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Effect of Logistics Strategies on Imports and Exports Coupled with Gross Domestic Product: A South Asian Perspective

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This paper assesses and analyses the existing relationship between logistics strategies, imports and exports, transit load time, and the growth of GDP (Gross Domestic Project) from the perspective of the South Asia region. Time is the most important attribute to be considered, since the inefficient management of time not only hampers trade output, but also influences the volume of imports and exports. There are certain products that have a short shelf-life, which makes their transit time-sensitive. Any delays or careless processing of these items can seriously impact the international trade of a country. The recent improvements in scientific methods to preserve the products, and enhancements in transportation techniques have significantly increased the demand for such time-sensitive products. It is observed that the demand for such products is higher in SAARC (South Asian Association for Regional Cooperation) countries. There is a potential need to enhance existing transportation frameworks using the competitive logistics standards, so the needs imposed by the modern day's market community could be catered. Previously described time-sensitive items may include a variety of products, such as lifesaving medicine, electronic equipment, clothing, and perishables. As mentioned earlier, developing countries are the biggest advocates of cutting-down a variety of logistics factors that are associated with lead time. The WDI (World Development Indicator) was utilised to collect the penal data, and for this purpose, the World Bank's database from the year 1970 to 2014 was consulted. This particular study made use of the Granger Causality Test and Panel Vector Error Correction model to test the existing long-range and short-range relationships between the variables. The results produced by the examination suggest that there is a possibility that measures can be employed in comparatively poor countries with reduced time and cost requirements. Thus, following the

formation is about a relationship between the aforementioned stealth policies, procedures, and factors. This paper identifies a prominent indicator of economic growth.

Key words: *Lead time, Logistics Strategies, SAARC Countries, Imports and Exports, Penal Data, VECM Model, GDP Growth.*

Introduction

All countries around the world are facing significant issues in attaining economic growth, specifically gross domestic product (GDP). Researchers have explored the factors that can influence economic growth, such as population change (Cai & Lu, 2013); population aging (Bloom, Canning, & Fink, 2011); technological progress, physical and human capital (Leimbach, Kriegler, Roming, & Schwanitz, 2017); unemployment (Adrian, 2009); renewable resources for electricity generation (Ohler & Fetters, 2014); interest rates, inflation, exchange rates (Semuel, 2015); corruption (Rehman & Naveed, 2007); FDI (Foreign Direct Investment) (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004; Tekin, 2012; Tiwari & Mutascu, 2011); and most importantly imports and exports (Awokuse, 2008; Ehinomen & Daniel, 2012; Mah, 2007;Hye, 2012). Imports and exports are considered vital factors that determine the GDP growth in any nation. As the Chinese economy seems to go down a little, the world is looking to the South Asian region as an economic hub because of it having an impressive potential for growth. This economic growth is substantiated by exports and can be a success story if logistic strategies are applied effectively along with them. This paper has investigated whether exports of goods/services, transport services for exports and export time have had an evident impact on the GDP growth of South Asian Countries between 1970-2014.

It is a very well-known fact that the exporting potential of a country is in direct relationship with its ability to earn foreign exchange that allows them to expand their economic growth by importing goods (Tahir & Azid, 2015). In addition to the imports and exports, transportation has also been among the most important factors to support GDP growth in numerous ways. Included in these is the ability of modern transportation systems to enhance the overall productivity of a country by carrying more cargo in lesser time span (Bougheas *et. al.*, (2000); Lakshmanan, 2007). The other reasons include the ability of modern transportation strategies to support an even spill-over of technology across all the national economic hubs. Also, micro-level financial investment has the potential to return a macro level output, which reduces costs and enhances profitability, eventually resulting in a steady growth in GDP (Nordås*et al.*,2006). Unfortunately, established businesses work around familiar spots. Other businesses and countries join these hubs through transport networks. Hence, improved transportation can spread economic activity evenly around the globe. Low transport costs can uplift traded volume. Investment in road transportation will encourage large trucks and improved ports will support fast and large vessels. Hence, approaches to global markets necessitate quality

transportation and relevant logistics services (Duranton & Storper, 2008; Harrigan & Venables, 2004; Redding & Schott, 2003). Since certain factors, such as cost per consignment, import and export times, satisfaction of the user, and reliability of a service are vastly dependent upon the choice of service, Wagner *et al.,* (2012) suggests that the choice of transportation for international as well as local level trade has become a key factor to consider.

