Impact of South-South Trade Agreement on Exports of Pakistan

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[1] This paper was prepared under the supervision and guidance of Prof. Dr. Muhammad Wasif Siddiqi (L). We dedicate this paper to our beloved teacher.

Abstract

International trade is an engine of sustainable economic growth. Regional trade agreements minimize political, social and economic barriers among economic units. This paper explores the impact of South-South FTA through regional trade integration of SAARC on exports of Pakistan. For the time span 2003-2015, three forms of gravity models are used for an in-depth analysis. The results suggest that only trade agreements cannot increase Pakistan's exports to SAARC region. In case of SAARC region, there effects are marginalized due to political reasons and fierce competition from non-members. As all members are developing countries and Pakistan too exports low value added products so it will not enhance Pakistan's exports in the long run unless it competes with other competitors and produce high value added products. Based on the results, special emphasis should be given to reduce political tensions with member countries. In addition, quantitative factors such as high tariff rate, inflation and interest rate must be minimized for exporters. Qualitative factors such as new technology, political stability, law and order and skill level of labor should also be focused.

Keywords: International Trade, Regional Integration, Gravity Model
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1. Introduction

International trade is important for sustainable economic growth (Frankel & Romer, 1999). As it brings both quantitative and qualitative gains (Chenery & Strout, 1966), therefore, it is considered as an engine of sustainable economic growth by both Classical and Neo-Classical economists. Trade provides benefits of quality production and economies of scale (Helpman & Krugman, 1985). This efficient production results in structural transformation of economies according to comparative advantage (Krueger, 1980). Regional integration through trade has foster sustainable economic growth around the world (Akhter & Ghani, 2010). After World War II, there has been a remarkable increase in trade integration amongst various regions of the world. Since 1990s, the physical location of national borders has effectively disappeared and changes can be observed in their economic significance as well. Baier *et* al. (2008) argue that the substantial growth of economic treaties amongst various economic units have minimized the political, social and economic barriers between them. As most economic treaties are regional specific and preferential trade agreements in general leading to enormous economic growth and improvement in the standard of livings, the Regional Trade Agreements (RTAs) therefore are very important in the global world. For instance, dated 2013, around 354 RTAs are in force via World Trade Organization (WTO).

Free Trade Agreements (FTAs) are an important part of RTAs. A FTA consists of group of members removing both tariff and non-tariff trade barriers or have common commercial policy among them and with a different commercial policy for the non-members. FTAs are generally categorized into three types; (i) North-North FTA (ii) North-South FTA (iii) South-South FTA. A FTA involving developed economies only is known as North-North FTA such as European Union (EU) etc. A FTA involving both developed and developing economies is North-South FTA such as North American Free Trade Agreement (NAFTA) involving United States of America (USA), Mexico and Canada. Lastly, a FTA between developing economies only is called South-South FTA such as Association of Southeast Asian Nations (ASEAN). Kahouli &

Kadhraoui (2012) points out four main reasons of FTAs between economies; (i) enhancing the bilateral trade with the member economies, (ii) efficient production and promote competition in both domestic sectors (goods and services), (iii) evolving trade and Foreign Direct Investment (FDI) flows with the member economies, (iv) expansion and diversification of trade flows with the member economies. Empirical literature supports the trade expansion from North-North and North-South FTAs. A large set of empirical literature provides evidence of trade expansion in members of EU (Bun & Klaassen, 2002; Micco *et* al., 2003; Flam & Nordstrom, 2006a). Chintrakarn (2008) found that bilateral trade flows between two EU member economies is 9 to 14 percent greater as compared to bilateral trade flows among non-members. Baldwin (2006) concludes about 5 to 20 percent increase in trade flows of EU member economies. Badinger & Turkcan (2014) suggests a trade effect of around 28 percent on EU members. In terms of theoretical perspective, Melitz (2003) states two channels by which trade has expanded through EU; (i) fall in variable cost of trade which increased both extensive and intensive margin (range and volume of traded goods), (ii) fall in fixed cost of trade leading to extensive margin only. Similarly, Parra *et* al., (2016) shows that North-South FTA of Middle East and North African (MENA) economies has a positive impact on imports from EU economies but negative impact on MENA exports to EU. Cieslik & Hagemejer (2009) also supports a decrease in exports of MENA economies to EU but a rise in imports from EU. The South-South FTA EU had a share of 15.6 percent in total world exports in 2016, second to China's share of 16.1 percent. Similarly, they had the third largest trade share of 4.8 percent in machinery and transport equipment. EU is the top exporter of food, drinks and tobacco. It is also the third largest exporter of mineral fuels, lubricants and related materials and second largest exporter of raw materials. The North-South FTA MENA has also benefitted the member economies. In 2016, MENA members combined exported raw materials of worth 141,082 million US$, 90,898 million US$ of intermediate goods, 159,154 million of consumer goods and 43,323 million US$ of capital goods.

Asia has been the greatest contributor to global trade after the economic slump of 2008-2009. Asia is the best merchandised exporter with a worth of 5.96 trillion US$ in 2016. Pakistan has a GDP of 304 billion US$. Its trade per capita is 199US$. Its major exports destinations are EU, USA, China, Afghanistan, United Arab Emirates (UAE), Bangladesh, Saudi Arabia, India, Turkey, Korea, Kenya, Hong Kong, South Africa, Srilanka and others. It is ranked 68th in merchandise exports and 83rd in commercial services. In 2016, Pakistan's agricultural exports were of worth 3870 million US$. The top exported agricultural products are rice, wheat or meslin flour, citrus fruit, dates, figs, pineapples and avocados etc. Similarly, non-agricultural exports are mainly bed, table, toilet, kitchen linen, men's suits, cotton yarn, woven fabrics, leather accessories of clothing etc. of worth 16663 million US$. In terms of commercial services, Pakistan's share in world exports is only 0.07 percent. Pakistan has a share of worth 1006 million US$ of transport exports while a worth of 2232 million US$ of business services, ICTs and financial services are also exported. In 2015, Pakistan became the 9th largest exporter of textile with a worth of 8 billion US$. In 2016, Pakistan became the 45th largest merchandised exporter of worth 22 billion US$. Moreover, Pakistan exported a worth of 9555 million US$ of

