

## Regional Trade and Food Security Challenges in SAARC Countries

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### Abstract

Regional Trade has become the need of the SAARC region due to increase in consumption and less utilization of resources. Due to better trade among SAARC countries, it will bring good effect on food security of the region. In this study the need of Regional Trade in SAARC countries has been explored. Study showed the pattern of SAARC countries Intra- trade and with the different regions of the globe. Panel data is used to explore the effect of explanatory variables. Volume of Food Trade is used as endogenous variable in the study. Items of Harmonized System of 1-24 have been taken in the study. In this we have used the Gravity model to analyze the empirical relationship between variables. The objective of the research is to analyze the food security condition in the SAARC region in order to obtain assistance & plans for provincial trade and co-operation in food safety. In the study, it has concluded that there is positive association among GDP of exporting and importing country with Volume of Trade. When the trade of food is increased the availability of food is easy for every citizen, due to demand supply gap prices also fall that will increase the purchasing power of the people and the accessibility of food to people of SAARC.

**Keywords :** Food security, Gravity model, SAARC countries

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## 1. Introduction

In the modern era financial integration is considered as essentially important for advancement of different regions of the World. Much of economic integration has previously been created like European Union, SAARC etc. This financial integration helps to settle the issues of food security and enhance the provincial trade between the countries (Bandara, 2003). This study will discuss the condition of food security, challenges of food security and major exports and imports among the SAARC countries. Most of the SAARC countries are agricultural dependent and the large share in GDP of the country comes from Agricultural products.

South-Asia consist of 27.4 per cent of world population. SAARC countries have 40 per cent of the globe's poor individuals, among them 35 per cent are living the world under nourished. There is only 5 per cent intra-regional trade in SAARC countries (Worldometer, 2015).

Two years ago, it was observed that prices of food and other items declined after the prices of fuel had fallen. It also affects the SAARC region but still the condition of food security is not adequate as contrasted to other regions of the world (FAO, 2016). SAARC has 27.64 per cent share in the world population (Worldometer, 2016). But the production of food elements in the region is not enough to fulfill the basic needs of the region. According to the estimates of Food and Farming Organization of United Nation around 80 million people are poor and are not able to fulfill their food necessities. If we check only the prices of cereals, these are still higher by 50 per cent from 2005 to 2010, at the same time the prices of other non-cereal items were declining. It seems that due to higher demand for food item and growing population of the world and especially in the SAARC region the need of the people for food looks high.

### 1.1 Food Price Index Number

The idea of Food safety is primarily emerged in the period of the mid 1970s, when the world food crisis arose. In the global food seminar in 1974 described the time food security as "assuring the supply of food, price stability of food at national and international level".

In 1983, FAO described Food security in this way that it was the balance among the demand and allocation of food in term of economic ease of access.

"Ensuring that all people at all times have both physical and economic access to the basic food that they need" (FAO, 1983).

The world food summit conference defined four magnitudes of Food Security: convenience, access, dietary status (food utilization), and stability. Let us examine each one by one and make a link between Regional Trade.

## **1.2. Dimension of food-security and regional trade of SAARC countries**

### **1.2.1. Trade and availability of food**

The steady arrangement of adequate gracefully of food things, the ordinary accessibility in adequate amounts of staples of fitting quality (at helpful spots) as per tastes and inclinations of the individuals is a fundamental component of Food Security. If the trades among the countries increase, it will bring more supply of food to those countries that are not able to produce it. In turn, accessibility is influenced by several factors involving production, processing, storage capacity, allocation, marketing systems, and machineries. In the perspective of SAARC region, these are also reasons for low productivity and availability of food. So, due to less production the domestic need of the food items is not fulfilling and there is nothing left to exports to generate revenues (Krishna, 2012).

### **1.2.2. Trade and accessibility of food**

Access is another significant determinant of Food Security. The availability to food relies upon factors like wages, wellsprings of pay including settlements, pay incongruities, genuine food costs, landlessness, gender, education, and business status. To start with, it is the want to enhance these variables by the improved government Policy in regard to business, instruction, and wellbeing. It can likewise be improved through local trade. It will make business opportunity that prompts improve HDI.

### **1.2.3. Trade and food utilization (nutritional aspect)**

When countries make economic integration then the problems of underdeveloped countries are resolved because UDC can also utilize their resources by using new technique imported from abroad. This contains the valuable organic utilization (food absorption) through suitable food, hygienic water, sanitation and healthcare for fulfillment of nutritional well-being that meet up all the physiological wants of an active and nutritious life. Thus, food concentration has public health and schooling component attached to the concept. So, the need of trade occurs and trade relations with other countries can bring better and healthy food for the people of the region.