Previously, research attention has been focused on the association of air transportation and economic variables in high income nations and less attention has been given to low income and South Asian nations (Baker *et al*, 2015, Marazzo *et al.,* 2010). One piece of research focused its attention on air transport and economic growth in SAARC nations (Hakim & Merkert, 2016). Until now, it signals the room of investigation of other logistic variables in connection to economic growth in South Asian nations. Hence, this paper can be considered the first attempt in this domain to estimate and assess transportation services of exports, timing of exports, and exports of goods and services in relationship to GDP growth in SAARC countries.

In terms of the context, this particular study primarily targets SAARC countries that include Pakistan, India,Bangladesh, Nepal, Bhutan, Maldives, and Afghanistan. In other words, it targets the South Asian Block. Over the past twenty years, South Asian economies have observed convincing and sustainable economic growth. In 2014, total GDP stood at 2.59 trillion US dollars and growth rate remained at 6.9% (World Bank, 2014). For 2014, combined exports were $156 billion, and imports reached almost $2 trillion. According to the World Bank (2016), registered carrier departures in the South Asian region through air transport increased to 912, 858 from 154,700 in 2014. This achievement was made in the presence of the political and economic chaos faced by these nations in years under scrutiny. Surprisingly, 4% of global air cargo (in tonnage) was traded in South Asia while its air freight stood at 2.7 billion-tons/km in 2014 (Boeing, 2015). Total air passengers also observed rising figures from 5.14 million to 99.15 million through 1973 to 2014 respectively (World Bank, 2016).

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This research paper has been organised as follows: The coming section provides a literature review of the existing research work and previous studies in a similar domain, while section 3 is related to econometrical methodology. Furthermore, it also discusses the data sources in a detailed manner. The remaining sections, 4th and 5th, are related to the results and conclusion respectively.