intermediate products. But Pakistan's exports have declined substantially as compared to its imports after 2007. According to State Bank of Pakistan (SBP), the exports of Pakistan in 2013-2014 were of worth 25,078 million US$ while the imports were of worth 41,668 million US$ but in 2016-2017, the exports are of worth 21,938 million US$ while imports are of worth 48,506 million US$. In June, 2017 the value of exports was 1885 million US$ while the imports value was 5080 million US$. Similarly, for September 2017, the growth rate of exports was -17.1 percent. Overall, the trade deficit is of worth 26,568 million US$. The monthly growth rate of exports is -0.2 percent. This decreasing trend in exports is due to both quantifiable and non-quantifiable factors.[2]

Pakistan has signed 18 trade agreements and 10 of them are in effect. It has signed 12 bilateral trade agreements such as Pakistan-Bangladesh FTA in 2003 but not yet notified by WTO, Pakistan-Morocco Preferential Trade Agreement in 2005 but not yet notified by WTO, Pakistan-Singapore FTA in 2005 but not yet notified by WTO, Pakistan-Thailand FTA in 2015 but not yet notified by WTO, Pakistan-Turkey FTA in 2004 but not yet notified by WTO, Pakistan-Iran Preferential trade Agreement in 2004 but not yet notified by WTO, Malaysia-Pakistan Closer Economic Partnership Agreement in 2008 and notified by WTO, Pakistan-Indonesia FTA in 2013 and notified by WTO, Pakistan-Mauritius Preferential Trade Agreement in 2007 and notified by WTO, Pakistan-Srilanka FTA in 2005 and notified by WTO, Pakistan-US Trade and Investment Framework Agreement in 2003 and notified by WTO, and People's Republic of China-Pakistan FTA in 2007 and notified by WTO. Similarly, multilateral trade agreements are Pakistan-Gulf Cooperation Council FTA in 2004 which includes Pakistan, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE but not notified by WTO, Trade Preferential System of the Organization of the Islamic Conference in 2014 which includes Pakistan, Bahrain, Egypt, Indonesia, Jordan, Kuwait, Lebanon, Morocco, Nigeria, Saudi Arabia, Turkey, Uganda, Bangladesh, Cote Diviore, Guinea, Iran, Maldives, Oman, Qatar, Senegal, Syria, Tunisia, UAE, Benin, Burkina Faso, Cameroon, Chad, Comoros, Djibouti, Gabon, Gambia, Guinea-Bissau, Iraq, Libya, Malaysia, Mauritania, Niger, Palestine, Sierra Leone, Somalia and Sudan but not yet notified by WTO, Economic Cooperation Organization trade Agreement in 2003 which includes Pakistan, Iran, Tajikistan, Afghanistan, Turkey, Azerbaijan, Kazakhstan, Kyrgyz Republic, Turkmenistan and Uzbekistan and notified by WTO, Pakistan-MERCOSUR Preferential Trade Agreement in 2009 which includes Pakistan, Argentina, Paraguay, Brazil and Uruguay and notified by WTO, Preferential Tariff Arrangement-Group of Eight Developing Countries in 2011 which includes Pakistan, Bangladesh, Indonesia, Malaysia, Egypt, Iran, Nigeria and Turkey and notified by WTO, South Asian FTA in 2006 which includes Pakistan, Afghanistan, Bangladesh, Bhutan, India, Nepal, Srilanka and Maldives and notified by WTO.

[2] Quantifiable factors means those factors which can be expressed in terms of quantities such as low FDI, high tariff rate, inflation and high interest rate etc. Non-quantifiable factors are those which are difficult to express in quantities such as high cost of doing business, lack of market diversification, liquidity problem, lack of quality of production, poor market access, law & order, war on terrorism, political unrest, decreasing prices of exported commodities, lack of technological advancement and unskilled labor etc.

Although, all multilateral trade agreements should be given importance but South Asian FTA or trade with SARRC region should be closely focused especially by Pakistan because of two main reasons; (i) All the members of this FTA are close neighbors of Pakistan as compared to the members in rest of the multilateral trade agreements (ii) Pakistan exports such products which are demanded or imported by other SAARC members such as jewelry, ethyl alcohol, surgical instruments, pharmaceuticals, electronics items and machinery are demanded by India and Pakistan has the potential to export it. Bangladesh imports onions, cement clinkers, motor vehicles and electronics which can be exported by Pakistan although India will be a fierce competitor in Bangladeshi markets. Srilanka imports copper wire, telephone parts and tractors which can be exported by Pakistan with the competition of China, Hong Kong and Malaysia. At present, Afghanistan imports rice, cement, pharmaceutical products, vegetables, fruits, plastic, chemical products, household equipment, food stuff of animals, electric fans, rubber products, tents and canvas goods, footwear, leather products, wheat, paper products, textile products, fish and yarn but its volume can be increased. Moreover, Pakistan has a great potential to export non-basmati rice, fruits and vegetables like mangoes, onions, potatoes, halal food and frozen seafood to Malaysia.

This paper aims to explore the impact of South-South FTA through regional trade integration of SAARC on exports of Pakistan by gravity model. For an in-depth analysis, this paper estimates three forms of gravity equations; (i) Basic gravity model (ii) Augmented gravity model (iii) Trade creating policies. This paper is further divided into five parts. Section 2 describes the literature review. Section 3 explains the data and methodology. Section 4 presents the results and discussion. Section 5 consists on conclusion and policy implications.

