

An Empirical Evaluation of Intra-Bloc and Extra-Bloc Export Flows: A Study of Select South Asian Economies

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Abstract The present study examines the export determinants for South Asian region with a major focus on intra-bloc and extra-bloc trade flows over the period of 1991-2022. For capturing the impact of intra-regional bloc flows, the study incorporates intra-SAARC as explanatory variable. To study the extra-bloc export association, the study includes SAARC-APTA and SAARC-ASEAN as explanatory variables. Results for intra-SAARC bloc variable suggested that the South Asian bloc has failed to boost trade opportunities among South Asian economies. However, the results for SAARC-ASEAN and SAARC-APTA extra-bloc were found to be positive and significant indicating extra-bloc trade facilitation. Lack of trade opportunities among South Asian economies might have encouraged SAARC countries to look for East and South-East Asian trading partners. Moreover, policy initiatives to strengthen economic, cultural, and strategic relationships with East and South-East economies of Asia would have contributed to such realignment of trade towards ASEAN and APTA economies.

Keywords: Trade, ASEAN, SAARC, APTA

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I. Introduction

South Asia comprises of bunch of emerging economies that are looking for strategic trade partners to strengthen the production; distribution; and supply chain channels (Manocha, 2023). As per trade map (ITC) database, a significant proportion of South Asia trade flows are reported from Asian economies but an insignificant intra-trade growth among South Asian economies is captured. In 2022, around 39% of South Asian exports were done with Asian economies and approximately 65% of South Asian imports came from Asian region but an intra-trade of less than 7% of the total trade volume among South Asian economies was recorded. To stimulate intra-regional economic growth and trade flows, South Asian economies came up with a regional cooperation, namely, South Asian Association for regional cooperation (SAARC) in 1985 and negotiated a preferential trade agreement, South Asian preferential agreement (SAPTA)¹ in

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1995 (to open the window for trade liberalisation among South Asian nations). To further reduce the trade barriers, SAARC countries entered into a deeper integration in 2006, South Asian free trade agreement (SAFTA). However, the bloc could not harvest intra-SAARC trade flows of more than 7% of the total trade of South Asian region (in 2022), suggesting an unsatisfactory intra-trade flows since its inception. Ali and Mufti (2022) identified huge rifts between the estimated potential and actual intra-regional trade among South Asian economies; the study stated that with the existing growth potentials, South Asian economies should have registered an intra-regional trade of USD 170 million as against the actual intra-trade flows of only USD 29 million (in 2018). Nawaz (2020) stated that South Asian region comprises of 21% of world population but registers an intra-trade of less than 5% of the total trade volume (in 2020). Though South-Asian region shares a strong colonial heritage, cultural and linguistic similarity but lacks intra-regional trade facilitation hence the trade potentials of the region remain untapped (UNESCAP, 2017). Existing literature (Dembatapitiya and Weerahewa, 2015; Hassan, 2001; Wadhwa, 2009; Akhter and Ghani, 2010; Khalid, 2023; Nawaz, 2020) suggests that South Asian economies are working towards stimulating trade volumes and integrations in the region but the intra-trade generation capacity of South Asian region is still far from satisfactory. The region needs to reduce political and regional disputes to register intra-regional trade growth (Akhter and Ghani, 2010). Further, trade connectivity among South Asian economies might be missing due to huge non-tariff barriers and loosely placed trade and logistic channels among economies (Taneja and Bimal, 2016). Sinha and Sareen (2020) stated that South Asian economies are competitors of similar products rather than consumers of varied products hence facilitate less intra-bloc trade.

Negligible to no intra-regional trade growth of SAARC trading bloc might have forced South Asian economies to look for opportunities in emerging markets of East and South-East Asian market. Hence, South Asian economies are looking for trade partners from Asian pacific and East Asian region (Manocha, 2023). Over the last three decades, South Asian economies have shown an intent (via various policy measures) to look towards East Asia, and build a strong cultural; economic; and strategic relationship with South-East and East Asian economies. Hence, India came up with "Look East" policy in 1991 and "Act East" in 2014 (Mazumdar, 2021); Bangladesh adopted "Look East" policy in 2001; and Pakistan developed "Strategic Vision East Asia" in 2003 (Ahmed, 2015). India, the fastest growing economy of South Asian, has consistently worked towards shaping and reshaping association with Southeast Asian region via various policy measures in the area of energy, health, trade, investment, digital infrastructure, technology, and environment. Further, India's association with ASEAN has been largely focused towards building strong economic and social relationship towards a ripped Indo-pacific region. In 1996,

1) SAPTA was initially negotiated among seven South Asian countries, namely, Bangladesh; Bhutan; India; Nepal; Pakistan; Maldives; and Sri Lanka. Afghanistan became the eighth member in 2007.

India emerged as a dialogue partner and in 2002 turned up as a summit level partner with ASEAN economies. Further, India introduced 'look east' policy and reworked towards instituting 'Act East' policy to provide a strategic, focussed, and engaged association with Southeast Asian economies. To further strengthen its association with Southeast Asian economies, India has actively participated in the formation of regional comprehensive economic agreement (RCEP), an FTA among ASEAN and few Asian-Pacific economies to enhance trade and supply chain. However, opted out of the said agreement in 2019 (might be due to political reasons). Following India's policy initiatives, Pakistan has played a catch-up approach (Shivpuri, 2005) vis-à-vis East Asia. Further, because of changing political and economic trends in Asian region, Pakistan has emphasised the need to build trade, investment, and economic relations with East and Southeast Asia. Hence, have endorsed 'vision east Asia' policy in 2003 followed by initiatives towards strengthening relations with ASEAN economies but the success of such efforts has been trivial because of Pakistan's domestic and regional challenges. However, the government of Pakistan is trying to redefine and restructure its economic and foreign policies to catch the fast-changing international environment. Further, Pakistan's economic and strategic association with China, Singapore, Philippines, Malaysia, Indonesia, and other Southeast nations has been considerable over the last few decades (Rid, 2007) that could add to building connects with East and Southeast Asia. Even, Bangladesh adopted look east policy and such initiatives were largely towards building focused relationship with China, Japan, and Korea (Ahmed, 2014). Bangladesh upgraded its infrastructure and transportation routes to strengthen trade channels and regional connectivity with Southeast and East Asian region. Further, in force few bilateral trade agreements (India-Thailand, India-Malaysia, ASEAN-India, India-Singapore, Pakistan-China, Pakistan-Malaysia, Pakistan-Indonesia) among the nations of South Asia and Southeast/East Asia are also indicative of intent to liberalise and strengthen trade in the said regions. Such measures indicate an inclination to regain focused and proactive trade, investment, and economic upsurge in Asian continent. Such initiatives also provide cumulative and strategic strength to stimulate supply chains, production and distribution channels, and marketing networks of South Asian economies vis-a-vis South-East, and East Asian region.

To study the inclination and movement of intra-bloc and extra-bloc imports/exports of South Asian region, existing trends of exports and imports among intra-SAARC, SAARC and ASEAN, and SARRC and APTA were tabulated (see online appendix: Annexure 1). The existing trends suggest that intra-SAARC imports have been stagnant since 2003 as only 3-4% of total imports (world imports) of SAARC has been registered within the bloc. Further, the imports of SAARC countries from APTA vis-à-vis total imports of SAARC have grown from 13.49% in 2003 to 22.44% in 2022. Similarly, SAARC countries were able to fetch imports of around 11-12% from ASEAN countries since 2003. Moreover, export trends of SAARC economies suggest that intra-SAARC exports have been only 6.52% of the world exports of SAARC on an average

over the period of 2003-2022; and SAARC exports to APTA and ASEAN economies have been approximately 10.5% and 9% on an average during 2003 to 2022. The exports and imports trends of SAARC countries indicate an active participation of South Asian economies with East and South-east Asia. Also, a notable intent to participate in South-East and East Asian markets both for exports and imports can be seen. As discussed earlier, South Asian economies are looking for trade partner to support development. Simultaneously, South Asian economies are trying to place well within Asian region hence, boosting trade with Asian economies at large. Further, an upsurge in extra-regional trade flows to/from Asian Pacific and East Asian region for South Asian is reported. Policy initiatives and trends of exports (and imports) of South Asian economies suggest an intent to stimulate trade connectivity with Southeast and East Asia.

Looking into such a scenario, we can explore the possibility of South Asian economies trading with other active regional blocs of Asia such as Eastern blocs (ASEAN) as well as Asian-Pacific bloc (APTA). ASEAN and APTA are two significant blocs in Asia and going by the statistics South Asian economies are actively trading with members in these two blocs. As per trade map (ITC) database, SAARC countries exported around 53 million (in thousands) US dollar to APTA countries and 46 million (in thousands) US dollar to ASEAN countries in 2022. Hence, the present study attempts to empirically examine extra-bloc export flows of South Asian economies with Asian Pacific region and East Asian economies. In the given scenario, the present was an attempt to empirically evaluate the intra-bloc and extra-bloc export flows for South Asia with major focus on ASEAN and APTA countries.

As per WTO, Association of Southeast Asian Nations (ASEAN) came into force on 1992 and is a bloc among East Asian economies. ASEAN comprises of Brunei Darussalam, Myanmar, Philippines, Singapore, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Thailand, and Vietnam. Other significant trading bloc in Asian continent is Asian-Pacific trading bloc APTA (Asian Pacific Preferential trade agreement) formerly known as Bangkok agreement negotiated in 1976. China; Bangladesh; India; Republic of Korea; Lao People's Democratic Republic; Mongolia; and Sri Lanka are the members of APTA. APTA is the oldest preferential agreement negotiated among developing countries²⁾. India, Sri-Lanka, and Bangladesh are overlapping members in SAARC and APTA, and hence might be benefiting the trade liberalisation structures of both the regional blocs. Hence, the study also explains whether multi-membership is promoting trade for South Asia. When two economies do participate in more than one trade agreement, they try to reduce (or remove) economic barriers and smoothen non-economic environment by bring up policies and measures to boost trade. The study attempts to find whether multiple and overlapping membership is complementary to trade in South Asian region or whether such network of RTAs is creating confusion in the region and leading to trade deterioration.

