

Regional trade and food security challenges: The case of SAARC countries

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Abstract: Higher consumption and increased import requirements for the South Asian Association for Regional Cooperation (SAARC) region can be catered through neighboring trade partners if resources are optimally utilized. The purpose of this research is to analyze the connection between regional trade of SAARC countries and the food security challenges faced by the region. The study uses data from 1990–2018 for Pakistan, India, Sri Lanka, and Bangladesh to econometrically analyze the determinants of the volume of food trade. The results show that the gross domestic product of importing or exporting countries and foreign direct investment (FDI) have positive impact on regional trade. The bilateral exchange rate between trading partners has a negative impact on the trade volume. The results also showed the absence of a long-run relationship between volume of trade and food security using Johansen's cointegration test. Our analysis suggests that policy makers should focus on the means for creating favorable environment in Pakistan and India to not only meet the increasing global demands for food but also increasing their competitiveness for high-quality and low-quality priced products in major exports markets.

Keywords: agricultural products; business linkages; economic impact; investment; price

Economic integration has become necessarily important for regional development. Much of economic integration has already been established, such as the European Union (EU) and the South Asian Association for Regional Cooperation (SAARC). Economic integration helps resolve the issue of food security and enhances regional trade among member countries (Mkandawire et al. 2014). Most SAARC countries are dependent on agriculture, which accounts for a large share of their gross domestic product (GDP). South Asia accounts for 27.4% of the global population and 40% of the world's poor people, of which 35% are

undernourished – equivalent to 27.6% of the global undernourished people (Worldometer 2016).

Food security is a significant part of national and economic security (Badalova and Larionov 2019). The idea of food security mainly surfaced during the mid-1970s, in the midst of the global food crisis. The world food conference held in 1974 had defined the term food security as “assuring the supply of food, price stability of food at national and international level” (FAO 2006). According to the Committee on World Food Security (2012) there are four dimensions of food security: availability, access, nutritional status (food utilization), and stability.

The availability of food in SAARC countries is not satisfactory as compared to other regions of the world due to insufficient production to fulfill the region's basic needs (SAARC 2014). Food availability is affected by a number of factors, including production, processing, storage, distribution, marketing systems, and technologies (Krishna 2012). Accordingly, the permanent provision of sufficient supply of food items, the regular availability in sufficient quantities of foodstuffs of appropriate quality (at convenient places) in accordance with tastes and preferences of the people is an essential dimension of food security (Etim et al. 2017). Access is another important determinant of food security. The accessibility to food depends on factors like incomes, sources of income, including remittances, income disparities, real food prices, landlessness, gender, literacy, and employment status (French et al. 2010). Hence, there is a need to improve these factors through better government policies on employment, education, and health. Accessibility can also be improved through regional trade, which creates employment opportunities that lead to improved Human Development Index scores (Zhou et al. 2019). Furthermore, the effective biological utilization (food absorption) of food is another determinant of food security.

Different benefits and incentives have been providing to SAARC's members. Members can access and dissemination of information on a wide range of subjects and activities and participate in trade fairs and exhibitions. SAARC also supports Business to Business (B2B) meetings and interaction with other members, institutions, state and central governments. To support business in the region, SAARC provides visa facilitation and SAARC's Visa Exemption Stickers (SVES) facility only for those who meet criteria (Ahmed 2016).

International trade among SAARC countries has traditionally been very low – intra-regional trade in 2015 accounted for only 7.5% of SAARC's total trade (SAARC 2014). It may be noted that the share of intra-regional trade of other economically integrated regions such as the EU, North American Free Trade Area, and Association of South East Asian Nations were 66.9, 45.6, and 22.8%, respectively (WTO 2017). According to Ahn et al. (2019), South Asia would stand to gain more by trading with other regional trading blocs as a group rather than individually. The economic impact of trade in ensuring global food security can be observed by undertaking required reforms (Mughal and Sers 2019). Improving intra-regional trade in South Asia is the key factor to enhance trade facilitation in the region (Weerahewa 2009). The formation of the South Asian Free Trade

Area (SAFTA) is an example of facilitating intra-regional trade among SAARC countries. This agreement was signed in 2004 and replaced the erstwhile South Asia Preferential Trade Agreement, which was limited in scope. The main objective of SAFTA is to establish a complete South Asian Economic Union similar to the EU. The goals include promoting joint trade and economic cooperation by removing trade barriers, promoting the creation of conditions for fair competition in free trade zones, ensuring fair interests for all, and expanding mutual benefit agreements (Ahmed 2016). According to this agreement, some form of compensation may be allowed, but the proposed tariff compensation mechanism cannot be part of the official form of agreement (Haque and Hossain 2011). Such partnerships among SAARC countries have been affected by Indo-US and Indo-China relations (Rahman 2012). In fact, China's trade policy has been achieving its objectives especially with neighboring countries, and has given a boost to its economy through trade with SAARC countries, in particular India (Mathew 2015).