2. Literature Review

(a) Theoretical Formulation of Gravity Model

Although, gravity model has been debated extensively in the literature having flows from various destinations on one side and weight of these destinations and inverse of distance on the other hand but the earliest formulation of the gravity model is given by Ravenstein (1885). His formulation explained that the centres of industry and commerce drive the migration process and it is inversely affected by distance. The classical trade models are given by Ohlin (1933), Predohl and Losch (1954). Based on their theories and the motive to include multilateral trade and along with distance in the toolkit of economists, Isard and Peck (1954) proved the negative impact of distance for both domestic and international traffic. Isard came close to framing a gravity model using a different approach as compared to Newton but he stressed upon the measurement issues, trade conformation, cultural and political factors that affect the bilateral trade flows between countries. The gravity narrative has many founders but many Dutch economists headed by Tinbergen (1962) became the first to publish a gravity equation along with its empirical application. The gravity equation of Linnemann was built from a partial equilibrium model of four equations including export supply and import demand in a reduced form. After this, the wave of discussion about gravity equation continued with Taplin (1967) & Leamer and Stern

(1970). These gravity models involved bilateral trade in contention and thus the basic form of gravity equation was as following:

$$T_{ij} = \frac{GDP_i^{\alpha}\, GDP_j^{\beta}}{D_{ij}^{\gamma}} \quad \text{..... (i)}$$

here, T_{ij} refers to bilateral trade between countries 'i' and 'j' or flow from country 'i' to 'j'. It is normally measured as monetary flow. Moreover, GDP_i refers to the economic size of country 'i' or origin country, GDP_jrefers to the economic size of country 'j' or destination country and D_{ij} refers to the distance between country 'i' and 'j'. Moreover, all the three parameters are log-linear in formation. This gravity equation explains that a larger economic size of trading partners enlarges the trade flows but larger distance between them minimizes the trade flows.

In the early days of gravity model, it lacked a comprehensive micro-economic foundation despite its popularity. The gravity equation formulated by Tinbergen (1962) determined trade in a simple manner using the GDPs of exporter (supply potential) and importer (demand potential) and transportation cost such as distance. On the other hand, Linnemann (1966) derived a quasi-walrasian model and did provide theoretical base for it. But neither Linnemann (1966) and Poyhonen (1963), nor Pullianen (1963) formulated strong micro-economic foundation for their trade equations (Leamer and Stern, 1970). Leamer and Levinsohn (1995) stated that gravity equations are only descriptive and lack theoretical formulation because once the facts are out from results, it become unclear what to do with them or where to adjust them. Deardorff (1998) criticized too many formulations behind the gravity model. Further Keller and Evenett (1998) and Feenstra *et* al. (2001) called the formulation of gravity equation as general but with specific empirical presentation. Moreover, different formulations of gravity theories led to different implications on the home markets.

The fact that Heckscher-Ohlin, Ricardian models and Increasing returns to scale could be used to derive a gravity model was fascinating the policy makers and in 1990s, it was fashionably used to analyze changes in the global trade system (Bergeijk and Oldersma, 1990; Wang and Winters, 1991; Hamilton and Winters, 1992). Havrylyshyn and Pritchett (1991) predicted that trade patterns of mid-European countries would change. Ward and Hoff (2005) found persistent variation in trade of country specific importer and exporter. Although, Anderson (1979) did provide micro-economic justification using a social utility function for traded and non-traded goods and used optimizing framework for gravity model. According to him, both regions are producing each type of goods. In the first phase of maximizing the utility, the share from income of region 'j' spent on a_j which are traded goods depends upon total income and population of region 'j'. In the second phase, region 'j' maximizes a utility function identical across both regions which is Cobb-Douglas in nature. It ignores the price discrimination. Further, share spent on s_i which exported goods from region 'i' equals all of region 'j'. The imports of region 'j' from region 'i' was expressed as following:

$T_{ij} = s_i a_j GDP_j$ ……..(ii)

For equilibrium market of traded goods, $a_i\ GDP_i = s_i \sum_j a_j \times GDP_j$ and further solving gives:

$$T_{ij} = \frac{a_i GDP_i a_j GDP_j}{\sum_i \sum_j T_{ij}}$$

here,

$\sum_i \sum_j T_{ij} = \sum_j a_j\ GDP_j$ ……(iii)

The equation (iii) represents a simple gravity model in which trade flows between region 'i' and 'j' are determined by their economic masses. Its application to real life problems is somewhat limited due to balanced trade because trading countries must experience similar demand schedules. Moreover, the model can be extended by the inclusion of variables like population and barriers to trade.

Bergstrand (1985, 1989, 1990) included the supply side of an economy by developing relationship between the theory of trade and bilateral trade flows. Bergstrand (1990) derived the following Grubel-Lloyd intra-industry trade index of two digit SITC industry between 'i' and 'j' as dependent variable for his gravity equation:

$GL_{Xij} = I - \frac{I}{M} \sum_{m=1}^{M} \left[\frac{|PX_{ijm} - PX_{jim}|}{(PX_{ijm} + PX_{jim})} \right]$ ……(iv)

here, GL_{Xij} is the Grubel-Lloyd intra-industry trade index of two digit SITC industry between 'i' and 'j', M represents the quantity of three digit SITC industries in 'X' which is two digit SITC industry group, PX_{ijm} shows the bilateral trade flow in three digit SITC industry 'm' from 'i' to 'j'. The equation also included variables such as inequality of capital-labor endowment ratio, inequality of per capital GDPs, inequality of tariff levels, average capital-labor endowment ratio, average per capita GDP, Average GDP and adjacent dummy.

