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Exploring India's Trade Potential and Commodities for Future Trade with SAARC Economies: A Quantitative Analysis Using Augmented Gravity Model of Trade

Md Kamrul Islam[1], Alamgir Hussain[2], Samar Das[3], Salina Akther[4]
[1]Senior Research Fellow
Department of Economics, Tripura University (A Central University), Suryamaninagar, Tripura, India, 799022
Email ID: kamrulamu@gmail.com
ORCID ID: https://orcid.org/0000-0002-8696-6425
[2]Senior Research Fellow (Political Science), Aligarh Muslim University (A Central University), Aligarh, Uttar Pradesh, India, 202002
Email:alamgirhussainamu@gmail.com
ORCID ID: https://orcid.org/0009-0000-6390-5876

[3]Research Scholar, Department of Economics, Tripura University, Tripura, India.
Email: samar.das.9856@gmail.com , ORCiD ID: 0009-0007-2876-700X

[4]Research Scholar, Department of Economics, Tripura University, Tripura, India, 799022
Email ID: salinaaktheramu@gmail.com,
ORCID ID: https://orcid.org/0009-0008-9872-730X

Corresponding Author: Samar Das, Research Scholar, Department of Economics, Tripura University, Tripura (A Central University), Suryamaninagar, Tripura West, India, 799022,
Email: samar.das.9856@gmail.com , ORCiD ID: 0009-0007-2876-700X

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Abstract

Purpose: This study aims to explore the factors affecting trade and determine the potential trade prospects between India and other South Asian Association for Regional Cooperation (SAARC) economies.

Methodology: The study employed the augmented gravity model, speed of convergence, along with Revealed Comparative Advantage (RCA) and Revealed Import Dependence (RID) indices to analyze trade determinants and identify trading potential and viable commodities for trade between the countries.

Findings: The results from the panel gravity model of trade reveal that most variables exhibit the expected sign and are statistically significant, confirming the applicability of the gravity model of trade. The speed of convergence indicates that during the pre-SAFTA period, India has untapped trade potential with five SAARC members (Bangladesh, Maldives, Nepal, Pakistan, and Sri Lanka), while experiencing overutilized trade potential with Bhutan. However, in the post-SAFTA period, India demonstrated underutilized trade potential with all SAARC members. Moreover, in the comparison of India's RCA with RID of Bangladesh, Nepal, Pakistan, and Sri Lanka, commodities like food and live animals, raw materials, and manufactured goods stand out as particularly suitable for trade between India and these specific economies.

Originality: To the best of the authors' knowledge, there is a lack of studies regarding India's trade potential and the identification of commodities with future trade prospects among SAARC economies. Therefore, our study aims to address this gap and make a contribution to the existing literature in this field.
Key Words*: Trade Potential, Gravity Model of Trade, Revealed Comparative Advantage, Revealed Import Dependence, SAARC.*

1 Introduction

In the domain of trade theories, international trade is frequently conceptualized as the foundation of an economy. The benefits inherent in international trade include the wise allocation of resources, the increased availability of goods at reduced costs, and the expanding range of options for consumption. Over the years, countries all over the world have established regional trading blocs to facilitate trade within the region. The European Union is one of the best examples of a successful group of countries considerably impacting regional trade and the world economy. Similarly, the "South Asian Association for Regional Cooperation (SAARC) was established in 1985, initially consisting of seven[1] members, and Afghanistan later became a member in 2007. This was an important step taken by South Asian countries in the 20th century to foster regional cooperation. During the 1990s, the widespread emergence of regional trade agreements and global economic liberalization culminated a consensus among SAARC nations to expand their trade integration. After the first round of negotiation "South Asian Preferential Trade Agreement" (SAPTA) was agreed upon in 1993 and became effective in December 1995. At the 12th SAARC summit, held on January 6th, 2004, in Islamabad, the member states of SAARC agreed upon to form the "South Asian Free Trade Area" (SAFTA) and went into force on January 1, 2006. Today, SAARC is a vibrant, rapidly expanding regional organization aiming to address its diversity, expansion and to foster regional cooperation regarding issues about economics, society, and culture. The Indian economy plays a dominant role in the SAARC region due to its enormous population, substantial gross domestic product (GDP), and considerable proportion of total trade. The economies of Pakistan, Bangladesh, and Sri Lanka, which are of medium size, contribute a relatively small trade share. While the economies of Maldives, Bhutan, and Nepal within the SAARC region are comparatively small resulting in negligible contributions to the overall trade dynamics in the region. Economic cooperation between geographically close countries is universally praised as a means of accelerating economic development. The level of intra-regional trade within SAARC is currently low, indicating limited economic exchange among member nations. It is widely believed that promoting and enhancing trade can play a vital role in driving the growth and development process of the region. The potential for increased trade within SAARC holds significant importance as it can serve as a catalyst for economic progress and overall development in the region. This study seeks to examine India's trade potential with SAARC economies and identifying potential commodities for trade between India and other SAARC member nation with the help of standard methodologies. The study is organized as: after the introductory first section, the study presents a brief review of literature on gravity model of trade, revealed comparative advantage, and revealed import dependence indices along with research gap in section 2. Data sources and methodology provided in section 3. The empirical results and discussion presented in section 4, followed by Conclusions in section 5.

2 Review of Related Literature

In this section, a brief overview of relevant research is presented, organized into two distinct subsections. Section 2.1 presents an analysis of studies related to trade potential based on the gravity

[1] "Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka"

model of trade, while section 2.2 offers a comprehensive examination of utilizing the revealed comparative advantage (RCA) and revealed imports dependence indices.