Reviewing the current situation of regional trade in SAARC countries revealed that neighboring business linkages is one of the more effective ways for SAARC countries to integrate, grow, and secure a foothold in emerging markets, and ultimately attract foreign direct investment (FDI). The regional integration of SAARC offers significantly less potential for trade of food items within the region than with other regions due to similar productivity trends and target markets of SAARC member economies. An expanded regional market, with free movement of goods and services, provides South Asian producers access to a large consumer base and presents new opportunities to build and specialize along the regional supply chain. Consequently, the aim of this study is to analyze the food security situation in the SAARC region to draw guidance and programs for regional trade and cooperation in food security. Specifically, the objectives are to: determine the current level of food trade among different SAARC countries, analyze the impact of regional trade agreement on food security in the region, and suggest specific guidance for regional trade to improve food security in the region.

METHODOLOGY

Data sources and variables. This study employs annual time series data for four SAARC countries, namely Bangladesh, India, Sri Lanka, and Pakistan. The data cover the period 1990–2018. The following

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sources are used to collect the data on variables: Asian Development Bank (2019) and UN comtrade (2019). The nominal data of all variables has been considered in this study due to some missing data of inflation for few years and it was not possible to adjust the data of inflation to get the real data. Therefore, nominal data has been used to avoid the complications. Moreover, there were also some complications to adjust the foreign direct investment with the rate of inflation due to the international exposure. The dependent variable was the total volume of trade (*VOT*) – exports and imports – of food (USD). The data was collected from UN comtrade (2019) for the items based on the harmonized system (HS) of classification at the 2-digit level (HS 1–24). The sub categories of food and agricultural commodities include dairy products, eggs, honey, edible animals, animal products, cereal flours, maize, and all bakery products. The independent variables used were *GDP* (current USD) of importing and exporting countries, distance between the two countries (km), exchange rate (*ER*) of local currency in terms of foreign currency, *FDI* (current USD) of importing and exporting countries, and the effect of joining SAFTA.

Econometric model. The gravity model of international trade was used in this study to predict bilateral trade between two countries. This model tests the variables that directly or indirectly affect trade flows, including *VOT* that comprises exports plus imports as dependent variables, *GDP* of importing and exporting countries, and distance; and is represented as follows:

$$VOT_{ij} = \beta_0 (GDP_i \times GDP_j) + \beta_1 (Distance_{ij}) + ut \quad (1)$$

The general gravity model is extended by adding *ER*, *FDI*, and the dummy variable *SAFTA* as follows:

$$VOT_{ij} = \beta_0 + \beta_1 \ln GDP_j + \beta_2 \ln GDP_i + \beta_3 \ln Distance_{ij} + \beta_4 FDI_j + \beta_5 FDI_i + \beta_6 ER_{ij} + \beta_7 SAFTA + ut_{ij} \quad (2)$$

where: subscripts *i* and *j* – the importing country (*i*) and exporting country (*j*).

When changes occur in any country, it will affect the exports of importing or exporting country. Some variables were taken in the form of natural log to make them linear and smooth, and can be interpreted in the form of elasticity, which shows the proportional change in dependent variable due to change in independent variables. The variable *SAFTA* is assigned a value of 0 before the signing of *SAFTA* agreement and 1 thereafter.

All variables are taken in the form of log to make the relationship between dependent and independent

variables linear. Here $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$, and β_7 are the coefficients that show the impact of independent variables on the dependent variable. For further explanation, the model is specific to Pakistan, India, Bangladesh, and Sri Lanka due to their major share in regional trade and availability of data. The equation of multilateral trade is:

$$VOT_{ij} = \beta_0 + \beta_1 \ln GDP_j + \beta_2 \ln GDP_i + \beta_3 \ln Distance_{ij} + \beta_4 FDI_j + \beta_5 FDI_i + \beta_6 ER_{ij} + \beta_7 SAFTA + ut_{ij} \quad (3)$$

where: *VOT_{ij}* – volume of trade of SAARC countries (exports + imports); *GDP_j* – GDP of exporting country that was given in the log form to smoothen the data; *GDP_i* – GDP of importing country that was given in the log form to smoothen data; *Distance_{ij}* – distance from the trading port of exporting country *j* to trading port of importing country *i*; *FDI_j* – FDI of exporting country; *FDI_i* – FDI of importing country; *ER_{ij}* – ER of importing country in term of exporting country; *SAFTA* is used as a dummy variable; and *ut_{ij}* – a normally distributed error term.

The model was estimated using the OLS method. The expected value of OLS estimators are equal to the true values of the parameters. According to the requirement of the gravity model, the occurrence of heteroscedasticity, auto correlation and multicollinearity was checked. EViews was used to estimate the panel gravity model.

Cointegration. To examine the long-run relationship among the variables, the cointegration between *VOT* and average protein supply (g/capita) was calculated using the Johansen's cointegration approach. If we regress a nonstationary time series on another nonstationary time series, it may result in spurious regression. This regression may be extended to a regression model containing *k* regressors; hence along with this, we find the *k* cointegrating parameters.

