TRADE FLOWS BETWEEN SAFTA MEMBER COUNTRIES: AN EMPIRICAL ANALYSIS

SADIA SULTANA ONI
Bachelor of Social Science, University of Science & Technology, 2018

A thesis submitted
In partial fulfillment of the requirements for the degree of

MASTER OF ARTS
in
ECONOMICS

Department of Economics
University of Lethbridge
LETHBRIDGE. ALBERTA, CANADA

TRADE FLOWS BETWEEN SAFTA MEMBER COUNTRIES: AN EMPIRICAL ANALYSIS

SADIA SULTANA ONI

Date of Defence: December 9, 2022

Dr. P. Ghazalian Thesis Supervisor	Associate Professor	Ph.D
Dr. A. Darku Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. A. Akbary Thesis Examination Committee Member	Professor	Ph.D.
Dr. S. Malla Chair, Thesis Examination Committee	Professor	Ph.D.

DEDICATION

To my parents, siblings, and friends from ECO-25th batch who supported me throughout my academic life.

Abstract

The South Asian Free Trade Agreement (SAFTA) of the SAARC is the principal regional trade agreement in South Asia. This thesis empirically examines bilateral trade flows between SAFTA member countries. The empirical analysis is executed using the gravity model to estimate the relative magnitude of bilateral trade flows between SAFTA member countries. A panel dataset presenting bilateral trade flows among SAFTA member countries and between SAFTA countries and non-SAFTA countries is used. The empirical gravity equations are estimated in the log-linear forms and estimated in multiplicative forms using the PPML estimation method. The results show that the magnitudes of trade flows among SAFTA member countries significantly fall below the magnitudes of trade flows between SAFTA and non-SAFTA member countries, ceteris paribus. They indicate that SAFTA member countries should adopt policies to reduce the significance of para-tariffs, sensitive items list, and to improve bilateral infrastructure and business networks, and settle conflicts.

ACKNOWLODGEMENTS

I would like to express my gratitude to my thesis supervisor, Dr. Pascal Ghazalian, for his guidance, critical inputs, inspiration, and endless support since day one. It would not have been accomplished without his guidance, supervision, and dedication. You have been an example of excellence and distinction as a supervisor, professor, researcher, and role model.

I would also like to thank my thesis committee members: Dr. Alexander Darku, and Dr. Amir Akbary, and the Examination Chair, Dr. Stavroula Malla, for their insightful comments, suggestions, and support.

Lastly, I would like to acknowledge the love and support of my parents and siblings. They are the reason who I am today. I am grateful to my friends who supported me during my academic journey.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AFTA: ASEAN Free Trade Area
ASEAN: Association of Southeast Asian Nations
BIT: Bilateral Investment Treaty
BTA: Bilateral Trade Agreement
CEPII: Centre d'Etudes Prospectives et d'Informations Internationales
CES: Constant Elasticity of Substitutions
CET: Constant Elasticity of Transformation
CoE: Committee of Experts
CUSFTA: Canada-United States Free Trade Agreement
ECOWAS: Economic Community of West African States
EU: European Union
FDI: Foreign Direct Investment
GATT: General Agreement on Tariffs and Trade
GDP: Gross Domestic Product
GDPC: GDP Per Capita
GLS: Generalized Least Squared
GMM: Generalized Method of Moments
ISFTA: India-Sri Lanka Free Trade Agreement
LDCs: Least Developed Countries
MERCOSUR: Southern Common Market
MNF: Most Favored Nations
NAFTA: North American Free Trade Agreement
NTM: Non-Tariff Measures
OECD: Organization for Economic Co-operation and Development
OLS: Ordinary Least Square
PMG: Pooled Mean Group
PPML: Poisson Pseudo-Maximum Likelihood
PSFTA: Pakistan-Sri Lanka Free Trade Agreement
RMGs: Ready Made Garments
RTA: Regional Trade Agreement
SACU: South Asian Custom Union
SADC: Southern African Development Community
SAFTA: South Asian Free Trade Agreement
SAPTA: SAARC Preferential Trading Arrangement
SMC: SAFTA Ministerial Council
US: United States
USMCA: United States-Mexico-Canada Agreement
WTO: World Trade Organization

CHAPTER ONE: INTRODUCTION

1.1 Background

Regional Trade Agreements (RTAs) represent one of the main aspects of the global economy. The number of RTAs that are implemented have been significantly increasing over the last few decades. Every member of the World Trade Organization (WTO) currently belongs to one or more RTAs. RTAs are spread across different geo-economic regions, and they exhibit significant variations in terms of breadth and depth of trade preferences among member countries. Members of RTAs typically offer each other preferential access to products and services. In some cases, they harmonize their external trade policies through customs union vis-à-vis imported products and services from other countries.

The importance of RTAs lies in the potential to increase trade flows among member countries that are in close geographic proximity, and that tend to significantly benefit from economic cooperation. In general, increases in trade flows and reductions in trade barriers are often associated with accelerated economic growth (Yanikkaya, 2003; Huchet-Bourdon et al., 2018). The effects of RTAs on international trade and national welfare are generally represented through the trade creation effect among RTA member countries and the trade diversion effect between RTA member countries and non-member countries (Viner, 1950). Therefore, RTAs that lead to significant increases in trade between member countries and that have a limited effect on trade between member and non-member countries would eventually result in increases in national welfare. In other words, these welfare benefits would occur when the trade creation effect from increases in trade between member countries (intra-regional trade) is larger than the trade diversion effect between member and non-member countries.

RTAs emerged in developing geo-economic regions, including South Asia, which features a vast land surface area and large population, and which includes sizable economies characterized by labour endowment and labour-intensive industries. This regional economic bloc includes a group of countries with the goal of lowering trade barriers on a fair and favourable basis for member countries. Such economic integration scheme would enhance access to regional markets and would enable countries to improve their global competitiveness. It is widely believed that RTAs would promote regional economic growth and economic integration based on geographical closeness, social and cultural links, and historical relationships between member countries. Currently, there are several prominent RTAs, such as the European Union (EU), the United States-Mexico-Canada Agreement (USMCA), the Southern Common Market (MERCOSUR), the Southern African Development Community (SADC), the Economic Community of West African States (ECOWAS), the Association of Southeast Asian Nations (ASEAN), and the South Asian Free Trade Agreement (SAFTA).

SAFTA is the regional trade agreement of the South Asian Association for Regional Cooperation (SAARC). The latter was established in 1985 with the aim of promoting regional economic development and regional economic integration. SAFTA became effective on January 1, 2006, and it superseded the initial South Asian Preferential Trade Agreement (SAPTA), which was operative among SAARC countries since 1995. The main objectives of SAFTA align with those of SAARC, and they aim at strengthening economic integration, stimulating trade and investment among member countries, and lowering trade barriers (including those on sensitive products that are excluded from SAFTA trade preferences) (Hirantha, 2004). Currently, SAFTA/SAARC membership includes eight countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

SAFTA's implementation was not entirely straightforward. Although the concept of creating free trade was first proposed in 1995, it took another four years for the Committee of Experts (CoE) of the SAARC to hold a detailed discussion about the issues related to RTA. The SAFTA was not signed for another five years, even though discussions had begun in 1999. The length of the sensitive lists, the supply of the rules of origin, and the system for compensating for revenue loss were some of the factors that contributed to the delay in the SAFTA discussions. The SAFTA was signed in 2004 without a resolution being reached about the rules of origin, sensitive lists, and process for compensating least developed countries (LDCs) for revenue losses or areas for technical assistance for LDCs. The tariff reduction plan was implemented in July 2006 without adjusting the period following the conclusion of the agreement in December 2005 and the approval by individual member nations (Rahman et al., 2006).

Some basic trade statistics have indicated limited changes in trade flows between SAFTA member countries following the implementation of this trade agreement. For instance, the average intra-regional trade has been 4.58% of the total trade of member countries during the post-SAFTA agreement period of 2006-2018 (Akram, 2020). This percentage is only slightly higher than the corresponding average intra-regional trade of 4.28% during the pre-SAFTA period of 1995-2005 (Akram, 2020). Also, the average pre-SAFTA and post-SAFTA intra-regional exports have slightly increased from 5.10% to 6.32%, while the average pre-SAFTA and post-SAFTA intra-regional imports decreased from 3.65% to 3.48% (Akram, 2020). Also, the three largest members of SAFTA in terms of economic size (India, Pakistan, and Bangladesh) are often described to be economically less reliant on each other, and there remain some important and unsolved political and geo-political issues between them (Sawhney, 2010; Jayasuriya & Weerakoon, 2001).

Also, compared to other RTAs in nearby geo-economic regions, SAFTA was less successful in increasing the shares of intra-regional trade. For instance, the percentages of intra-regional imports and exports among member countries of the Association of Southeast Asian Nations (ASEAN) have risen from 17% to 24% and from 21% to 27%, respectively, between 1992 and 2017. The corresponding intra-regional exports and import shares in the case of SAFTA remained at 3% and 6-7% since SAFTA came into force. The share of SAFTA intra- regional trade from overall world trade remained at around 5%. According to a report, "*A Glass Half Full: The Premise of Regional Trade in South Asia*", which is published by the World Bank (Kathuria, 2018), there are some reasons behind SAFTA's ineffectiveness in increasing trade between member countries. SAFTA has been sabotaged by the "sensitive list", which covers a list of products that are excluded from the tariff liberalization program and excluded from trade preferences. Also, there has been a proliferation of para-tariffs, which are border fees and taxes imposed on international trade transactions, and which have tariff-like impacts on imports. Such para-tariffs have become very common in many SAFTA countries, such as Bangladesh (supplementary duties, regulatory duties), Sri Lanka (port and airport development levies), and Pakistan (regulatory duties, additional duties) (Kathuria, 2018).

1.2 SAFTA: An Overview

SAFTA was signed in 2004 at the 12th SAARC summit in Islamabad, Pakistan, and came into effect in 2006. As noted earlier, it replaces the previous preferential trade agreement, SAPTA. The founding members of SAFTA were India, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka. In 2011, Afghanistan became a member of SAFTA (Hirantha, 2004; Rahman et al., 2006). Table 1.1 presents some average national statistics on Gross Domestic Product (GDP), GDP

Per Capita (GDPC), and economic growth rate for SAFTA member countries over two time periods: period I (2004-2011) and period II (2012-2020). The data for GDP and GDPC are displayed in US$ while the economic growth rate is measured in percentages. India has the highest average GDP in both periods among the SAFTA member countries, while the average GDPC is maximum for Maldives in both periods. The average GDP of Bangladesh has increased by 2.5 times from period I to period II. Also, the average GDP of Sri Lanka, Maldives, and Nepal surged by more than two times from period I to period II. In the case of Afghanistan and Bhutan, there have been increases in average GDP between period I and period II by less than two folds. The average GDPC statistics are higher in period II across all SAFTA member countries. Also, there are some significant decreases that are noticed in average economic growth rates of most SAFTA countries (except Bangladesh) in the second period. For example, the average growth rates for Afghanistan, Maldives, and Bhutan have dropped significantly by more than two folds from period I to period II.

Table 1.2 presents average imports, exports, and population statistics for period I (2004-2011) and period II (2012-2020). The statistics indicate that the population has significantly increased over time, with India, Pakistan, and Bangladesh having the largest populations among SAFTA member countries. The statistics also show some changes in the average values of imports and exports between period I to period II across SAFTA countries. The average import values are higher in period II across all SAFTA member countries. The average export values are higher in period II for most SAFTA countries, except Afghanistan and Sri Lanka, which have experienced a reduction in average export values. There is a moderate increase in the cases of Nepal and the Maldives - Nepal's average export values have increased by around 1.5 times while Maldives's average export values have increased by around two folds from period I to period II.

Table 1.1: National Statistics (GDP, GDPC, and Economic Growth Rates) - SAFTA Member Countries

Country	Average (2004-2011)			Average (2012-2020)		
	GDP (US$, Million)	GDPC (US$)	Growth Rate (%)	GDP (US$, Million)	GDPC (US$)	Growth Rate (%)
Afghanistan	10542.8	376.66	8.99	19280.4	550.96	3.35
Bangladesh	90501.1	627.83	6.08	250757.9	1574.1	6.39
Bhutan	1163.71	1731.73	8.77	2150.6	2911.20	3.46
India	1215746.6	1011.73	7.03	2330612.9	1754.42	5.10
Maldives	1976.7	5698.09	5.60	4196.9	8334.84	1.67
Nepal	12218.8	459.89	4.23	27242.8	982.56	3.39
Pakistan	155806.1	910.37	4.21	288966.5	1411.77	3.84
Sri Lanka	38812.1	1938.62	6.51	80597.5	3798.73	3.62

Source: World Bank Database (https://data.worldbank.org)

Table 1.2: National Statistics (Population, Exports, and Imports) - SAFTA Member Countries

Country	Average (2004-2011)			Average (2012-2020)		
	Population	Imports (US$, Million)	Exports (US$, Million)	Population	Imports (US$, Million)	Exports (US$, Million)
Afghanistan	27416822	5194.32	2397.07	35226282	8240	1556.13
Bangladesh	143335124	22450.88	16229.23	157923962	51288.65	36850.10
Bhutan	667321	795.56	594.07	736681	1196.63	719.05
India	11911119	314570.99	258047.15	1323848219	552761.43	479325.90
Maldives	342074	1477.63	1486.04	473540	3045.54	3046.41
Nepal	2640220	4173.93	1484.24	27618257	10206.93	2276.74
Pakistan	169842355	36776.70	23111.56	203832932	54748.12	29528.20
Sri Lanka	19904736	13554.48	9615.71	21199667	23100.18	16847.10

Source: World Bank Database (https://data.worldbank.org)

The purpose of SAFTA is to further and strengthen economic cooperation and trade between contracting states. The followings are the goals of SAFTA (Ministry of External Affairs - Government of India, 2022; SAARC, 2022):

- Removing obstacles to cross-border trade and simplifying the circulation of products across borders within the territory of the contracting states.
- Establishing favourable circumstances for free trade and guaranteeing that all contracting states get advantages equally by considering their various degrees and patterns of economic growth.
- Establishing efficient systems for the joint administration, implementation, and settlement of disputes related to the agreement.

The following principles will apply to regulate SAFTA (Ministry of External Affairs - Government of India, 2022; SAARC, 2022):

- SAFTA will be governed by the terms of this agreement as well as by the rules, regulations, judgements, agreements, and protocols that the contracting states decide to establish within its framework.
- The contracting states reaffirm their respective rights and obligations under the Marrakesh Agreement Establishing the World Trade Organization and other Treaties/Agreements to which they are signatories.
- SAFTA shall be based on and implemented in accordance with the principles of general reciprocity and mutuality of advantages in a manner that benefits each contracting state fairly while also considering each contracting state’s individual level of economic and industrial development as well as the structure of its external trade and tariff policies and systems.

- SAFTA encompasses the adoption of trade facilitation measures and other initiatives, as well as the progressive harmonization of laws by the contracting states in the relevant areas.
- SAFTA entails the elimination of tariffs, para tariffs, and non-tariff limitations on the movement of products as well as any other measures to facilitate the flows of goods between nations.
- The adoption of specific preferential measures in their favour on a non-reciprocal basis should explicitly recognize the unique requirements of the least developed contracting states.

Regarding the institutional arrangements, the SAFTA Ministerial Council was established by member countries to govern this agreement. The Ministers of Commerce or Trade of member countries constitute the SAFTA Ministerial Council (SMC). The SMC will call meeting at least once every year. The SMC oversees the management and implementation of this agreement. All the decisions and arrangements will be taken within its legal framework. The chair of the SMC will be selected from each contracting state for one year on a rational basis in alphabetic order. A Committee of Experts (CoE) with one nominee from each contracting state at the level of a Senior Economic Official will assist the SMC. The CoE observes, evaluates, and facilitates the execution of the provisions of this agreement. In addition, the CoE handles the tasks which are assigned to it by the SMC every six months. The CoE must submit its report to the SMC. The CoE also performs as Dispute Settlement Body under this agreement. The CoE must meet at least once every six months or more when it is considered necessary by the contracting states. The chair of the CoE is selected from each contracting state for one year on a rational basis in alphabetical order. Secretarial support is provided to the SMC and CoE in the discharge of their functions by the

SAARC Secretariat. Also, the SMC and CoE set their own rules of procedure (Ministry of External Affairs - Government of India, 2022; SAARC, 2022).