2) <http://www.unescap.org/apta>

II. Literature Review

Existing literature depicts number of theoretical and empirical studies capturing the growth of world trade. Not only world trade but even South Asian trade flows have also been explored by various research works. Further, number of empirical studies have examined South Asian trade flows to study the impact of intra-bloc trade flows of SAARC nations and simultaneously, ample studies have looked at trade flows with country-specific (that are part of SAARC) analysis. The first section of our LR captures studies that have empirically evaluated intra-trade flows for SAARC countries. Rahman, Shadat and Narayan (2006) focus on trade flows for few RTAs with major concern for SAFTA, using augmented gravity model with country-pair specific as well as year specific fixed effects. The study reveals that Bangladesh, Pakistan, and India have positive signs for trade but other member nations of SAPTA show a negative export performance mainly due to structural limitation. Akhter and Ghani (2010) employed gravity model using cross-sectional and pooled data to measure the bilateral trade flows and trade effects for member and non-member countries for a period of 2003 to 2008. The study covers the benefits of free trade agreements for SAARC countries. The study provides evidence of trade flows for Pakistan, India, and Sri Lanka. Wadhwa (2009) examined the intraregional trade for SAARC countries and suggested that member countries had limited significance of intra-regional trade since intraregional exports and imports of the SAARC countries as a proportion of their total world exports and imports have grown very slowly. However, advanced countries are significant destination for exports for SAARC nations. Coulibaly (2007) found significant net export flows for SAARC countries and Sharma (2013) suggested that trade among economies is enhancing post SAPTA negotiations. Further, Hirantha (2004) also suggested positive and significant coefficient for net trade flows for SAPTA by applying panel and cross-sectional frameworks. Khalid (2023) suggested that SAARC are finding better trade partners outside the said region. Further, the study suggested that South Asian economies need to have better and inclusive trade system and political setups to boost intra-regional trade flows. Siraj et al (2022) empirically evaluated the association between trade facilitation reforms on trade volumes of SAARC nations over the period of 2006 to 2013 by employing pooled OLS, fixed effects, and random effects. The study suggested that political stability, infrastructure reforms, policy initiatives, and trade facilitation can improve trade volumes for SAARC nations. An insight into the literature associated with intra-bloc SAARC [Hassan (2001); Wadhwa (2009); Siraj et al (2022) and Akhter and Ghani (2010)] suggested that SAARC economies are yet to achieve intra-bloc benefits and Khalid (2023) suggested that SAARC nations need to search for better trade partners outside the South Asian region.

The next section of LR talks of studies that have examined regional bloc (SAARC) variable as one of the explanatory variables while examining the determinants of trade, and we were

able to capture the impact on the country specific trade determinant for few South Asian economies. Sharma and Kumar (2021) have examined the trade potentials of India with other SAARC nations over the period of 2004-2019 by employing gravity framework. The results suggested that intra-SAARC trade can be boosted by taking advantage of locational and infrastructural setup on trade cost. Manglani et al (2022) empirically examined India's bilateral trade flows with SAARC countries using gravity model over the period of 1996 to 2016. The result suggested that trade flows are majorly dependent on the market size of the home and host countries, and also the trade flow is benefiting India's trade flows with SAARC countries. Gul and Yasin (2011) examined Pakistan's trade prospects, using the gravity model over the period 1981-2005 with 42 trading economies. The study validated that Pakistan's trade potential is highly significant with countries that belong to ASEAN, NAFTA, and EU. But the study reported low Pakistan's trade with SAARC and ECO countries. The study stated that the major obstacle being political disturbances between India and Pakistan. Jan and Shah (2019) evaluated Pakistan's trade flows with SAARC nations using gravity framework over the period of 2003 to 2016 using Fixed effects and random effects. The results suggested that Pakistan has low trade with SAARC countries despite high potential. Acharya (2012) examined the trade (export, import and trade balance) determinants for Nepal via extended gravity model (via fixed and random effects) based on panel data for 21 major trade partners of Nepal. The study stated that Nepal exports more to SAARC countries rather than to non-SAFTA economies. Taguchi and Rubasinghe (2019) examined trade flows of Sri-Lanka vis-à-vis SAFTA countries using gravity framework. The results did not verify trade creation impact for SAFTA and Sri-Lankan trade flows. Country-specific studies provide varied results for economies that are part of South Asian trading bloc. However, this section of our LR also largely depicts that low trade among South Asian economies despite high trade potentials.

As the present study is captive of extra-bloc trade flows of SAARC economies with a major emphasis on ASEAN and APTA association. Therefore, the next section of our LR talks of studies that have examined trade flows for ASEAN and APTA. Guillhot (2010) employed panel data gravity model to evaluate the impact of three major East Asian Trade agreements (ASEAN, ASEAN-China, ASEAN-South Korea) over the period 1985-2007 to estimate the impact of intra-regional and extra-regional trade. The study captured trade flows for 12 economies (10 ASEAN, South Korea, and China) with 22 main trading partners to empirically examined the bilateral export flows among east Asian countries. The study suggested that ASEAN free trade agreement is trade generating. The study suggested that ASEAN promoting both regionalism and multilateralism. But ASEAN-China and ASEAN-Korea still need to support intra-regional trade and make a significant impact on East-Asian trade flows. Park (2009) supported the extension of East Asian regional trade bloc (ASEAN) as a more desirable policy option for East Asian economies. The study suggested a positive and significant gain of trade among

the members of ASEAN+3 (an expansionary RTA strategy) with an equitable distribution among members. Venkatesh and Bhattacharyya (2014) examined the coefficient of dummy variable for intra-bloc ASEAN trade flows both for pre- and post-bloc formation over the period of 1970-2010. The study suggested no major change in the coefficient post-ASEAN formation. Dyomina (2015) evaluated whether ASEAN is prepared for deeper level of integration. Similar, to ASEAN trade flows, few studies have also examined the trade flows for APTA economies. Sen et al (2015) evaluated 11 PTAs with China and India as trade partners. The results associated with APTA suggested that potential trade growth for India and China if both extend the coverage of all goods traded as part of APTA. Ratna et al (2014) suggested that fourth round of tariff concession among APTA economies has led to an expansion of energy trade among the member countries. Hossain (2018) examined the comparative welfare for SAFTA and ASEAN free trade agreement using PPML analysis. The study suggested a reduction in GDP for member countries because of SAARC bloc and an increase in GDP for members due to ASEAN membership. Similarly, Ajmani et al (2020) examined food trade flows among two major Asian trade blocs, namely, SAARC and ASEAN. The study stated that Bangladesh, Philippines, Vietnam, and Sri-Lanka are under-exporting to all ASEAN and SAARC economies. Further, the existing literature suggests that we can also summarize the studies that have examined the impact for intra-bloc trade flows for ASEAN, and APTA blocs. Venkatesh and Bhattacharyya (2014), Dyomina (2015), Tri (2009), Park (2009) have examined the intra-regional trade flows for ASEAN, and few studies [Sen et al, 2015; Ratna et al, 2014] have empirically studied the trade flows for APTA with varied sample size. Further, the literature associated with SAARC suggested that numerous studies [Rahman et al (2006); Akhter and Ghani (2010); Wadhwa (2009); Coulibaly (2007); Sharma (2013); Hirantha (2004); Khalid (2023)] have empirically examined the intra-trade flows for South Asian economies by employing various econometric tools but none of the existing study has explored extra-bloc trade flows of South Asian economies vis-à-vis South-East and East Asian trade flows, namely, ASEAN and APTA. Though comparative studies [Hossain, 2018; Ajmani et al, 2020] for SAARC and ASEAN blocs have been conducted by few researchers. However, a study associated with extra-bloc flows of SAARC countries vis-à-vis ASEAN and APTA will add to a larger perspective of policy initiatives taken by South Asian economies and provide an insight into the unexplored literature.

As a result of growing association between South Asian economies (India, Pakistan, Sri-Lanka, and other country-specific), and East and South-east Asian (ASEAN) economies; number of empirical studies have been conducted to examine the pattern and trends among these Asian regions/economies by largely capturing country-specific association with ASEAN as well as APTA bloc. Hence, this section of our LR captures studies that have examined the trade flows for South Asian economies vis-à-vis East Asian and South-East Asian blocs and/or economies. Gulnaz and Manglani (2022) explored the determinants of India-ASEAN FTA using FGLS

framework over the period of 32 years starting from 1988 to 2019. The results suggested substantial untapped potential for trade among the countries. Similarly, Kashif (2024) also examined the determinants of India-ASEAN FTA and suggested that India's policy initiatives have benefitted India's trade flows with ASEAN economies. Singh (2021) examined the impact of India-ASEAN FTA vis-à-vis trade creation and trade diversion analysis using gravity framework over the period of 1996-2018. The results suggested that import creation impact was higher than the export creation impact for the said bloc. Nagraj and Ghosh (2021) empirically examined the trade cost and trade challenges between India-ASEAN economies. The study suggested that trade volume between India and ASEAN countries have enhanced over the years but distance and shipping cost are associated with trade cost for India-ASEAN FTA. Akram et al (2020) studied the association between Pakistan and ASEAN trade flows using gravity framework. The study suggested existence of trade potential for Pakistan vis-à-vis ASEAN economies. Irshad (2021) assessed Pakistan and ASEAN bilateral and technology trade flows over the period of 1995-2018 using gravity framework. The results suggested that due to difference in consumer preferences both Pakistan and ASEAN have opportunities and potentials of trade for each other. Bhasin and Manocha (2018) employed gravity framework to examine the trade flows of India vis-à-vis APTA over the period of 1991-2016. The results suggested that APTA is facilitating trade for India. This section of LR suggests that South Asian economies are facilitating trade with East and South-east Asian economies however, the studies we had our hand on were more country-specific (South Asian economies) rather than region-specific (South Asian trading bloc). Hence, it is suggested to empirically evaluate the association between South-Asian economies and East (as well as Southeast) Asian economies.