If two time series x_t and y_t are cointegrated, their linear combination must be stationary and is expressed as follows (μ_t is stationary):

$$y_t - \beta x_t = \mu_t \quad (4)$$

RESULTS AND DISCUSSION

Trade volume and economic trends of SAARC countries

The trend in values of *VOT*, *GDP*, and *FDI* of SAARC countries during the 1990–2018 period is

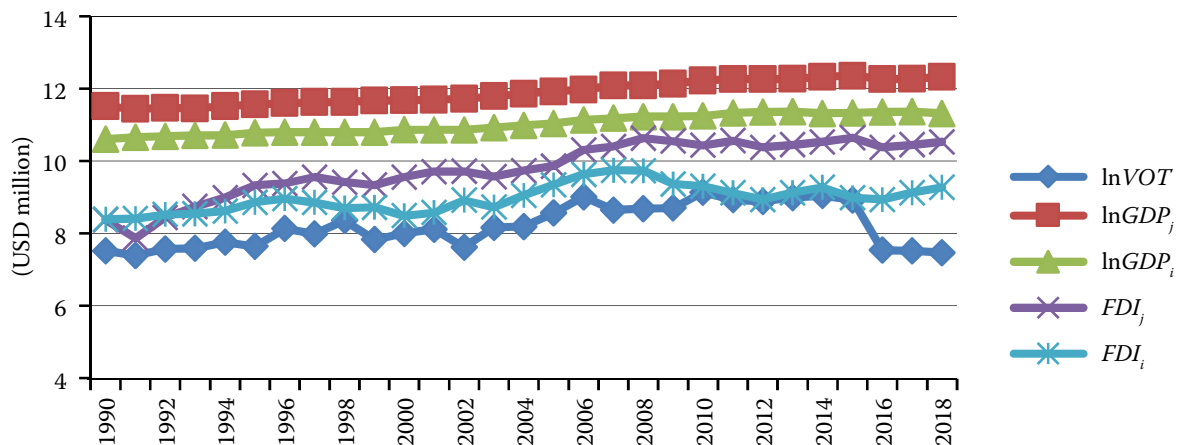


Figure 1. India-Pakistan trade

$\ln VOT$ – volume of trade between the two countries; $\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; FDI_i – foreign direct investment of importing country

Source: Asian Development Bank (2019)

presented in Figures 1–6. The results reveal that the values of all the parameters increased overtime. Furthermore, after joining SAFTA (since 2004), there has been a tendency of consecutive increase in the values of all the parameters compared to the 1990–2003 period. Despite the positive impact of FDI of SAARC countries on VOT , it has still not improved as desired due to instability in the regional relationship among SAARC countries.

As evident in Figure 1, $\ln GDP_j$ shows a slightly increasing trend throughout the 1990–2018 period, while $\ln GDP_i$ is showing the increasing trend but less than $\ln GDP_j$ throughout this period, although

it has witnessed a slightly constant trend in the last few years. Similarly, the line graph of $\ln VOT$ is the log of VOT between India and Pakistan, and it remains uncertain, not following constant trend while increasing in the last few years. The line graph of $\ln FDI_j$ shows an uncertain but increasing trend, although with major fluctuations. Lastly, the line graph of $\ln FDI_i$ also shows an uncertain trend, although it has increased in the last few years. The $\ln FDI_j$ is also following the uncertain pattern but it is less than $\ln FDI_i$. The traded commodities between Pakistan and India are mostly agricultural products including potato seeds, mustard oil, pig iron, high alumina fire bricks, hard cotton waste,

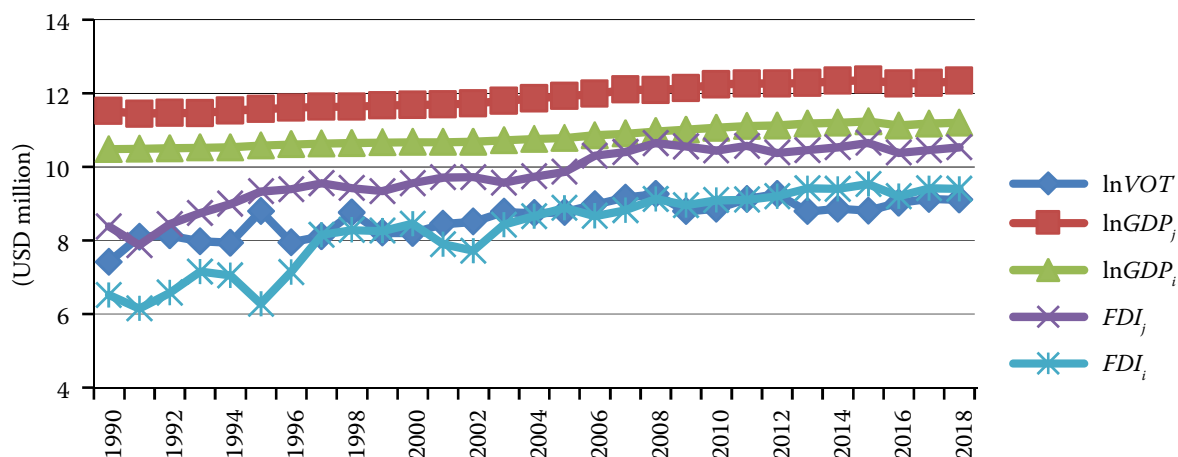


Figure 2. India-Bangladesh trade

$\ln VOT$ – volume of trade between the two countries; $\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; FDI_i – foreign direct investment of importing country