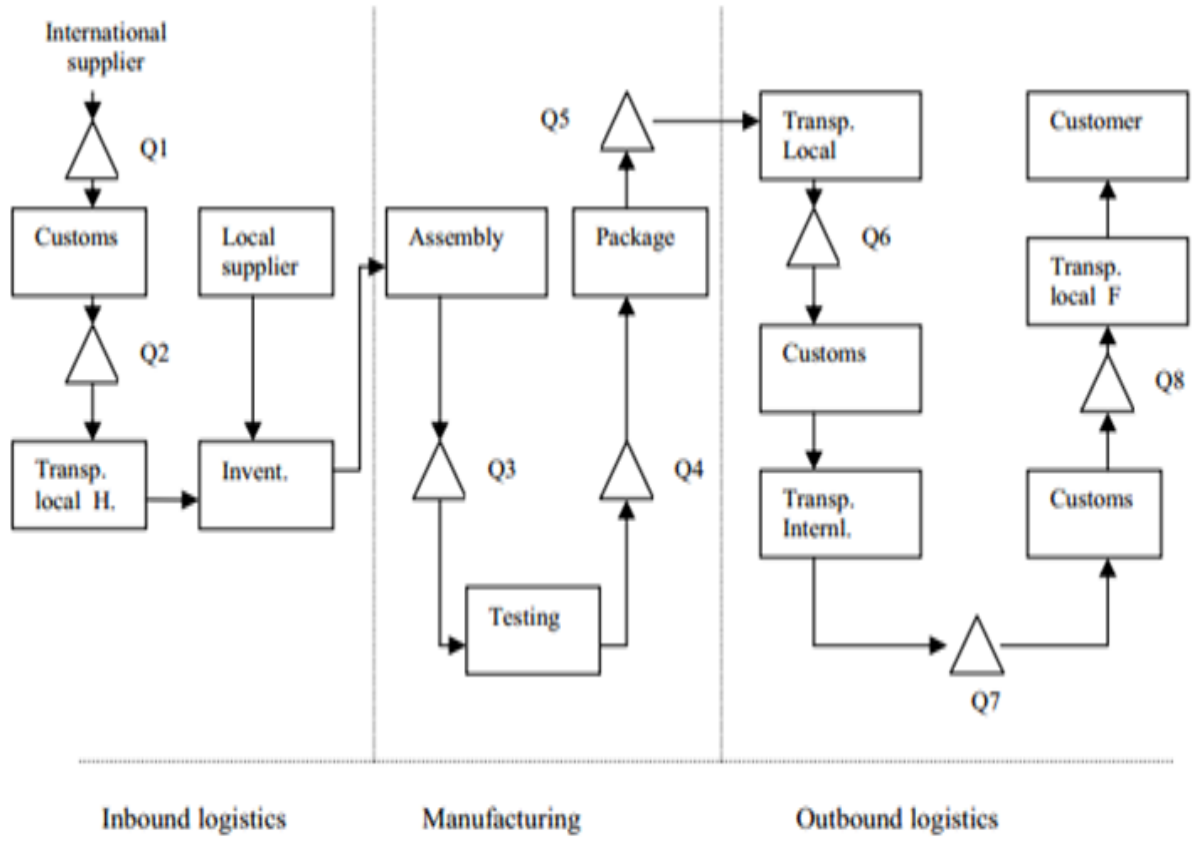
Literature Review

The literature examines how imports/exports, lead time and logistics strategies are related to economic growth. Most of the time, exports are linked with positive economic growth (Shawa, & Shen, 2013). Yet, some research studies indicate that imports allow nations to get goods and services that cannot be produced inside their borders or that are more costly for domestic production (Marwah, & Tavakoli, 2004). Fosu (1990) investigated the relationship of exports and economic growth in less developed economies. The findings of the research confirmed a positive association between the purposed variables. Kavoussi (1984) also found a relationship between exports and economic growth using a sample of 73 less developed economies. He found exports bring well-being in economies. Ehinomen and Daniel (2012) examined it in the long-term by analysing the causal relationship between economic growth and exports in Nigeria. They found unidirectional causality from exports to economic growth and cointegration relations through the ARDL approach. Another study by Mah (2007) found that there exists bi-directional causality between exports and the economic growth in the People's Republic of China. Similarly, Tekin (2012) estimated causality among real GDP, inward FDI, and real exports for least developing nations during the period from 1979 to 2009. His results revealed a causal relationship between exports and real GDP in Sierra Leone, Rwanda and Haiti, while there was an opposite direction of causality in Chad, Angola and Zambia.

Furthermore, international trade (exports/imports) is affected by time in two respects. Firstly, it influences the selection of a foreign market to be entered or not entered by a manufacturer. If entry is made, then time determines the trade volume (Hummels & Schaur, 2013).Time, cost or complexity of import or export is known as logistic performance (Hausman, Lee, & Subramanian, 2013). In the recent era, markets are modern. This is because businesses are competitive, and the delivery of punctual imports or exports is considered a major determinant of success (Guiffrida & Jaber, 2008). In a study by Munim & Schramm, (2018), it was found that logistic performance brings the highest level of wellbeing in the economy of any country. Mohamed (2015) studied the role of communication and information technology in reducing time for international trade. By employing a two stage least square approach in 16 Arab countries, he found the negative relationship between time and economic growth. Nordas & Pinali (2006) found that time required to export goods has an inverse relationship with the economic growth of a country. They found that delays in export time reduces trade volume.

Exports and imports require effective implementation of logistics strategies. Frazzele (2005) suggests that the term "logistics policies" refers to all those policies that are relevant to the flow of money, information, and materials between customers and suppliers. In addition, he also argues that certain activities, such as customers' responses, supply, inventory management, warehousing, and transportation are also related to logistics, which happens to be a broader term. Technological advancement also helps to upgrade logistics, as well as the services sector (Eichengreen & Gupta, 2013). Logistics also play a vital role in determining whether companies will reach international markets or not. They also influence the price they collect for their commodities. Transportation, lead time, and cost of inbound and outbound logistics aids the effective delivery of goods to their final destination in this competitive world. Thus, they boost economic growth (Hooi Lean, Huang, & Hong, 2014; Sheffy, 2012; Wang, 2010). Figure 1 illustrates the role of transportation.

Figure 1: Flow of material



Source: (Li, Ganesan, & Sivakumar, 2005)

The previously provided justification may further be examined in terms of one of Egypt's largest cotton exporters that relied upon thread imported from India and Pakistan. The average time for an arrival of this kind of consignment is 30 days, and it includes all the relevant activities, such as container handling at the terminal, the custom clearance process, and its

transportation from the port of Alexandra to the storage facility of the company. But since the consignment spends most of its time in India and Pakistan, to cater such delays, the firm maintains a stock of yarn for four months. In the case of this particular exporter, the estimated time for a container to reach the port of Alexandra (which happens to be 220 kilometres away from the company's storage facility) is only 48 hours. Interestingly, this time also includes the time required for the packing and documentation. However, due to a large number of stops, the sailing time for this cargo to the United States is estimated to be 21 days. However, the sailing time can be decreased by a great margin if the consignments are shipped directly to the US, as no stops would be required (Devlin & Yee, 2005).

