375.50	53370.91	11.40	10.86	8639.00	27689.50	-5958.14	-19017.56
India	7896.97	18476.96	10.92	9.96	8568.88	15840.75	-14725.33	-18021.13
East Asia	49642.78	102907.72	10.90	10.53	31290.00	77348.00	42024.92	34109.14
South East Asia	4556.61	28212.01	11.37	10.12	3059.50	21264.25	-4451.93	-9700.57
South Asia	-159.53	2441.09	9.17	8.56	2323.16	4761.25	-6908.87	-7462.42
North America	8769.54	41733.12	9.81	9.87	6590.00	41622.00	-65706.88	-73833.88
West Asia	5490.58	14519.68	8.93	8.52	5884.50	12464.25	-2337.94	-1447.94
Sub-Saharan Africa	114.11	4600.97	8.67	8.08	3354.81	6349.13	-5129.14	-6271.07
Latin America	-8049.11	-12414.26	7.67	8.52	-2175.50	-3397.25	2064.52	9651.83
EU-26	-22081.88	-38103.93	8.49	9.19	-4240.00	-8156.00	24266.54	47766.62
ROW	-12224.09	-27791.59	8.25	9.09	-2410.50	-4272.00	40877.61	51191.75

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 5.2: Welfare measured by allocative efficiency when free trade is considered among all Indo-Pacific regions

	Removing Tariffs				Removing Tariffs and Reducing NTBs				
	alloc_a1	**Tot_E1**	**IS_F1**	**Total**	**alloc_a1**	**Tech_C1**	**Tot_E1**	**IS_F1**	**Total**
Oceania	1643	1493	140	3266	2649	5192	3597	165	11603
LAMERICAINDO	584	-1068	-2	-486	862	3002	-223	23	3663
India	8569	-463	-209	7897	9525	6316	2432	204	18477
Euidopacific	8639	16971	-234	25375	14355	13334	26060	-378	53371
East Asia	31290	18328	25	49643	42721	34627	26205	-645	102908
SE Asia	3059	1221	276	4557	5104	16160	6616	332	28212
South Asia	2323	-1167	-1316	-160	2584	2178	-1026	-1294	2441
N America	6591	2021	158	8769	9608	32014	443	-332	41733
Latin America	-2175	-5087	-786	-8049	-3397	0	-7848	-1169	-12414
EU 26	-4240	-18074	233	-22082	-8156	0	-30185	237	-38104
West Asia	5884	-711	318	5491	6658	5806	1684	371	14520
Sub Saharan Africa	3355	-1680	-561	1114	3770	2579	-1176	-572	4601
ROW	-2410	-11773	1959	-12224	-4272	0	-26578	3058	-27792
Total	63112	0	0	63112	82010	121208	0	0	203219

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 5.3: Quantity index of value added when free trade is considered among all Indo-Pacific regions (only removing tariffs)

	Oceania	LAmerica Indo-Pacific	EU Indo-Pacific Alliance	India	East Asia	South East Asia	South Asia	North America	Latin America	West Asia	Sub-Saharan Africa	EU-26	ROW
Grain Crops	4.10	0.55	-1.02	-0.49	-2.73	0.16	0.68	4.93	-0.61	-2.55	0.73	0.03	-0.23
Meat Products	7.44	1.00	-1.40	1.45	-1.80	-1.59	-0.74	2.80	-0.86	0.23	0.23	-0.98	-0.36
Extraction	-0.28	0.66	-0.65	-0.59	-0.46	-0.32	-0.53	0.03	0.75	0.40	1.17	0.35	0.35
Processed Food	3.46	0.89	-0.07	-3.63	-0.51	2.90	-2.05	0.53	-0.57	-0.50	0.16	-0.31	-0.71
Textile	-10.28	-4.93	-3.01	2.69	5.36	11.04	6.79	-10.68	-2.91	-15.17	19.25	-4.33	-3.30
Light Manufacturing	-5.59	-3.43	1.51	0.21	0.42	-0.80	-9.54	0.05	0.29	-5.91	-3.43	-0.58	-0.73
Heavy Manufacturing	-0.96	0.64	-0.09	-0.36	-0.14	-0.70	-6.08	0.26	1.01	0.14	1.23	0.50	-0.03
Utility	0.72	0.05	0.50	0.79	0.44	0.74	0.62	-0.02	-0.87	0.89	1.65	-0.60	-0.68
TransComm	-0.05	0.16	-0.11	0.15	0.05	-0.10	0.24	-0.01	0.09	0.65	-0.06	6.14	0.27
Other Services	-0.06	-0.04	-0.14	-0.33	-0.00	-0.53	-0.23	-0.05	0.10	0.11	0.03	0.12	0.19
CGDS	1.16	0.07	1.28	1.40	0.65	1.14	2.68	-0.05	-1.49	1.23	2.60	-1.37	-1.14