There are several components that are covered through SAFTA. These components comprise tariffs, which are customs taxes that are included in the national tariff schedule of member countries; para-tariffs, which include border charges and fees other than tariffs on foreign trade transactions or indirect taxes and charges; Non-Tariff Measures (NTMs), which cover any measure, regulation, or practice other than tariffs and para-tariffs; and direct trade measures over long and medium-term trade among member countries. In addition, SAFTA encompasses several instruments, including trade liberalization programs, rules of origin, institutional arrangements, consultations and dispute settlement procedures, safeguard measures, and other instruments that may be agreed upon. Regarding the trade liberalization programs, member countries accept the following tariff reduction schedule (Ministry of External Affairs - Government of India, 2022; SAARC, 2022):

- The non-least developed contracting states must reduce their tariffs from their current tariff rates to 20% within two years of the agreement's entry into effect. It is suggested that contracting states implement reductions in equal yearly increments. Actual tariff rates will be reduced over two years on a Margin of Preference basis if they are less than 20% after the agreement enters into force.
- Within two years of the agreement's entry into effect, the least developed contracting states will reduce their tariffs from their current rates to 30%. There will be a 5% yearly decrease on a Margin of Preference basis on real tariff rates for each of the two years if actual tariff rates on the day the agreement enters into effect are less than 30%.

- The further tariff reduction by non-least developed contracting states from 20% or less to 0-5% shall be accomplished within a second period of 5 years starting from the third year following the date the agreement entered into effect. However, Sri Lanka would reduce its tariffs over a six-year period. It is recommended that contracting states adopt reductions that are no less than 15% each year and are implemented in equal yearly installments.
- The least developed contracting states must reduce their tariffs from 30% or less to 0-5% in the next eight years, starting with the third anniversary of the agreements entering into effect. It is suggested that the reductions occur in equal yearly increments of at least 10% annually.

1. Tariff reduction schedules outlined above will not prevent contracting states from lowering their tariffs to 0-5% immediately or from implementing an expedited tariff reduction timetable.
   - The tariff lines included in the Sensitive Lists, which shall be negotiated by the contracting states (for LDCs and non-LDCs) and integrated into this agreement as an essential element, may not be subject to the Trade Liberalization Program. With flexibility for LDCs to request derogations in respect of the items of their export interest, the maximum number of products on the Sensitive Lists should be subject to mutual agreement among the contracting states.
   - The SAFTA Ministerial Council (SMC) must review the Sensitive Lists every four years with the goal of lowering the number of items on the Sensitive Lists.
2. The contracting states must inform the SAARC Secretariat of all non-tariff and para-tariff trade restrictions yearly. The Committee of Experts will review the reported measures at its regularly scheduled sessions to assess their compliance with relevant WTO rules. The

Committee of legislation is abolished or implemented in the least trade-restrictive way possible.

3. All quantitative limitations on the items included by the Trade Liberalization Programs will be abolished by the contracting parties unless authorized by the General Agreement on Tariffs and Trade (GATT).
4. The non-least developed contracting states must lower their tariffs on goods from LDCs to 0-5% within three years of the agreement's entry into effect.

There are some special and differential measures for the least-developed member countries of SAFTA. The least-developed member countries are favoured by member countries in the application of anti-dumping and countervailing measures. They get the opportunity of consultations, and member countries consider price undertakings by their exporters. These measures will be practicable until member countries have completed the Trade Liberalization Programs. The least-developed member countries of SAFTA enjoy larger flexibility in carrying on quantitative or other restrictions provisionally and without favouritism in critical circumstances on imports from other member countries. Regardless of whether the Maldives is moved from the status of LDC, it will be treated in this agreement and subsequent contract terms in the same manner as the LDCs.

There are also other special and differential measures for the least-developed member countries. Direct trade measures are considered by SAFTA member countries to strengthen sustainable exports from least-developed member countries. SAFTA member countries provide technical assistance and cooperation at the request of least-developed member countries to support them in expanding their trade with other member countries and in taking advantage of the potential benefits of SAFTA. SAFTA member countries will have the power of negotiation over possible

areas of technical assistance. Lastly, the implementation of the Trade Liberalization Programs may cause loss of customs revenues under this agreement. Therefore, member countries would agree to set up an appropriate mechanism to compensate the least-developed member countries for their loss of customs revenues until alternative domestic arrangements are established to address this situation (Ministry of External Affairs - Government of India, 2022; SAARC, 2022).

Finally, SAFTA includes some general exceptions. It is stated that nothing in this agreement is interpreted to prevent any member country from taking steps that are considered compulsory for the protection of national security. Also, the measures are not applicable for those which are accounted for by arbitrary or unjustifiable favouritism between countries where there exist indistinguishable conditions or hidden restrictions on intra-regional trade. Nothing in this agreement is taken to restrain any member country from taking measures that are considered mandatory for the protection of public morals, life and health of humans, animals, or plants, and value of artistic, historical, and archaeological articles. Also, it is worth nothing that any serious balance of payments difficulties faced by member countries may interrupt the concessions extended under the agreement (Ministry of External Affairs - Government of India, 2022; SAARC, 2022).

1.3. Objectives of this Study

The main objective of this thesis is to empirically examine the magnitude of bilateral trade flows between member countries of SAFTA. Specifically, this thesis estimates whether SAFTA member countries trade more with each other relative to their trade levels with other countries. While SAFTA offered some moderate trade preferences for member countries, the effectiveness of those preferences is lessened by the implementation hurdles, the prevalence of the list of

sensitive products, general expiation, and the widespread use of para-tariffs. As noted in the previous sub-sections, some basic statistical figures suggested that SAFTA did not lead to significant increases in trade among member countries, and that the extent of intra-regional trade is relatively low. The success of SAFTA could have also been compromised by the existence of some political and geo-political issues among some SAFTA countries (e.g., India and Pakistan, Pakistan and Afghanistan, India, and Nepal) and inadequate bilateral infrastructure that limits trade between member countries. This thesis follows a wide empirical literature that examines the effects of RTAs on international trade flows between member countries (Martinez-Zarzoso et al., 2009; Carrere, 2006; Bussière et al., 2008; Garcia, 2013; Ghazalian, 2013; Urata & Okabe, 2014; Afesorgbor, 2017; Ghazalian, 2017; Abafita & Tadesse, 2021).

The empirical analysis in this thesis uses the gravity model of international trade to examine the effects of SAFTA on bilateral trade flows between member countries after controlling for a range of determinants, including the economic size of the exporting, and importing countries, bilateral geographic distance, contiguity, linguistic ties, and colonial ties. Also, the empirical analysis is implemented when using alternative model with SAFTA country-specific effects. The empirical analysis uses different econometric method to estimate the gravity model, including the Poisson Pseudo-Maximum Likelihood (PPML) estimator.

1.4. Structure of the Thesis

The remainder of this thesis is structured as follows. Chapter 2 presents the literature review. This chapter first covers the general literature that used the gravity equation to estimate the determinants of international trade flows. Then, it reviews the gravity literature on RTAs, and focuses on the literature that examined SAFTA and studied trade flows in the SAFTA region.

Chapter 3 discusses the gravity equation and presents the empirical model that will be used to estimate the extent of bilateral trade among SAFTA member countries. It also overviews the dataset and presents descriptive statistics on international trade of SAFTA member countries and the variables used in the empirical analysis. Chapter 4 implements the empirical analysis and presents supplementary results from alternative econometric methods and specifications. Finally, Chapter 5 presents concluding remarks and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Gravity Model and Applications

The gravity equation has been known for its significance in analyzing different types of bilateral flows, including trade in goods and services, migration, tourism, and foreign investment. In addition, a wide range of empirical literature used the gravity model to analyze trade flows in different geo-economic regions and between different countries and regions. For example, McCallum (1995) used the gravity model to examine the effects of the Canada-US Free Trade Agreement (CUSFTA) on trade between Canada and the United States (US). This study found that Canadian provinces trade significantly more with each other compared to trade between Canadian provinces and US states. This phenomenon is coined the "border effects".

The study of McCallum (1995) initiated a line of empirical literature that led to the refinement of the specification of the gravity equation by deriving it from a theoretical framework, and it also led to the refinement of the econometric methodology. In this context, Anderson & van Wincoop (2003) examined the border effects through a gravity equation that is derived from the Constant Elasticity of Substitution (CES) framework. This setup followed initial studies that used the CES and Constant Elasticity of Transformation (CET) frameworks to derive the gravity model (e.g., Anderson, 1979; Bergstrand, 1985, 1989). This gravity equation contains the multilateral resistance terms of the exporter and importer, which capture the extent of trade barriers that each country faces with all its trading partners. In parallel, Feenstra (2002) examined three estimation approaches: using published price index data, the Anderson & van Wincoop (2003) estimation approach and employing national fixed effects to calculate the price indices. There have been significant econometric advances in the estimation of the gravity model. The gravity model was conventionally estimated in its log-linear form using the Ordinary Least Square (OLS) estimator.

Santos Silva & Tenreyro (2006) recommended the use of the multiplicative form of the gravity model and the Poisson Pseudo-Maximum Likelihood (PPML) estimator (more discussions are provided in Chapter 3).

The gravity equation is used by a wide range of empirical studies to analyze the determinants of bilateral trade and to estimate the extent of trade barriers (e.g., Baier & Bergstrand, 2001; Egger, 2002; Brun et al., 2005; Ghazalian & Furtan, 2007; Olper & Raimondi, 2008; Ghazalian et al., 2012; Novy, 2013; Baniya et al., 2018; Agnosteva et al., 2019; Ghazalian, 2015, 2019; Heid et al., 2021). For example, Baier & Bergstrand (2001) used the gravity model to examine the relative effects of reductions in transportation costs, reductions in tariffs, and income convergence on trade among Organization for Economic Co-operation and Development (OECD) countries between the late 1950s and late1980s. Egger (2002) used the gravity model to estimate trade potentials and carry out counterfactual cases such as increases in income per capital and decreases in trade barriers. Brun et al. (2005) examined the effects of distance on international trade in an empirical gravity framework. Ghazalian & Furtan (2007) used the gravity model to examine the effect of innovation on agricultural and agri-food exports of OECD countries. Opler and Raimondi (2008) examined the extent of the border effects on food trade among the QUAD countries (i.e., the United States, Canada, Japan, and the EU) at disaggregated sector level. Ghazalian et al. (2012) developed a gravity framework to examine the vertical linkages in the beef/cattle sector and to analyze the effects of trade policies. Novy (2013) derived micro-founded measure of bilateral trade costs in a gravity model to measure international trade costs. Baniya *et al.* (2018) estimated the trade effects of China's Belt and Road Initiative (or the New Silk Road) through the gravity model. Agnosteva et al. (2019) examined intra-national and intra-regional trade

costs using the gravity equation. Heid et al. (2021) developed a gravity framework to estimate the effects of unilateral and non-discriminatory trade policies on bilateral trade flows.

2.2 Gravity Model and Regional Trade Agreements (RTAs)

There is a range of the empirical literature that used the gravity model to examine the effect of various RTAs on trade flows (e.g., Martinez-Zarzoso et al., 2009; Carrere, 2006; Bussière et al., 2008; Ghazalian et al., 2011; Garcia, 2013; Ghazalian, 2013; Urata & Okabe, 2014; Afesorgbor, 2017; Ghazalian, 2017; Abafita & Tadesse, 2021). For instance, Martinez-Zarzoso et al. (2009) evaluated the effects of some prominent RTAs (using a dynamic empirical framework) and found that the RTA effects on trade flows are more significant in the case of regional blocs that include developed countries (e.g., EU, NAFTA). Also, Carrere (2006) examined the effects of RTAs on trade flows using a gravity equation for a broad dataset that covers 130 countries and stretches over the time 1962-1996. This study found that RTAs have led to significant increases in trade between members, often at the expense of the rest of the world. Bussière et al. (2008) implemented a gravity analysis to examine the effects of the EU enlargement that occurred through the membership of Central and Eastern European countries. Garcia (2013) analyzed the effects of MERCOSUR on trade flows between member countries using a gravity model and found positive but moderate trade creation effects. Ghazalian (2013) used the gravity equation to examine the effects of MERCOSUR enlargement on the trade flows of existing members and potential new members. Urata and Okabe (2014) investigated the effects of RTAs on trade flows at the product level through the gravity model. They found significant variations across RTAs and products, and that trade diversion is more likely to occur in the case of RTAs that include developing countries. Afesorgbor (2017) applied the gravity equation to examine the effects of RTAs in Africa on trade

flows and found general positive trade creation effects. Ghazalian (2017) analyzed the effects of the North American Free Trade Agreement (NAFTA) on trade in agricultural and food products between member countries and found positive and heterogeneous effects across member countries and product categories. Abafita & Tadesse (2021) applied the gravity model to analyze the determinants of the global coffee trade.

There are many empirical studies that analyzed the effect of SAFTA on bilateral trade using the gravity model. Rahapakse & Arunatilake (1997) examined the effects of trade barriers from a Sri Lankan perspective using a gravity model to evaluate the potential for increases in bilateral trade from further trade liberalization policies. This study concluded that SAARC nations could not expect to achieve sustainable economic growth by just trading among themselves, although there was a wide opportunity for improvement in intra-regional bilateral trade with the elimination of restrictive trade policies. Additionally, this study evaluated the potential impact of Foreign Direct Investment (FDI) on SAARC trade.

In comparison to other regional trading blocs, intra-SAARC trade looks to be quite minimal. Hassan (2001) analyzed this issue and indicated that there are many cultural and socio-economic similarities among the SAARC nations. India stands out as the largest country, while the rest of the member countries are relatively smaller in different degrees. This study concluded that Southeast Asia's trade is significantly influenced by the creation of the SAARC, which cannot be attributed to observable factors like long-standing close trade relationships or advantageous trade arrangements with consistent long-term effects. The proportional relationship between export flows and the exporter or importer economy size shows that, if members of SAARC could maintain strong economic growth, the intra-SAARC trade would increase significantly. Common language and common borders are found to have positive and statistically significant effects. On

the other hand, bilateral distance factors, covering transportation and other costs, have statistically significant negative effects. However, the population growth of SAARC member countries has very little effect on their bilateral trade flows. Finally, this study found that intra-regional trade would be boosted by the increased trade openness of the members of SAARC.

Hirantha (2004) evaluated the performance of SAPTA and the proposed prospects for SAFTA. The study is based on both panel and cross-section data analysis. This study found evidence of trade creation effect under SAPTA and a slight trade diversion effect with the rest of the world. SAARC region has benefited from regional economic integration, and SAFTA has promoted intra-regional trade by removing tariff and non-tariff barriers among member states. Most South Asian countries are heavily dependent on non-member countries for import requirements. This study found that SAFTA has led to increases in trade with other regional blocs (e.g., ASEAN, EU), while there is a slight trade diversion effect with other non-member countries. It also found that bilateral distance has negative effects on trade, while sharing common border has positive effects on trade. This study also showed that trade increases with economic size. This study indicates that trade potentials depend on the trade relation history and political relationships. Therefore, trade expansion opportunities with other member nations are hampering, and it might be a big obstacle for the South Asian Customs Union (SACU) in the long run (Hirantha, 2004).

Rahman et al. (2006) applied the gravity model to analyze the effects of SAFTA and nine other Regional Trade Agreements (RTAs) on bilateral trade. This study applied the gravity model by using a panel data technique with fixed effects including, both country-pair and year-specific effects. The study performed the analysis over the net export dimension. This study found that SAFTA has negative effects in the cases of Nepal, Maldives, and Sri Lanka and positive effects in the cases of Bangladesh, Pakistan, and India.

Nag & Nandi (2006) applied the gravity model to assess India's trade dynamics inside SAARC. The article evaluated the likelihood of a South Asian trade bloc's success using the theory of "natural trading partners" as its empirical foundation. The study highlighted the need for more integration among SAARC members to flourish. This study estimated a log-linear variant of the gravity model for cross-section and time-specific coefficients for unbalanced panel data. This study found that removing all tariffs would boost intra-regional trade and that most SAARC members have mutually benefited from intra-regional trade integration. In parallel, Rodrguez-Delgado (2007) found that SAFTA would only have a modest impact on regional trade flows. This study examined the consequences of the trade liberalization programme using a modified gravity equation and applied a random effect model to estimate the gravity model.