Transportation services for exports can be defined as all the modes, including sea, land, pipeline, space, land, air and internal waterway, that help movement of all physical things, passengers and associated services to different destinations (World Bank, 2014). According to Easterly and Rebelo (1993), research work concluded that less developed and poorer countries could increase their growth rate by enhancing their communication and transportation sectors. On the other hand, Devarajan *et. al's* (1996) research work discovered the existence of an inverse relationship between the aforementioned factors. Their research work was quite extensive, as they closely studied 43 developing countries during the period from 1970 to 1990 (Beyzatlar *et. al.,* 2014). Later, various researchers conducted their research studies on similar topics and discovered no evidence to support Devarajan *et. al's* claims. Rather, they found that if governments focus on the development of their transportation sectors, it would cut-down a significant amount in terms of expenses, which may also be termed as a "cost function approach". This approach is the key to the establishment of the previously mentioned relationship. (Boarnet, 1996; Conrad & Seitz, 1994; Lynde & Richmond, 1993; Nadiri & Mamuneas, 1991; Seitz, 1993). Similarly, in their cross-country study, Bougheas *et al*., (2000) found that improvements in the transportation sector have the potential to pave the way for the financial growth of the country in the long-term. Furthermore, their study also discovered that integration of technology into infrastructure often does not cost much, but it significantly enhances the efficiency of systems, although this impact is very hard to locate in final output.

Upon an in-depth review of the existing literature and research, the following hypotheses have been formulated and proposed.

H_1: There exists a prominent long-term association between the volume of exports of services and goods and the GDP of *SAARC* partner countries.
H_2: There exists a prominent long-term relationship between the time required to export and the GDP of *SAARC* countries.
H_3: There exists a prominent long-term association between the transportation services of exports and the GDP of *SAARC* countries.
H4: There is no causality between purposed variables.

Data Collection and Methodology

As mentioned earlier, the primary objective to launch this particular research project is to study the causational and long-term relationship that exists between the economy of SAARC partner countries and certain factors, such as export time, transportation services of exported goods, and overall exports. The collected research data for the purposed variables has been arranged in terms of annual frequency for the period between 1970-2014. The research data, related to the SAARC partner states, has been collected from WDI (World Development Indicator). To estimate the causal relationship, the following data (and their units) was used. Terms are referred to as the exports of services and goods (EGS n constant 2010 US$), Export Time in Days (TE), Transport Services (TSE of commercial services exports), and per capita GDP (in constant 2010 US$). At first, to balance the SD (Standard Deviation) between the sample and to induce the stationarity in the variance matrix and covariance, the variables were converted into natural algorithmic values (Chang *et al.*, 2001).
This particular research study made use of a panel vector error correction model to investigate the long-run relationships existing between growth in GDP and selected indicators, as given below.

$$lnGDP_{it} = \beta_0 + \beta_1 (lnEGS_{it}) + \beta_2 (lnTE_{it}) + \beta_3 (lnTSE_{it}) + \mu_{it} \qquad eq.1$$

GDP = Gross domestic product *i =Country in the panel*
EGS = Exports of goods and services *t =Time period* *TE = Time to export* *μ = Error term*
TSE = Transport services, exports *ln= Refers to log*
β_1, β_2 *= sloops of coefficients*

Unit Root Test

A major chunk of existing research work utilises the time series data to conduct causal analysis. However, the Granger tests are far more efficient if performed on panel data instead of time series data (Baltagi *et. al.*, (2005); Im, Pesaran & Shin (2003); Levin, Lin& Chu, 2002). First of all, to assess whether or not the past and present data is not affected by the future, the unit root tests are conducted (Granger, 1969). However, the results may turn out to be spurious if the data is not stationary. Therefore, stationary data is required to perform these tests.

During his experiments, Hadri (2000) used the null hypothesis of stationarity to assess the panel unit root tests. Since the SAARC countries are naturally heterogenous, the dataset could not be optimally balanced. Considering this fact, this particular research project makes use of panel unit root testing (Im Pesaran & Shin, 2003). The stationarity of series can be examined using a variety of testing methodologies, but not all methodologies are well suited for this purpose due to certain shortcomings associated with them. This research uses the panel tests proposed by Levin, Lin and Chu (LLC) (Levin, Lin& Chu, 2002) and Im, Pesaran and Shin (IPS), (Im

Pesaran & Shin, 2003). The first test (LLC) aimed to assess the heterogeneity between the existing cross sections, which is a preferred approach since LLC has a unique serial correlation, as well as low power. Thus, to compensate the LLC confinements, Im, Pesaran and Shin's test was added to the research. This test has the additional capability of mitigating the serial correlations, which is very useful in this scenario (Li, Chen& Wang, 2011).