### **1.2.4. Trade and stability of food**

This component of food basically indicates that people have access to food whenever they want. They do not face any consequence of losing physical accessibility and ease of use of food. Sometimes, the stability of food is shocked due to environmental disaster like flood, earthquake, rains, tsunamis etc or sometimes, it is due to war situation.

At a period when worldwide food prices show wide variations this is a crucial challenge faced by countries in South Asia particularly in balancing the need for food security with that of delivering price incentives for agriculturalists to boost productivity and output.

## **1.3 Reason for long term food insecurity**

There are so many reasons for Food Insecurity in the SAARC region, but some main reasons are: Low productivity of Crops and livestock as compared with the advance countries. There is Lack of Investment in Agricultural Research in the South Asian countries. Pakistan and India have best irrigation system in the world but now, it has been ignored badly from last few decades especially in case of Pakistan. If these two major Countries give proper attention to the irrigation system infrastructure, then they will grow and overcome the problem of food insecurity. South Asia Agriculture is still dependent on the condition of weather in the region like flood, heavy rains, and other disasters

from last three to four years in Pakistan and India. The annual growth rate of food production varies from year to year because of high population and biased distribution of Income and resources, lack of soil potency and high-rate use of pesticides in the cultivation (SAARC/FAO, 2006).

Another key and major problem now-a-days is that mostly areas of SAARC countries are facing severe disaster in the region like Cyclones and floods in Bangladesh, India, and Pakistan (FAO, 1998).

Sometimes geographical location of the countries can create food insecurity in the region and there is inaccessibility of trade like Nepal, Bhutan, and Afghanistan because they are landlocked countries. The situation of the food security may also vary due to socio- economic conditions, dominance of agriculture sector, and abundance of natural resources.

#### **1.4 Current condition of food security and regional trade of some SAARC countries:**

##### **1.4.1 INDIA**

In 2004-05, 2.4 percent of the provincial populace and 1.9 percent of the urban populace announced non-accessibility of dinners daily. This converts into a normal of 1.9 percent of the nation's populace experiencing appetite or 2 million hungry individuals. More than 33% all things considered, the two people are underweight. 43% of kids under five years old in India are underweight. This figure crosses the midway imprint in the conditions of Madhya Pradesh, Jharkhand, and Bihar, with one of each two youngsters being undernourished. Under sustenance is more articulated in rustic zones, however even in urban territories very nearly 40% of the youngsters are deficiently fed (Nira, 2009).

##### **1.4.2 AFGHANISTAN**

Afghanistan is a well populated country in South Asia but around 29 percent people are living under nourishing. According to UN the daily requirement of a single person is 2100 calories that is not available in Afghanistan. Approximately 17 percent are using 50 grams of protein daily.

##### **1.4.3 PAKISTAN**

Conditions of food security in Pakistan are very poor from most recent couple of decades. Pakistan is positioned as eleventh nation of the world which is confronting the state of food security. In the event of Pakistan, 33% populace is living under the destitution line. Individuals of Pakistan can't meet their fundamental needs. Provincial zones have relative high neediness rate (35 percent) as contrast with urban zones (26 percent) .33% of the youngsters under 5 years old are under weight and furthermore malnourished. Maldives, Bhutan, Afghanistan, and Nepal are not taken in the study due to fewer shares of Trade and Productivity. There are also problems of Food Security but here we will discuss about Pakistan, India, Sri Lanka, and Bangladesh.

### 1.5. Research Questions

After studying the previous Literature, it is seen that low level of intra-regional trade and bad condition of Food security is the problem of almost every SAARC country. In the study, the central questions that are followed throughout the research is to explore whether Volume of food Trade is significantly related to

- Gross Domestic Product
- Distance
- Foreign-Direct Investments
- Exchange Rate
- SAFTA agreement

Another research question can be that whether the existing level of trade of Food Items between different SAARC countries is higher or lower than the level in proportion to world trade?

### 1.6. Objectives of Study

The goal of the research is to examine the food safety condition in the region of SAARC in order to pull assistance and programs for provincial trade and collaboration in food safety.

The other main objectives of the study are as follows:

- To examine the influence of provincial trade settlement on food security in the region.
- To verify that does existing level of food trade between various countries of
- SAARC is sufficient to ensure food security in the constituency?
- To recommend precise direction of regional trade improved food safety in the region.