2.1 Trade Potential and Gravity Model of Trade

Batra, (2004) employed the gravity model to assess the trade potential of India with its various partner nations. The findings showed that India's trade potential was highest in the Asia-Pacific region, with considerable potential in Western Europe and North America. Specifically, the analysis underscored huge opportunities for trade expansion, particularly with countries such as China, the UK, Italy. Similarly, Agrawal and Sangita, (2017) also used gravity model to estimate the predicted trade or potential trade between India and Central Asian countries. The study utilized Pooled OLS and Random Effect Model (REM) where the random effects model with time-fixed effects has been chosen as the preferred model for the analysis. Based on their study, they suggested that the trade volume between India and Central Asia in 2015 has the potential to be considerably higher, with estimates ranging from six to ten times greater than the current actual volume. Nevertheless, political unrest in nations along the direct trade route poses a significant obstacle to trade in this area. Accordingly, the study reevaluates the trade potential by examining alternative routes via Iran and China. The findings reveal that despite these challenges, the potential for increased bilateral trade between India and Central Asia remains favorable. Subsequently, Sharma and Kumar, (2021) employed the augmented gravity model to assess the trade potential among South Asian member countries. Using the Random Effect Model (REM) to estimate the augmented gravity model equation, the researchers identified the determinants of trade in India, favoring REM over the Fixed Effect Model (FEM) due to a higher number of cross-sections compared to the time period considered. The study calculated trade potential by subtracting predicted trade flows (derived from the gravity model) from actual trade flows. They observed that between 1992 and 1997, the trade potential of India was highest with Nepal, followed by Pakistan, Sri Lanka, and Bhutan. However, from 1998 to 2003, India's highest total trade potential shifted to Pakistan. In recent years, particularly between 2010 and 2014, India's highest potential for trade was observed with Bangladesh and Sri Lanka. Further, Ray et al., (2023) uses the structural gravity model to measure India's potential trade with Regional Comprehensive Economic Partnership (RCEP) as a block and individually with China, Australia, and New Zealand. It finds that India has more potential for expansion of exports than imports with RCEP as a block and specifically with China, Australia, and New Zealand. The predicted exports with RTA (Regional Trade Agreement) are significantly more compared to exports without RTA, indicating that India has not fully utilized the benefit of the RTAs yet. In the case of imports from RCEP countries, the predicted trade with RTA and without RTA are converging, with the level of predicted import higher than the present level of import. The ratio between potential and actual exports in the case of India and Australia is 1.4:1, indicating that India's exports to Australia are not growing as per their potential. Indian exports to China are not growing as per their potential, possibly due to non-tariff barriers and lack of competitiveness of Indian exporters. The study identifies sectors with high potential for India's exports, such as wheat, petroleum, and coke (till 2013), coal, beverage, and tobacco products.

Regarding bilateral trade potential between Pakistan and its trade partner a study conducted by Irshad et al., (2018) to estimate Pakistan's bilateral trade potential with China using a gravity model of trade. The findings indicate a substantial trade potential for Pakistan to enhance its trade relations with China. The study highlights the necessity for Pakistan to enhance its domestic supply capability and broaden its export base to promising economies, specifically China. Furthermore, the study advocates for dialogue between Pakistan and China aimed at reducing tariff barriers on Pakistani imports and granting additional market access to Pakistani products. Similarly, Irshad and Anwar, (2019) sought to investigate Pakistan's bilateral trade relationships with 198 trading partners over a span of 25 years, aiming to identify potential new markets for the country. They employed the gravity model approach

to analyze empirical results, revealing several factors that positively influenced Pakistan's bilateral trade volume. Regarding Pakistan's bilateral trade potential with the rest of the world, the analysis indicates that Pakistan has significant opportunities to enhance its trade relations with approximately 102 countries. Among these, the highest potential is observed with countries such as Saudi Arabia, Malaysia, Somalia, Hong Kong, Iran, and the USA. However, the actual trade volumes have surpassed expectations with countries like China, Oman, Spain, UAE, Germany, and the UK. These findings highlight the fact that Pakistan is currently focusing on trade with partners whose potentials have been largely tapped, emphasizing the importance of diversification and exploration of untapped opportunities. More recently Masood *et al.,* (2023) examines Pakistan's trade potential with South Asian countries using an augmented Gravity Model approach. The findings indicate substantial trade potential between Pakistan and South Asian countries, including Afghanistan (1.011%), Bangladesh (1.618%), India (1.280%), Maldives (0.881%), Nepal (1.160%), and Sri Lanka (0.909%). The highest potential is observed with India, attributed to the absence of a Free Trade Agreement (FTA) between Pakistan and India. Conversely, the lowest potential is with Sri Lanka, as Pakistan has already achieved its trade potential through an existing FTA. Hence, the study concludes that a multilateral trade agreement needs to be established among South Asian countries to enhance the economic well-being of billions of people. On the other hand, Bangladesh's trade potential with its major trading partners examined by Masudur and Arjuman, (2010) with the help of dynamic gravity model. The study finds that a large part of Bangladesh's potential trade remains unrealized. Bangladesh tends to trade more with larger economies, especially for imports from developing economies. The rising trade transaction cost is identified as a major barrier to trade potential realization in Bangladesh. Liberalization of non-policy barriers and improvement in infrastructure to reduce trade transportation costs are suggested as necessary steps to unleash Bangladesh's trade potential.

2.2 Revealed comparative advantage (RCA) and revealed import dependence (RID) indices.

Raghurampatruni et al., (2021) used indices like Export Intensity Index (EII), Import Intensity Index (III), Revealed Comparative Advantage (RCA) index from 1995-2018 to analyze the trade relations between India and other South Asian countries. The study observed that there is an increasing export intensity and import intensity of trade between India and the other South Asian countries. The study suggests that there is untapped trade and investment potential that could be tapped by strengthening the regional block of SAARC. Similarly, Sadhna (2016) used Revealed Comparative Advantage (RCA) and Trade Intensity Index (TII) to analyze the trade potential between India and Bhutan, considering exports, imports, and total trade. The study found that India's trade with Bhutan has been increasing year after year, and India has become Bhutan's largest trading partner. The trade intensity index (TII) indicates that India has strong and sustainable trade intensity with Bhutan, although there have been fluctuations in the intensity rate over time. Thus, the study suggests that India has full trade potential and prospects with Bhutan, but efforts should be made to develop trade specialization in products to enhance the level of integration. The studies by Taneja and Wani, (2014) and Ismail and Ahmed, (2022) offer valuable insights into the dynamics of comparative advantage between India and China. Taneja and Wani use of the Revealed Comparative Advantage (RCA) and Revealed Import Dependence (RID) indices from 1995 to 2011 suggests the existence of a mutually beneficial and economically profitable alliance between India and China. Despite facing internal challenges and non-economic issues, the findings emphasize a complementary interdependence through bilateral trade relations. On the other hand, Ismail, and Ahmed's analysis of the patterns of RCA for India and China, especially since 2000, reveals a consistent maintenance of comparative advantage by both countries. However, the study also points to a minor structural shift in RCA over time, challenging the conventional understanding of a purely competitive or complementary relationship in the global market between India and China. Furthermore, Ibrahim, (2015) focus on trade complementarity and similarities between Nigeria and India, identifies numerous commodities with potential for increased trade. These commodities include mineral fuels, organic chemicals, agricultural products, and textiles.

In case India-BRICS trade Dhami and Sidana, (2020) examine the trade potential of India within the BRICS framework, using the approaches of Revealed Comparative Advantage (RCA) and Revealed Import Dependence (RID). Their findings identify specific commodities where India has a comparative advantage over South Africa, China, and Brazil. Meanwhile, Singh's (2016) studies on intra-BRICS trade show a substantial increase in the share of BRICS countries in global commodity trade, with China playing a dominant role. However, the study indicates a decline in intra-BRICS trade intensity by 2015, particularly for major BRICS nations. Subsequently, the analysis conducted by Maryam and Mittal, (2018) explores the trade flows between BRICS and the EU, revealing considerable bilateral trade. It highlights Russia's emergence as a key trading partner. The comparative analysis emphasizes the distinct comparative advantages of Brazil and Russia in natural resource-based products, and India and China in manufactured and processed goods.