The tests for this research project were based on the equations that are given below.

$$\Delta x_{it} = \alpha_i + \beta x_{i,t-1} + \sum_{j=1}^{pi} \beta_{ij} \Delta x_{i,t-j} + \mu_{it} \qquad 2$$

In this equation i =1,…, I, which represents the countries. Similarly, t =1,…, T, as the name suggests, represents the time. $x_{i,t}$ is used as a representor for countries with respect to the time period *t*. In addition, the optimal legs serve the role for the representation of pi, and for the residuals used, μ_{it}. The LLC possesses a null hypothesis i.e. *H*0: $\beta = 0$ that opposes the alternative *H*1:$\beta < 0$. On the other side, the IPS follows the first equation. Nevertheless, variance in IPS β is a strong possibility. Since the IPS test offers heterogeneity for all the coefficients across the panel units, this research considers it to be better than LLC. Furthermore, the IPS test's null hypothesis is $H_0: \beta_1 = 0 \; \forall$ I with a different hypothesis of $H_0: \beta_1 < 0 \; \forall$ I.

Panel Co-integration Test

The second step tests the entire series that was under consideration during the previous stage to identify panel cointegration and to develop long-term relationships between the variables. The results produced by these tests help the researchers to formulate causality tests for the next phase. The research made use of both of the co-integration tests, i.e. the Johansen Fisher Panel test, and the Kao co-integration test. Later, the application of unit root tests showcased the stationarity in all of the variables at 1 (I). The application of panel cointegration develops the following model.

$$y_{it} = \beta_1 + p_i t + \beta_{1i} x_{1.it} + \beta_{2i} x_{2.it} + \beta_{3i} x_{3.it} \ldots\ldots\ldots\ldots\ldots\ldots . N + \varepsilon_{it} \qquad 3$$

In the above equation, i =1,…,I signifies the countries, while , t =1,…,T, as is evident, is for time. Other signs include β_1 and p_i, which discuss the overall intercept and arrogant trend.

Vector Error Correction Model (Panel VECM)

As mentioned in the previous section, the selection of causality tests is entirely dependent on the results produced by the cointegration tests. During this phase, since the series follows the same order and it is cointegrate, the VECM (Vector Error Correction Model) is best suited to the nature of research to identify the long- and short-range relationships. Previously, simple mathematical regressions were used by the researchers. However, the application of simple regression is only valid till the panel data is stationary. During this particular research project, it was identified that time series data contains a notable number of R-squares, but the results produced are discarded as they are considered meaningless. Box and Jenkins (1970, 1976) were the first to identify that the non-stationarity effect can be resolved if the first difference of data is applied.

As mentioned earlier, the inaccuracy of results can be examined using the first difference, but the processes does not retain most of the important details. Therefore, the entries related to dependable relationships also showcased an inaccurate answer (Davidson and Hendry, 1981). These issues emerged due to a change in data. The term "constant" has been abolished and the term "inaccurate" has been correlated with the disequilibrium effect, which is not considered (Davidson and Hendry, 1981). However, the research project made use of VECM to compensate for the loss of data and existing inaccuracies. VECM is very well suited to the nature of this research project due to a variety of reasons, i.e. the variables are constant at 1, which enables cointegration. The equations that were used in the panel VECM model have been listed below.

Eq.(4)

$$\Delta \mathrm{lngdp}_{it} = \alpha_{1j} + \sum_{K=1}^{m} \alpha_{11ik} \Delta \mathrm{lngdp}_{it\_k} + \sum_{K=1}^{m} \alpha_{12ik} \Delta \mathrm{lnegs}_{it\_k} + \sum_{K=1}^{m} \alpha_{13ik} \Delta \mathrm{lnte}_{it\_k} + \sum_{K=1}^{m} \alpha_{14ik} \Delta \mathrm{lntse}_{it\_k} + \lambda_{1t} \mathrm{ECT}_{1it\_1} + \mu_{1it}$$

Eq.(5)

$$\Delta lnegs_{it} = \alpha_{1j} + \sum_{K=1}^{m} \alpha_{21ik} \Delta lngdp_{it\_k} + \sum_{K=1}^{m} \alpha_{22ik} \Delta lnegs_{it\_k} + \sum_{K=1}^{m} \alpha_{23ik} \Delta lnte_{it\_k} + \sum_{K=1}^{m} \alpha_{24ik} \Delta lntse_{it\_k} + \lambda_{1t} ECT_{1it\_1} + \mu_{1it}$$

Eq.(6)

$$\Delta lnte_{it} = \alpha_{1j} + \sum_{K=1}^{m} \alpha_{31ik} \Delta lngdp_{it\_k} + \sum_{K=1}^{m} \alpha_{32ik} \Delta lnegs_{it\_k} + \sum_{K=1}^{m} \alpha_{33ik} \Delta lnte_{it\_k} + \sum_{K=1}^{m} \alpha_{34ik} \Delta lntse_{it\_k} + \lambda_{1t} ECT_{1it\_1} + \mu_{1it}$$