## 2. Review of Literature

The trade among the SAARC Countries was very low from last decade. SAARC Regional trade share 5.2 per cent in World Trade. It may be noted that the other economic integration like European Union, North Atlantic Free Trade (NAFTA) and Association of Southeast Asian Nation (ASEAN) shares 85 per cent of World Trade. EU shares 66.9 per cent, NAFTA shares 45.6 and an ASEAN share is around 22.8 per cent (Ansar, 2009). There are many researchers that had conducted research on Regional-Trade and food Security in SAARC countries. The previous study enables us to evaluate the role of regional trade on food security. Exports and Imports are the major key indicators of trade status of the countries. Here, the research of different scholars is discussed in the following section that gives clear understanding about regional trade and the need of better food security in the region.

### 2.1 Impact of trading agreement on Regional Trade

There were many scholars that had discussed about the regional Trade of SAARC countries and impact of Trading Agreement on Regional Trade. Further they discussed the Tariff structure, impact of Trade barriers and Trade Liberalization on Regional Trade. The studies of that researcher were given below:

Srinivasan (2018) and Srinivasan and Canonero (2017) described that although possible benefits from regional trade liberalization are considerable, they were larger for smaller economies. Like Sri Lanka, Maldives. Srinivasan (2017) also argued that South Asia should take to earn additional by dealing with the additional regional agreements as a group instead of individually.

Mehta and Kumar (2018) described that consenting to SAFTA arrangement was a point of interest in the arrangement of SAARC since its development in 1985. He said that to make the SAARC active, there is a need of joint session of all countries to discuss their common interests. Khan and Zahira (2016) found that the leading economic signs, such as GDP growth rate, GDP per capita, share in world trade, FDI, trade to GDP ratio and factor intensity of exports are too low in the region both in absolute and relative term.

Chaman (2005) described that if the countries of South Asia adopt a common currency for the trade, then it can bring a great effect on their economies like Pakistan, India, and Sri Lanka. He used VAR model for analysis and took Unemployment and real output for VAR model.

Batra (2007) found that the country with bigger economy can bring the other countries towards itself. He used the augmented gravity model for his study and applied simple OLS with cross sectional approach. He further described that distance had a major role in country exports and have negative effect.

Naseem and Ghani (2010) used gravity model to explore the trade capability and trade advantages for the South Asian countries. They analyzed that the potential for trade creation provided that Pakistan, India, and Sri Lanka sign regional trade agreement. They used cross sectional data for five years and the result of all year's show similar results. They found that if all countries are involved in regional trade agreement, then potential for trade can be increased. These results were also taken SAFTA as base of discussion.

## **2.2 Determinants the factors affecting the Trade of SAARC countries**

In this section, the study of some researcher that had focused on the determinants the factors that affecting the imports and exports of the SAARC countries will be discussed. They discussed the exports structure and comparative advantage and Trade pattern of the region. Their study is given below.

Khawaja and Mehmood (1988) founded export structure and revealed comparative advantage for SAARC and ASEAN countries. They suggested that resource rich countries with a strong comparative advantage in the exports, in the agricultural commodities will trade to those countries that had abundance of resources, where the primary goods producing country had trade relation with those countries that had lack of resources, but they wanted to enjoy the comparative advantage in another sector.

Further Bhalla (1995) discussed about the self-sufficiency in the food grains of ASEAN countries. He took the data from 1961 to 1985 of the calories per day, Imports and Excess supply of food and per

capita availability of food grain of the ASEAN countries. He found that except Nepal and Bangladesh, all countries were able to provide the sufficient calories for their citizen due to high production of food and excess supply of food.

Govindan (1996) described that the pattern of the regional trade was small for most of the commodities. He said that dairy commodities had major share in intra-regional exports that was 24.8 per cent. He found through his study that fish products had major share in imports of the region that was 47 per cent. Most of the products were not commonly used in all countries to improve the condition of food security. So, it would be focused that the most used commodity in the region like wheat and rice.

Van (2002) attempt to discover the components influencing send out execution for Indonesia fabricating firms. It featured the significance of sectoral variety in deciding fare exercises, Van inferred that relative size, unfamiliar, proprietorship, and age were huge components over all parts while talented work showed that innovative work exercises in Indonesia just advantage sends out in generally develop ventures, while capital force doesn't impact trade conduct in scale concentrated firms.

Brooks and Alen (2008) had made the relationships between Free Trade and food security. Trade had a central role to play in confirming global food security, but reforms were required. They found that intra-regional trade in region was not enough and need improvements by free trade or regional preferential trade.