The literature review demonstrates that most studies on India-SAARC trade focus on analyzing the trend, pattern, challenges, and impediments in bilateral trade between India and other South Asian nations. There needs to be more research that explicitly addresses India's trade pattern with SAARC economies, and it is on this basis that the present study is based. This study, therefore, contributes to the expanding body of literature in the field of international economics, specifically focusing on the dynamics of India-SAARC trade. It accomplishes this by examining India's trade potential with SAARC economies and identifying potential commodities for trade between India and other SAARC countries.

3 Data and Methodology

3.1 Data

In this study the trade statistics required for the study are extracted from various secondary sources. These sources include the Department of Trade Statistics under the Ministry of Commerce and Industry of the Government of India, World Development Indicators maintained by World Bank, Asia Economic Integration Centre maintained by the Asian Development Bank, World Integrated Trade Solution provided by the UN COMTRADE database, International Monetary Fund, as well as data from Statistical Yearbook of the Asia and Pacific, World Development Report, Direction of Trade Statistics, and UNCTADSTAT database, CEPII, among others. The study examines a time period of 32 years, from 1990 to 2021, and employs trade indices as well as various statistical and econometric tools to analyze the data.

3.2 Methodology

In this study, three different sets of methodologies are employed- gravity model of trade, revealed comparative advantage and revealed import dependence indices.

3.2.1 Panel Gravity Model of trade

The origin of the gravity model can be traced back to one of the most significant works of Isaac Newton - the 'Philosophiae Naturalis Principia Mathematica' (1687). Newton, often revered as the 'patron saint of physics,' introduced the law of gravitational force in this work. This law states that the attractive force between two particles or bodies is directly proportional to their masses and inversely proportional to the square of the distance between them, measured from the center of each body involved in the interaction (Gron, 2018).

$$F = G \frac{m_1 \times m_2}{r^2} \quad (1)$$

Here, F stands for the forces between two objects, G stands for gravitational constant term and m_1 and m_2 are the masses of the two objects and r^2 is the square of the distance between the bodies.

The gravity model of international trade was introduced and explained by Tinbergen (1962) in his piece of work titled 'Shaping the World Economy.' In this model, 'Force' is substituted with 'Trade,' and instead of using 'mass' for objects or particles, it employs the 'GDP' (Gross Domestic Product) of the respective countries. Thus, the basic gravity model of trade suggests that the trade flow between two countries is determined by the size of their respective economies, as measured by GDP, and the

distance between them, which serves as a proxy for trade costs. The following equation represents the basic gravity model of trade:

$$Trade_{ijt} = g\frac{M_{it} \times M_{jt}}{D_{ij}} \quad (2)$$

Here, $Trade_{ijt}$ represent trade between country i and country j at time t, M_i and M_j are the size of the economy for country i and j respectively, D_{ij} is the distance between country i and j and G is the gravitational term. The basic gravity equation can be expressed in a linear form as follows:

$$lntrade_{ijt} = lng + lnM_{it} + lnM_{jt} + lnD_{ij} + \sigma_{ij} \quad (3)$$

Over the time, the basic gravity model has been augmented to include additional variables, such as GDP per capita, GDP per capita differences, Exchange rate, free trade agreements, etc. These additional variables help to explain the factors that influence trade flows beyond just economic size and distance. These explanatory variables can be further categorized into two types: autogenous variables, such as GDP, per capita GDP, and per capita GDP difference, exchange rate etc. which directly impact trade flows, and virtual variables like language, culture, free trade agreements (FTA), and regional trade agreements (RTA), which also play a significant role in influencing trade. Consequently, the augmented gravity equation has seen notable progress and application in various studies related to trade, treaties, and international agreements. The study employed the following augmented form of gravity model:

$$\begin{aligned} lnTT_{ijt} = \alpha + \beta_1 ln(GDP_{it}GDP_{jt}) + \beta_2 ln(PCGDP_{it}PCGDP_{jt}) + \beta_3 ln\left(PCGDPD_{ijt}\right) + \\ \beta_4 ln\left(Distance_{ijt}\right) + \beta_5 ln(ER_{it}) + \beta_6 ln(ER_{jt}) + \beta_7 ln(TO_{it}) + \beta_8 ln(TO_{jt}) + \\ \beta_9(Border_{ij}) + \beta_{10}(FTA) + \beta_{11}(Lang) + \mu_{ijt} \end{aligned} \quad \text{Eq. (4)}$$

Table 1 explains details about the variables like full form of the variables, their expected sign, and data sources.

Table 1: Variables and their expected sign and Data Sources

Variables	Expected Sign	Data Sources
GDP_{ijt} =Gross Domestic Product (GDP) of country i and j, at time t	+ve	WDI
$PCGDP_{ijt}$ =GDP Per Capita of country i and j, at time t	+ve	WDI
$Distance_{ijt}$ =Distance between country i and j, at time t	-ve	CEPII
$PCGDPD_{ijt}$ =Per Capita GDP Differential of country i and j, at time	+ve or -ve	WDI
TO_{ijt} =Trade Openness measure as a trade-GDP ratio, at time t	+ve	WDI
ER_{ijt} =Exchange Rate based on US Dollar, at time t	+ve or -ve	IMF
$Border_{ij}$ =Common Border between country i and j, at time t	+ve	CEPII
$Language_{ij}$ =Common Language between country i and j, at time t	+ve	CEPII
FTA_{ij} =Free Trade Agreement between (Active) country i and j, at time t	+ve	ADB
TT_{ijt} = Total Trade between i and j, at time t	-	IMF

3.2.1.1 Analytical Techniques

In international trade there are multiple factors that affect trade between countries, which leads to the existence of unobserved variations when estimating determinant variables (Martinez and Lehmann, 2003). In order to tackle this issue, panel data is utilized for regression analysis because panel data proves to be effective in examining factors that may not be readily observable (Egger, 2002). In the existing literature, when working with panel data, three estimation techniques are commonly employed: pooled (OLS), fixed effects, and random effects approaches. Among these the two most widely used models for estimating panel data are the random effects model (REM) and the fixed effects model (FEM) (Gujrati, 2007). However, Ordinary Least Squares (OLS) models are efficient but exhibit bias as they overlook individual variations within the model. In Fixed Effects (FE) models,

variables that remain constant over time (such as distance, borders, FTA, and common language) typically cannot be estimated using accompanying coefficients. The purpose of this study is to determine the variables that remain constant over time as well as those that change over time in affecting India's trade with SAARC economies. Consequently, we prefer the Random Effect Model over the Fixed Effect Model, which is also supported by the Hausman test. However, in the domain of panel data analysis, pool (OLS), fixed effects, and random effects approaches face challenges when dealing with the presence of both zero trade flows and logarithm transformation of the gravity equation. To address the above-mentioned issues, Santos Silva and Tenreyro, (2006) suggest a solution by advocating for the use of non-linear estimators, specifically the Poisson Pseudo Maximum Likelihood (PPML) estimation technique. According to their logic, the PPML method not only ensures consistency in the presence of heteroscedasticity but also adeptly handles scenarios involving zero trade flows and argue that the PPML estimator is a suitable approach for estimating gravity equations. Accordingly, in our study we used both random effect model as well as PPML estimation technique in order to address the above-mentioned issues and validate our estimated results. Furthermore, in the estimation process, when we suspect multicollinearity in equations (4), to mitigate this concern, we divide the equations into two separate versions, in which highly correlated variables appear separately. The two different version of equations (4) are outlined as follows:

$$lnTT_{ijt} = \alpha + \beta_1 ln(GDP_{it}GDP_{jt}) + \beta_2 ln\left(Distance_{ijt}\right) + \beta_3 ln(ER_{it}) + \beta_4 ln(ER_{jt}) + \beta_5 ln(TO_{it}) + \beta_6 ln(TO_{jt}) + \beta_7(Border_{ij}) + \beta_8(FTA) + \beta_9(Lang) + \mu_{ijt} \quad 4\ (a)$$

$$lnTT_{ijt} = \alpha + \beta_1 ln(PCGDP_{it}PCGDP_{jt}) + \beta_2 ln\left(PCGDPD_{ijt}\right) + \beta_3 ln\left(Distance_{ijt}\right) + \beta_4 ln(ER_{it}) + \beta_5 ln(ER_{jt}) + \beta_6 ln(TO_{it}) + \beta_7 ln(TO_{jt}) + \beta_8\left(Border_{ij}\right) + \beta_9(FTA) + \beta_{10}(Lang) + \mu_{ijt} \quad 4\ (b)$$

3.2.2 Trade Potential

Several studies use point-estimated coefficients for explanatory variables to calculate the predicted trade potential using the gravity model. In this study, trade potentials have been determined using the concept of speed of convergence. The concept of speed of convergence introduced by Jakob et al., (2000) as an alternative to the traditional method for calculating potential trade. The speed of convergence is characterized as the average growth rate of potential trade divided by the average growth rate of actual trade observed over the years.

$$Speed\ of\ Convergence\ (SC) = \left(\frac{Average\ growth\ rate\ of\ potential\ trade}{Average\ growth\ rate\ of\ actual\ trade}\right) \times 100 - 100$$

3.2.3 Potential commodities for trade between India and other SAARC member nations: To identify the tradeable commodities between India and other SAARC member nation, we used Revealed Comparative Advantage (RCA) index and the Revealed Import Dependent (RID) index.

Revealed Comparative Advantage (RCA) Index

The RCA is a crucial innovation of Balassa (1965, 1986) for measuring a country's degree of trade specialization. A number of studies have applied this index to ascertain the comparative trade performance of a country in relation to a particular commodity/sector (e.g. Batra and Khan, 2005; Khan and Ahmad, 2017; Archana, 2019). **Calculating the RCA index of a country for a given product involves dividing the share of that product in the country's total exports by the share of that product in the world's total exports. It is computed as:**

$$RCA_{ik}{}^{(t)} = \left(\frac{x_{ik}{}^{(t)}}{X_i{}^{(t)}}\right) / \left(\frac{x_{wk}{}^{(t)}}{X_w{}^{(t)}}\right)$$

Where $RCA_{ik}{}^{(t)}$ stands for revealed comparative advantage for country 'i' in product 'k' at time t; $x_{ik}{}^{(t)}$is country i's exports of product k at time t; $x_{wk}{}^{(t)}$ is the world exports of product k at time t; $X_i{}^{(t)}$ is country i's total exports, and $X_w{}^{(t)}$ is the world total exports. The RCA index ranges from 0

to + ∞. A country is considered specialized if the RCA of a particular product class is greater than one (Granabetter, 2016). Contrarily, if the value is less than one, it signifies that the country has comparative disadvantage. The RCA index is computed to determine the commodity classes in which both India and other SAARC nation enjoy export competitiveness.

Revealed Import Dependence (RID) Index

The RID index identifies a country's import dependence on a particular product category (Raghuramapatruni, 2012; Wani and Dhami, 2014). It is often referred to as the Revealed Comparative Disadvantage (RCD) index. While the RID highlights a country's relative disadvantage in a given product class, the RCA highlights the comparative advantage. **Calculating the RID index of a country for a given product involves dividing the share of that product in the country's total imports by the share of that product in the world's total imports. It is calculated as:**

$$RID_{ik}^{(t)} = \left(\frac{m_{kj}^{(t)}}{M_j^{(t)}}\right) / \left(\frac{m_{kw}^{(t)}}{M_w^{(t)}}\right)$$

Where, $m_{kj}^{(t)}$ stands for imports of product k from country j at time t, $M_j^{(t)}$ denotes the total imports of country j at time t, $m_{kw}^{(t)}$ is the total value of world imports of commodity k and $M_w^{(t)}$ is the total world imports in the t-year.

4 Empirical Result and Discussion

4.1 Estimated results for gravity model of trade: In this section the empirical result of the gravity model of trade estimated through Random Effect model and PPML estimation approach presented in Table 2 as follows:

Table 2: Empirical Results for Gravity Model of Trade (lnT_{ijt})

Estimation Technique	Random Effect Model		PPML- Model	
Independent Variables	Coefficient Eq.4 (a)	Coefficient Eq. 4 (b)	Coefficient Eq.4 (a)	Coefficient Eq. 4 (b)
$ln(GDP_{it}GDP_{jt})$	0.579***	-	0.872***	-
	(0.00)		(0.00)	
$ln(PCGDP_{it}PCGDP_{jt})$	-	0.505***	-	0.885***
		(0.00)		(0.00)
ln $(PCGDPD)_{ijt}$	-	2.147***	-	2.489***
		(0.00)		(0.00)
$lnDistance$	-1.675**	-2.231***	-0.981	-2.778***
	(0.01)	(0.00)	(0.20)	(0.00)
$lnER_{it}$	0.467	2.483***	1.114**	3.862***
	(0.23)	(0.00)	(0.02)	(0.00)
$lnER_{jt}$	-0.140	-1.363***	-2.037***	-3.517***
	(0.65)	(0.00)	(0.00)	(0.00)
$lnTO_{it}$	0.873***	1.114***	0.614***	0.575***
	(0.00)	(0.00)	(0.00)	(0.00)
$lnTO_{jt}$	0.230*	0.150	0.140	-0.434**
	(0.05)	(0.19)	(0.45)	(0.02)
Border	-0.402	-1.528***	1.119***	-0.245
	(0.11)	(0.00)	(0.00)	(0.36)
FTA	1.081***	1.301***	3.468***	4.082***
	(0.00)	(0.00)	(0.00)	(0.00)
Language	0.385	2.673***	1.540***	4.852***
	(0.23)	(0.00)	(0.00)	(0.00)
Constant	-16.669**	6.528	-33.064***	9.086
	(0.01)	(0.24)	(0.00)	(0.11)