Source: Asian Development Bank (2019)

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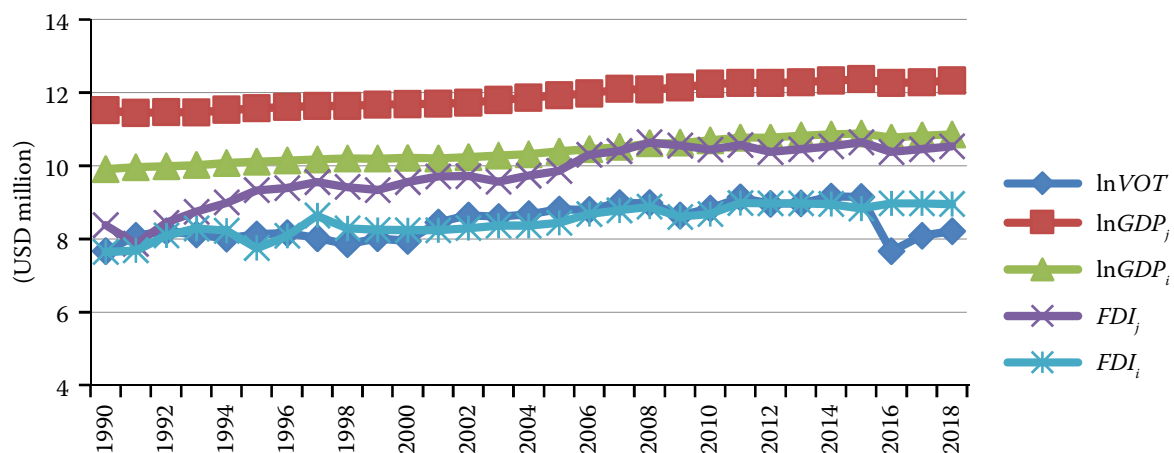


Figure 3. India-Sri Lanka trade

$\ln VOT$ – volume of trade between the two countries; $\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; FDI_i – foreign direct investment of importing country

Source: Asian Development Bank (2019)

lime and lime stone, sugarcane, sports goods, and textile machinery spare parts.

As can be seen in Figure 2, $\ln GDP_j$ shows a slightly increasing trend throughout the 1990–2018 period, while $\ln GDP_i$ shows a marginally increasing trend but less than $\ln GDP_j$ throughout this period, with a slight decrease in the last few years. The line graph of $\ln VOT$ – the log of volume of trade between India and Bangladesh – remains uncertain, increasing initially and then decreasing in the last few years following. The line graph of $\ln FDI_j$ shows an increasing trend in last 2 years. Lastly, the line graph of $\ln FDI_i$ also shows both a decrease and an increase in the last 2 years but is less than the $\ln FDI_j$. The major traded

products between India and Bangladesh includes rice, cotton fabrics, feeding stuff of animals, parts of vehicles, dry fruits and nuts, textile yarn, wheat and others.

Figure 3 depicts $\ln GDP_j$ showing a slightly increasing trend throughout the 1990–2018 period while $\ln GDP_i$ remains constant throughout this period but less than $\ln GDP_j$, although it has increased slightly in the last few years. The line graph of $\ln VOT$ – the volume of trade between India and Sri Lanka – is uncertain and does not follow any specific trend but it remains constant in last few years. The line graph of $\ln FDI_j$ shows a fluctuating but increasing trend while that of $\ln FDI_i$ shows much wider fluctuations with an uncertain decline before a near-consistent increasing after 2005. The major

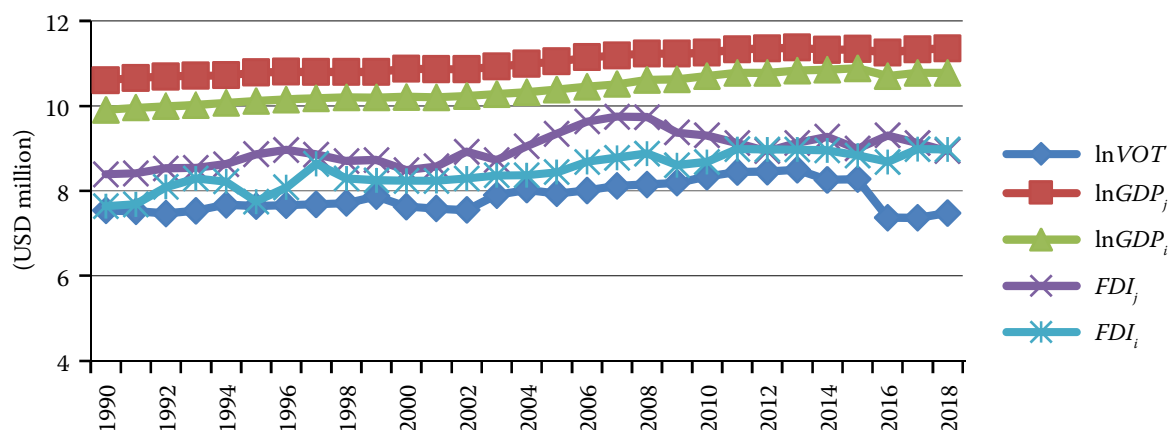


Figure 4. Pakistan-Sri Lanka trade

$\ln VOT$ – volume of trade between the two countries; $\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; FDI_i – foreign direct investment of importing country