McCallum (1995) based his work on Tinbergen and Linnemann to examine the potential determinants of international trade by including possible trade blocs. For this purpose, a gravity model was formulated for trade patterns between Canada and United States of America. His gravity model is as following:

$x_{ij} = \alpha + by_i + cy_j + ddist_{ij} + edummy_{ij} + \mu_{ij}$ ……..(v)

here, x_{ij} represents the shipments of goods from 'i' to 'j', y_i is the GDP of 'i', y_j is the GDP of 'j', $dist_{ij}$ shows the distance between 'i' and 'j' and $dummy_{ij}$ is a dummy variable representing interprovincial trade as 1.

Anderson and Wincoop (2003) manipulated the Constant Elasticity Substitution (CES) expenditure system in order to derive a gravity equation. For this purpose, three components of trade resistance were derived; (i) a bilateral trade resistance between 'i' and 'j' (ii) trade resistance of 'i' with others (iii) trade resistance of 'j' with others. For gravity equation, there are differentiated goods in terms of origin. Each region is specialized in one good only and there is fixed supply of goods. Further, there are homothetic preferences represented by a CES utility function. The gravity equation is as following:

$$x_{ij} = \frac{y_i y_j}{y^w} \left(\frac{t_{ij}}{P_i P_j}\right)^{1-\sigma} \quad \text{.....(v)}$$

here, x_{ij} represents the nominal demand of goods produced in 'i' by 'j', 'y' terms are the respected incomes of regions, t_{ij} shows the bilateral trade resistances and $P_i P_j$ represents the consumer price indexes in respective regions. The prices indices are referred to as multilateral resistance variables because they are dependent upon bilateral resistances. This gravity equation explains the bilateral trade flows by controlling economic sizes, bilateral trade resistance between regions and product of multilateral resistances.

(a) Empirical Literature on Gravity Model

The following list of studies have empirical examined the gravity model for various regions involved in trade.

Table 1

Studies	Countries	Time Period	Explained Variables	Explanatory Variables	Estimation Method
Lee & Park (2007)	Used a sample of 50 countries to analyze the RTA for East Asia	1994-1999	Bilateral Trade	GDP, Per Capita, Distance, Common Border, Area Countries, Monetary Association, Common Language, Facilitation in Trade, Tariff, FTA	Ordinary Least Square (OLS) , Fixed and Random Effects
Bun & Klassen (2007)	Used a sample of European Union (EU)- 15, Japan, Norway, USA, Canada and Switzerland	1967-2002	Bilateral Trade	GDP, Per Capita, Included in FTA, Eurozone	OLS using Fixed Effects
Martinez-Zarzoso & Saurez-	Used a sample of EU and Five Countries of Latin America	1999	Imports & Exports	GDP, Per Capita, Distance, Export or Import Volume, Language,	OLS using Fixed Effects

Burguet (2005)				Infrastructure (transportation and port), Landlocked and Transportation Cost (value ratio weight)	
Bussiere *et* al., (2008)	Used a sample of 61 Central and Southeastern European Countries and EU	1980-2003	Bilateral Trade	Distance, Borders, FTAs, Territory, Common Market, Language, FTA in Central Europe and Association of South Asian Nations (ASEAN)	OLS, Fixed & Random Effects, Dynamic OLS, Time Specific Regional Fixed Effects
Egger (2004)	Used a sample of Organization of Economic Cooperation and Development (OECD) Countries	1986-1997	Exports	GDP, Ratios of Skilled Labor to Transportation Cost, Similarity Index, Capital over Labor Ratio, Exporter and Importer Law, EU, European Free Trade Association (EFTA) and North American Free trade Agreement (NAFTA)	Fixed and random Effects (two way)
Kahouli & Maktouf (2015)	Used a sample of 27 Euro Mediterranean Countries	1980-2011	Exports	GDP, Population, Difference in Economic development, Similarity Index, Real Bilateral Exchange rate, Distance, Language, Common Border, Colony, Crises, FTA and various Regional Dummies	OLS, Fixed and Random Effects and Dynamic Panel Estimation using Generalized Method of Moments (GMM)

Peridy (2005)	Used a sample of Mediterranean Countries	1994-1999	Exports	GDP, Per capita, Similarity Index, Distance, Border, Arrangement with EU and language	OLS, Fixed and Random Effects
Carrere (2006)	Used a sample of 130 Developing and Developed countries	1962-1996	Imports	GDP, Population, Distance, Land Border, Access to Sea, Infrastructure, Multilateral Trade Resistance and Bilateral Real Exchange Rate	Cross Section OLS
Novy (2013)	Used a sample of 13 OECD countries	1970-2000	Relative Trade Cost	Distance, Adjacency, Island, Common Language, Tariff, FTA and Currency Union	Pooled OLS
Didia *et* al., (2015)	Used a sample of 37 African Growth and Opportunity Act (AGOA) Eligible Countries	1991-2006	Imports	Distance, GDP, Population, Exchange Rate, Inflation, Land-lock Dummy, Colony Dummy, Language Dummy, Political System Index, Recession Dummy and Dummy for Years under which exports took place via AGOA	GMM
Akhter & Ghani (2010)	Used a sample of SAARC Countries	2003-2008	Trade	GDP, Per Capita, Distance, Tariff, Border Dummy and FTAs	Pooled OLS and Generalized Least Square (GLS)
Achakzai (2006)	Used a sample of 137 Developed and Developing Countries	2005	Exports	GDP, Per Capita, Distance, Border Dummy, Language Dummy and FTAs	Cross Sectional OLS
Krisztin & Fischer (2015)	Used a sample of 146 Developed and Developing Countries	2000	Exports	GDP, Distance, Border Dummy, Language and FTA	Logit Model and Poisson Gravity Model

Frede and Yetkiner (2017)	Used a sample of 180 Developed and Developing Countries	1960-2012	Trade flows	GDP, Distance including Trade Cost Variables, Dummy Variables for various regions and Multilateral Resistance	Pooled OLS