R-squared (Overall)/ Pseudo R-squared	0.89	0.89	0.89	0.87
Observation	192	192	192	192

Notes: Coefficient with *, **, and *** denotes statistically significant at 10%, 5% and 1% level of significance respectively

The empirical findings of the gravity model of trade, as determined by the Random Effect model and PPML estimation approach presented in Table 2, are discussed below:

The analysis shows that the economic size (GDP) of trading country (India) as well as partner country (SAARC) was found to be positive and statistically significant at 1 percent level of significance, which clearly follow the theoretical foundation of gravity model. Our findings indicate that a 1 percent increase in the combined GDP of India and SAARC countries leads to an increase in bilateral trade volume ranging from approximately 0.57 percent to 0.87 percent, (maximum and minimum coefficient value) by using different estimation technique. It's worth noting that the random effects model (REM) tends to project a slightly lower rate of increase compared to the Poisson Pseudo Maximum Likelihood (PPML) method. While GDP per capita acts as a reliable indicator for evaluating the level of development and the presence of necessary infrastructures for facilitating trade. Accordingly, as countries become more developed, there tends to be an increase in trade between them, (Frankel,1993; Banik and Gilbert, 2010). Hence, in our model estimation, the coefficient associated with the product of GDP per capita is statistically significant and demonstrates a positive impact, thereby confirming the above statement. Specifically, a 1 percent increase in the product of GDP per capita leads to an increased in total trade from 0.50 to 0.88 percent. Similarly, the impact of GDP per capita difference was found to be positive and statistically significant at 1 percent level of significance i.e., a 1 percent increase in GDP per capita differences leads to an increased in total trade from 2.14 to 2.48 percent. This presence of a positive relationship between India's trade and GDP per capita difference implies the link between technological advancement and the bilateral trade dynamics involving India and its trade partners. Therefore, our estimated result provides evidence for the validity of the H–O hypothesis. The findings of this study is in line with other studies like Carrillo and Li, (2002); Kumar and Ahmed, (2014). Carrillo observed that the impact of GDP per capita differences was adverse for homogeneous product categories but became positive and statistically significant for differentiated product categories in Latin America and Kumar and Ahmed observed that the impact of per capita GDP differences is positive and statistically significance between India and Bangladesh trade. The study revealed that geographical distance between India and other SAARC countries has a negative impact on India's trade volume as longer the distance lesser the trade volume, which is aligning with what was expected based on theory, a 1 percent rise in distance decrease the trade volume from 1.67 to 2.77 percent, maximum calculated by PPML and minimum by RE model. This finding offers substantial evidence in favor of the hypothesis that transportation costs play a crucial role in shaping trade patterns between India and its trade partners. This suggests that India exhibited a stronger inclination to engage in more active trade with its neighboring countries, where transportation costs were lower, compared to those situated farther away. This is in line with the result obtained by Orindi, (2011); Irshad et.al., (2018); Modeste, (2011); Hibbert et al., (2012); Makochekanwa and Chimombe, (2017); Ibrahim and Ahmed, (2017), where Orindi identified that geographical distance, among other variables, had an adverse impact on the volume of trade between Kenya and its trading partners and Irshad observed that a 1 percent increase in distance between Pakistan and FTA member countries, Pakistan's exports decrease by 0.21 to 1.20 percent. In our estimation, it has been observed that the impact of India's exchange rate is positive and statistically significant. This positive coefficient associated with the exchange rate suggests that India's trade is closely associated with the appreciation or deprecation of its currency. While the coefficient of the partner country's exchange rate exhibits a negative and statistically significant impact on India's trade volume in all of the models, regardless of whether the RE or PPML estimation

technique is employed. This observation aligns with the results of Karamuriro and Karukuza, (2015); Kaur and Nanda, (2010) research, where Karamuriro observed a positive and statistically significant relationship between Uganda's devaluation of currency and its trade volume, while Kaur and Nanda, found that the coefficient of other SAARC country's exchange rate is negative and statistically significant with India' trade volume. Trade openness of India and SAARC member nations has a positive and significant impact on India's trade volume. Specifically, a 1 percent increase in India's trade openness level results in a bilateral trade volume increase ranging from 0.57 percent (maximum calculated by RE) to 1.11 percent (minimum calculated by PPML). Similarly, a 1percent increase in trade openness in SAARC countries leads to a bilateral trade volume rise of approximately 0.14 to 0.23 percent. The coefficient of common border shows negative effect on India's trade indicating lower trade with bordering countries which contradict with the principles of the gravity model of international trade. This is because of the fact that there are huge variations in the comparative advantages and economic structures of India and its SAARC neighbors. As some of the SAARC member nations have industries that directly compete with Indian exports, in this situation the common border might expose Indian products to stronger competition, potentially affecting the export market share. Despite having a common border, there might be non-physical barriers to trade such as geopolitical issue, tariffs, non-tariff barriers, and regulatory differences that hinder Indian exports. Political tensions or diplomatic issues among SAARC nations can also hinder the free flow of goods, impacting India's exports. Disparities in transportation, logistics, and border facilities can create bottlenecks that hinder the smooth flow of Indian exports, even with a common border. These factors can indeed outweigh the benefits of a common border as a result of a negative coefficient observed in our regression analysis. The coefficient for Free Trade Agreements (FTAs) and common language in our analysis is not only positive and statistically significance but also aligns with the fundamental principles of the Gravity model of trade. According to this model, free trade agreements (FTAs) plays a crucial role in promoting trade between nations. This finding is consistent with prior research conducted by Tamás and Manfred, (2015); Irshad et al., (2018); Achay, (2006); Eita and Jordaan, (2007); Foroutan and Lant, (1993); Martinez and Lehmann, (2003); and Ram and Prasad, (2000). These previous empirical investigations provide strong evidence in favour of the hypothesis that free trade agreement and common language is an important factor affecting trade between the countries.

4.2 Evaluation of India's Trade Potential with SAARC economies

Analyzing the trade potential is an essential component of gravity model of international trade, in which the evaluation of predicted trade is compare with actual trade to ascertain whether the bilateral trade flows between two nations have been either overutilized or underutilized. Several studies use point-estimated coefficients for explanatory variables to calculate the predicted trade potential using the gravity model. In this study, trade potentials have been determined by using speed of convergence. The concept of speed of convergence introduced by Jakob et al., (2000) as an alternative to the traditional method for calculating potential trade. Convergence occurs when the growth rate of potential trade is lower than that of actual trade, resulting in a negative computed speed of convergence. Conversely, in the opposite scenario, where the growth rate of potential trade surpasses that of actual trade, there is divergence. This approach enhances its effectiveness compared to the point estimation technique by taking advantage of the dynamic structure of the data consistently during the estimation process. It also facilitates a more rapid convergence and ensures a more reliable analysis when compared to the examination of point estimates. This convergence measure has demonstrated robustness across various methodologies, including random effects and PPML (Jakab et al., 2001). In this study, the rate of convergence has been calculated by considering two different time periods: the pre-SAFTA (1990-2005) period and the post-SAFTA (2006-2021) period, in order to observe the impact of the SAFTA agreement on India's trade potential with SAARC countries. The results are presented in Table 3.