Eq.(7)

$$\Delta lntse_{it} = \alpha_{1j} + \sum_{K=1}^{m} \alpha_{41ik} \Delta lngdp_{it\_k} + \sum_{K=1}^{m} \alpha_{42ik} \Delta lnegs_{it\_k} + \sum_{K=1}^{m} \alpha_{43ik} \Delta lnte_{it\_k} + \sum_{K=1}^{m} \alpha_{44ik} \Delta lntse_{it\_k} + \lambda_{1t} ECT_{1it\_1} + \mu_{1it}$$

In the given equations, the Δ signifies the first difference, while K indicates the maximum value of lag distance that is based on SIC. A closer observation of equation 1 shows that it only provides details about one-way relationships. For example, the volatility of stock index is caused by a longer run of exports, and the value of all coefficients of α12IKis set to zero in equation 1. Interestingly, a similar method is employed to testify the short-term causality.

Granger Causality Test

The research also employed the Granger test to examine the vaporisation of price index using the lead-lag link. Similarly, macro-economic variables were also examined. According to Granger (1069), since the variable Xt's past session can be helpful to make an accurate prediction about Yt and vice versa, the given equations can also be utilised to perform a causality analysis on the stock price index.

$$Y_t = \beta_0 + \sum_{j=1}^{n} \beta_{1j} Y_{t-1} + \sum_{h=1}^{p} \beta_{2h} X_{t-p} + \varepsilon_{1t} \quad Eq(8)$$

$$X_t = \alpha_0 + \sum_{s=1}^{k} \alpha_{1s} X_{t-s} + \sum_{t=1}^{m} \alpha_{2t} X_{t-m} + \varepsilon_{2t} \quad Eq(9)$$

In these equations, the t is a representative of time, while Yt represents economic growth. Xt, on the other hand, indicates the independent variables with respect to the time. The remaining Xt-j and Xt-m signify the lags of GDP, and Xt-pand Xt-s are there to represent independent variables. Lastly, ε_{1t}&ε_{2t} highlight the level of white noise with respect to time.

Results and Discussion

Table 1: Descriptive statistics

	LNGDP	LNEGS	LNTE	LNTSE
Mean	6.402534	8.371879	2.943282	3.325500
Median	6.645737	7.000000	3.218876	3.435275
Maximum	8.161657	25.52292	3.433987	4.212485
Minimum	1.008869	0.000000	2.000000	2.100337
Std. Dev.	1.233930	5.901780	0.552652	0.559022
Skewness	-2.474423	1.202609	-0.992182	-0.286446
Kurtosis	9.755000	3.596918	2.235652	1.743028
Jarque-Bera	461.6305	40.43078	29.76938	12.56222
Probability	0.000000	0.000000	0.000000	0.001871

Table 2: Correlation

Correlation				
Probability	LNGDP	LNEGS	LNTE	LNTSE
LNGDP	1.00			
	-----			
lnEGS	0.286	1.000		
	0.00	-----		
lnTE	0.08	0.200	1.000	
	0.300	0.011	-----	
lnTSE	0.355	0.228	0.495	1.000
	0.00	0.00	0.000	-----

Table 3: Data Stationary Test

Variables	Levin–Lin–Chu unit root test (LLC)		Im-Pesaran-Shin unit root test (IPS)		Decision
	Level	First difference	Level	First difference	
lnGDP	0.659 (0.745)	-5.459 (0.000)	1.617 (0.942)	-9.10 6 (0.000)	**I(*1*)**
lnEGS	0.003 (0.501)	-4.333 (0.000)	0.601 (0.161)	-9.702 (0.000)	**I(*1*)**
lnTE	0.447 (0.672)	-4.937 (0.005)	-1.343 (0.089)	-4.226 (0.000)	**I(*1*)**
lnTSE	-1.404 (0.079)	-6.643 (0.005)	-1.531 (0.064)	-4.176 (0.000)	**I(*1*)**

The study employs the VECM model, as described earlier, to examine the nature of long and short run causality. Unless the VECM model was introduced, the researchers used to utilise the panel root method. It was utilised to examine the integration between the series'. The up-given table-2 offers an illustration of results derived using the IPS and LLC during the unit root testing. The results produced by these tests showcase that all of the previously discussed variables can be turned from non-stationary to stationary by applying the first difference.