3. Data and Methodology

This research focuses on gravity models covering SAARC region such as Afghanistan, Bangladesh, India, Maldives, Nepal, Pakistan and Srilanka over the time period 2003-2015. We excluded Bhutan due to data issues. Although, there are many dimensions of trade but gravity model remains a famous method to understand trade between or within regions. On the basis of both theoretical and empirical literature elaborated earlier, this research examined the impact of integration of SAARC region on exports of Pakistan. For this purpose, the following set of variables was used:

a) Definition of variables

The below given are the definitions of variables used:

(i) Exports(x_{ijt}): It refers to all the products that are produced in Pakistan and shipped to Afghanistan, Bangladesh, India, Maldives, Nepal and Srilanka for future sale or trade over the years. The products included are capital goods, consumer goods, intermediate goods, raw materials, animals, chemicals, food products, footwear, fuels, hides and skins, machinery and electronics, metals, minerals, miscellaneous, plastic or rubber, stone and glass, textiles and clothing, transportation, vegetables and wood. The data is obtained from World Integrated Trade Solution (WITS). The nominal data in US dollar terms is divided by Consumer Price Index (CPI) 2010 to make it real.

(ii) Gross Domestic Product (GDP_{it} or GDP_{jt}): GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. The data is obtained from World Development Indicator (WDI) database. It is in 2010 US dollar terms. GDP_{it} refers to GDP of Pakistan or exporter while GDP_{jt} refers to the GDP of other SAARC countries or importers over the years.

(iii) Population ($POP_{it}\ or\ POP_{jt}$): It refers to the total population in a country. Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The values shown are midyear estimates. POP_{it} refers to total population of Pakistan and POP_{jt} refers to total population of other SAARC countries over the years. The data is obtained from WDI database.

(iv) Difference in Economic Development ($DIFGDP_{ijt}$): It refers to the difference between the GDPs of export and importer countries over the years. It is calculated as:

$$DIFGDP_{ijt} = \left|\frac{GDP_{it}}{POP_{it}} - \frac{GDP_{jt}}{POP_{jt}}\right|$$

(v) Similarity Indicator ($SIMIL_{ijt}$): It refers to the similarity between the exporter and importer in terms of their GDPs over the years. It is calculated as:

$$SIMIL_{ijt} = \left[1 - \left(\frac{GDP_{it}}{GDP_{it} + GDP_{jt}}\right)^2 - \left(\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}}\right)^2\right]$$

(vi) Bilateral Real Exchange Rate(RER_{ijt}): It basically tells us about the exchange rate between the trading partners in terms of international currency Dollars. For this purpose, Nominal Exchange Rate (NER) per Dollars terms and Consumer Price Index (CPI) are extracted from WDI database. NER refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average in local currency units relative to the US dollar terms. CPI reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals. RER is calculated as:

$$RER_{ijt} = \left(\frac{NER_{\frac{it}{\$}}}{NER_{\frac{jt}{\$}}}\right)\frac{CPI_{jt}}{CPI_{it}}$$

(vii) Distance($DIST_{ij}$): It refers to the distance between the capitals of trading countries. The distance between the capital of exporter and the capital of importer is measured in kilometers and the data is obtained from Comptes Harmonisés sur les Echanges et L'Economie Mondiale (CHELEM) or CEPII database.

(viii) Language($LANG_{ij}$): It refers to the common language between the trading partners. It is a common language index based on a level specification. The data is obtained from CEPII database.

(ix) Colonial Past (CP_{ij}): A dummy variable is used for countries with colonial past. It takes a value 1 if a country has a colonial past.

(x) Currency Union (CU_{ijt}): A dummy variable is used for a common currency between Pakistan, India, Srilanka and Bangladesh. It takes a value 1 if these trading partners have currency union and 0 for other trading partners.

(xi) Free Trade Agreement (FTA_{ijt}): A dummy variable is used for Free Trade Agreement between Pakistan, India and Bangladesh. It takes a value 1 if these countries sign FTA and 0 otherwise (Frede & Yetkiner, 2017; Baier *et* al., 2014).

All the variables are in logged form except for dummy variables adding an advantage that the resulting estimates can be explained as elasticities. On the basis of theoretical and empirical literature, this research targets the following gravity models:

(a) Basic Gravity Model

$$lnX_{ijt} = \alpha_0 + \alpha_1 lnGDP_{it} + \alpha_2 lnGDP_{jt} + \alpha_3 lnPOP_{it} + \alpha_4 lnPOP_{jt} + \alpha_5 lnDIFGDP_{ijt} + \alpha_6 lnSIMIL_{ijt} + \alpha_7 lnRER_{ijt} + \alpha_8 lnDIST_{ij} \quad \text{.....(vi)}$$

(b) Augmented Gravity Model

$$lnX_{ijt} = \beta_0 + B_1 lnGDP_{it} + B_2 lnGDP_{jt} + B_3 lnPOP_{it} + B_4 lnPOP_{jt} + B_5 lnDIFGDP_{ijt} + B_6 lnSIMIL_{ijt} + B_7 lnRER_{ijt} + B_8 lnDIST_{ij} + B_9 LANG_{ij} + B_{10} CP_{ij} \quad \text{.....(vii)}$$