Weerahawa (2009) depicted that the key exchanging accomplices of the South Asia are Non-South Asian created nations and the food and Agricultural exchange among South Asian nations is somewhat little. Despite the fact that endeavors had been made to improve intra-local exchange South Asia through exchange arrangement of RTAs, they were viewed as not fruitful in improving exchange South Asia. It was apparent that the status of exchange help South Asia was very low and there was a chance to improve exchange stream by improving exchange assistance. Exchange help factors affect fares of various items, in shifting degrees.

Mittel and Sethi (2009) described that SAARC countries had created a food bank in SAARC region to meet the need of food. It might also improve the level of food security. It worked even during the time of crisis. So, SAARC countries need to make more betterment in food Security. They had tried to find out issues regarding food security faced by the SAARC.

Moazzam (2012) described about the Tariff structure and Agricultural product in South Asia. He described that Tariff rate for agricultural products did change during 2006- 2011, so, it was not the hurdle for trade. He described that tariff must be imposed on luxurious good or that good, which were exported other than SAARC countries.

Foster and Valdes (2012) suggested that data of total net food and agrarian trade may mislead, and they proposed a difference between non-food and food commodities. They had found that net importers were in dominating but not improving situation. They said that the importance of cash crops export was declined in under developing countries.

Rahman (2012) described that Indo-US and Indo-China relationships were also the factors that were influencing the relationship among SAARC countries. He told that china trade policy was attaining its target particularly with nearby countries. China had provided a lift to financial system via regional trade with SAARC especially India. China had a growing economy and trade potential if SAARC countries focused on trade with China. They can progress. Role of China negatively affected on US economy.

Methew (2015) analyzed that there were both potentialities and need for agrarian inputs trade in SAARC region. He found that India is always at top to boost trade of agricultural inputs and outputs across the borders. Further research is needed to identify border issues for agricultural inputs and outputs. He found that local and domestic farms need to promote level of production and improvement in rural areas.

After studying the literature, it is concluded that there are still lack of regional trade in SAARC countries. Due to same competition in the productivity and the same targeted market, there is the problem of Regional Trade. Another point is that free trading agreements can encourage the Trade among SAARC countries. Regional Countries want to trade with other regions instead of among regions. That's why the problem of Food insecurity arises.

### **3. Materials and Methods**

In this section, research procedure is used and discussed; variable Volume of Trade of food of SAARC countries is explained. The research is based on a study which analyzed the Condition of food security & performance of Regional Trade in SAARC region. Econometric analysis is used to address the research objectives to investigate the determinants of the Food Trade between SAARC nations & condition of food safety and status of Provincial Trade in countries of SAARC. Data has been collected by utilizing the following resources.

1. Food and Agriculture Organization (FAO), World Development Indicators
2. Asian Development Bank's Key Indicators for Asia and Pacific
3. Economic Surveys of the respective countries
4. World Bank
5. Com trade.Org the organization of United Nation
6. Pakistan Bureau of Statistic

Panel data from the year 1990 to 2015 regarding India, Pakistan, Bangladesh, & Sri Lanka are used in the analysis because other countries are sharing less trade in SAARC region and the



Data regarding these countries is not available for the concerning years. Gravity model is used in the study as available in the literature. Firstly, Tiberger (1962) had introduced the Gravity Model. Different researchers used different models for their study; the suitable models that could be used in the study were VAR used by Chaman (2005), GRAVITY model used by Weeraheva (2009) and Batra (2006). Here according to the previous study, it was found that gravity model is well based on flows of Bilateral Trade between two countries. So, here Gravity model is used with extended form of food security & Multilateral Trade between SAARC region.

### 3.1 Econometric Model:

The gravity model is used to check the flows of Bilateral Trade between two countries. The conventional gravity model deals with Amount of Trade that contains export

& imports as dependent variables and GDP of recipient & exporting countries & distance is Independent variable. Here, the conventional model had been extended with the, Exchange Rate, FDI & the dummy of SAFTA agreement taken as explanatory variables.