Banik & Gilbert (2010) used the augmented gravity model with trade costs presented as an independent variable to investigate how the presence of trade costs influenced trade flows in South Asian countries. This study revealed that inefficiency in government regulation, inadequate port facilities, customs corruption and poor infrastructural facilities were the reason for having higher trade costs. Zaheer (2013) investigated how the macroeconomic structures of India, Pakistan, Bangladesh, and Sri Lanka are affected by trade liberalization. This study was based on time series data over 21 years from 1985 to 2006, and the OLS estimation approach was used to estimate individual gravity equations. This study found that some trade equations were shown to not have a good fit. The primary reason could be that the SAARC region was determined by the non-economic bilateral integrations while it should be defined by the economic theory of comparative advantages.

Ullah & Inaba (2014) empirically evaluated the factors that influenced FDI with an emphasis on the impacts of the Bilateral Investment Treaty (BIT), the Bilateral Trade Agreement

(BTA), and the Regional Trade Agreement (RTA). The gravity model analysis on unbalanced panel data showed that BIT, BTA, and RTA had little effects on FDI promotion. This study concluded that the ASEAN and the SAFTA nations competed for labour-intensive FDI by offering identical incentives and treatment standards.

Kumar & Ahmed (2015) used the panel data covering eight countries over the years 1985 to 2011 to examine the factors that influenced the export and import flow of South Asian nations. The gravity model was estimated by using the Generalized Least Squares (GLS) method. This study concluded that trade is affected by geographic distance and that tariff barriers have adverse effects on trade. Besides, this study found that country size increases trade but less than proportionately. A large population affects trade flows positively and it generates more opportunities for trade in a wide variety of goods.

SAFTA amendments were made as part of phase II, which granted duty-free and quota-free access to the Indian market for Bangladeshi garment exports. It was expected that the amendment would result in a sharp increase in Indian imports of apparel and Ready-Made Garments (RMGs). But no such thing happened. Awais (2016) examined the trade-in RMGs between India and Bangladesh to identify the underlying causes of why no such thing happened. The analysis confirmed Bangladesh's substantial comparative advantage though there was an absence of proper trade complementarity between the two nations.

Regmi et al. (2017) looked at how bilateral trade flows were influenced by the SAFTA. This study adopted the country-pair fixed effect method to estimate the gravity model and included the time dummies to consider the potential global economic shocks. This study found that SAFTA has led to an increase in bilateral trade among member countries and with non-member countries.

Iqbal & Nawaz (2017) evaluated the effects of institutional and non-institutional agreements on bilateral trade. They also examined the long-run and short-run effects of SAFTA on bilateral trade. The fixed effect model, along with the Pooled Mean-Group (PMG) estimator was used in the study for panel data covering SAFTA member nations from 1975 to 2013. The study revealed that SAFTA and Most Favoured Nations (MFN) had little effect on bilateral trade. The empirical evidence suggested that SAFTA and MFN would be more beneficial to bilateral trade when they are combined with an effective democratic institutional framework.

Hossain (2018) analyzed the SAFTA and ASEAN welfare impacts on both member and non-member nations. This study used the PPML estimator to estimate the welfare effects of SAFTA and ASEAN. It revealed that the member nations would suffer greater welfare losses from the termination of SAFTA in comparison to ASEAN. The welfare impact was minimized in the cases of the SAFTA and ASEAN joint agreement. The study did not find any significant evidence of trade diversion. Also, Kiran (2018) analyzed the primary factors influencing exports between Pakistan and SAFTA member countries using the gravity model. This study excluded data for the Maldives, Nepal, and Bhutan, as Pakistan did not have significant trade with them. This study found negative effects of bilateral border and distance between Pakistan and other SAFTA members, while there was a strong positive effect of inflation and per capita GDP.

Abbas & Waheed (2019) used an augmented gravity model on a wide panel data to examine the effects of macroeconomic factors on trade and to explore the future trade market for Pakistan. Three models were developed to analyze the effects of these factors on Pakistan's bilateral trade. The first model corresponds to the conventional gravity model, and the latter two models follow an augmented gravity model that is estimated with Generalized Least Squares (GLS) and random effect estimators. This study found that Pakistan's bilateral trade flows were favourably influenced

by both Pakistan's own GDP and the GDP of its trading partners, while bilateral geographic distance had a negative effect on Pakistan's bilateral trade flows. It also uncovered that Pakistan's trade flows are lower with nations with which it shares a common border and higher with nations with which it has linguistic ties.

Taguchi & Rubasinghe (2019) analyzed the trade effect of SAFTA for Sri Lanka using a gravity model. This study focused on the following three trade agreements: SAFTA, Pakistan-Sri Lanka Free Trade Agreement (PSFTA), and India-Sri Lanka Free Trade Agreement (ISFTA). This study used panel data for a gravity model that includes fixed effects and time-varying price resistance terms. The study adopted a dynamic panel data model, and the Generalized Method of Moments (GMM) estimator was implemented. The study found no evidence of SAFTA's trade creation effect for Sri Lanka, and it found that ISFTA and PSFTA had only such effects on imports.

Nawaz (2020) empirically examined the importance of institutional framework in stimulating bilateral trade through SAFTA. This study found that economic development and trade costs were the two major factors influencing bilateral trade. Due to political tensions (particularly between Pakistan and India, Pakistan, and Afghanistan, India, and Nepal), the often-beneficial shared border effect had not been observed in the case of South Asian economies. This study got reginal evidence that integration was ineffective in and of itself in stimulating bilateral trade. The results also showed that institutions affected bilateral trade in both direct and indirect ways. The important institutions to determine the performance of regional trade agreements are government efficiency, regulation, quality, and accountability.

Banik & Roy (2020) used the generalized gravity model to empirically investigate the impact of exchange rate uncertainty on trade performance covering the eight SAARC member nations. This study used pooled OLS and random effect estimation approaches to estimate the

basic panel data model. The primary explanatory variable was estimated with these methods with a one-year lag to minimize the endogeneity problem due to reverse causality. The hypothesis that exchanges rate volatility reduced trade flows in the SAARC region was supported by empirical findings.

Ward et al. (2020) used the gravity model to examine the regional changes in agricultural trade to investigate the effects of SAFTA on food security. This study adopted the extended gravity model with fixed effects and the PPML estimation method. This study found that SAFTA enhanced specialization in some nations and increased regional trade in meat which improved the supply of protein. Also, Sharma & Kumar (2021) applied the augmented gravity model to evaluate India's trade with other SAARC members. This study used the random effect model to estimate the augmented gravity equation. The study showed that India's actual trade with SAFTA members was lower than anticipated.

CHAPTER THREE: GRAVITY MODEL, DATA, AND ECONOMETRIC METHODOLOGY

3.1 The Gravity Model

The gravity model has been widely used in international trade over the last 50 years. Tinbergen (1962) was the first who applied the gravity model in the context of international trade and econometrically identified the traditional gravity model for bilateral trade flows. Early attempts to set the theoretical foundation for the gravity equation in international trade were conducted by Pöyhönen (1963), Pulliainen (1963), and Linnemann (1966). These studies aimed at using the gravity equation to examine the factors that determine bilateral trade flows. In its basic form, the gravity model shows that bilateral trade flows are proportional to the economic size of the exporter and importer and inversely proportional to the bilateral geographic distance separating them. Anderson (1979) provided a theoretical economic foundation for the gravity equation starting from a utility function that features the assumption of product differentiation and CES. The gravity equation derived by Anderson (1979) explained the presence of income variables in the model. The microeconomics basis of the gravity model was further developed by Bergstrand (1985, 1989), who incorporated the supply side of the economy explicitly using the CET function.

Helpman (1987) was the first author who developed the linkage between the monopolistic competition model and the gravity model. Evenett & Keller (2002) showed that the Heckscher-Ohlin (HO) model and increasing returns to scale are sufficient to describe the success of the gravity model equation. According to the gravity model, the supply conditions at the origin, the demand conditions at the destination, and the driving forces of international trade determine the size of bilateral trade flows (Kabir et. al., 2017). The prediction of the gravity model can be

obtained from the Ricardian approach, the HO model, and the New Trade Theory based on increasing returns to scale (Bergstrand, 1990; Deardroff & Stern, 1998; Eaton & Kortum, 2002).

Bergstrand and Egger (2007) developed a theoretical model to derive the gravity equations for trade flows in final products, trade flows in intermediate goods, and foreign direct investment (FDI) flows all at the same time. The authors argued that Ethier's (1982) intermediate inputs method is vital for describing the real patterns of bilateral intermediate outsourcing flows since their theoretical predictions are experimentally confirmed. Anderson & van Wincoop (2003) highlighted a gravity equation that contains the multilateral resistance terms of the exporter and importer, which capture the extent of trade barriers that each country faces with all its trading partners. In parallel, Feenstra (2002) examined three estimation approaches: using published price index data, following the Anderson & van Wincoop (2003) estimation approach, and including fixed effects in the empirical gravity equation. Hence, there were initially two main techniques to estimate the gravity equations: the customized non-linear approach by Anderson & van Wincoop (2003) and the fixed effects estimation. Baier & Bergstrand (2009) proposed an alternative approach for obtaining general equilibrium comparative statistics without considering the non-linear equation system. Bikker (2009) solved the issues of the traditional gravity model of failing to justify the substitution between trade flows by establishing the extended gravity model.

The basic model of the gravity equation implies that bilateral trade flows between two countries is proportional to the economic sizes of the exporting and importing countries and inversely proportional to the bilateral geographic distance between them. This basic model can be represented as (Head, 2003):

(3.1) $$Trade_{ij} = G\, Y_i^{\alpha} Y_j^{\beta} / D_{ij}^{\theta}$$

Where $Trade_{ij}$ represents bilateral trade flows from country "i" (the exporting country) to country "j" (the importing country); Y_i is the economic size of the exporting country and it captures the supply capacity; Y_j is the economic size of the importing country and it captures the market demand capacity; and D_{ij} is the bilateral geographic distance between these two countries, and it covers transportation, communication, and information costs, among others. The parameters in this equation are α, β, and θ, and G is the gravitiaonal constant. The gravity model has been gradually extended to account for cultural and institutional distances between countries. For example, it is thought that linguistic ties would reduce transaction costs, and it tends to increase trade flows between countries. Also, contiguity and colonial ties post-1945 are associated with similarities in institutions, leading to increases in trade flows. The gravity model often accounts for contiguity between trading countries - that is whether they share a common border. This factor could cover some cross-border business and social networks, and some common infrastructure (highways), which tend to increase trade flows between trading partners. Taking the logarithm on both sides of equation (3.1), we get:

(3.2) $$\ln Trade_{ij} = \ln G + \alpha \ln Y_i + \beta \ln Y_j - \theta \ln D_{ij}$$

According to Head and Mayer (2002), the prevailing measure of the bilateral geographic distance in the gravity literature, which is the great circle geographic distance between trade partners is inadequate, particularly between geographically scattered economies. They introduced a measure of "effective distance" that integrates trade flows at a more disaggregated level. Rauch (1999) showed that intangible trade restrictions like institutional and cultural distances are important determinants of trade flows, and their effects vary across industries and product categories. Also, remoteness variables, which capture each country's average effective distance to or from its partners, were initially used in the conventional gravity literature (Anderson, 2011).

However, these remoteness variables were replaced by the theatrical-based multilateral resistance terms, which are included in the gravity equation or controlled by time-varying exporter and importer fixed effects (Anderson & van Wincoop, 2003). These terms imply that bilateral trade flows are not just determined by bilateral trade barriers but also by trade obstacles shared by all trading partners.

The gravity model has been used in many empirical studies in examining bilateral trade flows and estimating the effects of RTAs (Martinez-Zarzoso et al., 2009; Carrere, 2006; Bussière et al., 2008; Garcia, 2013; Ghazalian, 2013; Urata & Okabe, 2014; Afesorgbor, 2017; Ghazalian, 2017; Abafita & Tadesse, 2021). The development and the application of the gravity model for examining trade flows are classified into four categories (Kabir et al., 2017):

- Generalized Gravity Model: This model describes the bilateral trade flows based on the economic size (GDP) and the geographical distance. This model has been used for the purpose of analyzing the determinants of bilateral trade flows (common language, common border, common currencies, common colonial legacies/colonial ties, and common legal systems).
- Intra-Industry Trade: These types of models are used to understand monopolistic competitive markets and trade flows (For instance, the HO model and Linder hypothesis).
- Homogeneous and Heterogeneous Products: The gravity equation can be used for both homogeneous and heterogeneous goods and services, along with complete and incomplete specializations. The trade models with heterogeneous firms indicate different levels of productivity depending on their draws from a pareto distribution. According to Helpman et al. (2008), there is a link between heterogeneous firms and market entry sunk cost.

- Structural Gravity Model: These types of models focus on the elasticity of substitution in comparative statistics and are based on the monopolistic competition and increasing returns to scale models.

3.2 Empirical Model, Data, and Variables

The dataset used in this study covers trade flows of SAFTA member countries with each other and with other (non-SAFTA) countries. It includes the trade flow observations of SAFTA countries with 92 countries (8 SAFTA member countries and 84 non-member countries of SAFTA) from 2006-2020. The dataset is collected from the Centre d'Études Prospectives et d'Informations (CEPII) database (Head and Mayer, 2014). The gravity data includes all the information required to estimate the gravity equations, such as trade flows, trade facilitation measures, macroeconomic indicators, geographical distances, linguistic proximity, colonial ties, and so on. The CEPII database obtained the data for bilateral trade flows from the UN COMTRADE database. Bilateral trade flows are used as the dependent variable, while GDP, GDPC, geographic distance, contiguity, linguistic ties, colonial ties post-1945, and the binary variable of interest, SAFTA, are included as explanatory variables in the basic gravity equation. The basic gravity equation can be presented as:

$$\ln Trade_{ijt} = \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP_{jt} + \alpha_3 \ln Dist_{ij} + \alpha_4 Lang_{ij} + \alpha_5 Cont_{ij} + \alpha_6 Col45_{ij} + \alpha_7 SAFTA_{ij} + u_{ijt} \quad (3.3)$$

Bilateral trade flows are represented by $Trade_{ij}t$, which represents trade flows from country "*i*" to country "*j*" at time "*t*". Trade flows can be categorized into exports and imports. Exports imply goods and services produced in one country and sold in another country. Imports mean goods and services bought in one country which was produced in another country. The empirical analysis

relies on imports dataset. The trade flows data are collected from the CEPII database, and they are basically sourced from the UN COMTRADE database. These trade flows observations are deflated to the constant US$ values. The economic size of the exporting and importing countries are represented by the GDP variables (the total monetary or market value of all the finished goods and services produced within a country's borders in a certain period), GDP_{it} and GDP_{jt}. These variables are expected to have positive effects on bilateral trade flows as larger countries tend to trade more with each other (the economic size effect). The bilateral geographic distance is represented by the variable, $Dist_{ij}$. The basic distance variable is calculated through the great circle formula, which uses latitudes and longitudes of the most important city (in terms of population) or of its official capital. This distance dataset is collected from the CEPII database, and it is expected to have negative effects on bilateral trade flows since larger geographic distances imply higher transportation, communication, and time costs.

Also, the variable $Lang_{ij}$ is a dummy variable that captures linguistic ties between trading partners. It equals 1 if both countries have a common language, and zero otherwise. The variable $Col45_{ij}$ is a dummy variable that captures colonial ties between trading partners post-1945. It equals 1 if trading partners have colonial ties after-1945, and zero otherwise. The variable $Cont_{ij}$ is a dummy variable for contiguity, and it captures if there is any common border between trading partners or not, i.e., it equals 1 if both countries have a common border and zero otherwise. The variable of interest is $SAFTA_{ij}$, which equals 1 if both countries are members of SAFTA, and it equals zero otherwise. The SAFTA dummy variable is not subscripted by time "t" since the SAFTA membership did not change over the period in this study. The definitions and sources of these variables are summarized in Table 3.1. This gravity model could be augmented by adding other variables such as GDPC (which proxy for economic development level) and by adding

country-specific effects. All values (trade flows, GDP, GDPC) are valued in constant 2015 US$ throughout the regressions.