(c) Trade Creating Policies

$$lnX_{ijt} = \gamma_0 + \gamma_1 lnGDP_{it} + \gamma_2 lnGDP_{jt} + \gamma_3 lnPOP_{it} + \gamma_4 lnPOP_{jt} + \gamma_5 lnDIFGDP_{ijt} + \gamma_6 lnSIMIL_{ijt} + \gamma_7 lnRER_{ijt} + \gamma_8 lnDIST_{ij} + B_9 LANG_{ij} + \gamma_{10} CP_{ij} + \gamma_{11} CU_{ijt} \quad \text{..(viii)}$$

$$lnX_{ijt} = \gamma_0 + \gamma_1 lnGDP_{it} + \gamma_2 lnGDP_{jt} + \gamma_3 lnPOP_{it} + \gamma_4 lnPOP_{jt} + \gamma_5 lnDIFGDP_{ijt} + \gamma_6 lnSIMIL_{ijt} + \gamma_7 lnRER_{ijt} + \gamma_8 lnDIST_{ij} + B_9 LANG_{ij} + \gamma_{10} CP_{ij} + \gamma_{11} FTA_{ijt}$$

α_0 , β_0 and $\gamma_0$are the intercepts while other $\alpha's$, $\beta's$ and $\gamma's$ are slopes of the models. This research aims to capture the main variables of the gravity models on exports of Pakistan. For this purpose, we determined gravity model in three forms. Firstly, a basic gravity model based on

classical gravity literature is used including difference in economic development, similarity indicator and bilateral real exchange rate along with traditional variables is targeted. Secondly, an augmented gravity model was also determined by the inclusion of language and colonial past variables in basic gravity model. Lastly, two variables of trade creating policies such as currency union and free trade agreement are also included in the gravity model. These three gravity models provide depth to evaluate South-South trade integration of SAARC region and its impact on exports of Pakistan. For this purpose, this study uses GLS methodology. Firstly, using OLS, our models violated some properties of OLS as they suffered from autocorrelation and heteroscedasticity. Therefore, the final estimates are based on GLS because it is superior to other methods in handling serial correlation and heteroscedasticity (Akhter & Ghani, 2010). The basic GLS equations are as following:

$$[\sum_{i=1}^{N} \ddot{X}_i' V^{-1} \ddot{X}_i]\, \delta_{GLS} = [\sum_{i=1}^{N} \ddot{X}_i' V^{-1} y_i] \quad \text{.....(ix)}$$

here V^{-1} is derived as:

$$V^{-1} = \frac{1}{\sigma_\mu^2}\left[\left(I_T - \frac{1}{T} ee'\right) + \varphi . \frac{1}{T} ee'\right] = \frac{1}{\sigma_\mu^2}\left[Q + \varphi . \frac{1}{T} ee'\right] \quad \text{.....(x)}$$

here,

$$\varphi = \frac{\sigma_\mu^2}{\sigma_\mu^2 + T\sigma_\alpha^2} \quad \text{.....(xi)}$$

Therefore, equation ix can be written as following:

$$[W_{\hat{x}\hat{x}} + \varphi B_{\ddot{x}\ddot{x}}] \begin{bmatrix} \hat{\mu} \\ \hat{\beta} \end{bmatrix}_{GLS} = [W_{\hat{x}y} + \varphi B_{\hat{\ddot{x}}y}] \quad \text{.....(xii)}$$

here,

$$T_{\hat{x}\hat{x}} = \sum_{i=1}^{N} \widehat{X_i'} \widehat{X_\iota}\,, \qquad T_{\hat{x}y} = \sum_{i=1}^{N} \widehat{X_i'} y_i$$

$$\beta_{\hat{x}\hat{x}} = \frac{1}{T} \sum_{i=1}^{N} \left(\widehat{X_i'} ee' \widehat{X_\iota}\right) \qquad \beta_{\hat{x}y} = \frac{1}{T} \sum_{i=1}^{N} \left(\widehat{X_i'} ee' y_i\right)$$

$$W_{\hat{x}\hat{x}} = T_{\hat{x}\hat{x}} - B_{\hat{x}\hat{x}} \qquad W_{\hat{x}y} = T_{\hat{x}y} - B_{\hat{x}y}$$

here, $\beta_{\hat{x}\hat{x}}$ and $\beta_{\hat{x}y}$ consist of sum of squares and sum of cross products between groups. While, $W_{\hat{x}\hat{x}}$ and $W_{\hat{x}y}$ are within group matrices. Further, $T_{\hat{x}\hat{x}}$ and $T_{\hat{x}y}$ are matrices for total variation. By solving equation xii,

$$\begin{bmatrix} \varphi NT & \varphi T \sum_{i=1}^{N} \bar{x}_i' \\ \varphi T \sum_{i=1}^{N} \bar{x}_\iota & \sum_{i=1}^{N} X_i' Q X_i + \varphi T \sum_{i=1}^{N} \bar{x}_\iota \bar{x}_\iota' \end{bmatrix} \begin{bmatrix} \hat{\mu} \\ \hat{\beta} \end{bmatrix}_{GLS} = \begin{bmatrix} \varphi NT \bar{y} \\ \sum_{i=1}^{N} X_i' Q y_i + \varphi T \sum_{i=1}^{N} \bar{x}_\iota \bar{y}_\iota \end{bmatrix} \quad \text{.....(xiii)}$$

By applying the partitioned inverse, we get

$$\hat{\beta}_{GLS} = \left[\frac{1}{T}\sum_{i=1}^{N} X_i' Q X_i + \varphi \sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{x}_i - \bar{x})'\right]^{-1} . \left[\frac{1}{T}\sum_{i=1}^{N} X_i' Q y_i + \varphi \sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{y}_i - \bar{y})\right]$$ …..(xiv)

$$= \Delta\hat{\beta}_b + (I_K - \Delta)\hat{\beta}_{cv}$$

$$\hat{\mu}_{GLS} = \bar{y} - \hat{x}'\hat{\beta}_{GLS}$$

here,

$$\Delta = \varphi T[\sum_{i=1}^{N} X_i' Q X_i + \varphi T \sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{x} - \bar{x})']^{-1} . [\sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{x} - \bar{x})']$$

$$\hat{\beta}_b = [\sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{x} - \bar{x})']^{-1}[\sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{y}_i - \bar{y})]$$