The conventional model of gravity equation:

$$T_{ij} = \alpha_0 \left( \frac{GDP_i \cdot GDP_j}{D_{ij}^h} \right) + \alpha_1 \left( \frac{ER_{ij}}{D_{ij}^h} \right) + \alpha_2 \left( \frac{FDI_{ij}}{D_{ij}^h} \right) + \alpha_3 \left( \frac{SAFTA_{ij}}{D_{ij}^h} \right) \quad (h, 2009)$$

Now, the general model of the gravity is extended to the desire equation by adding concerning variables.

$$T_{ij} = \alpha_0 + \alpha_1 GDP_i + \alpha_2 GDP_j + \alpha_3 D_{ij} + \alpha_4 ER_{ij} + \alpha_5 FDI_{ij} + \alpha_6 SAFTA_{ij}$$

Here, Volume of Trade of food is taken as dependent variable that contains the food and farming commodities of Harmonized System (HS-1-24). The sub groups of food & agrarian products are Dairy Goods, eggs, honey, edible mammals, animals product, Agriculture Spray, Cereal flours & all bakery goods etc. Subscripts of i & j shows the importing (i) and disseminating (j) country. When the adjustments take place in any nation, it would distress the export of trade in or trade out country. We have taken a few variables in natural log in order to sort up them direct & smooth, and they can be explained in the form of elasticities, and it shows the relative change of endogenous variable because of change in exogenous variables.

GDP showed the gross domestic product. ER showed the Exchange rate of country. FDI showed the foreign direct investment. In this study every variable was taken in logarithm to create them linear correlation among endogenous and explanatory variables.

Here  $\beta$ 's were the measurements that show the impact of independent variables on dependent variable.

Furthermore explanation the model is specified to Bangladesh, PAK, IND, and SRL because of main contributors in Provincial Trade and accessibility of data. The equation of Multilateral Trade is:

$$=0+1+2+3+4+5+6+7+$$

Trade <sub>ij</sub> =	Level of trade of SA
GDP <sub>j</sub> =	GDP of exporting country
GDP <sub>i</sub> =	GDP of importing
Dist <sub>ij</sub> =	Distance from the trading port of trade out nation j to trading port of trade in nation i
FDI <sub>j</sub> =	FDI of trade out country
FDI <sub>i</sub> =	FDI of trade in country
ER <sub>ij</sub> =	Exchange rate of importing nation in stint of exporting nation
Safta =	South Asian free trading agreement used as dummy variable

### 3.3 Operational Definition and Data Sources

#### 3.3.1 Volume of Food Trade (VOT)

The overall value of exports of food and Imports of food in Pakistan, India, Bangladesh, and Sri Lanka (in each year 1990 to 2015) is taken in US Dollars. Volume of Trade is a vital measure of a country's trade progress. This suggests that country trade status in the international market. Volume of Trade is often taken as endogenous variable in intercontinental trade research (Bowden, 1983). Here, the Volume of Trade is taken as dependent variable that contains the exports plus imports of the concerning countries. The data was collected from the site of united nation that is comtrade.com by 1990 to 2015 for the items of harmonized system of 1-24.

#### 3.3.2 Gross Domestic Product (GDP)

It shows the total market value of all the final goods & services produced with in a country in a year. Domestic production may affect the Trade volume of the food because agriculture output shares a major portion in GDP of SAARC countries. In gravity model GDP has positive effect on exports of any country because the bigger economy attracts the trade from other countries. The data of GDP of all concerning countries in the study is taken from World Bank through 1990-2015.

#### 3.3.3 Distance

Distance is taken as fixed independent variable. It has negative relationship with exports of any country because when the distance increases the trade option will be increased and might be diverted to other near countries. In some studies, distance also highlights the cost of transportation. Distance is fixed but cost of transportation can be fluctuated. Here distance is taken from port to port and in is taken in KM.

#### 3.3.4 Exchange Rate

It is the rate of change of Home Currency in Term of Overseas currency. It is often used to measure the Currency effects on International Trade. Here, the data of exchange rate of trade in nation in term of trade out countries, Pakistan, India, Sri Lanka, and Bangladesh is taken from World Bank by 1990-2015.

### 3.3.5 Foreign Direct Investment

FDI assumes a significant job of any economy. The significant job of FDI is that it is the wellspring of move of innovation. It additionally bolsters the economy of the nation. It is the wellspring of capital development in the nation through inflow of assets. The sum which is put resources into one nation from some other nation or the inflow of capital is known as the unfamiliar direct venture. Venture is characterized in two different ways. One is immediate venture which a nation comes in some nation and introduces another plant there. Another sort of speculation resembles when far off nation gives fund to Domestic Government. In this study, FDI of SAARC countries is taken as independent variable. Here, the data of FDI of Pakistan, India, Sri Lanka, and Bangladesh is taken from World Bank from 1990-2015.

### 3.3.6 SAFTA (South Asian Free Trading Agreement)

The SAFTA was held in 6<sup>th</sup> January-2004 at the 12<sup>th</sup>-SAARC Summit in Pakistan. It created the free trade facility of 1.6 billion people of SAARC Region. The SAFTA agreement reduces tax duties of all traded goods to the year 2016.