Source: Asian Development Bank (2019)

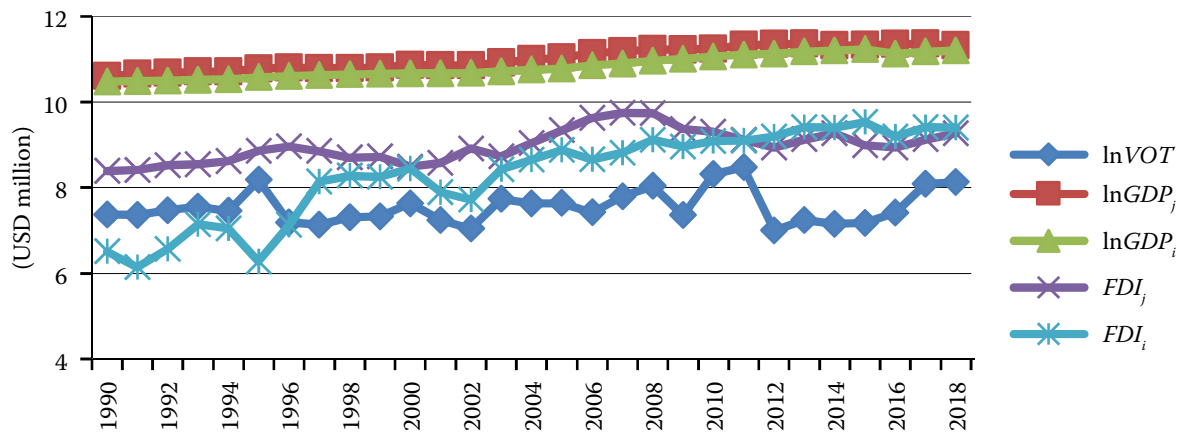


Figure 5. Pakistan-Bangladesh trade

$\ln VOT$ – volume of trade between the two countries; $\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; FDI_i – foreign direct investment of importing country

Source: Asian Development Bank (2019)

traded products between India and Sri Lanka include, motor vehicles, mineral fuels and oils, cotton, pharmaceutical products, plastic articles, iron and steel, chemicals, cement, and sugar.

Figure 4 indicates that $\ln GDP_j$ shows an increasing trend throughout the 1990–2018 period, similar to $\ln GDP_i$, though it remained below the former throughout this period. Initially $\ln GDP_i$ shows the constant trend but it has slight increase in last few years. Similarly, the line graph of $\ln VOT$ – the volume of trade between Sri Lanka and Pakistan – was continuously increasing in last few years. The line graph of $\ln FDI_j$ exhibits increasing trends although with major fluctuations, similar to that of $\ln FDI_i$. The major traded products between Sri Lanka and Pakistan includes minerals

fuels, iron and steel, pharmaceutical sector, agri-foods (rice, wheat and maslin, and dairy products), cotton fabrics, and electrical machinery.

As is evident from Figure 5, both $\ln GDP_j$ and $\ln GDP_i$ show an increasing trend throughout the 1990–2018 period, although the latter remains below the former throughout this period. The line graph of $\ln VOT$ – the volume of trade between Pakistan and Bangladeshis showing the constant trend and it has some downfall in mid of this time period and again remains constant after 2015. The line graph of $\ln FDI_j$ shows increasing trends, similar to $\ln FDI_i$ with both exhibiting wide fluctuations during the period under consideration. The major traded commodities between Pakistan and Bangladesh include onion, woven garments,

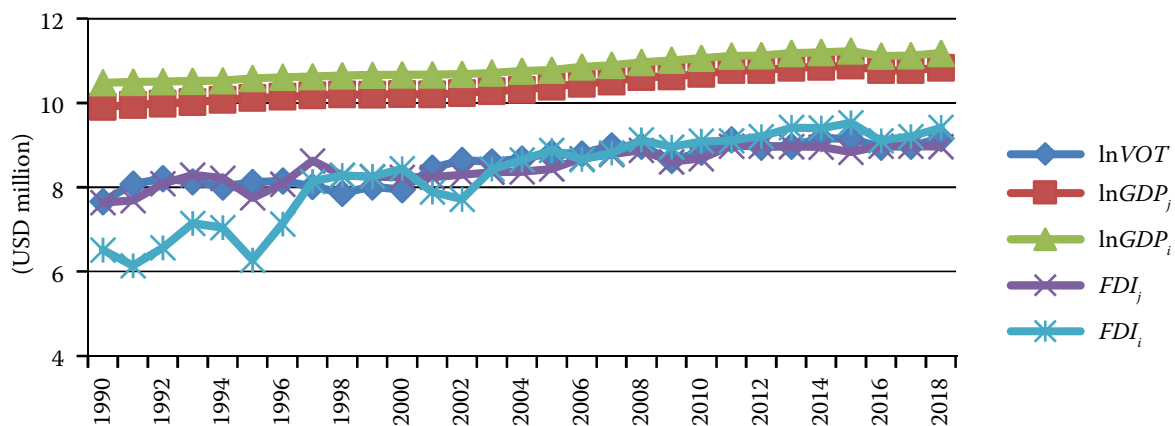


Figure 6. Sri Lanka-Bangladesh trade

$\ln VOT$ – volume of trade between the two countries; $\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; FDI_i – foreign direct investment of importing country

Source: Asian Development Bank (2019)

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knitwear, home textile, agri-products, leather and leather products, footwear, raw jute, and jute goods.