The empirical analysis is also applied for the multiplicative form of the gravity equation, and the estimation is implemented using the Poisson Pseudo-Maximum Likelihood (PPML) estimator that is proposed by Santos Silva & Tenreyro (2006). This estimator has two main properties. First, it addresses the statistical issues that result from zero bilateral trade flows since the gravity model is estimated in its multiplicative form – thus avoiding the issue of log of zero. Second, the PPML estimation approach addresses the econometric issues of consistency and efficiency that arise because of heteroskedasticity. This empirical gravity equation can be presented as:

$$(3.4)\quad Trade_{ijt} = exp\big(\beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln Dist_{ij} + \beta_4 Lang_{ij} + \beta_5 Cont_{ij} + \beta_6 Col45_{ij} + \beta_7 SAFTA_{ij}\big) + \epsilon_{ijt}$$

where ϵ_{ijt} is the error terms of the empirical non-linear gravity equation.

Table 3.1: Variable's Name, Definitions, and Data Source

Variables	Definition	Type of Variable	Source of Data
$Trade_{ijt}$	Bilateral trade of SAFTA countries	Dependent	CEPII/ UN Comtrade database
GDP_{it}	Real GDP of the exporting country	Explanatory	CEPII database
GDP_{jt}	Real GDP of the importing country	Explanatory	CEPII database
$GDPC_{it}$	Real GDP per Capita of the exporting country	Explanatory	CEPII database
$GDPC_{jt}$	Real GDP per Capita of the importing country	Explanatory	CEPII database
$Dist_{ij}$	Geographical distance between the exporting and importing countries	Explanatory	CEPII database
$Lang_{ij}$	Linguistic ties between the exporting and importing countries (dummy variable)	Explanatory	CEPII database
$Col45_{ij}$	Colonial ties between the exporting and importing countries post 1945 (dummy variable)	Explanatory	CEPII database
$Cont_{ij}$	Sharing common border between the exporting and importing countries (dummy variable)	Explanatory	CEPII database
$SAFTA_{ij}$	SAFTA ties between the exporting and importing countries (dummy variable)	Explanatory	

Table 3.2: Descriptive Statistics

Variables	Mean	Std. Dev.	Minimum	Maximum
$Trade_{ijt}$ (US$, million)	810.245	3446.941	0	69796.45
GDP_{it} (US$, billion)	782.439	2215.469	0.702	19943.57
GDP_{jt} (US$, billion)	310.041	655.723	0.977	3184.735
$GDPC_{it}$ (US$, thousand)	19.491	22.355	0.207	109.127
$GDPC_{jt}$ (US$, thousand)	2.321	2.509	0.299	43.783
$Dist_{ij}$ (kilometers)	6965.972	4161.128	423	18167
$Lang_{ij}$	0.075	0.263	0	1
$Col45_{ij}$	0.008	0.09	0	1
$Cont_{ij}$	0.031	0.174	0	1
$SAFTA_{ij}$	0.076	0.265	0	1

The following Figures 3.1 to 3.16 present the import and export values (US$) of SAFTA countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) with other SAFTA partners over time.