SAFTA agreement is taken as dummy variable in the study. SAFTA agreement is sign in 2004 among SAARC Countries to improve the regional trade among SAARC Countries but to show the effect of SAFTA it is consider 2005. According to this agreement SAARC Countries must prefer SAARC Countries for trade instead of other regions. Here, the effect of SAFTA agreement before and after SAFTA is discussed. Before SAFTA agreement the value of SAFTA is taken as 0, and after SAFTA agreement value of variable is taken as 1.

## 4. Statistical Analysis

In this study we have used OLS for the estimation of above discussed models.

OLS estimators are best linear unbiased estimators as they have the smallest variance and their estimators expected values are equals to the true values. Due to gravity model the existence of Heteroscedasticity, Auto-correlation and Multi co linearity is quite possible so. Some of them will be discussed. Eviews is used for the estimation the Panel-Gravity model.

### 4.1. Co-integration

In order to acquire the first objective of the study, it can be checked the co integration between Volume of trade and Per capita supply of protein by using the Johanson Co integration approach. First it will be describing the Co integration. If we run a no stationary time series on another non-stationary time series, it may outcome in the spurious regression. Two variables are supposed to be co integrated, when they have a long term, or equilibrium association among them. The equation is known as the co integrating regression model & the parameter are known as the non-integrated parameter. This regression may be extended to a regression model comprising k repressors so along with we find the k co integrating parameters.

If two time series  $x_t$  and  $y_t$  are co integrated, a linear combination of them must be stationary. In other words:

Where  $u_t$  is stationary.

$$y_t - \beta x_t = u_t$$

## 5. Results and Discussion

Past work tells that mixed regional business associations are a few of the more successful ways for SAARC territories to incorporate, develop, and ensure footholds in rising markets and eventually to attract FDI. SAARC regional integration proposes substantial less capacity for Trade of food items surrounded by the region. The Trade potential of SAARC countries is greater in the regions other than SAARC because of parallel production trends and targeted market. An extended provincial marketplace, with open undertaking of goods and services, offers South Asian manufacturers entry to a significant customer base and present new opportunities to develop and concentrate alongside regional supply chain. Regional exporters obtain the skills essential to meet quality standards and to operate supply chain operations, permitting them to reach higher level of competitiveness and formulate for integration into the world economy.

### 5.1. Empirical Results of Ordinary Least Square For Gravity

**Model:**

**Table. 4.1:**

Variable	Coefficient	t-Statistic	Prob.
LNGDPJ	0.736988	8.143992	0.0000
LNGDPI	0.428310	2.694539	0.0079
LNDISTij	0.426209	2.262593	0.0251
LNFDIJ	0.043037	1.302957	0.1946
LNFDII	0.048136	1.544192	0.1247
ERij	-2.130061	-6.834840	0.0000
SAFTA	-0.558333	-2.608844	0.0100
C	-14.44705	-2.783821	0.0061

### 5.2. Empirical Results of Ordinary Least Square For Gravity Model Without Safta Dummy:

**Table.4.2:**

Variable	Coefficient	t-Statistic	Prob.
LNGDPJ	0.727816	8.048716	0.0000
LNGDPI	0.171879	1.375908	0.1709
LNDISTij	0.140996	0.919134	0.3595
LNFDIJ	0.030931	0.945842	0.3458
LNFDII	0.020626	0.703130	0.4831
ERij	-1.961382	-6.433573	0.0000
C	-5.470595	-1.408121	0.1612

### **Gross Domestic Product**

There are separate variables of GDP of exporting country and importing country is taken. Because the share of exporting country and importing countries is different so it cannot be considered in the same ratio. It had to consider the variable separately to check the individual effects. Another reason is the basis of gravity model (Weeraheva, 2009).

### **Gross Domestic Product (Exporting Countries)**

The above results confirm the theory of the gravity model as mentioned in the literature the GDP and trade has positive relation (Weeraheva, 2009).

There is significant level of GDP of all exporting country and VOT that is 0.00 which is highly significant. t-value was also high that was 8.14, which indicates that there is positive association among GDP of all exporting countries and VOT. The coefficient of ( $\beta_1$ ) was 0.73 which mean that if GDP proportional increased by 1 unit, then the VOT of food will be increased by 0.73 units. When the GDP of exporting country increases then it will attract the Investors from all over the world which will increase the supply of products. That is why it showed the positive impact on volume of food trade.