Table 3: Speed of Convergence (Percent)

Period Country/Variables	Pre-SAFTA Trade (lnT_{ijt})	Post-SAFTA Trade (lnT_{ijt})
Bangladesh	-53.79	-117.40
Bhutan	88.02	-117.98
Maldives	-8.80	-97.01
Nepal	-64.54	-119.59
Pakistan	-259.2	-1168.3
Sri Lanka	-213.3	-64.40

Source: Based on Result of Gravity Model

The findings derived from Table 3 concerning India's potential for trade with other SAARC members, as assessed with the help of speed of convergence, reveal a compelling situation that categorizes trade partners into two distinct groups. The first group is characterized as the "overtraded" category, indicating countries where India has maximized its trade potential, and the second group signifies the potential for India's trade development, encompassing both exports and imports. A closer analysis of Table 3 indicates that in the pre-SAFTA period, India demonstrated convergence in trade with five SAARC members (Bangladesh, Maldives, Nepal, Pakistan, and Sri Lanka) but experienced divergence with Bhutan. In post-SAFTA period India demonstrate trade convergence with all members of SAARC. The speed of convergence analysis suggests that countries exhibiting divergence with India may be experiencing overexploitation of India's trade potential, indicating saturated trade relationships. Conversely, countries displaying convergence with India indicate untapped trade potential, thereby presenting opportunities for further development and enhancement of bilateral trade ties. The examination of trade potential based on the rate of convergence indicates that India possesses vast untapped trade potential with the majority of the SAARC economies, whether it is during the pre-SAFTA or post-SAFTA period. This suggests that the SAFTA accord has not been able to generate any favorable impact on India's trade with SAARC countries.

4.3 Commodities for trade potential between India and other SAARC economies

The preceding section gives an idea about the factors affecting India's trade with SAARC economies and identifies the countries where India has untapped trade potential. However, the preceding section does not provide the information about the commodities in which country possess trade potential. This section focuses on commodities for trade potential between India and other SAARC countries. To explore trade potential for commodities among SAARC countries based on their respective comparative advantage and disadvantage in commodities, we consider 50 major commodities from the three-digit commodity classification of the Standard International Trade Classification (SITC, revision 4). To facilitate the analysis, these commodities are classified into 10 categories based on the aggregation scheme proposed by E.E. Leamer. These categories are as follows: Food & live animals (0), Beverage & tobacco (1), Raw materials (non-edible, excluding fuel) (2), Fuel minerals, lubricants, and associated materials (3), Oils, fats, and waxes from animals and plants (4) Chemicals and other relevant products (5), Manufactured goods (6), Machinery and transportation devices (7), Diverse manufactured items (8), and Commodities and transactions not elsewhere specified (9). The study consider five SAARC member nations, i.e., Sri Lanka, Pakistan, Bangladesh, India, and Nepal. Due to insufficient data availability, countries like Maldives, Afghanistan, and Bhutan were excluded from the analysis. We know that RCA provide information about the commodities in which a country possess exports specialization, but not provide information about the markets where a country exports its products. Similarly, RID provide information about the commodities in which a country has an

imports requirement, but not provide the information about the markets from where a country fulfills this requirement. In such a situation, it is imperative to draw a comparative analysis between India and other SAARC countries over the commodities in which India has a comparative advantage and partner countries have import requirements and vice versa. So, a specific commodity said to have trade potential to the partner nation if India's RCA>1 and the same product RID>1 is its partner nation and vice versa. For the purpose of comparative analysis based on RCA and RID approach, we matched the value of RCA and RID between the countries to assess the commodity potential between the nation. Finally, to provide a comprehensive analysis, we present the average value of these commodities in Tables 4-8. These Tables will offer a clear understanding of the potential for commodity trade between India and the other member nations of SAARC.

Table 4. Commodities with RCA >1 for India and RID >1 for Bangladesh

SITC	Commodities	RCA of India	RID of Bangladesh
0	**Food and live animals (I)**		
042	Rice	16.03	11.91
061	Sugar, molasses& honey.	2.34	7.24
075	spices	12.58	7.02
081	Animal feeding materials excluding unprocessed cereal.	2.79	1.44
2	**Raw materials, non-edible, excluding fuel (II)**		
222	Oil seeds and oily fruits, but not flour.	1.40	2.37
223	Oil seeds and oily fruits including flour.	2.56	7.84
263	Cotton	5.42	44.71
264	Other textile bast fibers not woven, besides jute; tow.	2.82	6.80
273	Stone, sand, and gravel.	6.71	1.94
4	**Oils, fats, and waxes from animals and plants (III)**		
422	crude, refined, and fractured fixed vegetable oil and fats.	1.90	21.35
6	**Manufactured goods (IV)**		
651	Textile yarn.	6.65	11.56
652	Cotton fabric and woven.	4.47	29.64
653	Fabric and woven of man-made fabric.	2.78	11.80
661	Lime, cement, textile, and construction material with the exception of glass and clay.	3.39	11.23
8	**Diverse manufactured items (V)**		
846	Clothing accessories of textile fabrics.	2.28	9.43

Source: Authors' own computation using the UNCOMTRADE dataset.

According to Table 4, there are fifteen potential commodities that can be trade between India and Bangladesh. This is determined by examining India's Revealed Comparative Advantage (RCA) and Bangladesh's Revealed Import Dependence (RID). These commodities are mutually beneficial for trade as India possesses a comparative advantage (RCA > 1), while Bangladesh has an import dependence (RID > 1) for them. The commodities like rice (SITC 042), sugar, molasses, and honey (SITC 061), spices (SITC 075) and animal feeding materials excluding unprocessed cereal (SITC 081) under commodity classification of food and live animals (I). Oil seeds and oily fruits, but not flour (SITC 222), oil seeds and oily fruits including flour (SITC 223), cotton (SITC 263), other textile bast fibers not woven, besides jute; tow (SITC 264), and stone, sand, and gravel (SITC 273) are under the commodity classification of raw materials, non-edible, excluding fuel (II). Similarly, crude, refined, and fractured fixed vegetable oil and fats (SITC 422) are under the commodity classification of oils, fats, and waxes from animals and plants (III) and clothing accessories of textile fabric (SITC 846) are under diverse manufactured items (V). The manufactured goods category (IV) includes

textile yarn (SITC 651), cotton fabric and woven (SITC 652), fabric and woven of man-made fabric (SITC 653), lime, cement, fabric, and construction materials excluding glass and clay (SITC 661). According to the analysis of Table 4, most of the potential commodities for trade between India and Bangladesh are from food and live animals, raw materials, non-edible, excluding fuel and manufacturing items; for these commodities, India exhibits export specialization while Bangladesh is import-dependent on it, which suggests that these commodities possess the potential for mutually beneficial trade between the countries.