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 5.4: Quantity index of value added when free trade is considered among all Indo-Pacific regions (only removed tariffs+ reduced NTBs)

	Oceania	LAmerica Indo-Pacific	EU Indo-Pacific Alliance	India	East Asia	South East Asia	South Asia	North America	Latin America	West Asia	Sub-Saharan Africa	EU-26	ROW
Grain Crops	4.13	0.71	-2.24	-0.66	-3.34	-0.23	0.61	5.29	-0.34	-2.98	0.63	0.39	-0.06
Meat Products	8.21	1.12	-2.04	1.57	-2.00	-1.89	-0.73	2.99	-0.71	0.19	0.37	-0.58	-0.28
Extraction	-0.26	0.69	-1.87	-1.63	-1.19	-0.93	-1.14	-0.32	0.64	0.56	1.19	0.07	0.22
Processed Food	3.49	1.21	-0.40	-3.66	-0.59	2.66	-2.22	0.57	-0.34	-0.42	0.10	0.00	-0.51
Textile	-14.12	-6.52	-4.10	2.25	5.30	12.22	7.32	-12.39	-2.72	-17.30	-20.99	-3.87	-2.68
Light Manufacturing	-7.58	-4.73	1.40	0.24	0.41	-1.21	-11.24	-0.28	0.50	-7.55	-4.29	-0.36	-0.38
Heavy Manufacturing	-2.95	-0.52	-0.52	-0.46	-0.10	-0.66	-8.44	-0.27	1.23	-1.44	0.31	0.35	0.02
Utility	1.30	0.46	1.03	1.37	0.75	1.96	0.85	0.18	-1.40	1.17	2.31	-1.10	-1.20
TransComm	0.02	0.37	-0.04	0.32	0.07	-0.03	0.43	0.05	0.10	1.08	-0.16	0.18	0.36
Other Services	0.07	0.13	-0.10	-0.51	0.05	-0.62	-0.01	0.03	0.10	0.43	0.35	0.16	0.22
CGDS	2.13	0.63	2.42	2.37	1.11	2.83	3.38	0.28	-2.36	1.55	3.85	-2.45	-2.02

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

Table 5.5: Real returns to factors of production when free trade is considered among all Indo-Pacific regions

	Removing Tariffs					Removing Tariffs and Reducing NTBs				
	Land	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**	**Land**	**Unskilled Labor**	**Skilled Labor**	**Capital**	**Natural Resources**
Oceania	17.28	0.56	0.51	0.43	-1.41	18.83	1.05	1	0.87	-0.86
Latin America Indo-Pacific	2.73	0.2	0.11	0.26	4.71	3.77	0.65	0.54	0.68	5.45
EU Indo-Pacific Alliance	-2.64	0.67	0.62	0.63	-3.68	-4.81	1.12	1.08	1.1	-11.3
India	1.5	1.25	1.12	1.06	-2.8	1.67	1.86	1.74	1.6	-9.16
East Asia	-7.68	0.66	0.74	0.71	-2.72	-8.91	1.02	1.15	1.09	-7.84
South East Asia	0.55	1.06	0.76	0.89	-1.26	-0.35	2.19	1.88	1.97	-4.42
South Asia	3.09	1.55	1.23	1.07	-2.49	3.37	2.08	1.88	1.6	-6.17
North America	15.9	0.12	0.13	0.18	0.36	17.22	0.28	0.33	0.35	-2.1
Latin America	-2.53	-0.32	-0.2	-0.22	5.31	-1.87	-0.44	-0.28	-0.32	4.38
West Asia	-5.09	1	1.69	1.75	4.6	-5.65	1.5	2.45	2.37	6.4
Sub-Saharan Africa	3.5	1.34	1.27	1.49	9.65	3.92	1.91	1.96	2.07	10.33
EU-26	-1.68	-0.26	-0.19	-0.2	2.16	-0.81	-0.41	-0.31	-0.35	0.1
ROW	-1.19	-0.36	-0.21	-0.24	2.33	-0.83	-0.51	-0.37	-0.44	1.13

Source: Authors' own simulations via GTAP 10. Note: Latin America, EU-26 and ROW are not part of simulations

There still seem to be gains for India and the results are similar to other scenarios but the maximum gains can be observed only when China is not part of the alliance.

Further, it can be seen that heavy subsidies are given for agriculture sector, developed and developing economies alike. If we liberalize our agricultural sector with African countries, there will be gains in terms of welfare. However, if we align with North American and EU region in terms of agricultural trade there can be losses as well due to them providing heavy subsidies to the agricultural sector making us non-competitive in the International markets. If we analyse for India, land is abundant but since prices are going up in the urban sector, we are expanding our production in the rural areas. Land seems to be scarce in the urban areas of India. Further, when distortions are removed, allocative efficiency is the key factor responsible for all the changes.