### **Gross Domestic Product (Importing Countries)**

In case of GDP of importing countries and VOT, there is also positive relationship between them. Because it attracts the trade towards importing country. The p-value shows a significant result that is less than 0.0079 and t-value is 2.69 that are also significant. The value of the coefficient ( $\beta_2$ ) is 0.42 which mean that if 1 unit proportional increased in GDP of importing country the Trade will be increase by 0.42.

### **Distance**

In this study, the third relationship was Distance and VOT of food. The probability value was 0.0251 that is highly significant. The t-value was 2.26 that show positive relationship between distance and VOT that is against the theory In terms of this environment, in order to clarify the bizarre phenomenon that is stated above. Trend of Agricultural Trade Distance Coefficient directs the types of agrarian products, is possibly the most valuable one. When the gap among the two interchange allies is nearby, these two nations possibly have very like or yet the similar environments. Consequently, agriculturalists in these two counties will raise related plants what flourish well under the unique climate. There will not be any comparative advantage over the other country in growing the species. There will very little, if any agricultural trade fluctuations hand across border. i On The Other Hand, the greater geographical gap between two countries is, the more likely they belong to separate types of environments. Disagreements in the composition of agrarian output will also arise. As a consequence, agrarian trade will be better (Haonan, 2015).

One more cause behind this sign is that Pakistan & India are two main donors in the SAARC provincial food trade and they have extra trade with those nations which is far away from them and less trade among them, that's why the sign is progressive and outcome is substantial The value of coefficient ( $\beta_3$ ) was 0.426 which mean that if 1 unit proportional increased in distance the VOT will be increased

by 0.426 units. That will be not better for the trade. So, trade cost must be reduced through low transportation expenditures.

### **Foreign Direct Investment**

There are also significant interrelationship between the Foreign direct investment in two trading country and the Volume of Food trade because when the trade between two countries increases then it is good symbols for the investors from rest of the world to invest in these countries. So, it can be said that the greater the trade is the source of greater the Foreign direct investment. So, FDI is played vital role in the bilateral Trade (Derosa, 2007).

### **Foreign Direct Investment (Exporting Countries)**

The fourth relationships between Foreign Direct Investment occurred in Exporting countries. It shows the insignificant results. Because most of the times FDI is made in industrial segment and businesses as an alternative of Food industries. The value of probability is 0.1946 and t-value is 1.302 which shows the positive impact of FDI with VOT. The value of the coefficient ( $\beta_4$ ) is 0.043, which means that if 1 unit proportional increased in FDI the VOT will be proportional increased by 0.043 units.

### **Foreign Direct Investment (Importing Countries)**

Another Connection among Foreign Direct Investment occurred in importing countries and VOT. It shows the weakly significant results. The value of probability is 0.1247 that is weakly significant. The t-value is 1.544 that shows the positive relationship between FDI and VOT because when the investment occurred in importing nation. They will become self-sufficient in the production of goods but if it occurred in Agriculture sector. The value of the coefficient ( $\beta_5$ ) is 0.0481 which means that if 1 unit increased in FDI the VOT will be proportionally increased by 0.0481 units. So, the need of FDI is more important in developing countries.

### **Exchange Rate**

The sixth relationship between Exchange rate and Volume of food trade, which shows significant result. The value of probability is 0.0000. The t-value is -6.47, which shows the negative relationship between ER and VOT and confirm by the literature. The value of the coefficient ( $\beta_6$ ) is -2.13 which mean that if 1 unit increased in ER the VOT of food will be decreased by 2.13 units. So, it would be better for exporting country to devalue its currency to increase its trade volume by adding more shares of exports.

### **SAFTA**

The last relationship is between SAFTA and VOT. It is used to check the influence of SAFTA on the trade among the SAARC countries. It shows the highly significant results, and the value of the coefficient ( $\beta_7$ ) was - 0.558 which mean that in the existence of SAFTA the trade will be decreased by 0.558 units. It is as of regional uncertainty in the association among the bordering countries.

#### 4.2.1 Auto Correlation

The value of Durbin Watson in the regression results show the problem of auto-correlation if it increases from 2.5. Here, the value of D.W was .98 which indicate that there is problem of autocorrelation in the model due to Panel Gravity model.

#### 5.2.2. Overall Goodness of Fit

Overall goodness of fit means that whether our model is well specified or not. The value of R-squared and adjusted R-squared tells about the overall variation in endogenous variable due to explanatory variables. It also tells about Multi-co linearity if the value of R-square is increased by 0.90 then multi-co linearity exists. Here, the value of R-square was 0.88 which means the model is well specified and independent variables cause the 88 % variation in the dependent variable and 12% variation occurred due to omitted variable. So it can say that model is good fitted and well specified.