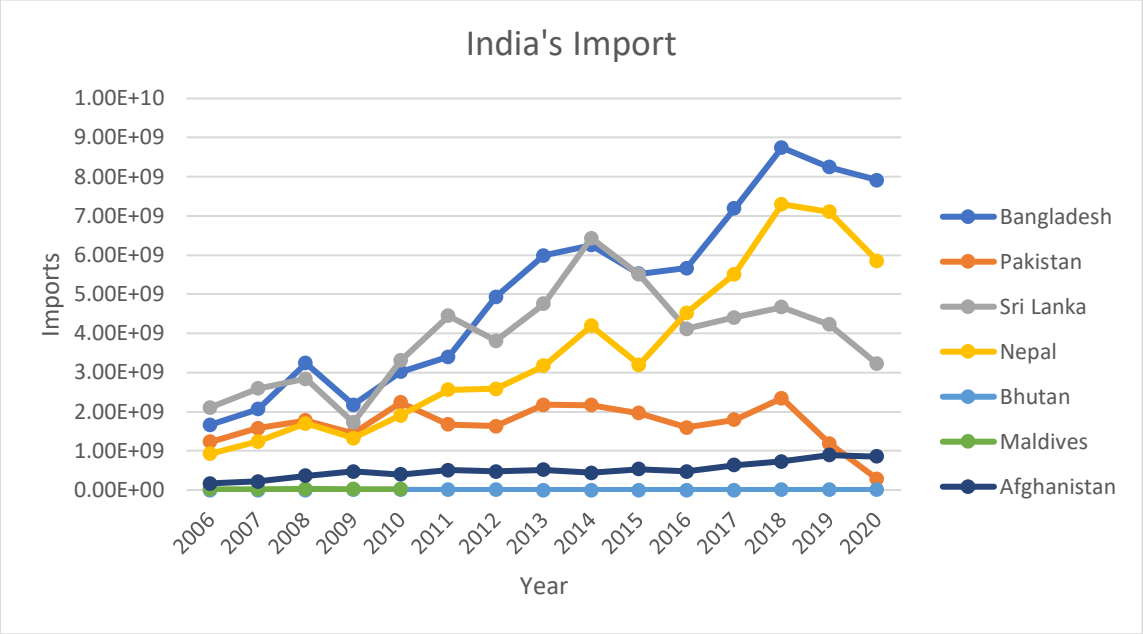

Figure 3.1: India's Imports from other SAFTA Member Countries

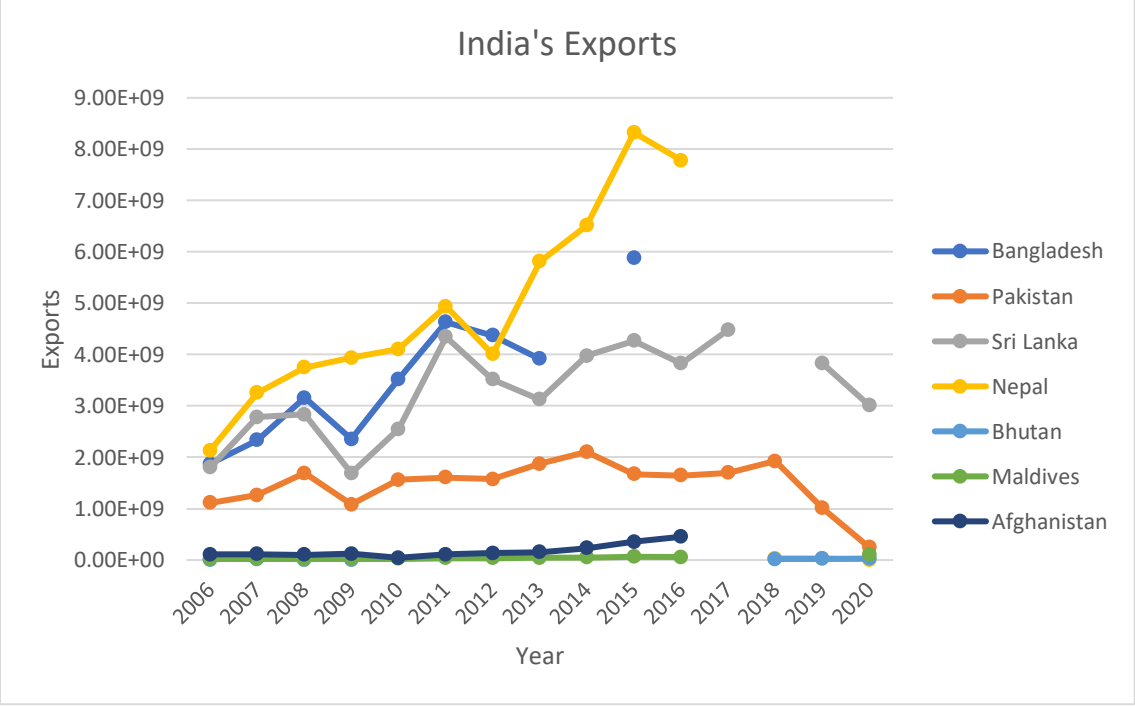

Figure 3.2: India's Exports to other SAFTA Member Countries

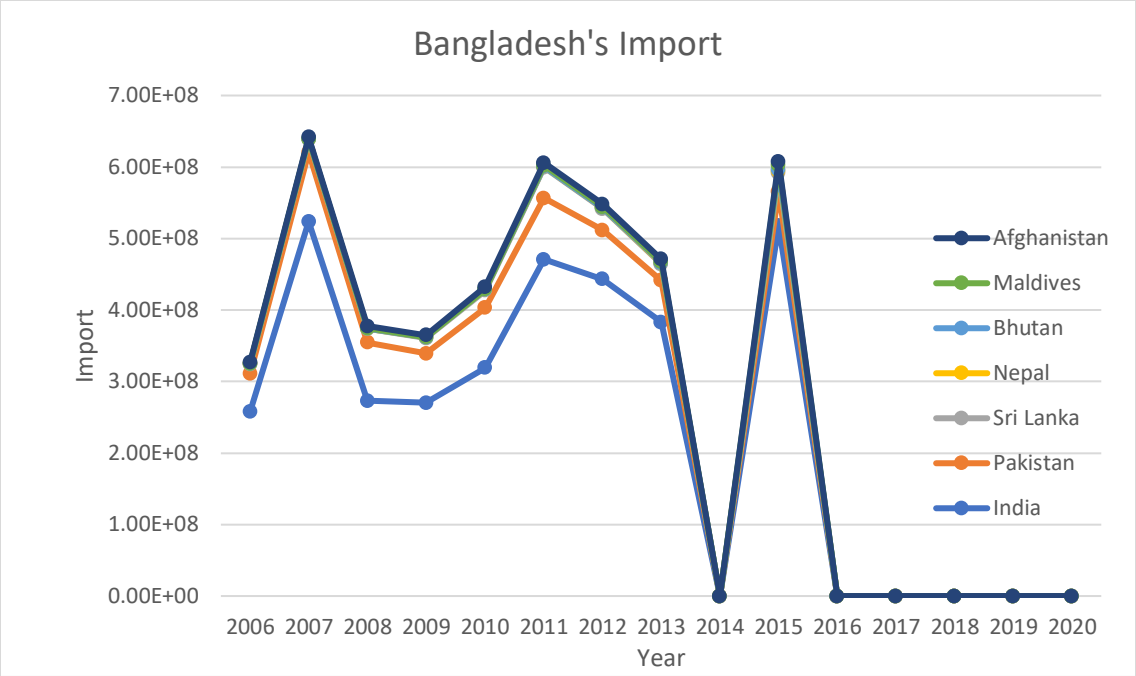

Figure 3.3: Bangladesh's Imports from other SAFTA Member Countries

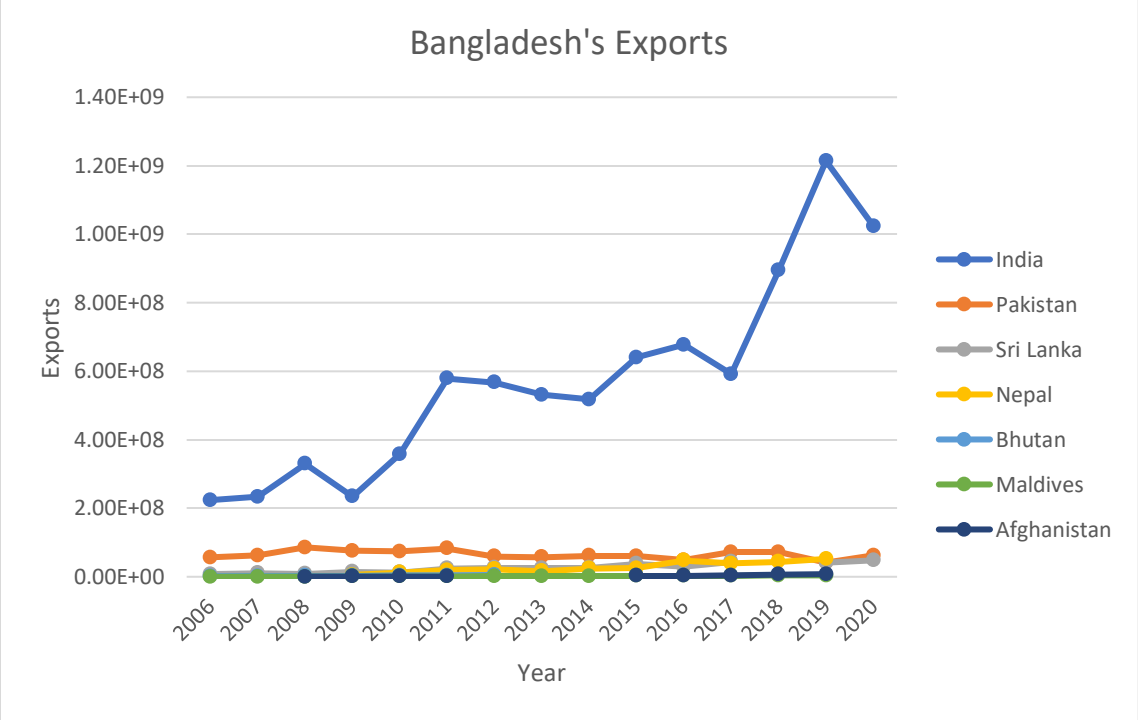

Figure 3.4: Bangladesh's Exports to other SAFTA Member Countries

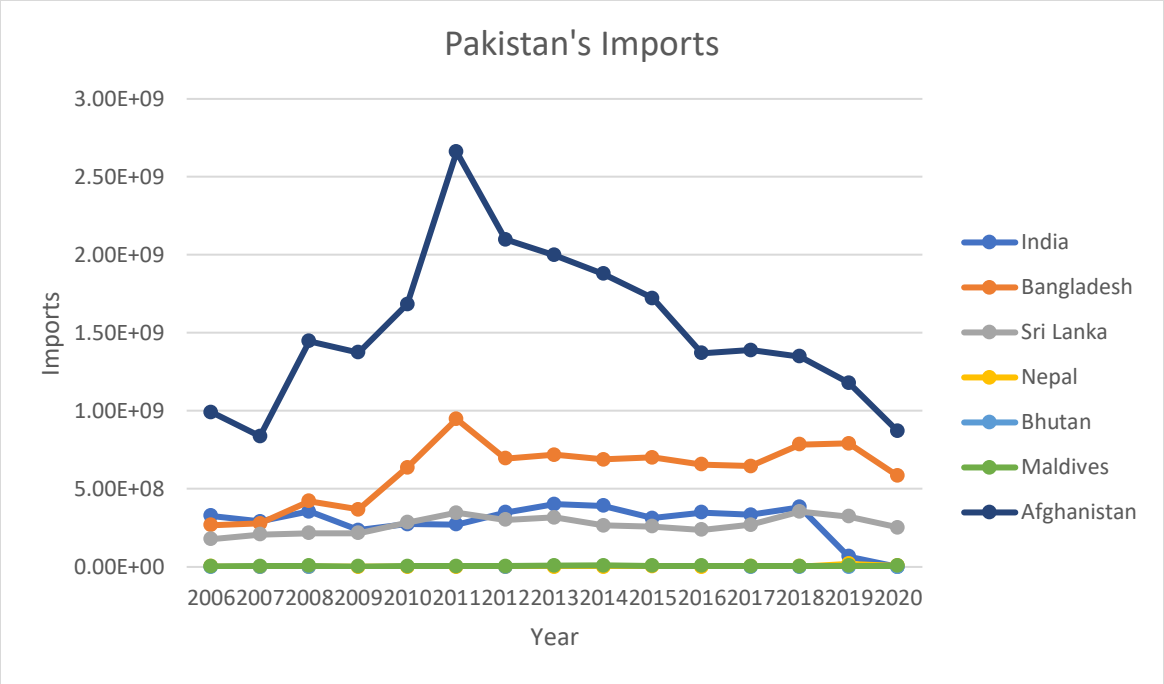

Figure 3.5: Pakistan's Imports from other SAFTA Member Countries

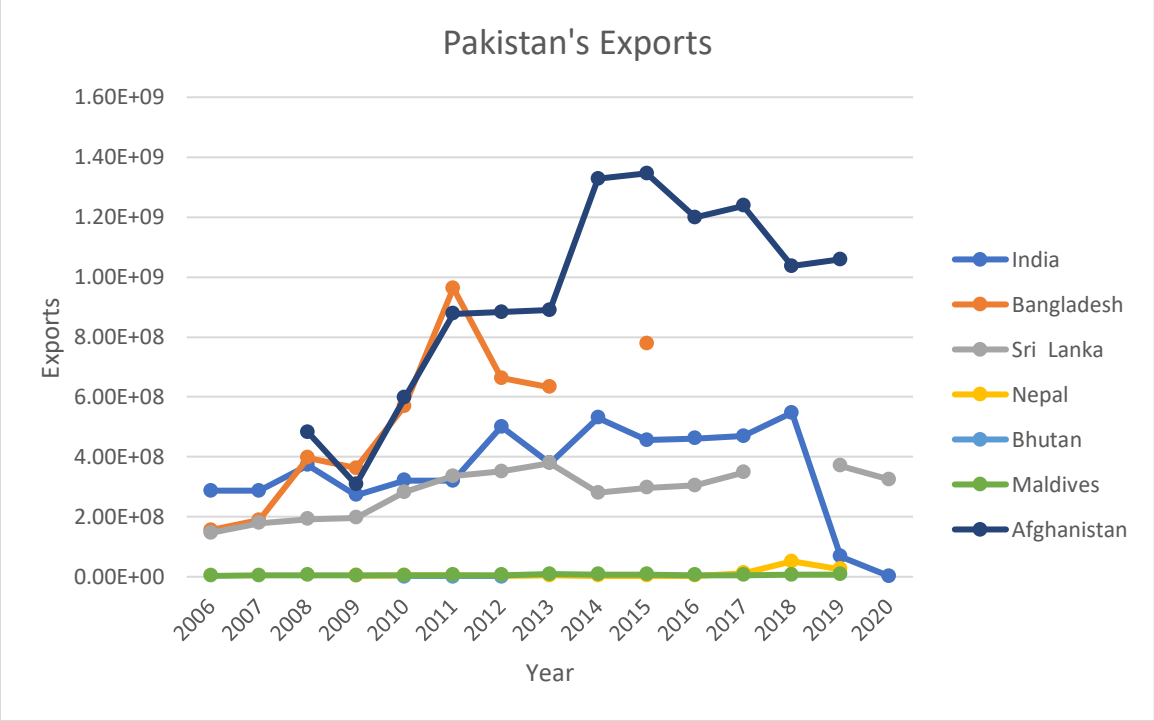

Figure 3.6: Pakistan's Exports to other SAFTA Member Countries

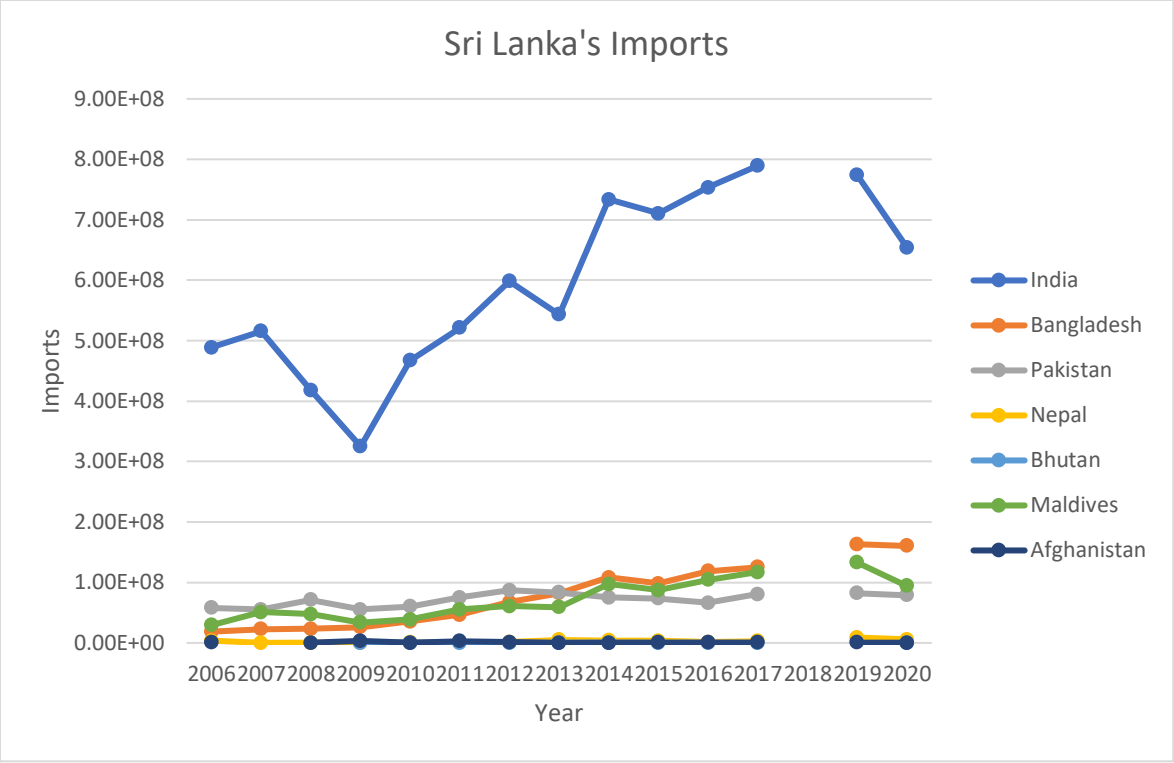

Figure 3.7: Sri Lanka's Imports from other SAFTA Member Countries

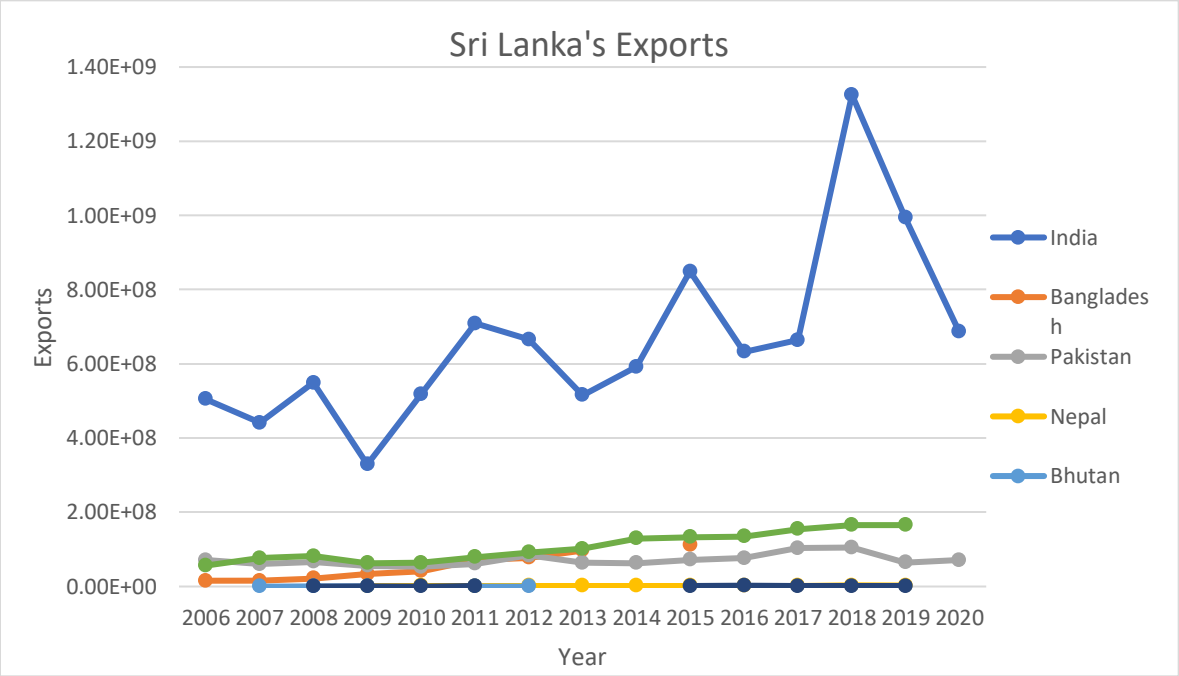

Figure 3.8: Sri Lanka's Exports to other SAFTA Member Countries

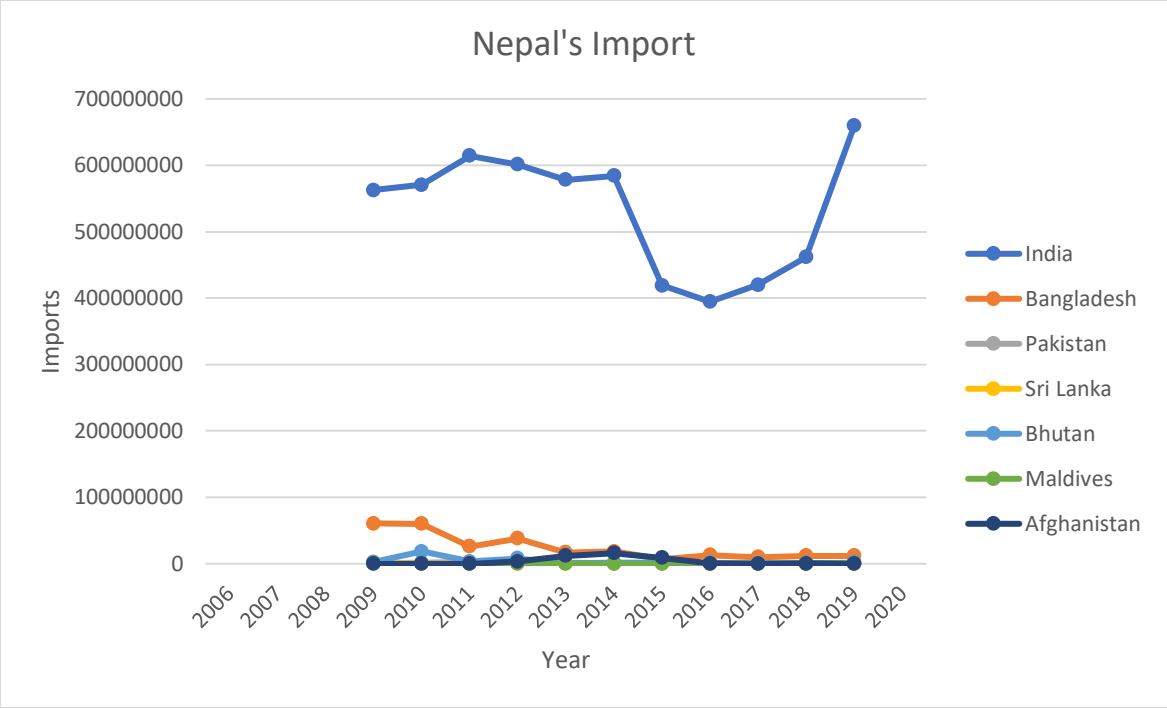

Figure 3.9: Nepal's Imports from other SAFTA Member Countries

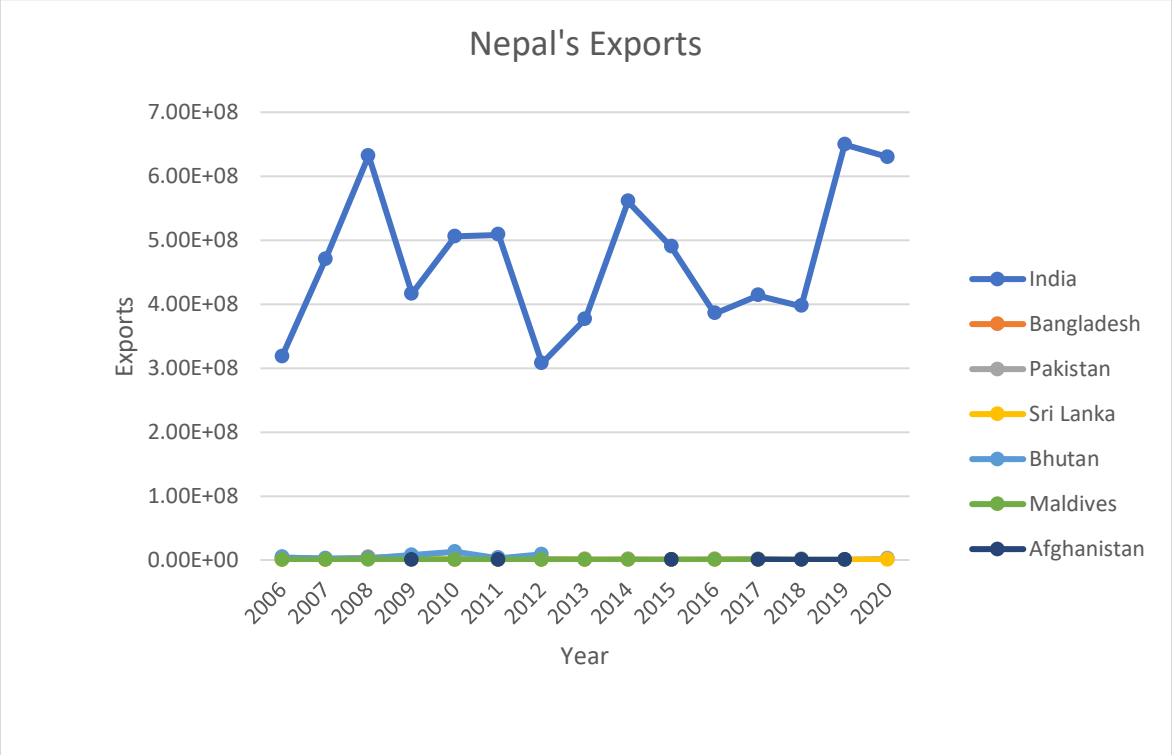

Figure 3.10: Nepal's Exports to other SAFTA Member Countries

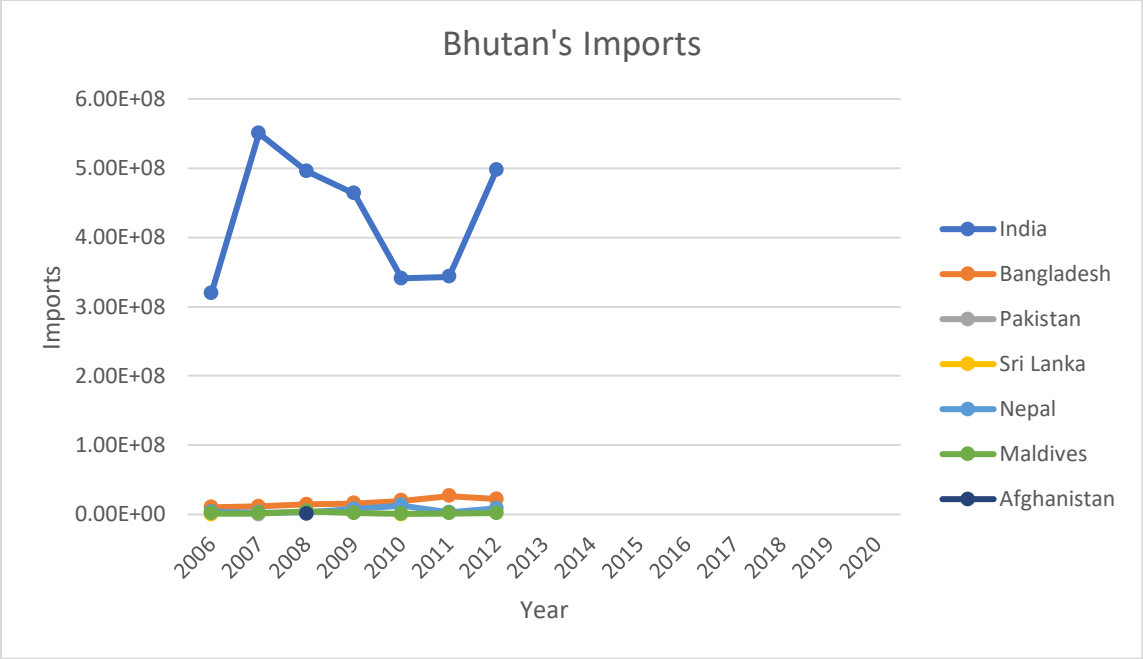

Figure 3.11: Bhutan's Imports from other SAFTA Member Countries

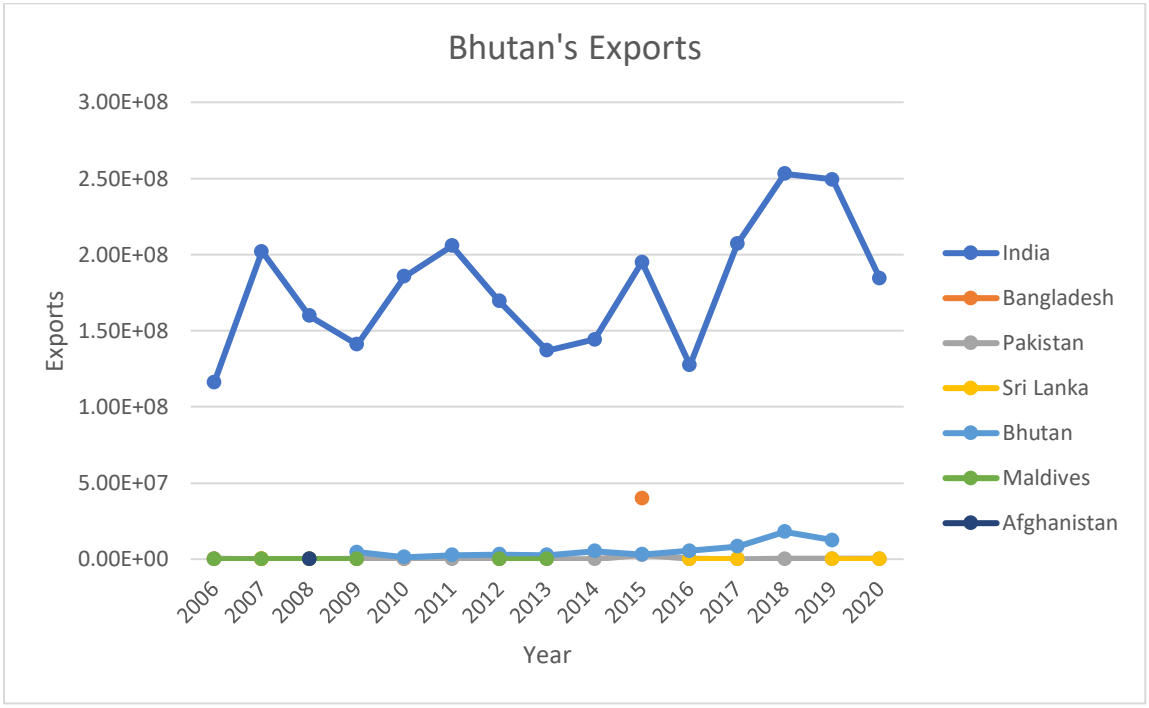

Figure 3.12: Bhutan's Exports to other SAFTA Member Countries

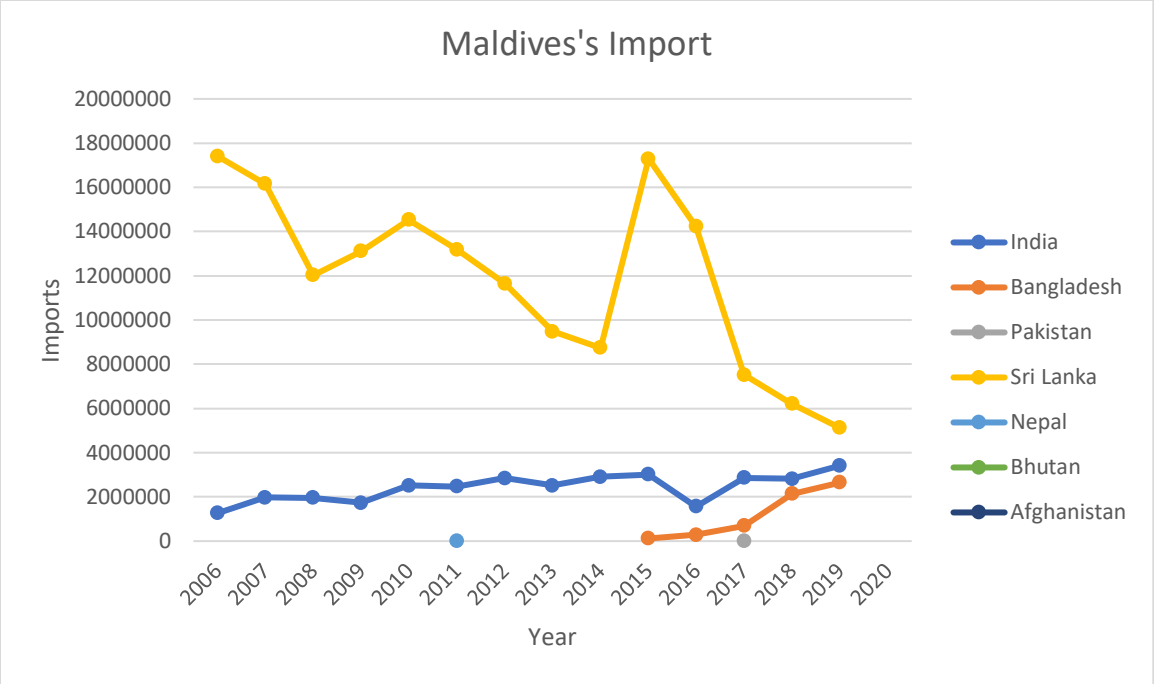

Figure 3.13: Maldives's Imports from other SAFTA Member Countries

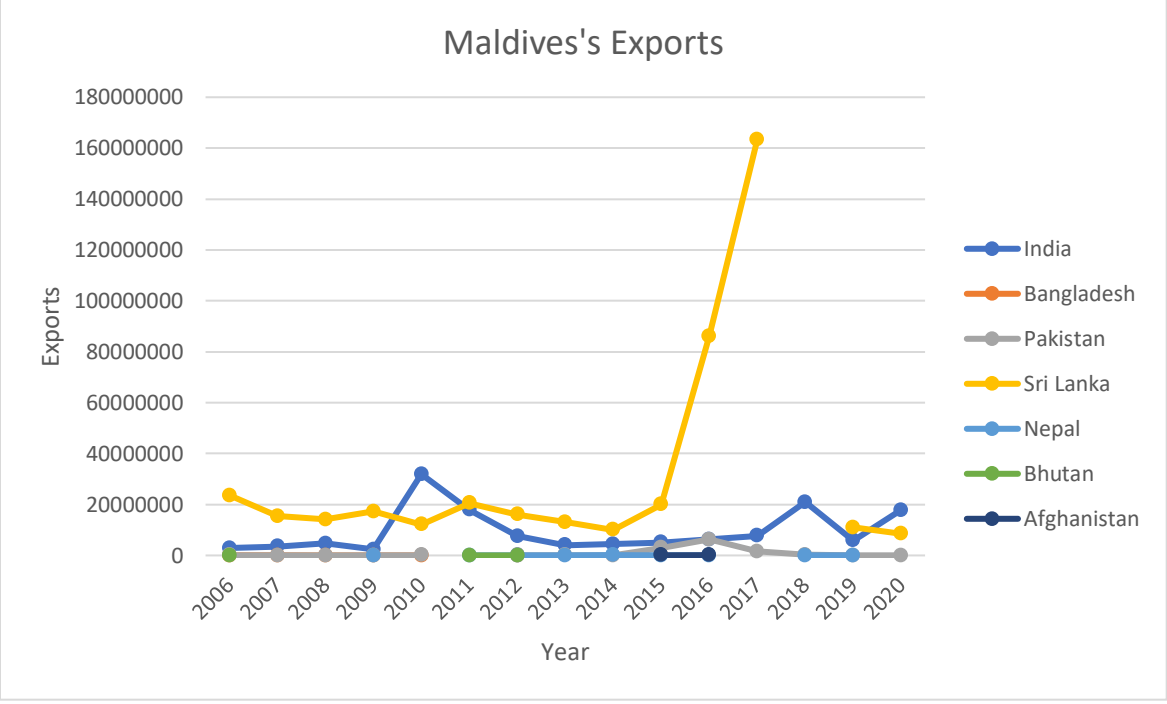

Figure 3.14: Maldives's Exports to other SAFTA Member Countries

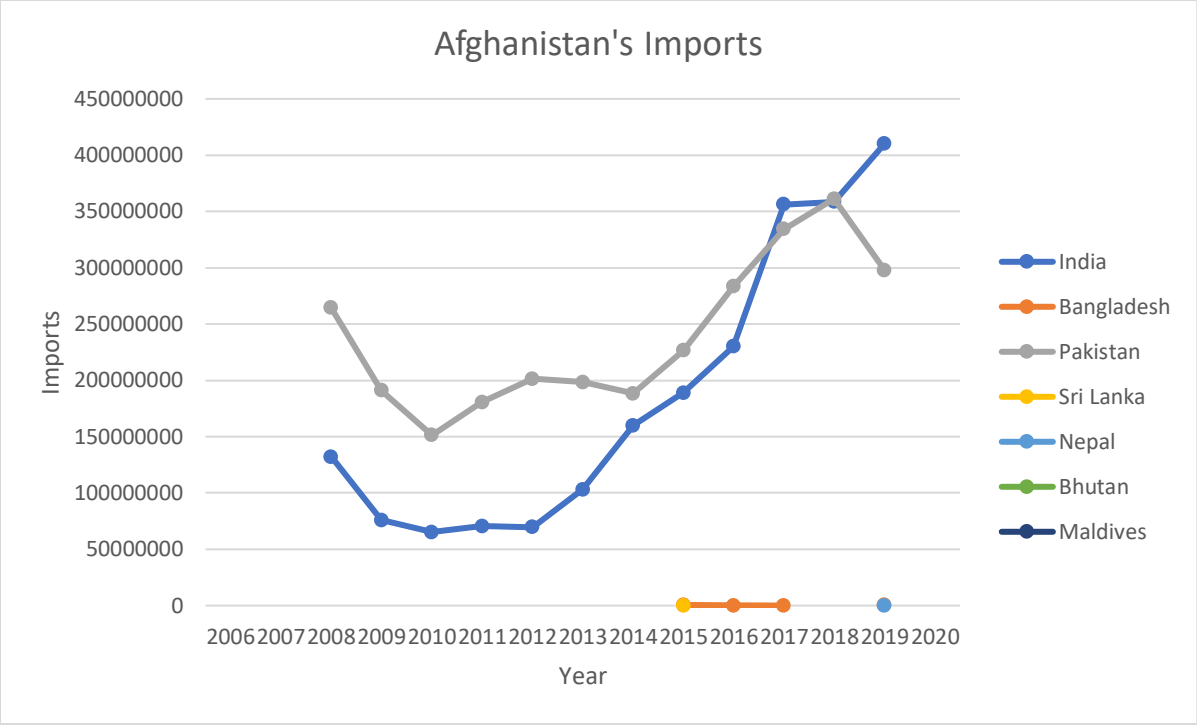

Figure 3.15: Afghanistan's Imports from other SAFTA Member Countries

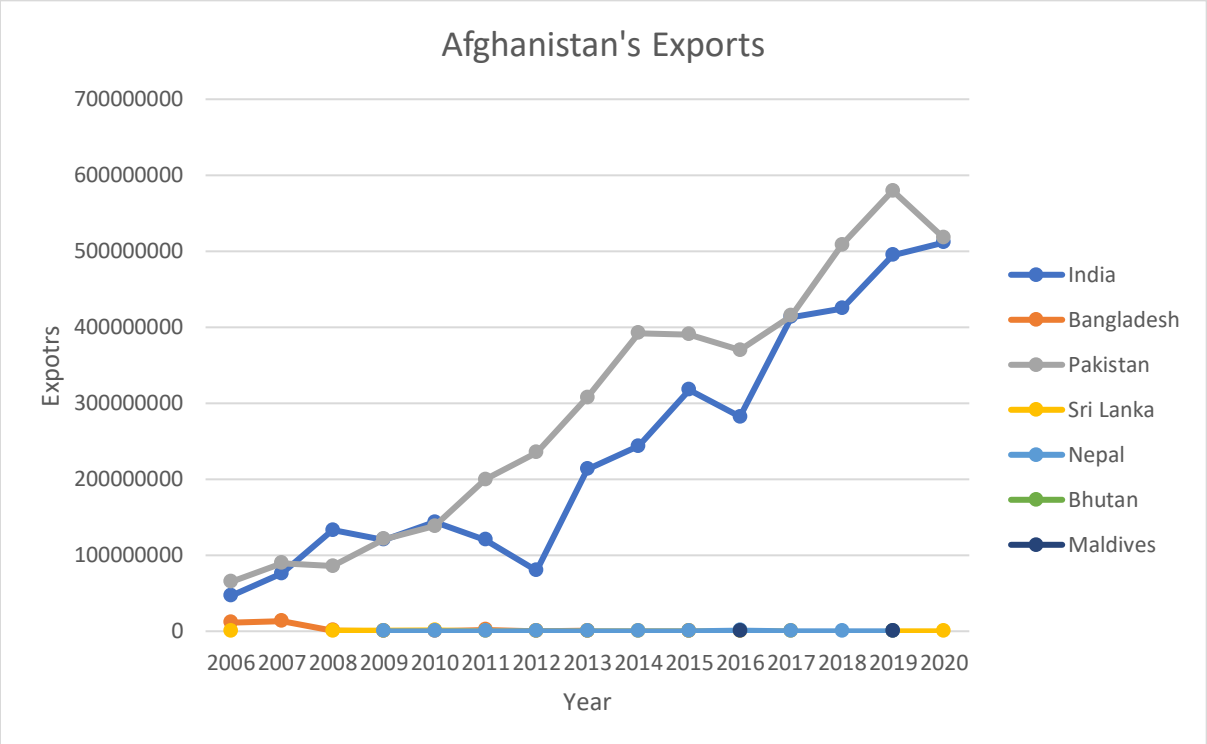

Figure 3.16: Afghanistan's Exports to other SAFTA Member Countries

CHAPTER FOUR: EMPIRICAL RESULTS

4.1. Empirical Results – Benchmark Estimations

The basic empirical model uses the log of trade flows (in constant 2015 US$) as the dependent variable, and it includes the following explanatory variables: log of GDP of the exporter, log of GDP of the importer, log of GDPC of the exporter, log of GDPC of the importer, common language, colonial ties, contiguity, and SAFTA. To capture the effect of SAFTA on bilateral trade flows, we consider several empirical specifications, including those that are consistent