Further, Peter et al (2011) examined intra-bloc and extra-bloc trade flows for African trading blocs (ECOWAS and SADC) but we were not able to capture any study that empirically examined the intra-regional and extra-regional trade flow for South Asian economies.

An appreciation of the literature [Hassan (2001); Wadhwa (2009); and Akhter and Ghani (2010)] and existing trends for intra-SAARC (see section 1) suggested that SAARC economies are yet to achieve intra-bloc benefits, might be due to political disturbances. Khalid (2023) suggested that SAARC nations need to search for better trade partners outside the South Asian region. Further, SAARC country-specific studies depicted that economies of South Asia are stimulating trade and trade potentials with Southeast and East Asia. Existing literature and trends suggest that SAARC economies need to adopt a more comprehensive and holistic rebuilding of region rather than just concentrating on intra-bloc flows, South Asian economies should stimulate policy initiatives to capture trade connectivity with emerging strong markets of Southeast and East Asia. Hence, the present study is an attempt to empirically examine the trade flows for South Asian economies intra-regional (within SAARC economies) and extra-regional (SAARC economies with ASEAN to study the extra-bloc flows from East Asia, and SAARC

economies with APTA countries to examine the extra-bloc flows of South Asian economies from Asian pacific region).

III. Gravity Framework and Empirical Discussion

The study examines the gravity model for trade to measure the impact of intra-regional and extra-regional trade (export) flows for South Asian economies. Gravity model was suggested by Tinbergen in 1962 and since its inception gravity framework has been employed extensively (both in its naïve and augmented form) to empirically examine international trade flows. The standard model of gravity encapsulated economic development as GDP and transaction cost via distance; the model stated that bilateral flow of goods³) among economies is positively associated with economic development/growth/GDP and negatively related with trade cost. Numerous researchers (Bergstrand, 1989; Anderson and van Wincoop,2003; Helpman et al., 2008) have significantly contributed via comprehensive description to the gravity framework. The basic multiplicative configuration of gravity model can be stated as follows:

$$E_{ij} = C \cdot \frac{Y_i^{\alpha_1} \cdot Y_j^{\alpha_2}}{D_{ij}^{\alpha_3}} \cdot \epsilon_{ij} \quad (1)$$

Where E_{ij} represents export volume from country i to country j, C denotes constant; Y_i and Y_j captures GDP of economies i and j; D_{ij} refers to the distance between the two economies i and j; and ϵ_{ij} represents the error term (with an assumption that it equates 1). Following the existing literature, empirical evaluation of gravity framework is facilitated by incorporating natural logarithms of all variables and a log-linear estimation of equation can be presented as follows:

$$\log(E_{ij}) = \alpha_0 + \alpha_1 \log(Y_{it}) + \alpha_2 \log(Y_{jt}) + \alpha_3 \log(D_{ij}) + \epsilon_{ijt} \quad (2)$$

With a history of over six decades, gravity model has emerged as a strong theoretical underpinning framework and empirical appraiser for international trade (Larch and Yotov, 2023). As one of the most appreciated empirical frameworks for trade, the model is well equipped to incorporate considerable number of variables as part of a single equation, and generates coefficients that are economically suggestive and statistically well resolved (Frankel and Rose,

3) Following the existing literature (Breuss & Egger, 1999; Rose, 2000; Soloaga & Winters, 2001; Baltagi et al., 2003; Musila, 2005), the present study examines bilateral exports as the dependent variable for our gravity framework.

2002, Kabir et al., 2017). To account for time-invariant trade cost, the present study incorporates common border (Com_Bor) and colonial heritage (Com_Col) as explanatory variables (along with bilateral distance between the trading partners) and hence, the econometric specification expands to:

$$\log(E_{ijt}) = \alpha_0 + \alpha_1 \log(Y_{it}) + \alpha_2 \log(Y_{jt}) + \alpha_3 \log(D_{ijt}) + \alpha_4 \text{Com_Bor}_{ijt} + \alpha_5 \text{Com_Col}_{ijt} + \epsilon_{ijt} \quad (3)$$

To incorporate "demand similarity" between the trading partners, the study includes absolute difference between the GDP per capita of both the trading partners (SKILL_{ijt}) |GDP per capita of country i - GDP per capita of country j| as one of the explanatory variables (Wani and Yasmin, 2023; Nawaz, 2020). Further, Bayley (2014) suggested that South Asian and South-East Asian regions are facilitating measures to strengthen trade hence enhancing infrastructure and overall policy initiatives therefore, the present study also encompasses infrastructural development and trade openness of both the trading economies as additional variables. South, South-East, and East Asian economies are stimulating infrastructure development specially in the sector of transportation, power, ICT and digital networks, sea ports, and telecommunications (Asian Development Bank, 2017; Asian Development Bank, 2023). Such developments are likely to enhance trade in the Asian subcontinent hence to account for infrastructure development of the trading economies, the study captures infrastructure (INFRA_{it} and INFRA_{jt}) development of both the trading partners as explanatory variables.

Guttmann and Richards, 2004 gauged trade openness as an indicator of domestic policies that promote trade with partner economies and world at large; home and host countries with liberal trade policies act as a better destination (and source) of trade. Therefore, trade openness of home economy (TOPEN_{it}) and trade openness of host economy (TOPEN_{jt}) are incorporated. Trade openness variable also takes care of globalization impact (Bhasin and Manocha, 2015). The bilateral exchange (Bi_Exc_{ijt}) rate is incorporated as explanatory variable to study the impact of domestic currency variations vis-à-vis international currency fluctuations. Further, to account for changes in the domestic output prices and factors of production cost, the study incorporates another significant variable, inflation level of the domestic/home country (INFLA_{it}). Hence, the econometric equation (3) is transferred into eq (4) and can be stated as:

$$\begin{aligned} \log(E_{ijt}) = & \alpha_0 + \alpha_1 \log(Y_{it}) + \alpha_2 \log(Y_{jt}) + \alpha_3 \log(D_{ijt}) + \alpha_4 \text{Com_Bor}_{ijt} + \alpha_5 \text{Com_Col}_{ijt} \\ & + \alpha_6 \text{Log}(\text{SKILL}_{ijt}) + \alpha_7 \text{Log}(\text{TOPEN}_{it}) + \alpha_8 \text{Log}(\text{TOPEN}_{jt}) \\ & + \alpha_9 \text{Log}(\text{INFLA}_{it}) + \alpha_{10} \text{Log}(\text{Bi_ex}_{ijt}) + \alpha_{11} \text{Log}(\text{INFRA}_{it}) \\ & + \alpha_{12} \text{Log}(\text{INFRA}_{jt}) + \epsilon_{ijt} \end{aligned} \quad (4)$$

Further, to quantify the intra-bloc and extra-bloc impact for South Asian economies, the study captures three significant regional blocs variables to the gravity framework. Firstly, SAARC_{ijt} (South Asian Preferential trade agreement) is included to evaluate whether trading partners who are members of south Asian trading bloc can create trade for South Asian economies (intra-regional impact). Therefore, the value of the variable is 1 if both the trading partners are part of SAPTA for a given year otherwise 0. Secondly, the study captures two explanatory variables to examine the impact of extra-regional trade for South Asian economies, namely, SAARCi-APTA_{jt} and SAARCi-ASEAN_{jt}. SAARC-APTA variable is a dummy variable capturing whether South Asian economies are significantly attracting exports from Asian Pacific trade bloc. Peter et al (2011) examined the extra-bloc impact for Africa trade blocs, namely, ECOWAS and SADC. The value of the variable (SAARC-APTA) is 1 in case country i belongs to South Asian bloc and country j belong to Asian Pacific bloc (APTA), otherwise 0. The extra-regional exports flows between South Asian economies and East Asian Association (ASEAN) are also captured with a dummy variable, SAARC-ASEAN. The variable takes a value 1 in case the home country belongs to SAARC and host country is the member of ASEAN bloc, otherwise 0. Further, the study also evaluates whether multiple RTAs (MultiRTA_{ijt}) negotiated between the trading partners stimulate exports for South Asian economies or not; trading partners with multiple RTAs try to minimize the trade related barriers and negotiate trade supportive policies. Peter et al (2011) suggested a positive association between trade and multiple RTAs negotiated while examining African trade blocs whereas Kimura, 2006 found negative coefficient for multiple RTA variable. Multiple negotiations might lead to confusion and "spaghetti bowl" phenomena. However, we expect a positive relationship between South Asian exports and multiple RTA variable as the bloc is still emerging and most of the economies that are part of SAARC are looking for more liberal and barrier free trade markets. Hence, the equation (5) is remodeled to incorporate bloc variables:

$$\begin{aligned}
 \text{Log}(E_{ijt}) = & \alpha_0 + \alpha_1 \log(Y_{it}) + \alpha_2 \log(Y_{jt}) + \alpha_3 \log(D_{ijt}) + \alpha_4 \text{Com_Bor}_{ijt} + \alpha_5 \text{Com_Col}_{ijt} \\
 & + \alpha_6 \text{Log}(SKILL_{ijt}) + \alpha_7 \text{Log}(TOPEN_{it}) + \alpha_8 \text{Log}(TOPEN_{jt}) \\
 & + \alpha_9 \text{Log}(INFLA_{it}) + \alpha_{10} \text{Log}(Bi_ex_{jt}) + \alpha_{11} \text{Log}(INFRA_{it}) \\
 & + \alpha_{12} \text{Log}(INFRA_{jt}) + \alpha_{13} SAARC_{ijt} + \alpha_{14} SAARC_{it} APTA_{jt} \\
 & + \alpha_{15} SAARC_{it} ASEAN_{jt} + \alpha_{16} MltiRTA_{ijt} + \epsilon_{ijt}
 \end{aligned} \tag{5}$$