The above mentioned estimator $\hat{\beta}_b$ ignores within group variation and is known as between group estimator. It is a weighted average of within and between group estimators. For $\varphi \to 1$, $\hat{\delta}_{GLS}$ approaches to OLS but for $\varphi \to 0$, it becomes Least Square Dummy Variable (LSDV). φ calculates the weight assigned to between group. The variation is ignored in LSDV method but in OLS $\varphi = 1$ and both within and between groups variations are summed up. Therefore, both OLS and LSDV approaches are different methods to utilize variation of between group. Further, if $[W_{\hat{x}\hat{x}} + \varphi B_{\ddot{x}\ddot{x}}]$ appears to be nonsingular, then the covariance matrix of GLS estimators is:

$$Var\begin{bmatrix}\hat{\mu}\\ \hat{\beta}\end{bmatrix}_{GLS} = \sigma_\mu^2 [W_{\hat{x}\hat{x}} + \varphi B_{\ddot{x}\ddot{x}}]^{-1}$$ …….(xv)

$$= \sigma_\mu^2 \left[\begin{pmatrix}0 & 0'\\ 0 & \sum_{i=1}^{N} X_i' Q X_i\end{pmatrix} + T\varphi \begin{pmatrix}N & \sum_{i=1}^{N}\bar{x}_i'\\ \sum_{i=1}^{N}\bar{x}_i & \sum_{i=1}^{N}\bar{x}_i\bar{x}_i'\end{pmatrix}\right]^{-1}$$

By applying the partitioned inverse, we get

$$Var(\hat{\beta}_{GLS}) = \sigma_\mu^2 [\sum_{i=1}^{N} X_i' Q X_i + T\varphi \sum_{i=1}^{N}(\bar{x}_i - \bar{x})(\bar{x} - \bar{x})']^{-1}$$ ……(xvi)

The GLS method needs known values of σ_μ^2 and σ_α^2 but if they are unknown, two step estimation of GLS is applied. Firstly, variance components are estimated. Secondly, we substitute their estimated values in equation x. Now, as $\bar{y}_i = \mu + \beta'\bar{x}_i' + \alpha_i + \bar{u}_i$ and $(y_{it} - \bar{y}_i) = \beta'(x_{it} - \bar{x}_i) + (u_{it} - \bar{u}_i)$, the residuals of within and between groups can be used to estimate the unknowns:

$$\hat{\sigma}_u^2 = \frac{\sum_{i=1}^{N}\sum_{t=1}^{T}[(y_{it} - \bar{y}_i) - \hat{\beta}_{cv}'(x_{it} - \bar{x}_i)]^2}{N(T-1) - K}$$ …….(xvii)

$$\hat{\sigma}_\alpha^2 = \frac{\sum_{i=1}^{N}(\bar{y}_i - \hat{\mu} - \hat{\beta}'\bar{x}_i)^2}{N - (K+1)} - \frac{1}{T}\hat{\sigma}_\mu^2$$ ……..(xviii)

here, $(\hat{\mu}, \hat{\beta}')' = B_{\hat{x}\hat{x}}^{-1} B_{\hat{x}\hat{y}}$. With large sample size, the GLS estimator will have same efficiency as with known components. Even for small sample size, the GLS estimator still is efficient than within group estimator because the difference between them is nonnegative (Maddala & Mount, 1973).

4. Results and Discussion

The table 2 shows descriptive statistics of the data used for analysis. All the variables are in logged form except for language and dummy variables. The variables consist of 78 observations in total. The variable $lnpop_{it}$ has the highest mean while $lnsimil$ has the lowest mean. Similarly, the highest standard deviation is of time variable while $lngdp_{it}$ has the lowest standard deviation. All the three dummy variables such as $Colonial\ Past$, $Monetaryag\tilde{}e$ and $SAFTZ$ are between 0 and 1. Except for dummies, only $LANcle$ has the minimum value of zero. There are little deviations between the observations in all variables. Only two variables, $lnsimil$ and $lngdp_{jt}$had negative means while $lngdp_{jt}$ and $lnsimil$had both negative maximum and minimum values. Three variables such as $lngdp_{it}$, $lngdp_{jt}$and lnX show too little deviation comparatively.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Years	78	2009	3.765875	2003	2015
lnX	78	3.302979	.0008141	3.301681	3.304275
lngdpit	78	.5189058	.000107	.5187351	.5190762
lngdpjt	78	-.2849115	.0000896	-.2850544	-.2847689
lnpopit	78	8.223169	.0339093	8.16939	8.277335
lnpopjt	78	7.498352	1.071815	5.482874	9.116958
lnDIFGDP	78	2.803561	.6023262	.5195048	3.784019
lnSIMIL	78	-.7987648	.4159534	-1.696739	-.3121633
lndist	78	3.140095	.344199	2.573628	3.516338
LANGcle	78	.239	.2198046	0	.53
lnRER	78	.1961506	.3032012	-.2274941	.8337379
ColonialPast	78	.6666667	.4744557	0	1
Monetaryag~e	78	.5	.5032363	0	1
SAFTZ	78	.5	.5032363	0	1
ID	78	3.5	1.718879	1	6

In table 3, three forms of gravity models are given. The first gravity model represents the results of Basic gravity model. Using GLS model corrected for autocorrelation and heteroscedasticity, the results showed that GDP of exporter country Pakistan and GDP of its trading partners, difference between the development of exporter country Pakistan and its trading partners,