Our trade balance becomes negative in all the scenarios. This may be due to our exchange rate, which may be overvalued and may require realignment or India may be importing heavily natural resource intensive products from the rest of the world. It may be that we are also lagging behind in the productivity growth of coal, petroleum and minerals extraction.

Overall, the results of this study reveal that Indo-Pacific alliance centroid seems to be ASEAN because of our economic and strategic gains safeguards, while if India aligns with the African nations it is more of economic gains due to freer trade with the region. Economic interest lies when free trade is considered among all the Indo-Pacific partners. India did not sign the RCEP treaty because there was a role of non-tariff measures to safeguard interests of the MSMEs and tackle the potential trade deficit with the countries of the east.

6. Concluding remarks

The Indo-Pacific alliance seems to be a strategic alliance. The ASEAN centrality remains when India looks to the east because of the economic advantages and safeguarding of the country's maritime security. The Indo-Pacific region has huge potential as it also has countries from Sub-Saharan African region, which are rich in natural resources and if we potentially align with them with deeper commitments on trade and capital flows, our returns to natural capital can turn out to be positive. Further, agricultural trade liberalization and freer trade between India and Sub-Saharan African region can bring relatively more gains to the region in terms of welfare, value of GDP and in promoting manufacturing and textiles in the Sub-Saharan African region. The back of the envelop GTAP simulation results further show

that Chinese aid and investments have had detrimental impact on the Sub-Saharan African region in terms of value of GDP and manufacturing growth processes. In the present study, we have considered four simulation scenarios where in India gains the most in terms of welfare, value of GDP and real GDP when we bilaterally liberalize in terms of tariff and non-tariff barriers with the 45 Indo-Pacific alliance countries. The later helps us to be part of the QUAD alliance whose motive seems to be more tilted towards strategic alliance rather than trade agreement. Again the background simulation results have shown that the Indo-Pacific alliance seems to provide us higher relative welfare as compared to India aligning with ASEAN 10, RCEP, CP-TPP, SCO, GCC, the EU, G-20, the US, the UAE, Singapore and our other top trading partners. Further, services and investment liberalization would bring larger dividends in terms of welfare and real GDP for all nations in the Indo-Pacific alliance. The fact remains that India gains the most in terms of welfare, value of GDP and real GDP when India liberalizes multilaterally with all nations of the world under the aegis of the World Trade Organization (WTO). Therefore, we suggest as a roadmap that let India adopt two-pronged strategy: first, continue with strengthening economic partnership with the sub-regions such as BIMSTEC, SAARC, ASEAN, IORA, etc., and second, build greater trade integration with the entire Indo-Pacific group. The welfare effects of aligning with such sub-regions can further be analysed in detail in our future research.

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Appendix I

Description of Products

Product Category	Products
Grain Crops	Paddy Rice, Wheat, Cereal Grains, Vegetables, Fruits, Nuts, Oil Seeds, Sugar Cane, Sugar Beet, Plant Based Fibres, Crops, Processed Rice
Meat and Meat Products	Bovine Cattle, Sheep and Goats, Animal Products, Raw Milk, Wool, Silk-Warm Cocoons
Extraction	Forestry, Fishing, Coal, Oil, Gas, Minerals
Processed Food	Vegetable Oils and Fats, Dairy Products, Sugar, Food Products, Beverages and Tobacco Products
Textile	Textiles, Wearing Apparel
Light Manufacturing	Leather Products, Wood Products, Paper Products, Publishing, Motor Vehicle and Parts, Transport Manufactures
Heavy Manufacturing	Petroleum and Coal Products, Chemical Products, Basic Pharmaceutical Products, Rubber & Plastic Products, Mineral Products, Ferrous Metals, Metal Products, Computer, Electronic & Optic, Electrical Equipment, Machinery & Equipment

Region and Country Description of the Indo-Pacific Alliance Countries

Oceania	Australia, New-Zealand and all the Pacific Island
Latin America Indo-Pacific	Chile, Columbia, Ecuador, Peru
EU Indo-Pacific Alliance	France, Germany
East Asia	China, Hong-Kong, Taiwan, Magnolia, Japan, South-Korea
South East Asia	Brunei, Cambodia, Indonesia, Laos, Malaysia the Philippines, Singapore, Thailand, and Vietnam.
South Asia	Bangladesh, Sri-Lanka, Nepal, Pakistan
North America	Canada, USA, Mexico
Latin America	Countries other than above in the Indo-Pacific Region
West Asia	Iran, Oman, United Arab Emirates and Rest of Western Asia
Sub-Saharan Africa	Kenya, Madagascar, Mauritius, Mozambique, Tanzania, South Africa, Rest of Western Africa
EU – 26	Rest of the EU countries apart from France and Germany which are part of Indo-Pacific

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