The study employs gravity model and linear framework for examining the variables therefore variables were examined using fixed effects-Poisson pseudo-maximum likelihood (PPML) suggested by Silva and Tenreyro (2006). PPML is more reliable framework for examining gravity specification (Martínez-Zarzoso, 2013). The specification (PPML) is well equipped to overcome

the econometric issues associated with gravity framework; takes care of heteroscedasticity problem better than any traditional approaches of OLS (Fally, 2015; Silva and Tenreyro, 2006) hence, number of contemporary researchers (Wani and Yasmin, 2023; Ferreira, 2021) have extensively examined the gravity model via PPML framework. However, Anderson and van Wincoop (2003) stated that multilateral resistance terms⁴) are not directly rationalised by gravity model, and Olivero and Yotov (2012) suggested incorporation of home-country time and host-country time fixed effects to account for multilateral resistance terms. Further, Baier and Bergstrand (2007) supported country-pair fixed effects for endogeneity issues associated with gravity, and Wani and Yasmin (2023) recommended year-fixed effects to address macroeconomic shocks. FE-PPML (fixed effects-Poisson pseudo-maximum likelihood) takes care of multi-dimension fixed effects (Correia et al., 2020)⁵) and hence can be well armed to incorporate home-country (exporter) time and host-country (importer) time fixed effects, country-pair fixed effects, and year fixed effects in a single model framework (therefore suggested for our augmented gravity model). "Three-way" fixed effect PPML (FE-PPML) model is gaining popularity as workhorse of gravity model for examining trade (Correia et al, 2020; Weidner and Zylkin, 2021). "Three-way" FE-PPML supports exporter-country and importer-country fixed effects as well as country-pair fixed effects whereas "two-way" FE-PPML captures only exporter-country and importer-country fixed effects (Weidner and Zylkin, 2021)

Further, Adam and Cobham (2007) suggested that accurate estimation of gravity framework requires not only modelling of bilateral trade resistance (that accounts for trade barriers associated with the pair of trading countries) but also to accommodate multilateral trade resistance (MTR) that accounts for barriers to trade that each economy observes with all its trading partners. As discussed, Hummels (2001); Feenstra (2004); Redding and Venables (2004) suggested exporter and importer fixed effects to account for MTR. However, Baldwin and Taglioni (2006) stated that multilateral resistance might be time-varying therefore correct estimation of fixed effects for panel gravity specification need to accommodate exporter-time (π_{it}) and importer-time (ρ_{jt}) fixed effects. Further, to curtail the potential endogeneity issues, the study incorporates country-pair fixed effects (μ_{ij}) suggested by Baier and Bergstrand (2007) and macroeconomic shocks are adjusted via year fixed effects (γ_t). The study places the augmented gravity model with all above-mentioned issues along with the exporter-time and importer-time fixed effects; country-pair fixed effects; and year fixed effects in equation (6):

4) Multilateral resistance terms (MRT)/omitted terms are directly correlated with trade cost hence likely to generate estimates that are biased Anderson and van Wincoop (2003); Baier and Bergstrand (2007), Head (2003).

5) We employ `ppmlhdfc`, a stata command for evaluating (pseudo-)Poisson regression models with multiple high-dimensional fixed effects (Correia et al 2020).

$$\begin{aligned}
\text{Log}(E_{ijt}) = & \alpha_0 + \alpha_1 \log(Y_{it}) + \alpha_2 \log(Y_{jt}) + \alpha_3 \log(D_{ijt}) + \alpha_4 \text{Com-Bor}_{ijt} + \alpha_5 \text{Com-Col}_{ijt} \\
& + \alpha_6 \text{Log}(\text{SKILL}_{ijt}) + \alpha_7 \text{Log}(\text{TOPEN}_{it}) + \alpha_8 \text{Log}(\text{TOPEN}_{jt}) \\
& + \alpha_9 \text{Log}(\text{INFLA}_{it}) + \alpha_{10} \text{Log}(\text{Bi-ex}_{i,t}) + \alpha_{11} \text{Log}(\text{INFRA}_{it}) \\
& + \alpha_{12} \text{Log}(\text{INFRA}_{jt}) + \alpha_{13} \text{SAARC}_{ijt} + \alpha_{14} \text{SAARC}_{it} \text{ APTA}_{jt} \\
& + \alpha_{15} \text{SAARC}_{it} \text{ ASEAN}_{jt} + \alpha_{16} \text{MltiRTA}_{ijt} + \gamma_t + \tau_{it} + \rho_{jt} + \mu_{ij} + \epsilon_{ijt} \quad (6)
\end{aligned}$$

$\alpha_1, \alpha_2, \alpha_3, \dots$ represents the coefficients for the explanatory variables;

γ_t indicates the time fixed effects;

τ_{it} denotes the home-country time fixed effects; ρ_{jt} is the host-country time fixed effects;

μ_{ij} represents the country-pair fixed effects.

Equation (6) was empirically examined for capturing the functional form of our gravity framework via FE-PPML. However, the country-pair fixed effects soak (absorb) the impact of time invariant variables. Therefore, the study estimates FE-PPML "three-way" with country-pair effects to examine the variables but also examines "two-way" FE-PPML to study the results of time invariant variables. Lastly, the study examines the explanatory variables using fixed effects (FE), random effects (RE), and FE-PPML to study the export flows for South Asian economies over the period of 1991-2022 however the results are interpreted based on FE-PPML to provide a better captivity of gravity specification and to generate statistically determined coefficients [as fixed effects (FE)⁶ models may face problems associated with incidental parameter (Weidner and Zylkin, 2021)]. The results of Wald test also supported the estimated model as significant for result interpretation.

IV. Sample Period and Data Description

A. Sample period

The study captures the impact of intra-RTAs and extra-RTAs for 4 South Asian economies, namely, India, Pakistan, Bangladesh, and Sri Lanka. The choice of these countries was based upon the availability of data. Moreover, these economies have actively negotiated trade agreements and have strong trade channels. The study covers a period 32 years from 1991 to 2022 as data for number of infrastructure variables associated with telecommunication and digital network, and finance were not available prior to 1991. Moreover, as discussed earlier, the select South Asian economies (India, Pakistan, Bangladesh)⁷ promoted intensive economic, strategic, and

6) Hausman test supported the results for fixed effects.

cultural relationship with South-East and East Asian region either in 1991 or post 1991. Further, the said regions (South; South-East; East Asia) have witnessed a strong association over last three decades and as a result a significant upsurge in the trade of goods, services, investment, and economic and digital links (World Bank, June 2023) therefore the present study was an attempt to study trade impact on South Asian region as result of three decades long association starting from 1991. We examined the determinants of bilateral exports for South Asian economies (4 in number as discussed earlier) coming from 14 Asian significant partners, namely, Bangladesh, China, Hong Kong, India, Indonesia, Japan, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, and Viet Nam. These partner countries are strategic players (in terms of trade) for South Asian economies as they account for top 14 ASEAN and APTA economies (in terms of trade balance) trading with South Asia [for the year 2022] [as per trade map (ITC) database].

B. Data description and source

Bilateral exports (measured in current USD) between the trading partners were incorporated as dependent variable and data for export flows were collected from UN Comtrade database (<https://comtradeplus.un.org/>) over the period of 1991-2022. The study incorporates considerable number of explanatory variables for the augmented gravity model, data description and data source for the same are tabulated below (see Table 1).