Figure 6 shows that $\ln GDP_j$ and $\ln GDP_i$ exhibit similar increasing trends throughout the 1990–2018 period with the former showing a marginally steeper increasing trend. The line graph of $\ln VOT$ – the volume of trade between Sri Lanka and Bangladesh – follows an irregular trend, although it exhibits an appreciable increase in the last few years. The line graph of $\ln FDI_j$ and $\ln FDI_i$ both show the fluctuating trends, although the fluctuations in $\ln FDI_j$ seemed to have tapered during the period after 2010. The major traded commodities between Sri Lanka and Bangladesh include trousers and shorts of cotton, t-shirts and vests of cotton, knit/crochet, nuts and sports items.

Trends of domestic food price index numbers of SAARC countries

Without a proper understanding of the food price–food security relations, excessive price volatility cannot be reduced effectively. The risk of extreme price events can intensify and contribute to broader social risks in political stability, human development, and food security (Kalkuhl et al. 2016). Integrated food trade has a direct impact on food security by augmenting domestic food supplies and thereby increasing the availability of food. This will push food prices down and reduce food supply variability. In other words, free movement of food products across countries is necessary to allow international price changes to be fully transmitted to domestic markets in relative terms (United Nations and Asian Development Bank 2015). Accordingly, the food price index numbers were analyzed to determine whether the current level of food trade was sufficient for food security. Data was sourced from the Food and Agriculture Organization (FAO) for the 1997–2018 period (FAO 2019), and is presented in Figure 7, which depicts the variation in trend of the domestic food price

indices. The lowest index – both nominal and deflated – was noticed in 1999–2003 due to the great depression in the international market. The highest prices were observed in 2011–2014. According to the World Bank (2010), a major driver of price rise has been the rapid increase in the use of food crops to produce biofuels. Moreover, most South Asian countries reduced import taxes, and several of them also introduced export control measures or even banned exports of certain staples. These “beggar-thy-neighbor” type policies aggravated price increases elsewhere. As depicted in Figure 7, the food price index during 2018 reached similar levels as that in 2007 – a good indicator from the food security perspective.

Impact of regional trade agreement on food security

To determine the suitability of our data for regression analysis, the Durbin Watson test (DW) and Goodness of Fit (GOF) test were performed. DW was 0.96 (< 2.5), indicating no autocorrelation among variables. The GOF test is conducted to know whether a variable can be approached by using a theoretical model or not. In this paper, the GOF test performed included: partial parameter significance test and correlation test between independent variable with dependent variable. The value of R -square was 0.88, indicating that the explanatory variables explained around 88% of the variation in VOT .

GDP. We separately consider the GDP variable for importing and exporting countries to check the individual effects, as demanded by the gravity model. Findings in Table 1 show that GDP of all exporting countries significantly influenced the VOT . This result confirms the theory of the gravity model that highlights a positive relationship between GDP and trade (Ahn et al. 2019). Specifically, a 2% increase in GDP was associated with around 0.81% increase in VOT when all other variables were held constant. This might be because an increased GDP of exporting country at-

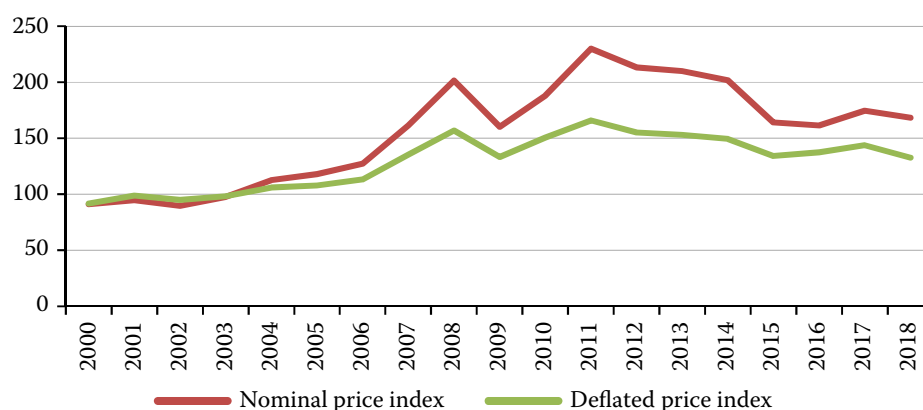


Figure 7. Food price index (nominal and deflated)

Source: Asian Development Bank (2019)