Table 4: Panel co-integration test (KAO co-integration test)

	t-Statistic	Prob.
ADF	2.627658	0.0043
Residual variance	1.974943	
HAC variance	0.100364	
Null Hypothesis: There is no co-integration		

Table 5: Johansen fisher panel co-integration test

Hypothesised	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-Eigen test)	Prob.
None	38.42	0.0000	25.42	0.0003
At most 1	17.98	0.0063	16.45	0.0115
At most 2	6.874	0.3326	8.027	0.2361
At most 3	2.447	0.8744	2.447	0.8744

After observing the stationarity of the variables, the research project proceeded to find any existing relationships between the variables. As mentioned in the previous section, the utilised two tests were the *KAO Panel, and John Fisher Test. The results drawn through these tests have put the null hypothesis to a clear rejection, which otherwise translates into the possibility of a relationship existing between the aforementioned factors.

Table 6: Normalised long-run relationship of VECM

Variables	**Coefficients**	**Standard errors**	**T- value**
lnEGS	0.070	3.022	2.221
lnTE	-0.496	0.253	-1.954
lnTSE	0.968	0.256	3.780
C	4.023		
CointEq1	-0.712	0.106	-6.706
Adjusted R-squared	**0.44**		
F-statistic	**23.01**		
Serial correlation LM (prob.)	**0.51**		
Heteroscedasticity (prob.)	**0.69**		

The VECM model is bound to certain pre-conditions that have been described as follows: The first pre-condition requires the variables of stationarity at the first difference. Furthermore, the model also requires that the purposed variables should also possess the cointegration. The VECM panel can only be implemented if the model passes these pre-conditions. The above-given table 4 illustrates the existence of relationships between previously discussed variables/factors. Empirical findings make it evident that there exists a significant relationship between the InGDP and InEGS at a rate of 5% in terms of significance. Any 1% increase in inEGS reflects a 7% increase in the InGDP. This finding is also supported by previous research work (Bokosi, 2015; Simon, 2016; Vardari, 2015). Additionally, the results found that InGDP and InTSE are positively relate to each other and their relationship holds the 5% mark on the scale of significance. Interestingly, any 1% increase in inTSE causes a 97% increase in the inGDP (Easterly& Rebelo, 1993; Bougheas *et al*.,2000). On the other hand, the research study also discovered a negative relationship between the InGDP and InTE at a significance level of 10%. In other words, any 1% increase in InTE impacts the inGDP negatively by 49% (Munim & Schramm, 2018; Mohamed,2015; Nordas & Pinali (2006)).

The above given Table-6 represents this entire scenario in the statistical form for a better and clearer understanding of this entire situation. For this particular study, the error correction factor for the coefficients is close to 1%, which is fairly high. Due to the high error margin, the error correction team has to re-implement the entire scenario. However, the time consumed during this process was 71% in comparison to the previous years' values for dis-equilibrium process.

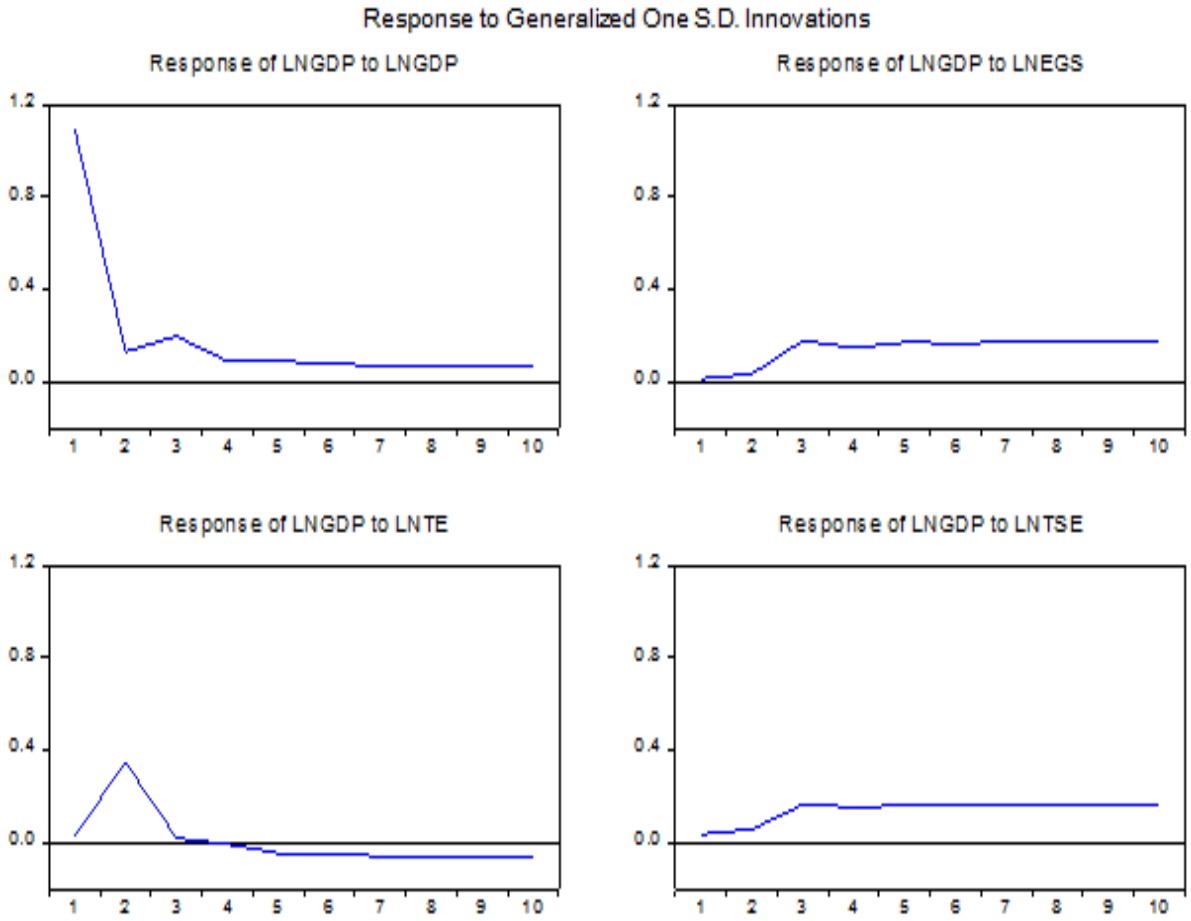
Additionally, the value of R-square has showcased a 44% value of disparity in terms of independent variability. This value is greatly influenced by the projected variations. Similarly, the 56% value is also due to various other factors that are no longer associated with the system. However, the overall values suggest that the model is well suited to the system, and it's a good fit.