Table 3: Basic, Augmented Gravity Models and Trade Creating Policies

Gravity Models

	(1) lnX	(2) lnX	(3) lnX	(4) lnX
lngdpit	5.201**	3.501	3.228	3.228
	(2.69)	(1.88)	(1.75)	(1.75)
lngdpjt	2.474***	2.140*	2.473*	2.473*
	(27.24)	(2.03)	(2.31)	(2.31)
lnpopit	-20.68***	-11.79**	-11.31**	-11.31**
	(-5.74)	(-2.78)	(-2.69)	(-2.69)
lnpopjt	-3.165***	-3.754***	-4.417***	-4.417***
	(-24.28)	(-3.43)	(-3.76)	(-3.76)
lnDIFGDP	0.356***	0.0187	-0.0729	-0.0729
	(5.78)	(0.20)	(-0.66)	(-0.66)
lnSIMIL	6.156***	2.276***	1.302	1.302
	(26.27)	(4.96)	(1.72)	(1.72)
lnRER	3.459***	-1.570*	-0.860	-0.860
	(11.44)	(-2.52)	(-1.15)	(-1.15)
lndist	-4.555***	-8.911***	-9.183***	-9.183***
	(-30.41)	(-7.47)	(-7.66)	(-7.66)
LANG(cle)		4.252**	5.100**	5.100**
		(2.86)	(3.22)	(3.22)
Colonial Past		3.945***	2.317*	2.317*
		(8.66)	(2.13)	(2.13)
Monetary agreement~e			2.316	
			(1.62)	
SAFTZ				2.316
				(1.62)
Constant	131.7***	94.46***	94.92***	94.92***
	(13.68)	(4.68)	(4.75)	(4.75)
Observations	78	78	78	78

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

economic similarity between Pakistan and its trading partners and bilateral real exchange rate have a positive and significant impact on the exports of Pakistan. On the other hand, population of Pakistan, population of its trading partners and distance between the capital of Pakistan and capitals of its trading partners have a negative and significant impact on the exports of Pakistan. The second gravity model represents the results of Augmented gravity model. Using GLS model corrected for autocorrelation only, the results showed that GDP of trading partners of Pakistan, economic similarity between Pakistan and its trading partners, common language and colonial past play a positive and significant impact on the exports of Pakistan. But populations of Pakistan and its trading partners, bilateral real exchange rate and distance have a negative and significant impact on the exports of Pakistan. The third and fourth gravity models represent the results of gravity models by the inclusion of trade creating policies such as common currency

measure and FTA amongst trading partners. By including common currency measure in the gravity model, the GLS model corrected for autocorrelation only showed that GDP of trading partners, common language and colonial past have a positive and significant impact on the exports of Pakistan but population of Pakistan and its trading partners and distance amongst the capitals have a negative and significant impact on the exports. The common currency of Pakistan, India, Srilanka and Bangladesh showed a positive but insignificant impact on the exports. By including FTA in the gravity model, GLS model corrected for autocorrelation showed a positive and significant impact of GDP of trading partners, common language and colonial past but distance and both populations showed a negative impact on the exports. FTA between Pakistan, India, Srilanka and Bangladesh also showed a positive but insignificant impact on the exports of Pakistan. All the variables are showing signs according to the theory but trade creating policy variables are positive and insignificant. Now, the economies which are integrated through trade or economic relations can work together under an optimum currency area. Mundell (1961) calls it a trade-off between reduced trade costs and unfavorable macro-economic effects like variations in the interest rates and exchange rates. The single currency makes government unable to follow a monetary policy and tackle variations in both interest and exchange rates. This inability can increase cyclical unemployment. A country in currency union cannot tackle the fall in demand which caused unemployment through lower real interest rate. Combining those countries together that face same demand shocks, variations in interest rates and exchange rates would change nothing due to their similar economic ability. Similarly, a fall in demand should not necessarily increase unemployment if labor is mobile to places within union having jobs but all selected countries have bulk quantity of unskilled labor force with different languages and low availabilities of jobs. A fall in demand can be met by fiscal transfers such as transfer payments to tackle the unemployment but no such cyclical transfer payments are possible in this case. Moreover, all the selected countries are developing economies and they all export raw materials mostly rather than capital goods therefore, an arrangement of common currency can be unsuccessful due to their similar economic capacities. It would be more suitable if currency union have a set of both developing and developed countries similar to EU arrangement. Moreover, FTA may not always favor exports (Krisztin &Fischer, 2015). FTA amongst developing countries is limited due to similar economic structure. Considering this case of SAARC, the exports are mainly of raw materials or commodities with low prices in the international market. Looking at the nature of importers of Pakistan in this FTA, they all export raw materials and their major imports are capital goods. Pakistan also exports commodities having low prices so FTA may not enhance exports in the long run. In addition, border and political tensions with India and political tensions with Bangladesh and influence of Indian capitalists on other SAARC countries are also barriers for exports of Pakistan in SAARC countries. Further, Pakistan faces fierce competition in these markets from China, Malaysia and others in terms of quality and prices of the exports. Pakistani exports have suffered from both quantitative and non-quantitative factors and therefore cannot compete with other competitors.

5. Conclusion and Policy Implication

This research explores the impact of South-South FTA through regional trade integration of SAARC on exports of Pakistan. For the time span 2003-2015, we estimate three forms of gravity models. The results suggest that distance has a negative and significant impact on the exports of Pakistan. Similarly, trade creating policies such as common currency and FTA have shown positive but insignificant impact on the exports. These policies reduce trade barriers amongst the signatories but in case of SAARC, there effects are marginalized due to political reasons and fierce competition from non-members. Another important reason is the similarity of economic structure amongst the members. As all members are developing countries and Pakistan too exports low value added products so it will not suit Pakistan in the long run unless it competes with other competitors and produce high value added products. Based on the results, the research suggests that mere trade agreements cannot boast Pakistan's exports rather special emphasis should be given to reduce political tensions with member countries. In addition, quantitative factors such as high tariff rate, inflation and interest rate must be minimized for exporters. Qualitative factors such as new technology, political stability, law and order and skill level of labor should also be focused.

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