with the theoretical background of the gravity equation (Bergstrand, 1985, 1989; Anderson & van Wincoop, 2003). The empirical analysis proceeds as follows. First, we run pooled panel estimations to check the relationship between bilateral trade flows and other regressors, including contiguity, colonial ties, common language, and the variable of interest, SAFTA.

Then, we apply the Poisson Pseudo-Maximum Likelihood (PPML) estimator proposed by Santos Silva & Tenreyro (2006). This estimator has two main properties. As noted earlier, since the gravity model is estimated in its multiplicative form, it tackles the statistical problems associated with zero bilateral trade flows and avoids the log of zero problem. Also, the PPML estimating approach solves the consistency and efficiency problems in econometrics that result from heteroskedasticity. We apply the PPML estimation method to the basic gravity equation that includes the standard gravity variables, and to the gravity model that includes exporter-specific and importer-specific effects.

The empirical analysis examines the magnitude of bilateral trade between SAFTA member countries using the gravity model. We first run pooled panel regressions, and the results are presented in Table 4.1. In this table, there are six alternative specifications that are determined by modifying the combination of variables or adding a few additional variables to each model. Models

1, 2, and 3 are the basic models without the SAFTA variable, and Models 4, 5, and 6 are the alternative empirical specifications that include the SAFTA variable. In the first model, the estimated coefficients on the GDP variables of the importer and exporter are positive and statistically significant at the 1% level with values of 1.262 and 1.096, respectively. These coefficients imply that a 1% increase in the GDP of the importer and the exporter will raise bilateral trade flows by 1.262% and 1.096%, ceteris paribus. On the other hand, the estimated coefficient on the bilateral geographic distance variable is negative and statistically significant at the 1% level with a value of -1.539. This result indicates that a 1% increase in bilateral distance between two countries will decrease bilateral trade flows by 1.539%.