Table 5. Commodities with RCA >1 for India and RID >1 for Nepal

SITC	Commodities	RCA of India	RID of Nepal
0	**Food and live animals (I)**		
042	Rice	16.03	3.90
061	Sugar, molasses, and honey	2.34	2.10
075	Spices	12.58	14.84
081	Animal feeding materials excluding unprocessed cereal.	2.79	2.18
2	**Raw materials, non-edible, excluding fuel (II)**		
222	Oil seeds and oily fruits, but not flour.	1.40	3.03
223	Oil seeds and oily fruits including flour.	2.56	3.61
264	Other textile bast fibers not woven, besides jute; tow.	2.82	212.36
273	Stone, sand, and gravel	6.71	3.31
4	**Oils, fats, and waxes from animals and plants (III)**		
422	crude, refined, and fractured fixed vegetable oil and fats.	1.90	6.56
6	**Manufactured goods (IV)**		
651	Textile yarn.	6.65	2.84
652	Cotton fabric and woven.	4.47	5.15
653	Fabric and woven of man-made fabric.	2.78	1.27
659	Floor coverings, etc.	8.03	1.05
661	Lime, cement, textile, and construction material with the exception of glass and clay.	3.39	12.04
697	Equipment for the home made of basic metal, n.e.s.	2.40	1.06

Source: Authors' own computation using the UNCOMTRADE dataset.

Table 5 presents the list of tradeable commodities between India and Nepal. Accordingly, there are fifteen commodities demonstrate potential for trade between the two countries, as India's Revealed Comparative Advantage (RCA) aligns with Nepal's Revealed Import Dependence (RID). These commodities are specifically characterized by RCA values greater than 1 for India, which corresponds to RID values greater than 1 for Nepal. The commodities are food and live animals' category (I) includes **rice (SITC 042), sugar**, molasses, and honey (SITC 061), spices (SITC 075), and animal feeding materials excluding unprocessed cereal (SITC 081). raw materials, non-edible, excluding fuel (II) include oil seeds and oily fruits, but not flour (SITC 222), oil seeds and oily fruits including flour (SITC 223), cotton (SITC 263), other textile bast fibers not woven, besides jute; tow (SITC 264), and stone, sand, and gravel (SITC 273). While oils, fats, and waxes from animals and plants (III) include crude, refined, and fractured fixed vegetable oil and fats (SITC 422) and finally manufactured goods category (IV) include textile yarn (SITC 651), cotton fabric and woven (SITC 652) fabric and woven of man-made fabric (SITC 653), floor coverings, etc. (SITC 659), lime, cement, textile, and construction material with the exception of glass and clay (SITC 661) and equipment for the home made of basic metal, n.e.s. (SITC 697). Table 5 also indicates that there is a huge trade potential between India and Nepal in the category of manufactured goods. This is evident from the fact that the

majority of commodities for which India's RCA>1 align with Nepal's RID>1 during the specified study period. Therefore, it can be inferred that there is a favorable trade environment for manufactured goods between India and Nepal based on their respective comparative advantages and disadvantage.

Table 6. Commodities with RCA >1 for India and RID >1 for Pakistan

SITC	Commodities	RCA of India	RID of Pakistan
0	**Food and live animals (I)**		
061	Sugar, molasses, and honey.	2.34	2.99
074	Tea and mate.	11.20	25.55
075	Spices.	12.58	5.33
2	**Raw materials, non-edible, excluding fuel (II)**		
222	Oil seeds and oily fruits, but not flour.	1.40	3.73
223	Oil seeds and oily fruits including flour.	2.56	4.20
263	Cotton.	5.42	17.44
264	Other textile bast fibers not woven, besides jute; tow.	2.82	106.28
292	Unprocessed plant products, n.e.s.	2.98	1.17
4	**Oils, fats, and waxes from animals and plants (III)**		
422	crude, refined, and fractured fixed vegetable oil and fats.	1.90	23.25
5	**Chemical with other relevant product, n.e.s. (IV)**		
551	Essential oil, fragrances, and flavours.	1.60	1.03
6	**Manufactured goods (V)**		
651	Textile yarn.	6.65	3.63
653	Fabric and woven of man-made fabric.	2.78	1.14

Source: Authors' own computation using the UNCOMTRADE dataset.

Similarly, Table 6 outlines the potential trade commodities between Pakistan and India. The Table highlights twelve specific commodities where India's Revealed Comparative Advantage (RCA) exceeds 1, aligns with Pakistan's Revealed Import Dependence (RID) also exceeding 1. These commodities exhibit a substantial trade potential between the two countries, indicating favorable conditions for trade. The commodities are sugar, molasses, and honey (SITC 061), tea and mate (SITC 074), and spices (SITC 075) fall into the category of food and live animals (I). The raw materials, non-edible, excluding fuel (II) include oil seeds and oily fruits, but not flour (SITC 222), oil seeds and oily fruits including flour (SITC 223), cotton (SITC 263), other textile bast fibers not woven, besides jute; tow (SITC 264), and unprocessed plant products, n.e.s. (SITC 292). The commodity classification of oils, fats, and waxes from animals and plants (III) include crude, refined, and fractured fixed vegetable oil and fats (SITC 422), and chemical with other relevant product, n.e.s. (IV) includes essential oil, fragrances, and flavours (SITC 551). Manufactured goods (V) include textile yarn (SITC 651), fabric and woven of man-made fabric (SITC 653). Table 6 provides insights that commodities classified under the category of raw materials, non-edible, excluding fuel hold enormous trade potential between India and Pakistan. This is evident as this category encompasses a large number of commodities for which India has a Revealed Comparative Advantage (RCA) value greater than 1, and Pakistan also has a Revealed Import Dependence (RID) value exceeding 1 consistently throughout the study period. Thus, it can be inferred that there is considerable scope for trade in raw materials, non-edible, excluding fuel between India and Pakistan based on their respective comparative advantages and disadvantage.

Table 7. Commodities with RCA >1 for India and RID >1 for Sri Lanka

SITC	Commodities	RCA of India	RID of Sri Lanka
0	**Food and live animals (I)**		
042	Rice	16.03	3.30
061	Sugar, molasses, and honey	2.34	8.27
074	Tea and mate	11.20	3.27
075	Spices	12.58	10.74
081	Animal feeding materials excluding unprocessed cereal.	2.79	1.50
2	**Raw materials, non-edible, excluding fuel (II)**		
273	Stone, sand, and gravel	6.71	1.33
4	**Oils, fats, and waxes from animals and plants (III).**		
422	crude, refined, and fractured fixed vegetable oil and fats.	1.90	4.67
5	**Chemical with other relevant product, n.e.s (IV)**		
551	Essential oil, fragrances, and flavours.	1.60	1.26
6	**Manufactured goods (V)**		
651	Textile yarn.	6.65	6.04
652	Cotton fabric and woven.	4.47	22.85
653	Fabric and woven of man-made fabric.	2.78	11.20
661	Lime, cement, textile, and construction material with the exception of glass and clay.	3.39	10.82
8	**Diverse manufactured items (VI)**		
846	Clothing accessories of textile fabric.	2.28	2.52
848	Article of cloth and clothing accessories, other than textiles.	3.07	1.26

Source: Authors' own computation using the UNCOMTRADE dataset.