Table 1. Data Source and Description for Explanatory Variables

Variables	Source	Variable Description	Expected sign
GDP of the home country (South Asian economies) (GDP _{it})	World Bank database indicators (WDI), world bank	GDP of the home economy measures productive capacity of the exporting home country (Kalbasi, 2001); symbolic of supply of goods and services in the home economy for the given year t (Jayasinghe and Sarkare, 2004).	Positive
GDP of the trading economy. (GDP _{jt})	World Bank database indicators (WDI), world bank	GDP of the host country (GDP _j) measures absorptive capacity of the importing partner economy.	Positive
(SKILL _{ijt}) GDP per capita of country it - GDP per capita of country jt	World Bank database indicators (WDI), world bank	Economies with difference in factor endowment will promote inter-industry product whereas countries with similarity in factor endowment will support intra-industry (Wani and Yasmin, 2023)	Positive/ Negative
Trade openness (TOPEN _{it}) (trade as a % of GDP)	World Bank database indicators (WDI), world bank	Openness in trade captures the degrees to which the trading economy permits trade and gauges the strength in the domestic policies which promote trade with partner economies and world at large (Guttman and Richards, 2004).	Positive

7) India came up with "Look East" policy in 1991 and "Act East" in 2014 (Mazumdar, 2021); Bangladesh adopted "Look East" policy in 2001; and Pakistan developed "Strategic Vision East Asia" in 2003 (Ahmed, 2015)

Table 1. Continued

Variables	Source	Variable Description	Expected sign
Trade openness of host economy (TOPEN _{ijt})	World Bank database indicators (WDI), world bank	Host countries with liberal trade policies act as a better destination for trade.	Positive
Bilateral exchange (Bi_Exc _{ijt})	Exchange rates of both the economies were collected from World Bank indicators (WDI), world bank	The coefficient of the bilateral exchange rate is expected to be ambiguous (negative or positive) depending on the exchange rate fluctuations of both the trading economies.	Positive/ Negative
Inflation level of the home economy (INFLA _{it})	World Bank database indicators (WDI), world bank	With an upsurge in inflation level, home country is likely to offer lesser product and services. Therefore, the coefficient of the inflation is expected to carry a negative impact on international trade.	Negative
Infrastructural development of both the home and host economies (INFRA _{it} and INFRA _{jt}).	Data for infrastructure variables were collected from World Bank database indicators (WDI), world bank	Four broader aspects of infrastructure, namely, <i>transportation; telecommunication; energy consumption; and financial growth</i> were accounted for. Transportation development was included via total network of roads (in kms), total paved road (in kms), air transport registered carrier departures worldwide, and total rail lines. For telecommunication and digital enhancement, telephone line (per 100 people), mobile cellular subscription per 100 persons, and internet users (per 100 people), were included. For energy consumption, electric power consumption (kWh per capita) is employed (Kumar and De, 2008) and for financial growth, domestic credit provided by financial sector (as a percentage of GDP was employed) is used ⁸)	Positive
Distance (DIS _{ijt})	French Research Center for international economics). CEPII. http://www.cepii.fr/cepii/en/bdd_modele/bdd_modele.asp	Incorporated to estimate the impact of increase or decrease in transit and information cost of goods. Higher transportation cost would make trade expensive and/or reduce the trade level.	Negative
Common Border (Com_Bor _{ijt})	CEPII. http://www.cepii.fr/cepii/en/bdd_modele/bdd_modele.asp	A measure of proximity or nearness. Adjacent countries tend to incur less transportation cost. The variable was assigned 1 in case both the trading economies share a common border else 0 (dummy variable).	Positive
Colonial heritage (Com_Col _{ijt})	CEPII. http://www.cepii.fr/cepii/en/bdd_modele/bdd_modele.asp	Common Colonial heritage is another dummy variable incorporated in the study to examine whether the trading economies share links or not.	Positive
Intra-bloc Variable (SAARC _{ijt})	WTO RTA database	Intra-regional impact for SAARC countries. Therefore, the value of the variable is 1 if both the trading partners are part of SAPTA for a given year otherwise 0	Positive
Extra-bloc variable (SAARC _{it} -ASEAN _{jt})	WTO RTA database	The variable takes value 1 in case the home country belongs to SAARC and host country is the member of ASEAN bloc, otherwise 0.	Positive/ Negative
Extra-bloc variable (SAARC _{it} -APTA _{jt})	WTO RTA database	The value of the variable is 1 in case country i belongs to South Asian bloc and country j belong to Asian Pacific bloc (APTA), otherwise 0	Positive/ Negative
Multiple RTA membership (Multi_RT _{Aijt})	WTO RTA database	Multiple RTAs between the trading partners might strengthen via minimizing the trade related barriers and enhancing trade supportive. However, few studies (Kimura, 2006) suggested that multiple negotiations might lead to confusion and "spaghetti bowl" phenomena.	Positive/ Negative

(Source) Authors' own to capture the source of data.

V. Results and Analysis

Gravity model fits well to capture the impact of intra-regional and extra-regional trade flows for South Asian exports. For FE-PPML specification, we obtain R^2 as 97.58%, higher than the R^2 suggested by Tinbergen ($R^2 = 0.7$) might be because of inclusion of considerable number of intuitive covariates/explanatory variables. Table 2 states the results using random effects, fixed effects, and FE-PPML estimation for a period of 32 years 1991-2022. The results for all empirical modelling were reported but the results were interpreted using "three-way" FE-PPML specification for time variant explanatory variables and "two-way" FE-PPML for time invariant variables. As evident in Table 2, the coefficient for GDP of South Asian economies was found to significant and positive; with an increase in GDP (economic size), South Asian economies are able to offer a better market for goods and services. To quantify using the elasticity estimates, the coefficient of GDP of home economies suggests that an increase of GDP of home economies by 1% leads to an increase of 1.55% in exports among the trading partners (column 4). Even the larger economic size (GDP) of the partner economies was supportive for South Asian exports and an increase of 1% of GDP of partner economies is contributing to an increase in exports flows by 2.4%. The results were supportive of the economic theories and gravity associated existing literature; economies with larger demand capacity and supply capacity tend to import and export more (Wani and Yasmin, 2023). Similarly, the results for trade openness of home and host economies are found to be positive and highly significant. Countries with liberal and encouraging trade policies, trade more. Elasticity coefficients for trade openness suggested an increase in 1% of trade openness policies of home and host economies is supporting an upsurge in exports by 2.8% and 1.8% respectively. Trade related studies (Silajdzic and Mehic, 2018) suggest that external economic liberalisation (in terms of trade openness) has boosted trade and economic growth for developing economies, the present study provides results in line with the existing literature. The results for GDP per capita difference between the trading economies are extensively employed to discuss the pattern of international trade (Adnan et al, 2005). The variable is captured as part of the gravity framework to identify the presence of H-O/Heckscher-Ohlin theory or Linder hypothesis. H-O theory suggested inter-industry trade because of difference in GDP per capita/factor endowment whereas Linder hypothesis supported intra-industry trade with similar GDP per capita/factor endowment. The results for SKILL (absolute difference between

8) The infrastructure development variables had varied units of evaluation so the data was normalised. Subsequently, quartile orders for each economy were calculated on yearly basis and values 1,0.75,0.5, and 0.25 were assigned starting from the highest rank quartile to lowest rank quartile (highest order of quartile is allocated value as 1; country with second highest rank quartile was assigned value as 0.75; countries with third and fourth quartile are designed value as 0.5 and 0.25 respectively). Finally, a composite index is calculated based on the simple average of all quartile value assigned for all measures of infrastructure for each corresponding economy on yearly basis. The method assisted us to incorporate all measures of infrastructure simultaneously and encompassed various economies on the same scale of measurement [Hulten (1996) and Calderson and Chong (2001)]

GDP per capita of both the trading partner) are found to be significant but negative (for FE-PPML estimation), South Asian are offering intra-industry goods hence, specialising in production of similar products (and processes) that can be offered to Asian markets. The coefficient for the difference in GDP per capita suggested that a reduction of 10% in GDP per capita difference between the trading economies contributes to an increase in exports by 9% hence supporting intra-industry trade. Result for GDP per capita difference was similar to Nawaz, 2020; Rauh, 2010. Bukhari et al (2005) also supported Linder hypothesis for India, Pakistan, and Bangladesh (developing South Asian economies) and stated that developing economies largely export intra-industry products.

The results for infrastructure development were also encouraging both for home and host economies, countries with better infrastructure are able to offer better products and services; and host countries with better infrastructure provide better trade channels to South Asian home economies for goods offered. Elasticity estimates for infrastructure facilities demonstrated that an increase in infrastructure provisions of home and host economies by 1% leads to an increase of 1.7% and 0.4% respectively in the exports of South Asian region. The results are in line with the existing literature suggesting increase in bilateral trade as a result of enhance infrastructure. Talking about the coefficient of bilateral exchange rate, the coefficient was found to be significant but negative. Generally, exporter-importer bilateral exchange rate makes exports more competitive and hence depict a positive impact but our results were not compatible with the existing trends. Such results suggest that economies in the South Asian region are highly dependent on the other Asian economies for basic resource/input and raw material which adds to the cost to the products exported (Mallick, 2011).

As discussed earlier, the results for time invariant variables were captured via "two-way" FE-PPML estimation (without country-pair fixed effects). The results for time invariant variables indicate distance and common border insignificant for South Asian exports. Talking about time invariant variable vis-à-vis international trade, they are associated with the trade cost. Improvement in the transportation, telecommunication channels, and exchange networks might have contributed to such results. Kurihara (2011) also found similar results for distance while examining impact of regional trade agreement on OECD countries. For common border results, unrest among select South Asian economies (India and Pakistan) might have contributed to such results. However, the results for common colonial links are found to be significant and positive. This indicates a similarity in political and historical connects leads to export upsurge (because of historical and cultural links) for South Asian economies. To quantify the dummy variable Common colonial links, Delta method is employed. The results indicate that the exports for the South Asian economies increase by 0.82% [$\exp(0.6)-1$] in case the trading economies share a colonial heritage (see column 3 Table 2).