Model 2 presents the results of an augmented empirical specification where a few dummy variables, such as common language, contiguity, and colonial ties are included. The estimated coefficients on the GDP variables of the importer and the exporter and on the bilateral distance variable are like those in Model 1. The estimated coefficient on the common language variable is positive and statistically significant at the 1% level, taking the value of 0.830. This coefficient indicates that two countries that have a common language will trade more with each other by a factor of exp(0.830) = 2.293 (that is 2.293 times more) compared to countries that do not have a common language, ceteris paribus. The estimated coefficient on the contiguity variable is positive and statistically significant at the 1% level, taking the value of 0.605. Then, sharing common borders increases bilateral trade flows. by exp(0.605) =1.831 folds compared to countries that do not have common borders. The estimated coefficient on the colonial ties variable is negative and statistically significant at the 5% level, taking the value of -0.296. It implies that countries that had colonial relationships post-1945 have lower bilateral trade flow levels by an estimated factor of exp(-0.296)=0.744 in comparison to countries that did not have colonial relationships post-1945.

Model 3 illustrates the results when adding the GDPC of the importer and exporter to the empirical model. Again, there are no remarkable changes in the estimates of the previous variable (GDP, bilateral distance, common language, and contiguity). The estimated coefficient on the colonial ties variable remains negative, but it becomes significant at the 1% level. The estimated coefficients on the GDPC variables of the importer and the exporter are positive and statistically significant at the 1% level, taking the values of 0.198 and 0.448, respectively. These estimates imply that an increase in the GDPC of the importer and exporter by 1% will expand bilateral trade flows by 0.198% and 0.448%, respectively, ceteris paribus.

Model 4 is an extended version of Model 1 but with the SAFTA dummy variable being added to the empirical equation. Again, there are no significant changes in the coefficients on the GDP and bilateral distance variables. The estimated coefficient on the bilateral SAFTA variable is negative and statistically significant at the 1% level, indicating that trade flows among SAFTA countries are lower than trade flows between SAFTA and non-SAFTA countries, ceteris paribus. The estimated coefficient on SAFTA is -0.832. It indicates that members of SAFTA trade less with each other by a factor of exp(-0.832) =0.435 compared to trade between SAFTA and non-SAFTA countries. These results could be explained by many impediments that limit bilateral trade flows between SAFTA member countries such as the existence of “sensitive list” that covers a list of products that are excluded from the tariff liberalization program and excluded from trade preferences bilateral political issues, poor bilateral infrastructure, deficient bilateral business networks, and significant para-tariffs on bilateral trade flows between SAFTA member countries.

Model 5 is an extended version of model 2 by including the bilateral dummy variable SAFTA. The estimated coefficients on the GDP, distance, common language, and contiguity variables are similar, and they remain statistically significant at the 1% level. The estimated

coefficient on the colonial ties variable is negative, and it becomes statistically insignificant, taking the value of -0.175. The estimated coefficient on SAFTA is negative and statistically significant at the 1% level, with a value of -1.151. It implies that SAFTA countries trade less with each other by a factor of exp(-1.151) =0.316 compared to trade between SAFTA and non-SAFTA countries.

Model 6 presents the results from an empirical specification that includes all variables used through the previous specifications. We find that the estimated coefficient on the SAFTA variable is negative and statistically significant at the 1% level, taking the value of -1.047. In other words, the SAFTA member countries trade less with each other by a factor of exp(-1.047)=0.351 compared to trade between SAFTA countries and other foreign (non-SAFTA) countries. Again, these results suggest that bilateral trade between members of SAFTA has experienced some important obstacles and constraints.

4.2. Empirical Results – PPML Estimations

Table 4.2 presents the empirical results when implementing the estimations for the multiplicative form of the gravity model through the PPML estimator (Santos Silva & Tenreyro, 2006). Model (1) shows the results from a basic empirical equation that only includes the GDP variables of the trading countries and the bilateral geographic distance variable. The estimated coefficients on the importer and exporter GDP variables are positive and statistically significant at the 1% level with values of 0.749 and 0.885. They imply that a 1% increase in these variables increases bilateral trade flows by 0.749% and 0.885%, respectively, ceteris paribus. Also, the estimated coefficient on the bilateral distance variable is negative and statistically significant at the 1% level with a value of -1.125. In other words, a decrease in the bilateral geographic distance by 1% will increase bilateral trade flows by 1.125%, ceteris paribus.

Table 4.1: Empirical Results – Basic Estimations

Dependent Variable: Log of Bilateral Trade Flows ($\ln Trade_{ij}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
$\ln GDP_i$	1.096***	1.052***	1.108***	1.092***	1.042***	1.101***
	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)	(0.014)
$\ln GDP_j$	1.262***	1.271***	1.194***	1.244***	1.243***	1.182***
	(0.017)	(0.017)	(0.020)	(0.017)	(0.017)	(0.020)
$\ln Dist_{ij}$	-1.539***	-1.514***	-1.635***	-1.717***	-1.699***	-1.795***
	(0.049)	(0.054)	(0.055)	(0.053)	(0.056)	(0.056)
$Lang_{ij}$		0.830***	0.847***		0.808***	0.820***
		(0.089)	(0.090)		(0.088)	(0.089)
$Cont_{ij}$		0.605***	0.738***		1.122***	1.168***
		(0.138)	(0.135)		(0.147)	(0.143)
$Col45_{ij}$		-0.296**	-0.581***		-0.175	-0.446***
		(0.118)	(0.115)		(0.118)	(0.113)
$\ln GDPC_i$			0.448***			0.460***
			(0.041)			(0.041)
$\ln GDPC_j$			0.198***			0.163***
			(0.025)			(0.026)
$SAFTA_{ij}$				-0.832***	-1.151***	-1.047***
				(0.123)	(0.129)	(0.135)
Observations	7148	7148	7148	7148	7148	7148
R-squared	0.647	0.652	0.649	0.662	0.655	0.665

Notes: Standard errors are reported in parentheses. In this table, ***, **, * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4.2: Empirical Results – PPML Estimations

Dependent Variable: Bilateral Trade Flows ($Trade_{ij}$)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
$\ln GDP_{it}$	0.885***	0.904***	0.901***	0.870***	0.859***	0.858***	0.711***
	(0.015)	(0.017)	(0.017)	(0.014)	(0.015)	(0.015)	(0.017)
$\ln GDP_{jt}$	0.749***	0.805***	0.776***	0.765***	0.776***	0.772***	
	(0.013)	(0.017)	(0.018)	(0.013)	(0.015)	(0.016)	
$\ln Dist_{ij}$	-1.125***	-1.310***	-1.335***	-1.579***	-1.683***	-1.681***	-1.755***
	(0.050)	(0.065)	(0.067)	(0.051)	(0.054)	(0.053)	(0.057)
$Lang_{ij}$		-0.015	-0.006		0.403***	0.401***	0.528***
		(0.077)	(0.076)		(0.063)	(0.064)	(0.060)
$Cont_{ij}$		-0.439***	-0.245**		0.010	0.035	0.067
		(0.115)	(0.119)		(0.078)	(0.090)	(0.084)
$Col45_{ij}$		-0.707***	-0.749***		-0.879***	-0.883***	-0.972***
		(0.083)	(0.080)		(0.076)	(0.075)	(0.063)
$\ln GDPC_{it}$			-0.057			0.005	0.030
			(0.062)			(0.059)	(0.033)
$\ln GDPC_{jt}$			0.105***			0.014	
			(0.034)			(0.030)	
$\ln Rem_{it}$							0.367***
							(0.092)
$SAFTA_{ij}$				-1.759***	-2.078***	-2.064***	-2.291***
				(0.144)	(0.171)	(0.170)	(0.165)
Observations	7148	7148	7148	7148	7148	7148	7148
Pseudo R-sq	0.799	0.805	0.807	0.826	0.831	0.831	0.928

Notes: Standard errors are reported in parentheses. In this table, ***, **, * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Model 2 presents the results for an alternative empirical specification where the bilateral dummy variables, common language, contiguity, and colonial ties, are added to the empirical equation. Again, the estimated coefficient on the GDP and bilateral distance variables are similar to those in Model 1 and they are statistically significant at the 1% level. Also, the estimated coefficient on the common language variable is negative and statistically insignificant, taking the value of -0.015. The coefficient on the colonial ties variable is negative and statistically significant at the 1% level with a value of -0.707, and the estimated coefficient on the contiguity variable is negative and statistically significant at the 1% level taking the value of -0.439. Sharing colonial ties post-1945 decreases bilateral trade flows by a factor of exp(-0.707)=0.493, ceteris paribus.

Model 3 presents the results from an empirical specification that covers all variables (including the GDPC of the explorer and GDPC of the importer) except SAFTA. Again, there are no remarkable changes in the results on the estimated coefficients such as those on the GDP, bilateral distance, language, and colonial ties variables. Also, the estimated coefficient on the contiguity variable is negative with a value of -0.245 and statistically significant at the 5% level. This estimate indicates that countries that share common borders trade less with each other by a factor of exp(-0.245)=0.783. The estimated coefficient on the importer's GDPC variable is positive and statistically significant at the 1% level, taking the value of 0.105, while the estimated coefficient on the exporter's GDPC is statistically insignificant. This result implies that a 1% increase in GDPC of the reporting country (importer) will increase trade flows by 0.105%.

Model 4 shows the results when adding the SAFTA binary variable to Model 1. The estimated coefficient on the SAFTA dummy variable is negative and statistically significant at the 1% level, taking the value of -1.759. The members of SAFTA trade less with each other by a factor

of 0.172 compared to trade between SAFTA member countries and foreign (non-SAFTA) countries. These results could be attributed to a variety of factors that restrict bilateral trade flows between SAFTA member countries, including the sensitive list of products that are excluded from SAFTA preferences, bilateral political tensions, inadequate infrastructure, weak bilateral business networks, and para-tariffs and perhaps other major covert bilateral trade barriers.

Model 5 is the extension version of Model 2 when the SAFTA dummy variable is added to the empirical equation. The estimated coefficients on the GDP, bilateral distance, and colonial ties variables are similar to those in Model 2, and they are statistically significant at the 1% level. The estimated coefficient on the common language variable is positive and statistically significant at the 1% level, taking the value of 0.403. It indicates that countries that share a common language have higher trade flows with each other by a factor of exp (0.403) =1.496. Meanwhile, the estimated coefficient on the contiguity variable is statistically insignificant. The estimated coefficient on the SAFTA variable is negative and statistically significant at the 1% level, taking the value of -2.078. Then, this result indicates that SAFTA member countries trade less with each other by a factor of exp(-2.078)=0.125 compared to trade between SAFTA member countries and foreign (non-SAFTA) countries.

Model 6 shows the results when all variables are included in the empirical specification, including the SAFTA variable. The estimated coefficients on the GDP variables are positive and statistically significant at the 1% level, and the estimated coefficient on the bilateral distance variable remains negative and statistically significant at the 1% level. The estimated coefficients on the common language and contiguity variables are positive with values of 0.401 and 0.035, respectively. The coefficient for language is statistically significant at the 1% level, while the coefficient on the contiguity is statistically insignificant. The estimated coefficients on the

importer's and exporter's GDPC variables are positive but statistically insignificant. The estimated coefficient on the SAFTA variable is negative and statistically significant at the 1% level, taking the value of -2.064. It indicates that SAFTA member countries trade less with each other by a factor of exp (-2.064) = 0.127 compared to trade between SAFTA member countries and foreign (non-SAFTA) countries.

Model 7 presents the estimation results from an alternative empirical model that includes importing country (SAFTA country) specific effects and the log of the exporter's remoteness, $\ln Rem_{it} = [\sum_s (w_{st}/Dist_{is})]^{-1}$, where w_{st} is the relative economic weight of country "s". It is worth noting that the inclusion of time-varying specific effects will also control for time-specific shocks that occurred over the studies period (e.g., the COVID-19 pandemic). These SAFTA-country specific effects control for the GDP and GDPC of the destination country in our dataset. In this specification, we include all basic bilateral gravity variables (bilateral geographic distance, common language, colonial ties, and contiguity variables), the GDP and GDPC of the origin countries, and the bilateral SAFTA dummy variable. Model 7 is the preferred model as it is less impacted by the omitted variable bias problem. The results show some moderate changes in the estimated coefficients. The estimated coefficient on the bilateral distance variable is negative and statistically significant at the 1% level with a value of -1.755. It indicates that a 1% decrease in distance between trading countries would increase trade flows by 1.755%, ceteris paribus. The estimated coefficient on the common language binary variable is positive and statistically significant at the 1% level, taking the value of 0.528. It implies that countries that have a common language trade more with each other by a factor of exp(0.528)=1.696, ceteris paribus.

The estimated coefficient on the contiguity binary variable is not statistically significant, taking the values of 0.064. This result indicates that countries that share common borders do not

trade more than countries that do not share common borders, ceteris paribus. Given that the dataset covers bilateral trade flows among SAFTA member countries and between SAFTA and non-SAFTA countries, the estimated coefficients on these variables could be absorbing some of the effects of bilateral political issues and tensions that occur between nearby countries. The estimated coefficient on the colonial ties binary variable is negative and statistically significant at the 1% level, taking the value of -0.954. It indicates that countries that have had colonial relationships post-1945 trade less with each other, on average, by a factor of exp (-0.972) =0.378 compared to countries that do not share colonial ties. These results could be explained by the significant increase in bilateral trade flows between SAFTA countries and other (developed countries) that do not share colonial ties with SAFTA countries (e.g., India and the United States), relative to trade between SAFTA and non-SAFTA countries that share colonial ties with each other (e.g., India and the United Kingdom). Also, the estimated coefficient on the remoteness variable is positive and statistically significant at the 1% level, taking the value of 0.367.

The estimated coefficient on the SAFTA variable is negative and statistically significant at the 1% level, taking the value of -2.292. It indicates that SAFTA member countries trade less among each other by a smaller factor of exp(-2.224)=0.101 compared to trade between SAFTA member countries and foreign (non-SAFTA) countries. This result shows relatively lower bilateral trade flow levels among SAFTA member countries, and it could be attributed to different causes such as the sensitive list of products excluded from SAFTA preferences, bilateral political conflicts and tensions, poor bilateral infrastructure connecting trading countries, limited bilateral business networks, and para-tariffs and other covert bilateral trade barriers.

CHAPTER FIVE: CONCLUSION AND POLICY RECOMMENDATIONS

The number of RTAs has grown significantly since the early 1990s. One of the main common objectives of RTAs is to increase trade flows between member countries and to eventually lead to greater regional economic integration. South Asia is regarded as one of the world's least integrated geo-economic regions. Despite the implementation of SAFTA and the continuous increase in bilateral trade flows between member countries over time, bilateral trade flows between member countries are observed to remain relatively low. There is a range of empirical literature that studies the economic and trade effects of SAFTA (e.g., Rahapakse & Arunatilka, 1997; Jayasuriya & Weerakoon, 2001; Rahman et al., 2006; Sawhney, 2010; Zaheer, 2013; Ullah & Inaba, 2014; Kumar & Ahmed, 2015; Rehmi et al., 2017; Kiran, 2018; Taguchi & Rubasinghe, 2019; Nawaz 2020; Sharma & Kumar, 2021). The SAFTA comprises some significant trade and investment liberalization terms that go beyond the simple elimination/reduction of tariffs and non-tariff barriers, as it includes provisions on businesses, and on political and economic cooperation and coordination.

However, this agreement was countered by several economic and political obstacles, and it was hindered by the predominance of the sensitive items list that covers products excluded from SAFTA trade preferences, widespread expiation, and extensive uses of para-tariffs and other covert trade barriers that decrease the efficiency of the trade preferences that SAFTA provides to its member nations. It was also marginalized by political tensions between member countries (e.g., India and Pakistan, Pakistan and Afghanistan, India, and Nepal) and by corruption and deficient bilateral infrastructure and business networks.

The primary objective of this thesis is to examine the magnitude of bilateral trade flows between SAFTA member countries. The empirical analysis is executed using the gravity model

for international trade. The gravity model is one of the most empirical successful tools to examine the determinants of bilateral trade flows and to estimate the effects of RTAs on bilateral trade flows (e.g., Helpman, 1987; Bergstrand, 1989; Baldwin, 1994; Eichengreen & Irwin, 1998; Feenstra, 1998, 2002; Egger, 2002; Santos Silva & Tenreyro, 2006; Olper & Raimondi, 2008; Ghazalian, 2017, 2019). A standard gravity specification is used to examine the relative magnitude of bilateral trade flows between SAFTA member countries. A panel dataset covering bilateral trade flows among SAFTA countries and between SAFTA countries and other (non-SAFTA) countries is used. The empirical analysis starts with simple empirical specifications that include standard gravity variables (e.g., GDP of the exporting and importing countries, GDPC of the exporting and importing countries, bilateral geographic distance, contiguity, common language, and bilateral colonial ties) in addition to the binary variable of interest, SAFTA. The empirical gravity equations are estimated in their log-linear forms, and they are also estimated in their multiplicative forms using the PPML estimation method (Santos Silva & Tenreyro, 2006). This study estimated the magnitude of bilateral trade flows among SAFTA member countries relative to bilateral trade flows between SAFTA and non-SAFTA countries. The empirical analysis in this study could be complemented by examining bilateral trade flows over the pre-SAFTA and post-SAFTA periods.