The prospective commodities for trade between India and Sri Lanka in terms of RCA and RID are displayed in Table 7. It has been specified that fourteen commodities offer the potential for trade between the countries. The commodities for which India's RCA>1 and Sri Lanka's RID>1 are food and live animals' classification (I) include rice (SITC 042), sugar, molasses, and honey (SITC 061), tea and mate (SITC 074), spices (SITC 075), and animal feeding materials excluding unprocessed cereal (SITC 081). The raw materials, non-edible, excluding fuel (II), include stone, sand, and gravel (SITC 273). Similarly, oils, fats, and waxes from animals and plants (III) include crude, refined, and fractured fixed vegetable oil and fats (SITC 422), and chemical with other relevant product, n.e.s. (IV) includes essential oil, fragrances, and flavours (SITC 551). The commodity classification of manufactured goods (V) has textile yarn (SITC 651), cotton fabric and woven (SITC 652) fabric and woven of man-made fabric (SITC 653), lime, cement, textile, and construction material with the exception of glass and clay (SITC 661). Similarly, diverse manufactured items (VI) include clothing accessories of textile fabric (SITC 846), article of cloth and clothing accessories, other than textiles (SITC 848). Table 7 also highlights that the commodity classification of food and live animals, as well as manufactured goods, holds greater potential for trade between India and Sri Lanka. This is supported by the fact that these categories encompass maximum number of commodities where India's Revealed Comparative Advantage (RCA) value exceeds 1, and Sri Lanka's Revealed Import Dependence (RID) value also exceeds 1 during the study period. Therefore, it can be concluded that there is a higher feasibility for trade in food and live animals, as well as manufactured goods, between India and Sri Lanka, following their matching RCA and RID.

Table 8. Commodities with RID>1 for India and RCA>1 for Bangladesh, Nepal, Pakistan, and Sri Lanka

SITC	Commodities	RID of IND	BGD	NPL	PAK	LKA
0	**Food and live animals (I)**					
054	Vegetables	1.61	-	8.20	1.52	-
057	fruits and nuts, both fresh and dry, except oil nuts.	1.09	-	1.16	2.11	2.71
075	Spices	2.28	-	65.01	4.58	45.96
2	**Raw materials, non-edible, excluding fuel (II)**					
263	Cotton	2.04	-	-	8.74	-
264	Other textile bast fibers not woven, besides jute; tow.	14.91	736.62	16.32	2.13	1.10
268	Wool, as well as other types of animal hair, includes woolen top	2.67	-	-	-	1.27
273	Stone, sand, and gravel	1.48	-	13.00	2.05	-
4	**Oils, fats, and waxes from animals and plants (III).**					
422	crude, refined, and fractured fixed vegetable oil and fats.	8.84	-	3.94	-	1.34
8	**Diverse manufactured items (IV)**					
898	Musical instruments, components; albums, cassettes, and related items.	1.23	-	-	-	-

Source: Authors' own computation using the UNCOMTRADE dataset.

Table 8 shows the potential tradable commodities between India and four SAARC member nations, i.e., Bangladesh, Nepal, Pakistan, and Sri Lanka, during 1996–2020. The study identified that India has a revealed import dependence (RID>1) in nine of the fifty commodities selected for the study. The commodities in which India's RID>1 matches with partner country's RCA>1 include the commodities, i.e., other textile bast fibers not woven, besides jute; tow (SITC 264) with Bangladesh, vegetables (SITC 054), fruits and nuts, both fresh and dry, except oil nuts (SITC 057), spices (SITC 075) other textile bast fibers not woven, besides jute; tow (SITC 264), stone, sand, and gravel (SITC 273) and crude, refined, and fractured fixed vegetable oil (SITC 422) with Nepal. Similarly, vegetables (SITC 054), fruits and nuts, both fresh and dry, except oil nuts (SITC 057), spices (SITC 075), cotton (SITC 263), other textile bast fibers not woven, besides jute; tow (SITC 264), stone, sand and gravel (SITC 273) with Pakistan, while fruits and nuts, both fresh and dry, except oil nuts (057), spices (SITC 075), other textile bast fibers not woven, besides jute; tow SITC (264), wool, as well as other types of animal hair, includes woolen top (SITC 268) and crude, refined, and fractured fixed vegetable oil and fats (SITC 422) with Sri Lanka.

5 Conclusion

In the contemporary context, the widespread presence of international economic agreements, which include multilateral frameworks, bilateral arrangements, and regional pacts, has a profound impact on the development of global trade and investment policies. In this context, SAARC has emerged as an important platform for asserting its expanding role in the global economy and exerting influence on pivotal issues that shape trade and investment dynamics. The study employed gravity model of trade to identify the factors that affects India's trade with SAARC nation. The results suggests that all the variables like GDP, per capita GDP, per capita GDP differential, trade openness, exchange rate of India has a positive and statistically significant impact. This positive relationship is also evident in studies by Mishra et al., (2015); Sahu et al., (2017); Kumar and Ahmed, (2014); Sharma and Kumar, (2021); Modeste, (2011); Hibbert et al., (2012); Makochekanwa and Chimombe, (2017). However,

exchange rate of SAARC and distance between India and SAARC member nation has a negative impact on India's trade volume. In case of dummy variables such as free trade agreement and common language has a positive impact, but common border has a negative impact on India's trade with SAARC economies. Moreover, when coefficient derived from gravity model is used to determine trade potential between India and other SAARC nation, we observed that during pre-SAFTA period, India demonstrated untapped trade potential with five SAARC members (Bangladesh, Maldives, Nepal, Pakistan, and Sri Lanka) but experienced over utilized trade potential with Bhutan. However, in post-SAFTA period India demonstrate under-utilized trade potential with all members of SAARC. Further, when India's Revealed Comparative Advantage (RCA) is compared to the Revealed Import Dependence (RID) of Bangladesh, Nepal, Pakistan, and Sri Lanka, the commodity categories of food and live animals, raw materials, and manufactured goods emerge as comparatively more viable for trade between India and other SAARC countries. These sectors encompass a wide range of commodities, offering a greater scope for trade within the region. Thus, the study concludes that there exists a substantial trade gap and a tremendous trade potential between India and other SAARC economies, taking into account their respective comparative advantages and disadvantages, as well as the speed convergence between the countries. Therefore, India needs to prioritize its trade with nearby nations that are liberalizing their economies for economic growth while maintaining its existing level of trade since this might become a major hub for its exports. The study can also serve as a foundation for identifying suppressed sectors for further trade enhancement using the indicated approaches, and it can be done with other countries as well.

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