Table 1. Empirical results of OLS for the gravity model

Variable	Coefficient	<i>t</i>	Probability
$\ln GDP_j$	0.7407	8.1639	0.0000
$\ln GDP_i$	0.4303	2.7043	0.0080
$Distance_{ij}$	0.4310	2.3252	0.0261
FDI_j	0.0430	1.3035	0.1950
FDI_i	0.0481	1.5541	0.1304
ER_{ij}	-2.1301	-7.0314	0.0000
SAFTA	-0.5603	-2.7090	0.0101
Constant	-14.5001	-2.8242	0.0071

$\ln GDP_j$ – gross domestic product of exporting country; $\ln GDP_i$ – gross domestic product of importing country; FDI_j – foreign direct investment of exporting country; $Distance_{ij}$ – distance from the trading port of exporting country *j* to trading port of importing country *i*; FDI_i – foreign direct investment of importing country; ER_{ij} – exchange rate of importing country in term of exporting country; SAFTA – South Asian Free Trade Area
Source: UN Comtrade (2019)

tracts investors, which in turn will increase the supply of products. Even regarding the *GDP* of importing countries, the results indicated a positive relationship with *VOT* ($t = 2.69$; 0.007). This might be because increasing *GDP* attracts trade towards importing country. The value of the coefficient (β_2) is 0.44, indicating that a 2% increase in *GDP* of importing country results in 0.46% increase in trade.

Distance. The most important determinant to facilitate trade in agricultural products is the distance between partners or countries. Despite our expectations, the effect of distance was positively significant with *VOT* ($t = 2.31$; 0.02). Given that the distance between the two trading partners is close, these two countries probably have very similar or even the same climate. Therefore, farmers in these two countries will grow similar crops which prosper well under that particular climate. Consequently, there will not be any comparative advantage for the two countries. Conversely, the greater the geographical distance between two countries, the more likely are they to belong to different climate zones. This

implies that there will be differences in the structure of agricultural output as well. As a result, agricultural trade will be greater. Another reason behind this result is that Pakistan and India are two major contributors to the SAARC regional food trade, and they trade more with those countries which are far away, while trading less between them. This is the reason that the sign is positive and the result is significant.

FDI. Findings in Table 1 indicate that *FDI* in exporting countries was an insignificant determinant of *VOT* ($t = 1.35$; 0.19). The coefficient of *VOT* were found to increase by a factor of 0.04 when *VOT* increased by 1 unit. A probable explanation for this result is that a high percentage of *FDI* is generated in manufacturing sector and industries instead of food and agriculture sector. Similarly, there was an insignificant relationship between *FDI* in importing countries and *VOT* ($t = 1.49$; 0.12). Simply stated, more investment undertaken in any importing country increases self-sufficiency in the production of goods.

ER. Despite the importance of *ER* in facilitating trade flow, its effect on *VOT* was negatively significant ($t = -6.79$; 0.00). The value of the coefficient (β_6) was found to be -2.13, implying that if there is a 1% increase in *ER*, the *VOT* of food will decrease by 2.13%. The result reflects the urgent need to devalue the currency of exporting countries to increase their trade volume and thereby, their share of exports.

SAFTA. The impact of SAFTA on the *VOT* was negatively significant ($t = -2.6$, 0.01). In other words, the existence of the SAFTA decreased the *VOT* by 0.558 units. This result revealed that SAFTA has negative impact on *VOT*. This might be because of regional instability in the relationship between the neighboring countries. SAFTA has two main giants, i.e. Pakistan and India both are trying to hold the organization by accompany of friendly states. Due to the conflicting interest, the data showed a negative relationship for the period under investigation. As far as results related to SAARC are concerned, we can assume the same. Both of these organizations are having significant importance but due to rivalry nature of members not handy in terms of trade.

Table 2. Results of Johansen's co-integration

Hypothesized number of CE(s)	Fisher statistics			
	trace test	probability	Max-Eigen test	probability
None	11.09	0.3708	6.940	0.7401
At most 1	21.40	0.0190	22.01	0.0204

CE – Co-integrating equations

Source: UN Comtrade (2019)

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Cointegration analysis. Johansen's cointegration test was performed to test the relationship between *VOT* and average supply of protein (Table 2). The results showed insignificant association between *VOT* and average supply of protein (6.8; 0.73), reflecting the absence of a long-run relationship between the two variables. In other words, the *VOT* among SAARC countries had no effect in satisfactorily enhancing the food security.

CONCLUSION

Food trade is very important for SAARC region to maintain its food security. The results of our study indicate that there is a positive relationship between *GDP* and *FDI* of importing and exporting countries with *VOT*. Conversely, increase in *ER* of importing country in terms of the currency of exporting country has a negative impact on *VOT*. Decreasing food price at last years was found as an important driver of food security. Non-existence of long-run relationship between *VOT* and average protein supply reflects the need for raising awareness of the quality of diets. The SAARC countries should pay special focus on the agricultural sector to reduce food insecurity. To achieve this, we recommend the following actions:

- The SAARC countries should export considering their comparative advantages among all the SAARC countries.
- The governments of Pakistan, India, Bangladesh, and Afghanistan should try to resolve all the issues with each other and endorse enhancing trade opportunities in the SAARC region.
- The SAARC countries should pass a law for the standardization of value chain to ensure production of quality goods.
- Regional relations among SAARC countries must be favorable for improving trade and *FDI* in the region. Due to major share in regional trade, India and Pakistan must implement suitable policies and play an enabling role for the upgradation of their exports and creation of a friendly environment for trade.