Table 2. Estimates of Gravity Model with Panel Random Effects, Fixed Effects and FE-PPLM Estimation with Bilateral EXPORTS as Dependent Variable (Results for the period of 32 years 1991–2022)

EXPljt	Random Effects			Fixed effects			PPML (without country-pair fixed effects)			PPML (with country-pair fixed effects)		
	1			2			3			4		
	Coef.	Std. Err.	P-value	Coef.	Std.	P-value	Coef.	Std. Err.	P-value	Coef.	Std.	P-value
Com_Borijt	0.007	0.171	0.967	-	-	-	0.051	0.143	0.724	-	-	-
COM_Colij	0.534*	0.104	0.000	-	-	-	0.603*	0.183	0.001	-	-	-
LDISij	0.257	0.280	0.358	-	-	-	1.9880	0.251	0.553	-	-	-
LGDPlt	0.711*	0.054	0.000	0.324*	0.087	0.000	1.095*	0.816	0.000	1.554**	0.611	0.011
LOPNit	0.474*	0.078	0.000	0.679*	0.085	0.000	2.887*	0.300	0.000	2.819*	0.222	0.000
LINFLit	-0.006	0.037	0.872	-0.0157	0.037	0.667	-0.2640	0.202	0.190	-0.238***	0.132	0.070
LGDPlt	0.543*	0.061	0.000	0.8271*	0.086	0.000	1.934*	0.269	0.000	2.441*	0.211	0.000
LOPNjt	0.164**	0.084	0.051	0.2232*	0.100	0.026	1.381*	0.293	0.000	1.837*	0.274	0.000
SKILLijt	0.0026	0.052	0.959	-0.157**	0.078	0.044	-0.028***	0.044	0.052	-0.952*	0.181	0.000
LB_exchijt	-0.0147*	0.006	0.019	-0.014*	0.007	0.031	0.028**	0.013	0.029	-0.008**	0.008	0.031
SAARC	-0.1859*	0.056	0.001	-0.213*	0.057	0.000	-0.213**	0.194	0.027	-0.0185	0.190	0.922
SAARC-AFTA	0.1277*	0.042	0.002	0.094*	0.044	0.031	0.148**	0.164	0.036	0.0486***	0.150	0.074
SAARC-ASEAN	-0.0613**	0.032	0.055	-0.0785*	0.033	0.019	0.314**	0.159	0.048	0.001***	0.140	0.095
multIRTAijt	0.09549*	0.024	0.000	0.121	0.026	0.000	0.053***	0.049	0.076	0.011***	0.054	0.083
LINFRit	2.1105*	0.242	0.000	1.338*	0.277	0.000	0.469***	1.082	0.065	1.796**	0.782	0.022
LINFRjt	0.65471*	0.225	0.004	0.426*	0.238	0.073	1.487**	0.482	0.002	0.422***	0.715	0.054
CONST	-7.418*	1.049	0.000	-5.857*	0.532	0.000	-28.290*	10.216	0.006	-34.009*	7.937	0.000
R-square	70.34%			92.53%				95.66%				
Adjusted R-square	70.00%			92.12%								
home_country fixed effects								yes				yes
host_country fixed effects								yes				yes
year fixed effects								yes				yes
country_pair fixed effects				yes				yes				yes
Wald test							4688.4				8500.2	
							Prob > chi2				Prob > chi2	
							= 0.0000				= 0.0000	

(Source) based on Authors calculations. *, ** and *** indicate statistical significance at 1, 5 and 10 percent levels respectively.

Results for both intra-bloc and extra-bloc variables are evaluated based on FE-PPML estimation. The results for intra-SAARC coefficient were found to be negative and significant for FE-PPML estimation without country-pair fixed effects but insignificant with country-pair fixed effects; might be due to endogeneity issues. Results for intra-SAARC exports evaluated by Hassan (2001) also indicated a negative and significant results for intra-bloc SAARC flows hence South Asian countries have failed to enhance intra-bloc exports over the period of 1991-2022. Lack of appropriate policy measures, limitations associated with the removal and reduction of tariff and non-tariff structures, cross-border unrest among select South Asian economies, and insufficient regional liberalisation initiatives might have contributed to such results for intra-bloc SAARC exports. Further, Manocha (2023) suggested that apart from India, other South Asian economies need to gear up exports in South Asian region. For SAARC-APTA extra-bloc export (the home economy has SAARC membership and host economy is member of APTA) variable, a positive and significant results were reported. The results indicated that South Asian products have a market in APTA economies. Also, in case of ASEAN trading bloc, the coefficient for the SAARC-ASEAN was found to be significant and positive implying that South Asian economies are also able to offer exports to East Asian economies. The results for SAARC-ASEAN and SAARC-APTA exports indicate that South Asian economies are able to facilitate extra-bloc exports with ASEAN and APTA economies as a result for better initiatives and policies ("Look East", "Act East", "Strategic Vision East Asia" policy) with South-East and East Asian economies. The bloc related variables suggest that South Asian economies are not able to create intra-bloc trade but are looking for trade partners in East and Southeast Asian region. South Asian countries have export potentials and opportunities hence are expanding markets in East and Southeast Asia. The coefficient for multiple RTAs negotiated by South Asian economies to promote exports in Asian subcontinent was also found to be significant and positive, indicating negotiating multiple trade agreements with the host economy liberalises the tariff regime for South Asian economies and hence facilitates exports from South Asia.

VI. Conclusion

The impact of intra-regional and extra-regional export flows of South Asian economies were examined over the period of 1991-2022. Intra-bloc trade flows were captured for SAARC trading bloc whereas extra-bloc flows were associated with ASEAN and APTA. The results for the regression equation were reported using FE, RE and FE-PPML (both 'two-way' and 'three-way' FE-PPML) estimation. FE-PPML estimation results were employed to support gravity specification, and to account for home-country time and host-country time fixed effect; time fixed effects; and country-pair fixed effects. Though, 'three-way' FE-PPML suggested country-pair fixed

effects to address endogeneity issues but fails to interpretate time invariant variables hence, 'two-way' FE-PPML was employed to provide coefficients for time invariant variables. Results for time variant variables were captured via 'three-way' FE-PPML estimation. Wald test also supported the model estimations via FE-PPML.

The results suggested that diversified production capability (in terms of GDP of South Asian economies) and liberal trade policy initiatives (trade openness) are supportive for South Asian exports to East/Southeast Asian economies. Level of infrastructural development of both the home and host countries are promoting exports in the South Asian region. South, South-East, and East Asian economies are stimulating infrastructure development specially in the sector of transportation, power, ICT and digital networks, sea ports, and telecommunications (Asian Development Bank, 2017; Asian Development Bank, 2023) and such developments are likely to enhance trade in the Asian subcontinent. Talking about the results of time-invariant variables, the results for common colonial links are also found to be significant and positive indicating a cultural and historical links promoting exports in South Asian region. However, results for distance and common border were not found to be as expected, indicating development of transportation and communication networks leading to an insignificant result for these variables.

A brief discussion of results generated for intra-bloc and extra-bloc trade flows is desired. Results for intra-SAARC were found to be negative. The results for SAARC intra bloc flows indicates no sign of trade/export facilitation in SAARC trading bloc. South Asian economies are not able to create trade opportunities (Wani and Yasmin, 2023) and advantages among the member of the bloc. The result for SAARC trading bloc were in line with the outcome suggested by Dembatapitiya and Weerahewa, 2015; Hassan (2001); Wadhwa (2009); and Akhter and Ghani (2010). SAARC economies are yet to achieve intra-bloc benefits and Khalid (2023) suggested that SAARC nations need to search for better trade partners outside the bloc. Sinha and Sareen (2020) stated that high para-tariff charges escalate import cost for South Asian economies. High informal trade and trade channels; huge non-tariff barriers; inappropriate transaction procedures and custom processes; and lofty logistic cost seem to be detrimental factors for SAARC economies (Prabir, 2014; Taneja and Bimal, 2016). Further, lack of political stability and loosely structured formal channels of communication for trade and investment both at the macro-level (restricted and unfriendly environment among the authorities of SAARC nations and restrictive visa regimes specially for India and Pakistan) and at the micro-level (lack of confidence among the traders, custom personnel, and transit mechanisms). Further, South Asian economies are competitors of similar products (apparel and textile) in the export market (Sinha and Sareen, 2020). India (largest economy in the bloc in terms of GDP and population) largely imports semi-conductors and none of the SAARC country seems to have a comparative advantage in manufacturing semi-conductors (Pitigala, 2005).

The results for extra bloc exports were captured with major focus on flows to APTA and

ASEAN via FE-PPML ("three-way") specification. The results for extra bloc exports suggested that South Asian economies are significantly exporting goods to Asian Pacific and South-East region. As per trade map (ITC) database, ASEAN and APTA economies are consistently importing products such as cotton; cereals; meat and fish; mineral oils and fuel; nuclear boilers and regulators; iron and steel; and other consumer and manufactured products from South Asian exporting market. Further, the trends of exports and policy initiatives by select Asian economies have contributed towards boosting the potential opportunities of trade with ASEAN and APTA economies. Such outcomes might be the result of constructive dialogue, multi-facet relationships, and persistent support among the economies of South, South-East and East Asia in the last few decades. India recognised ASEAN as the central pillar of India's Act East Policy (The ASEAN magazine, 30 Years of ASEAN-India relations, 2023) and India has also negotiated a bilateral trade agreement with ASEAN; Pakistan is also having progressive talks with ASEAN though at sectoral level and is consistently lobbying ASEAN countries to be full dialogue partner (Izzuddin and Jamil, 2020); Bangladesh counted as the 26th member of the ASEAN Regional Forum (ARF) in 2006 to strengthen and liberalise economic, commercial, and trade routes. Talking about APTA, the results were significant and positive. China and India (giant trade partners of Asia) have a direct trade agreement link only through APTA, and both the economies had all-time trade upsurge of USD 135.98 billion in 2022 (as per Chinese custom database). Further, as per Observatory of Economic Complexity (2022), exports of Pakistan and Bangladesh exports to China (largest exporter and importer of APTA bloc) has upsurged by 11% and 11.8% annually since 1995. Moreover, the results of APTA might be due to overlapping membership among select members of SAARC and APTA (Verma et al, 2017). Results for multiple RTAs were quite encouraging suggesting that with increase in the number of RTAs negotiated between the trading partners, tariff structure liberalises and strengthens the flow of goods and services in the region.