#### 5.3. Movements of National FPI Numbers Countries Of The SAARC (2000-2015)

In order to achieve the objective, that was the present level of food-trade is adequate for food safety or not. It will be checked by food security indicator of the domestic food price index numbers that tell us that whether the condition of food security is improved or not. Here it is taken the data of domestic food price index number for the years 2000-2015 collected from Food and agriculture organization. (FAO, 2016)

The above graph shows the mixed trend in the domestic food price index number. It can see that in 2007 the great fall had occurred specially in India and Bangladesh economy because in 2007 the great depression in the international market had seen so the trend shows negative behavior in the year 2007. The graphs show negative slope along with time and for Pakistan and Sri Lanka it shows positive trend that means that improvements Food Security can be seen in these countries.

#### 5.4. Co-integration Analysis

The Variables might be cointegrated if they have a long run association among them. If there can exist a association among two non-stationary 1(1) series and X such as the residuals of the regression are stationary then the variables are said to be cointegrated.

Co-Integration analysis was used to check the long-lasting association among variables like Volume of Food Trade and Average Supply of protein. Johanson co integration test is used to examine the correlation between variables. In order to check the stationary in the variables, ADF test was used. The long run Equation is called the static or long run functional relation.

In order to attain our objective, we can run the Johanson co integration approach to check long run association between Volume of trade of food and Average Supply of protein per day in gram. Results of Johanson co integration are;

**Table. 4.3: Result of Johanson Co Integration**

Hypothesized (from max-eigen No. of CE(s))	Fisher Stat.* (from trace test) Prob.	Fisher Stat.* Prob. test)		
None	10.90	0.3650	6.847	0.7398
At most 1	21.35	0.0188	21.35	0.0188

The above results show that there is no long run association among volume of trade and average supply of Protein. The P value shows insignificant results that it is greater than which means that there is no long run relationship between variables and accepts the null hypothesis. It is insignificant which means that if the Volume of trade of food among SAARC country increases the condition of food security will not be improved at satisfactory level.

## 6. Conclusion

Trade of food item is very vital for SAARC constituency to sustain the food-security situation. In this study, it is concluded that there is positive association among GDP of trade in country and trade out country and FDI with Volume of Food trade. Exchange rate of trade in nation in term of trade out nation has negative impact on trade of food because when exchange rate of any country will improve the imports will be costly and vice versa. It is seen that after the agreement the trades of SAARC countries have not improved as desired because of uncertainty of the regional association between countries. Results show that GDP has directly affected the Volume of Trade. So, to increase GDP, some step should be taken to enhance the Volume of Trade of SAARC countries.

Another important point is that FDI of SAARC countries has positive impact on VOT because in Pakistan most of the FDI is made in manufacturing sector so it does not able to create opportunities for the VOT directly that can be seen in the graph.

In case of India, it is also happening in Agricultural sector due to large economy so here FDI has positive impact on VOT. So, Pakistan should focus on its agricultural side because it has major share in exports. When the Trade of food is increased the availability of food is easy for every citizen due to demand supply gap prices are also fall that will make the accessibility of food to people of SAARC. SAARC countries should pay a unique attention on agricultural sectors to lower the condition of food insecurity.



### 6.1. Recommendations

- To compete in the region, government should formulate such policies that are helpful for farmers in lowering their costs.
- SAARC countries should exports keeping in view the comparative advantages to among all these SAARC countries.
- Domestic's farmers, dairy farmers and other food productive agencies should be given suitable information and modernized knowledge for the healthier production and exports ways.
- Government of PAK, IND, BANG and AFG should try to settle all the matters with its neighboring countries to endorse trade prospects in the region of SAARC.
- SAARC countries would pass a rule for the standardization of value chain to guarantee manufacture of quality goods.
- Government should formalize a policy to remove water sanitation and logging problem and pollution problems in Agriculture sector to improve the standard of food items.
- Producers are more probable to take benefit of trade agreements and make allocation judgments according to them if the resulting market is easy to understand and negotiate. The faster goods can reach their destinations, the more benefits can accumulate.
- Last but not the least; Regional interactions between SAARC countries must be advantageous for the trade and Foreign Direct Investment in the region. Because of main portion in provincial trade India and Pakistan essential play their role to make the policies for the up gradation of their exports and create friendly environment for trade.
- Trade Liberalization with SAARC countries may encourage policy makers as well as private.

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