The main results show that the magnitude of bilateral trade flows among SAFTA member countries significantly fall below the magnitude of bilateral trade flows between SAFTA countries and other (non-SAFTA) countries. For example, the estimation of the amended log-linear gravity equation shows that the magnitude of bilateral trade flows among SAFTA member countries is only a fraction of 35.1% of bilateral trade flows between SAFTA and other (non-SAFTA) countries, ceteris paribus. Also, the estimation of the amended multiplicative gravity equation through the PPML estimation method shows that the magnitude of bilateral trade flows among

SAFTA member countries are only a fraction of around 10.1% of bilateral trade flows between SAFTA and other (non-SAFTA) countries, ceteris paribus.

These empirical results suggest that SAARC partners did not take full advantage of SAFTA economic and trade preferences, and that there remains a wide margin to increase bilateral trade flows between SAFTA member countries. The relatively lower magnitudes of bilateral trade flows among SAFTA member countries could be attributed to the sensitive items list (which covers a list of products that are excluded from the tariff liberalization program and, hence, excluded from SAFTA trade preferences), extensive use of para-tariffs, deficient bilateral business networks, weak bilateral infrastructure that economically links member countries (e.g., highways, maritime, and land transportation lines; air cargo transportation line), inadequate and corrupted regulatory agencies, and corruption at land, port, and airport custom checkpoints and when carrying business transactions in general. They could also be linked to political and geo-political tensions and conflicts among some SAFTA member countries (e.g., India and Pakistan, Pakistan, and Afghanistan, India, and Nepal).

The empirical findings in this thesis show that SAFTA member countries are still lagging in attaining higher levels of bilateral trade flows. They suggest that SAFTA trade preferences were overall ineffective in increasing trade flows between member countries, and that the significance of these preferences has been diminished by trade-restricting factors within the SAFTA region such as, sensitive list, para-tariffs, deficient bilateral business networks, weak bilateral infrastructure, corruption. On the other side, these findings imply that SAFTA member countries have the potential to boost intra-regional trade by reducing or eliminating those trade restricting factors. Also, there have been significant political tensions and conflicts among some SAFTA member countries (e.g., India and Pakistan, Pakistan and Afghanistan, India, and Nepal) over the

last few decades. Then, attaining higher levels of intra-regional trade flows would require significant governmental cooperation and coordination to resolve conflicts and to attain appropriate settlement of political problems between SAFTA member countries. In other words, political tensions and conflicts must be reduced in favour of the pursuit of shared economic interests. Also, SAFTA member countries could adopt policies that encourage the establishment of bilateral vertical and horizontal business networks and that facilitate intra-regional business transactions. SAFTA member countries should adopt development policies to improve their bilateral infrastructure and transportation facilities. Such policies are particularly relevant in the case of SAFTA landlocked countries (e.g., Nepal, Bhutan).

SAFTA trading partners should cooperate to reduce excessive shipment delays caused by corruption at customs checkpoints and to decrease/eliminate para-tariffs and to tackle different forms of corruption that face bilateral trade transactions. Also, trading partners often fail to meet the quality requirements and expectations of importers in other SAFTA countries, resulting in low intra-regional trade. The governments of SAFTA countries should adopt policies that improve the performance of exporting industries so that they can meet quality and cost standards. Also, supply chain management should be upgraded and maintained. Moreover, SAFTA countries should take significant steps to harmonize customs and other administrative procedures, to mutually recognize standards and certifications, and to facilitate trade measures.

The dismantling of trade restrictions and institutional rigidities would likely improve intra-regional trade flows between SAFTA member countries. Initiatives to promote intra-regional and extra-regional investment flows could potentially increase intra-regional trade by allowing preferential access to the manufacturing industry. The governing bodies of SAARC/SAFTA could also consider the inclusion of some major provisions such as simplifying the banking procedures

for financing imports, eliminating the restrictions on intra-regional investments, furthering macroeconomic consultations, implementing economic regulations for fair competition, easing foreign exchange controls on profit repatriation, and simplifying business visa procedures.

REFERENCES

Abafita, J., & Tadesse, T. (2021). Determinants of global coffee trade: Do RTAs matter? Gravity model analysis. *Cogent Economics & Finance*, *9*(1), 1892925.

Abbas, S., & Waheed, A. (2019). Pakistan's global trade potential: A gravity model approach. *Global Business Review*, *20*(6), 1361-1371.

Afesorgbor, S. K. (2017). Revisiting the effect of regional integration on African trade: evidence from meta-analysis and gravity model. *The Journal of International Trade & Economic Development*, *26*(2), 133-153.

Agnosteva, D. E., Anderson, J. E., & Yotov, Y. V. (2019). Intra-national trade costs: Assaying regional frictions. *European Economic Review*, *112*, 32-50.

Akram, H. W. (2020). Trade within South Asia: unrealistic expectations. *South Asia Research*, *40*(3), 381-396.

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American economic review*, *69*(1), 106-116.

Anderson, J. E. (2011). The gravity model. *Annu. Rev. Econ.*, *3*(1), 133-160.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American economic review*, *93*(1), 170-192.

Awais, N. (2016). Was the SAFTA (Phase II) Revision Successful? A Case Study of Bangladesh's RMG Exports to India. *The Lahore Journal of Economics*, *21*(1), 151.

Baier, S. L., & Bergstrand, J. H. (2001). The growth of world trade: tariffs, transport costs, and income similarity. *Journal of international Economics*, *53*(1), 1-27.

Baier, S. L., & Bergstrand, J. H. (2009). Bonus vetus OLS: A simple method for approximating international trade-cost effects using the gravity equation. *Journal of International Economics*, *77*(1), 77-85.

Baldwin, R. E., & Portes, R. D. (1994). *Towards an integrated Europe* (Vol. 25, No. 234). London: Centre for Economic Policy Research.

Banik, B., & Roy, C. K. (2020). Effect of exchange rate uncertainty on bilateral trade performance in SAARC countries: a gravity model analysis. *International Trade, Politics and Development*.

Banik, N., & Gilbert, J. (2010). Regional integration and trade costs in South Asia. In *Trade facilitation and regional cooperation in Asia*. Edward Elgar Publishing.

Baniya, S., Rocha, N., & Ruta, M. (2020). Trade effects of the New Silk Road: A gravity analysis. *Journal of Development Economics*, *146*, 102467.

Bergstrand, J. H. (1985). The gravity equation in international trade: some microeconomic foundations and empirical evidence. *The review of economics and statistics*, 474-481.

Bergstrand, J. H. (1989). The generalized gravity equation, monopolistic competition, and the factor-proportions theory in international trade. *The review of economics and statistics*, 143-153.

Bergstrand, J. H. (1990). The Heckscher-Ohlin-Samuelson model, the Linder hypothesis and the determinants of bilateral intra-industry trade. *The Economic Journal*, *100*(403), 1216-1229.

Bergstrand, J. H., & Egger, P. (2007). A knowledge-and-physical-capital model of international trade flows, foreign direct investment, and multinational enterprises. *Journal of International Economics*, *73*(2), 278-308.

Bikker, J.A. (2009) An Extended Gravity Model with Substitution Applied to International Trade. DNB Working Paper No. 215, July 2009.

Brun, J. F., Carrère, C., Guillaumont, P., & De Melo, J. (2005). Has distance died? Evidence from a panel gravity model. *The World Bank Economic Review*, *19*(1), 99-120.

Bussière, M., Fidrmuc, J., & Schnatz, B. (2008). EU enlargement and trade integration: Lessons from a gravity model. *Review of Development Economics*, *12*(3), 562-576.

Carrere, C. (2006). Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. *European economic review*, *50*(2), 223-247.

Deardorff, A. V., & Stern, R. M. (1998). *Measurement of nontariff barriers* (Vol. 179). University of Michigan Press.

Eaton, J., & Kortum, S. (2002). Technology, geography, and trade. *Econometrica*, *70*(5), 1741-1779.

Egger, P. (2002). An econometric view on the estimation of gravity models and the calculation of trade potentials. *World Economy*, *25*(2), 297-312.

Eichengreen, B., & Irwin, D. A. (1998). The role of history in bilateral trade flows. *The regionalization of the world economy*, *2008*, 33-62.

Ethier, W. J. (1982). National and international returns to scale in the modern theory of international trade. *The American Economic Review*, *72*(3), 389-405.

Evenett, S. J., & Keller, W. (2002). On theories explaining the success of the gravity equation. *Journal of political economy*, *110*(2), 281-316.

Feenstra, R. C. (2002). Border effects and the gravity equation: Consistent methods for estimation. *Scottish Journal of Political Economy*, *49*(5), 491-506.

García, E. C., Navarro Pabsdorf, M., & Gómez Herrera, E. (2013). The gravity model analysis: an application on MERCOSUR trade flows. *Journal of Economic Policy Reform*, *16*(4), 336-348.

Ghazalian, P. L. (2013). Mercosur enlargement: Predicting the effects on trade in primary agricultural commodities. *Economic Change and Restructuring*, *46*(3), 277-297.

Ghazalian, P. L. (2015). The new tomato suspension agreement: What are the implications for trade flows?. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, *63*(3), 359-380.

Ghazalian, P. L. (2017). The effects of NAFTA/CUSFTA on agricultural trade flows: an empirical investigation. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie*, *65*(2), 219-248.

Ghazalian, P. L. (2019). Canada's beef exports: Border effects and prospects for market access. Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 67(1), 53-74.

Ghazalian, P. L., & Furtan, W. H. (2007). The effect of innovation on agricultural and agri-food exports in OECD countries. *Journal of Agricultural and Resource Economics*, 448-461.

Ghazalian, P. L., Larue, B., & Gervais, J. P. (2011). Assessing the implications of regional preferential market access for meat commodities. *Agribusiness*, *27*(3), 292-310.

Ghazalian, P. L., Tamini, L. D., Larue, B., & Gervais, J. P. (2012). A gravity model to account for vertical linkages between markets with an application to the cattle/beef sector. *The Journal of International Trade & Economic Development*, *21*(4), 579-601.

Hassan, M. K. (2001). Is SAARC a viable economic block? Evidence from gravity model. *Journal of Asian Economics*, *12*(2), 263-290.

Head, K. (2003). Gravity for beginners. *University of British Columbia*, *2053*.

Head, K., & Mayer, T. (2014). Gravity equations: Workhorse, toolkit, and cookbook. In *Handbook of international economics* (Vol. 4, pp. 131-195). Elsevier.

Head, K., & Mayer, T. (2002). *Illusory border effects: Distance mismeasurement inflates estimates of home bias in trade* (Vol. 1). Paris: CEPII.

Heid, B., Larch, M., & Yotov, Y. V. (2021). Estimating the effects of non-discriminatory trade policies within structural gravity models. *Canadian Journal of Economics/Revue canadienne d'économique*, *54*(1), 376-409.

Helpman, E. (1987). Imperfect competition and international trade: Evidence from fourteen industrial countries. *Journal of the Japanese and international economies*, *1*(1), 62-81.

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. *European Trade Study Group (ETSG)*.

Hossain, S. (2018). SAFTA and AFTA: a comparative welfare analysis of two regional trade agreements. *Journal of Economic Structures*, *7*(1), 1-27.

Huchet-Bourdon, M., Le Mouël, C., & Vijil, M. (2018). The relationship between trade openness and economic growth: Some new insights on the openness measurement issue. *The World Economy*, *41*(1), 59-76.

Iqbal, N., & Nawaz, S. (2017). Pakistan's bilateral trade under MFN and SAFTA: Do institutional and non-institutional arrangements matter?. *The Pakistan Development Review*, 59-78.

Jayasuriya, S., & Weerakoon, D. (2001). FDI and Economic Integration in the SAARC Region. *Trade, Finance and Investment in South Asia, Social Sciences Press, New Delhi*.

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.

Kathuria, S. (Ed.). (2018). *A glass half full: The promise of regional trade in South Asia*. World Bank Publications.

Kiran, S. (2018). Determining the trade potential of trade between Pakistan and SAFTA countries using Gravity Model. *City University Research Journal*, *8*(2).

Kumar, S., & Ahmed, S. (2015). Gravity model by panel data approach: An empirical application with implications for South Asian countries. *Foreign Trade Review*, *50*(4), 233-249.

Linnemann, H. (1966). *An econometric study of international trade flows* (No. 42). Amsterdam, North-Holland.

Martinez-Zarzoso, I., Felicitas, N. L. D., & Horsewood, N. (2009). Are regional trading agreements beneficial?: Static and dynamic panel gravity models. *The North American Journal of Economics and Finance*, *20*(1), 46-65.

McCallum, J. (1995). National borders matter: Canada-US regional trade patterns. *The American Economic Review*, *85*(3), 615-623.

Ministry of External Affairs - Government of India, 2022; SAARC, 2022

Nag, B., & Nandi, A. (2006). Analysing India. s Trade Dynamics vis-É-vis SAARC Members Using the Gravity Model. *South Asia Economic Journal*, *7*(1), 83-98.

Nawaz, S. (2020). Institutions, regional integration and bilateral trade in South Asia: PPML based evidence. *The Pakistan Development Review*, *59*(2), 221-242.

Novy, D. (2013). International trade without CES: Estimating translog gravity. *Journal of International Economics*, *89*(2), 271-282.

Olper, A., & Raimondi, V. (2008). Explaining national border effects in the QUAD food trade. *Journal of Agricultural Economics*, *59*(3), 436-462.

Pöyhönen, P. (1963). A tentative model for the volume of trade between countries. *Weltwirtschaftliches Archiv*, 93-100.

Pulliainen, K. (1963). A world trade study: An econometric model of the pattern of the commodity flows in International Trade in 1948-1960. *Ekonomiska Samfundets Tidskrift*, *16*(2), 78-91.

Rahapakse, P., & Arunatilake, N. (1997). Would a reduction in trade barriers promote intra-SAARC trade?: A Sri Lankan perspective. *Journal of Asian Economics*, *8*(1), 95-115.

Rahman, M., Shadat, W. B., & Das, N. C. (2006). Trade potential in SAFTA: An application of augmented gravity model. *CPD occasional paper series*, *61*, 512.

Rauch, J. E. (1999). Networks versus markets in international trade. *Journal of international Economics*, *48*(1), 7-35.

Regmi, R. K., Devkota, S. C., & Upadhyay, M. P. (2017). Impact of SAFTA on South Asian trade. *Asian Economic and financial review*, *7*(3), 232-247.

Rodríguez-Delgado, J. D. (2007). SAFTA: Living in a world of regional trade agreements.

Sawhney, U. (2010). Growth and structural change in SAARC economies. *International Journal of Economics and Finance Studies*, *2*(2), 95-103.

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*(3).

Silva, J. S., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and statistics*, *88*(4), 641-658.

Taguchi, H., & Rubasinghe, D. C. I. (2019). Trade impacts of South Asian free trade agreements in Sri Lanka. *South Asia Economic Journal*, *20*(1), 1-18.

Tinbergen, J., & Bos, H. (1962). Mathematical models of economic growth.

Ullah, M. S., & Inaba, K. (2014). Liberalization and FDI Performance: evidence from ASEAN and SAFTA member countries. *Journal of Economic Structures*, *3*(1), 1-24.

Urata, S., & Okabe, M. (2014). Trade creation and diversion effects of regional trade agreements: A product-level analysis. *The World Economy*, *37*(2), 267-289.

Viner, J. (1950). Full employment at whatever cost. *The Quarterly Journal of Economics*, *64*(3), 385-407.

Ward, M., Herr, H., & Pédussel Wu, J. (2020). *South Asian Free Trade Area and food trade: Implications for regional food security* (No. 148/2020). Working Paper.

Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. *Journal of Development economics*, *72*(1), 57-89.

Zaheer, R. (2013). The economic performance of SAARC member countries. *Research on Humanities and Social Sciences*, *3*(5), 201-214.