An insight into the study suggests that trade agreements are stimulators of trade among the negotiating partners but the success of a regional bloc depends on the holistic approach of the member economies. South Asian economies negotiated SAPTA in 1995 and deeper integration, SAFTA in 2006. Even select members of SAARC have negotiated few bilateral trade agreements, namely, India-Nepal, Sri Lanka-India, India-Bhutan, Pakistan-Sri Lanka, and few more. However, the existing trends and literature suggests that the region needs comprehensive and holistic rebuilding as intra-bloc trade trends of SAARC economies is still limited. Trade connectivity among South Asian economies is missing largely due to decades old political tension between India and Pakistan, two strategic members of SAARC. The results indicate that the negotiation of agreements without a holistic intent to stimulate a positive environment for economic, cultural, and strategic growth might generate limited or no growth in trade, services, and investment among members in long-run. A platform for addressing challenges with open communication

channels that goes beyond the political limitations of the member economies is suggested for South Asian economies. Simultaneously, select South Asian economies have built a strong association with ASEAN and APTA economies consequent of policy initiatives that support supply chains, distribution channels, and economic parameters (to facilitate bilateral trade). In nutshell, we can state that SAARC economies need to work towards compactible foreign policies; sustainable regulatory and institutional setup; strong global distribution and trade channels; better trade logistic and infrastructure networks; tariff-free zone; and minimise political stress in Southern Asia.

The present study can be extended to incorporate extra-bloc trade flows of South Asian economies with global trade partners rather than just Asian trade partners. Inclusion of global trade partners will be a better insight into the trends and direction of South Asian trade, and provide a better understanding of inter-regional trade blocs that are stimulating South Asian trade.

References

- Adam, C., & Cobham, D. (2007). Modelling multilateral trade resistance in a gravity model with exchange rate regimes. *CDMA Conference Paper Series 0702, Centre for Dynamic Macroeconomic Analysis*.
- ADB. (2017). <https://www.adb.org/publications/asia-infrastructure-needs>.
- ADB. (2023). <https://www.adb.org/publications/infrastructure-financing-southeast-asia-post-pandemic>.
- Adnan, S., Bukhari, H., Ahmad, M. Alam, S., Bukhari, S., & Butt, M. (2005). An empirical analysis of the Linder theory of international trade for South Asian countries. *The Pakistan Development Review*, 44(3). <https://doi.org/10.30541/v44i3pp.307-320>
- Ahmed, R. (2015). India's look east policy: Challenges and options for Pakistan. *NDU Journal*, 55-74.
- Ajmani, M., Choudhary, V., Kishore, A., & Roy, D. (2020). *ASEAN, SAARC, and the indomitable China in food trade: A gravity model analysis of trade patterns* (Discussion Paper No. 1914). IFPRI. <https://ssrn.com/abstract=3561517>
- Akhter, N., & Ghani, E. (2010). Regional integration South Asia: An analysis of trade flows using the gravity model. *The Pakistan Development Review*, 49(2), 105-118.
- Akram, A., Ghani, E., & Din, M. ud. (2020). Strengthening Pakistan's trade linkages: A case study of regional comprehensive economic partnership (RCEP). *The Pakistan Development Review*, 59(3), 399-418. <https://www.jstor.org/stable/27200127>
- Ali, I., & Mufti, A. (2022). *Enhancing intra-regional trade in SAARC: A survey of potential competitive commodities*. SSRN. <https://ssrn.com/abstract=4087157> or <http://dx.doi.org/10.2139/ssrn.4087157>
- Anderson J.E., & Van Wincoop, E. (2003) Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1), 170-192. <https://doi.org/10.1257/000282803321455214>
- Archarya, S. (2012). *A panel data analysis of foreign trade determinants of Nepal: Gravity model approach* (Working Paper Series No. NRB-WP-13,2012). NRB.

- Baier SL, & Bergstrand JH. (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics*, 71(1), 72-95. <https://doi.org/10.1016/j.jinteco.2006.02.005>
- Baltagi BH, Egger P, & Pfaffermayr M. (2003). A generalized design for bilateral trade flow models. *Economic Letters*, 80(3), 391-397.
- Bayley, A. (2014). Policies to Enhance Trade Facilitation in South Asia and Southeast Asia (Working Paper No. 489). ADBI. <https://ssrn.com/abstract=2465870> or <http://dx.doi.org/10.2139/ssrn.2465870>
- Bergstrand, J. H. (1989). The generalised gravity equation, monopolistic competition, and the factor-proportions theory in international trade. *The Review of Economics and Statistics*, 71(1), 143-153.
- Bhasin, N., & Manocha, R. (2014). Impact of Globalisation on India's exports with special reference to Regional Trade Agreements. *FOCUS: Journal of International Business*, 1(2), 42-54.
- Breuss F., & Egger P. (1999). How reliable are the estimations of east-west trade potentials based on cross-section gravity analyses? *Empirica*, 26(2), 81-94.
- Calderón, C., & Chong, A. (2004). Volume and quality of infrastructure and the distribution of income: an empirical investigation. *Review of Income and Wealth*, 50(1), 87-106.
- Cernat, L. (2001). Assessing Regional Trade Arrangments: Are South-South RTAs More Trade Diverting? *Global Economy Quarterly*, 2(3), 235-259.
- Correia, S., Guimarães, P., & Zylkin, T. (2020). Fast Poisson estimation with high-dimensional fixed effects. *The Stata Journal*, 20(1), 95-115. <https://doi.org/10.1177/1536867X20909691>
- Coulibaly, S. (2007). *Evaluating the trade effect of developing regional trade agreements: A semi-parametric approach* (Working Paper Series No. 4220). World Bank Policy Research.
- Dee, P., & Gali, J. (2003). *The trade and investment effects of Preferential trade agreements* (Working Paper No. 10160). NBER.
- Dembatapitiya P., & Weerahewa, J. (2015). Effects of regional trading agreements on South Asian trade: a gravity model analysis. *Tropical Agricultural Research*, 26(3), 468.
- Dyomina, Y. V. (2015). Trade Integration Effects in ASEAN Countries. *Spatial Economics*, 3, 120-141.
- Ferreira, C. (2021). International trade and the gravity model: Recent evidence in theoretical and empirical analysis. <https://doi.org/10.13140/RG.2.2.11671.70562>
- Frankel, J., & Rose, A. (2002), An Estimate of the Effect of Common Currencies on Trade and Income. *The Quarterly Journal of Economics*, 117(2), 437-466.
- Gu, J. (2008). *A gravity analysis of China's export growth* (Doctoral dissertation). Dept. of Economics-Simon Fraser University.
- Guillhot. (2010). Assessing the impact of main East-Asian free trade agreements using a gravity model First results. *Economic Bulletin*, 30(1), 282-291.
- Gul, N., & Yasin, H. M. (2011). The trade potential of Pakistan: An application of the gravity model. *The Lahore Journal of Economic*, 16(1), 23-62.
- Gulnaz, S., & Manglani, H. (2022). Does gravity work in the context of India and ASEAN bilateral trade? An application of the FGLS method. *Theoretical and Applied Economics, Asociatia Generala a Economistilor din Romania / Editura Economica*, 1(630), 143-160.
- Guttman, S., & Richards, A. (2004). *Trade Openness: An Australian Perspective* (Research Discussion Papers No. RDP2004-11). RBA.

- Haq, M. (2021). Financial Sector Development, Trade Openness and Economic Growth Nexus: Evidence from SAARC Countries. *Forman Journal of Economic Studies*, 17. <https://doi.org/10.32368/FJES.20211705>
- Hassan, M. Kabir (2001). Is SAARC a viable economic block? Evidence from gravity model. *Journal of Asian Economics*, Elsevier, 12(2), 263-290.
- Helpman, E., Melitz, M., & Rubinstein, Y. (2008). Estimating trade flows: Trading partners and trading volumes. *The Quarterly Journal of Economics*, 123(2), 441-487
- Hirantha, S. W. (2004). *From SAPTA to SAFTA: Gravity Analysis of South Asian Free Trade*. Mimco, Department of Economics, Nagoya University, Japan.
- Hossain, S. (2018). SAFTA and AFTA: A comparative welfare analysis of two regional trade agreements. *Economic Structures*, 7, 25. <https://doi.org/10.1186/s40008-018-0124-0>
- Hulten, C. (1996). *Infrastructure Capital and Economic Growth: How well you use it may be more important than how much you have* (Working Paper No. 5847). National Bureau of Economic Research.
- Irshad, M. Saqib. (2021). The Application of Gravity Equation While Accessing the Environment of Pakistan-ASEAN Technological Trade Flows. *Jurnal Perspektif Pembiayaan dan Pembangunan Daerah*. <https://ssrn.com/abstract=3843558>
- Izzuddin, M., & Jamil, S. T. (2020). *Rekindling Pakistan's Southeast Asia Engagement under Imran Khan*. ISAS Insights. Detailed perspectives on developments in South Asia.
- Jan, W., & Shah, M. (2019). A Gravity Model Approach towards Pakistan's Bilateral Trade with SAARC Countries. *Comparative Economic Research*, 22, 23-38. <https://doi.org/10.2478/cer-2019-0030>
- Jayasinghe, S., & Sarker, R.(2004). *Effects of regional Trade Agreements on Trade in agrifood products: Evidence from Gravity Modeling* (Working Paper No. 04-WP374). Center for Agricultural and Rural Development (CARD) at Iowa State University.
- Kabir, M., Salim, R., & Al-Mawali, N. (2017). The gravity model and trade flows: Recent developments in econometric modeling and empirical evidence. *Economic Analysis and Policy*, 56, 60-71.
- Kalbasi, H. (2001). The gravity model and global trade flows. *Paper presented at the 75th International Conference on Policy Modelling for European and Global Issues*, Brussels. July 5-7.
- Kashif, M. (2024). Determinants of India-ASEAN trade: An augmented gravity model analysis. *International Journal of Indian Culture and Business Management*, Inderscience Enterprises Ltd, 31(2), 231-242.
- Khalid, N. (2023). An analysis of intra-SAARC trade relations. *International Journal of Economics and Business Research*, 25(4), 489-505.
- Kimura, F., Kuno, A., & Hayakawa, K. (2006). Does the Number of RTAs Matter? Empirical Analysis on the Spaghetti Bowl Phenomenon. <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.491.2468>
- Kumar, N., & De, P. (2008). East Asian Infrastructure Development in a Comparative Global Perspective: An Analysis of RIS Infrastructure Index. In Kumar, N. (Ed.), *International Infrastructure Development in East Asia - Towards Balanced Regional Development and Integration* (ERIA Research Project Report 2007-2). Chiba: IDE-JETRO.7-29.
- Kurihara, Y. (2011). The Impact of Regional Trade Agreements on International Trade. *Modern Economies*. 2, 846-849.
- Larch, M., & Yotov, Y. (2023). *Estimating the Effects of Trade Agreements: Lessons from 60 Years*