REFERENCES

Ahmed Z.S. (2016): Regionalism and regional security in South Asia: The role of SAARC. London, Routledge. Available at <https://doi.org/10.4324/9781315604442> (accessed June 14, 2019).

Ahn J., Dabla-Norris E., Duval R., Hu B., Njie L. (2019): Re-assessing the productivity gains from trade liberalization. *Review of International Economics*, 27: 130–154.

Asian Development Bank (2019): Key Indicators for Asia and Pacific. Metro Manila, Philippines, Asian Development Bank. Available at <https://www.adb.org/data/statistics> (accessed Dec 2, 2019)

Badalova A., Larionov V. (2019): Modern paradigm of ensuring food security risk resistance in Russia. *Advances in Economics, Business and Management Research*, 79: 110–113.

Committee on World Food Security (CFS) (2012): Coming to Terms with Terminology: Food Security, Nutrition Security; Food Security and Nutrition; and Food and Nutrition Security. Thirty-Ninth Session, Rome, Oct 15–20, 2012: 1–9. Available at <http://www.fao.org/3/MD776E/MD776E.pdf> (accessed March 21, 2019).

Etim E.E., Ogbinyi Jr. O.J., Duke O.O. (2017): International politics of oil monomania and food security: The Nigerian case. *Asian Research Journal of Arts & Social Science*, 3: 1–11.

FAO (2006): Food Security Policy Brief. Available at http://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf (accessed March 12, 2019).

French S.A., Wall M., Mitchell N.R. (2010): Household income differences in food sources and food items purchased. *The International Journal of Behavioral Nutrition and Physical Activity*, 7: 77.

Haque M.E., Hossain M. (2011): Impact of stock market development on economic growth: Evidence from SAARC countries. *Eastern University Journal*, 3: 1–13.

Kalkuhl M., von Braun J., Torero M. (2016): Volatile and extreme food prices, food security, and policy: An overview. In: Kalkuhl M., von Braun J., Torero M. (eds): *Food Price Volatility and its Implications for Food Security and Policy*. Cham, Springer: 3–31.

Krishna P. (2012): Regional approach to food security in South Asia: SAARC Food Bank. In: *Proceedings Regional Consultation on Trade, Climate Change and Food Security SAWTEE*, Kathmandu, Dec 20–21, 2012: 1–13. Available at <http://www.sawtee.org/presentations/SessionThree-20Dec2012.pdf> (accessed Sept 16, 2019).

Mathew S. (2015): Agricultural input trade and food security in South Asia. Rajasthan, India, Consumer Unity & Trust society: 2–12.

Mkandawire P., Nyantakyi-Frimpong H., Armah F., Arku G. (2014): Regionalism, food security and economic development. Occasional Paper No. 23. Harare, Zimbabwe, The African Capacity Building Foundation: 1–45.

Mughal M., Sers C. (2019): Cereal production and food security in South Asia. Working Papers hal-02089616, HAL archives. Available at <https://hal.archives-ouvertes.fr/hal-02089616/document> (accessed Feb 12, 2019).

Rahman K. (2012): Regional cooperation, global changes, SAARC and China. *Policy Perspectives*, 9: 5–14.

<https://doi.org/10.17221/3/2020-AGRICECON>

- SAARC (2014): South Asia Regional Action Framework for Nutrition. SAARC in collaboration with UNICEF. South Asian Association for Regional Cooperation (SAARC). Available at <https://motherchildnutrition.org/pdf/saarc-nutrition-action-framework-2014.pdf> (accessed Oct 5, 2019)
- UN Comtrade (2019): World Development Indicators. UN Comtrade. UN Comtrade Database. Available at <https://comtrade.un.org/> (accessed April 3, 2019).
- United Nations and Asian Development Bank (2015): Food Security in South Asia: Developing Regional Supply Chains for Food Processing Industry. United Nations and Asian Development Bank. Available at <https://www.adb.org/sites/default/files/publication/189217/south-asia-food-processing.pdf> (accessed Nov 11, 2019).
- Weerahewa J. (2009): Impact of trade facilitation measures and regional trade agreements on food and agricultural trade in South Asia (No. 69). ARTNeT Working Paper Series. Bangkok, Asia-Pacific Research and Training Network on Trade (ARTNeT): 5–32.
- World Bank (2010): Food Price Increases in South Asia: National Responses and Regional Dimensions. Washington, DC, World Bank.
- World Trade Organization (WTO) (2017): World Trade Statistical Review. WTO. Available at https://www.wto.org/english/res_e/statis_e/wts2017_e/wts2017_e.pdf (accessed March 26, 2019).
- Worldometer (2016): Demographic Statistics. Worldometer. Available at <https://www.worldometers.info/population/> (accessed March 5, 2019).
- Zhou D., Shah T., Ali S., Ahmad W., Din I.U., Ilyas A. (2019): Factors affecting household food security in rural northern hinterland of Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, 18: 201–210.

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