- of Methods and Data* (Working Paper No. 10267). CESifo. <https://ssrn.com/abstract=4359371> or <http://dx.doi.org/10.2139/ssrn.4359371>
- Lee, Jong-Wha & Shin, K. (2006). Does regionalism lead to more global trade Integration in East Asia? *The North American Journal of Economics and Finance*, 17(3), 283-301.
- Mallick, H. (2011). Role of exchange rate on services and goods exports: A comparative empirical analysis. In *7th annual conference on economic growth and development*. Indian Statistical Institute, New Delhi. http://www.isid.ac.in/~pu/conference/dec_11_conf/Papers/HrushikeshMallick.pdf
- Manglani, H., Kumari, L., & Jha, D. (2022). Gravity Model Analysis of India's Bilateral Trade with Special Reference to Selected Saarc Countries. *IIS University Journal of Social Sciences*, 7&8(1), 106-113.
- Manocha, R. (2023). Dynamics of Trade Agreements, Trade and Investment in South, Southeast and East Asia. *Review of professional Management*. <https://doi.org/10.1177/09728686231177120>
- Mazumdar, A. (2021). From "look east" to "act east": India's evolving engagement with the Asia-Pacific region. *Asian Affairs*, 52(2), 357-374. <https://doi.org/10.1080/03068374.2021.1912467>
- Muhammad K., & Yucer A. (2010) Trade effects of regional trade agreements: Trade creation and trade diversion within the Western Hemisphere. *International Journal of Economic Issues*, 3(2), 221-238.
- Musila JW. (2005). The Intensity of trade creation and trade diversion in COMESA, ECCAS and ECOWAS: a comparative analysis. *Journal of African Economics*, 14(1), 117-141.
- Nagraj, D., & Ghosh, I. (2021). Trade Costs Between India and ASEAN: A Gravity Framework. In Lakhanpal, P., Mukherjee, J., Nag, B., & Tuteja, D. (Eds.), *Trade, Investment and Economic Growth*. Springer, Singapore. https://doi.org/10.1007/978-981-33-6973-3_5
- Nawaz, Saima. (2020). Institutions, Regional Integration and Bilateral Trade in South Asia: PPML Based Evidence. *Pakistan Development Review*, 59(2), 221-241.
- OECD. (2023). *Economic Outlook for Southeast Asia, China and India 2023 - Update: Resilience Under Uncertainty*. Paris: OECD Publishing. <https://doi.org/10.1787/cd94bcf6-en>
- Olivero, M.P., & Yotov, Y.V. (2012) Dynamic gravity: Endogenous country size and asset accumulation. *Canadian Journal of Economics*, 45(1), 64-92. <https://doi.org/10.1111/j.1540-5982.2011.01687.x>
- Park, I. (2009). Regional Trade Agreements in East Asia : Will they be sustainable? *Asian Economic Journal*, 23(2), 169-194.
- Peter A. G Afesorghor, Sylvanus & Van Bergeijk (2011). *Multi-Membership and the Effectiveness of Regional Trade Agreements in Western and Southern Africa: A Comparative Study of ECOWAS and SADC* (Working Paper No. 520). Institute of Social Sciences.
- Pitigala, N. (2005). *What Does Regional Trade in South Asia Reveal about Future Trade Integration? Some Empirical Evidence*. World Bank. <https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-3497>
- Prabir, D. (2014). Economic Corridors and Regional Economic Integration. In Prabir De & Kavita Iyengar (Eds.), *Developing Economic Corridors in South Asia* (p. 15). Manila: Asian Development Bank.
- Rahman, M., Shadat, W.B., & Das, N.C. (2006). *Trade Potential in SAFTA : An Application of Augmented Gravity Model* (Working Paper No. 61). Centre for Policy Dialogue (CPD).
- Ratna, R., Cho, J., & Min, V. L (2014). Prospects for Energy Security in Asia-Pacific through Regional Trade. In *2nd International Conference on Energy, Regional Integration and Socio-Economic*

Development 7607, EcoMod.

- Rauh, A. (2010). Empirical analysis of the linder hypothesis: The case of Germany's trade within Europe. *The American Economist*, 55(2), 136-141.
- Rid, S. A. (2007). Pakistan's 'look east' policy: opportunities & constraints. *Regional Studies*. XXV(1), 64-92.
- Rose AK. (2000). Currency unions-one money, one market: the effect of common currencies on trade. *Economic Policy*, 15(30), 7-45
- Sen, R., Srivastava, S., & Webber, D. (2015). *Preferential trading agreements and the gravity model in presence of zero and missing trade flows: Early results for China and India* (Working Papers No. 2015-02). Auckland University of Technology, Department of Economics.
- Sharma, H. (2013). A Measurement of India's Trade Intensity With Saarc Countries. *Journal of Commerce and Trade, Society for Advanced Management Studies*, 8(12), 76-84.
- Sharma, V., & Kumar, V. (2021). Trade potential under the SAFTA between India and other SAARC countries: The augmented gravity model approach. *Statistics in Transition New Series*, 22, 81-97. <https://doi.org/10.21307/stattrans-2021-028>.
- Silajdzic, S., & Mehic, E. (2018). Trade Openness and Economic Growth: Empirical Evidence from Transition Economies. *InTech*. <https://doi.org/10.5772/intechopen.75812>
- Silva, J.S., & Tenreyro, S. (2006) The log of gravity. *Review of Economics and Statistics*, 88(4), 641-658. <https://doi.org/10.1162/rest.88.4.641>
- Singh, L. B. (2021). Impact of India-ASEAN Free Trade Agreement: An Assessment from the Trade Creation and Trade Diversion Effects. *Foreign Trade Review*, 56(4), 400-414. <https://doi.org/10.1177/00157325211021503>
- Sinha, R., & Sareen, N. (2020). *India's Limited Trade Connectivity with South Asia* (Policy Brief, 2020). Brookings Institution India Center.
- Siraj, K., Khan, M. I., & Naqvi, K. A. (2022). Impact of Trade Facilitation Reforms on The Trade Volume of SAARC Countries. *Sustainable Business and Society in Emerging Economies*, 4(2), 393-402.
- Soloaga, I., & Winters, A. L. (2001). Regionalism in the nineties: what effect on trade? *The North American Journal of Economics and Finance, Elsevier*, 12(1), 1-29.
- Taguchi, H., & Rubasinghe, D. (2019). Trade impacts of South Asian Free Trade Agreements in Sri Lanka. *South Asia Economic Journal*, 20, 139156141882220. <https://doi.org/10.1177/1391561418822203>
- Taneja, N., & Bimal, S. (2016). *India's informal trade with Pakistan* (Working Paper No. 327). Indian Council For Research On International Economic Relations.
- The ASEAN. (2023). 30 Years of ASEAN-India relations. <https://theaseanmagazine.asean.org/article/30-years-of-asean-india-relations/>
- The World Bank. (2022). *Deepening linkages between South Asia and Southeast Asia*. <https://www.worldbank.org/en/region/sar/publication/deepening-linkages-between-south-asia-and-southeast-asia>
- Tri, W. (2009). *Inter- and Intra-ASEAN regional trade* (MPRA Paper No. 77990). University Library of Munich, Germany.
- Venkatesh, V., & Bhattacharyya, R. (2014). *The ASEAN free trade agreement: How effective?* (Working

- Papers No. 1425). Indian Institute of Foreign Trade.
- Verma, S., Madhukar, V., Abhyaratne, A., & Bankhad, K. (2017). Trade creation and trade diversion: India's experience in Apta and Isceca. *Paper submitted for the National Conference on Managing Indian Economy: Challenges for Future Deendayal Upadhyay College, Delhi University.*
- Wadhwa, D. (2009). Assessing the potential for growth of intraregional trade in South. *Working Paper by United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) in its series Studies in trade and investment.*
- Wani, S.H., & Yasmin, E. (2023). India's trade with South and Central Asia: An application of institution-based augmented gravity model. *Future Business, 9, 77.*
- Weidner, M., & Zylkin, T. (2021). Bias and consistency in three-way gravity models. *Journal of International Economics, Elsevier. 132(C).*
- World Bank. (2023). *Deepening linkages between South Asia and Southeast Asia.* <https://www.worldbank.org/en/region/sar/publication/deepening-linkages-between-south-asia-and-southeast-asia>