Table 7: VECM based Granger Causality Test for SAARC Countries

Null Hypothesis:	Obs.	F-Statistic	Prob.
LNEGS doesn't Granger Cause LNGDP	175	9.677	0.002
LNGDP doesn't Granger Cause LNEGS		2.150	0.144
LNTE doesn't Granger Cause LNGDP	174	0.380	0.538
LNGDP doesn't Granger Cause LNTE		0.005	0.940
LNTSE doesn't Granger Cause LNGDP	154	11.254	0.001
LNGDP doesn't Granger Cause LNTSE		0.431	0.512

Table 7 reports the results of causal direction between projected variables. The findings showed unidirectional causality running from lnEGS and lnTSE to lnGDP. It implies that lnGDP will effect due to changes in lnEGS and lnTSE in the short run. On the other side, there is no proof of causality between lnTE and lnGDP in the short-run for SAARC nations.

Figure 1: Impulse response function



We adopted the following order to conduction IRF analysis for lnGDP, lnEGS, lnTE and lnTSE. The above graphical presentation indicates the response of financial growth due to a

shift in lnEGS, lnTE, lnTSE and lnGDP itself. To interpret the impulse response functions, one needs to clearly understand what impulse response is. The impulsive reactions mainly respond to the adverse effects of variable substitution variables. The disturbing pulses are calculated as the changes in the standard deviation of the variations. For instance, if a variable is changed from 1 item of standard deviation, this may take place in response to what happens to the variable. This response then takes place over time. If the response returns to the zero-level line, we can say the response is temporary and will disappear in a given period of time. As a result, the response converges with the zero line. If the zero-line responds, then the impact of having a non-convergent and non-time response to shocks can be commented on. It can be decided whether it is going to produce a temporary impact through the observation of the impact of policies or, over a longer period of time and with a longer cumulative effect, whether it will influence the pattern of economic changes related to theory.

A one standard shock to lnGDP indicates that lnGDP will respond positively for the next ten periods. However, a very sudden decreasing response for the first period after this responds systematically. In terms of the impulse is lnEGS and lnTSE, the lnGDP responded positively for the next ten years. However, due to a shift in standard deviation for lnTE, for the first three periods, lnGDP responds positively but for the last seven years, lnGDP responds negatively.

Table 8: Variance decomposition analysis

Period	S.E.	LNGDP	LNEGS	LNTE	LNTSE
1	1.094099	100.0000	0.000000	0.000000	0.000000
2	1.158918	90.44131	0.079863	8.734603	0.744224
3	1.200513	87.01708	2.255147	8.142388	2.585388
4	1.222493	84.44698	3.619386	7.866920	4.066716
5	1.248873	81.46743	5.346563	7.735639	5.450372
6	1.273070	78.74771	6.869672	7.669770	6.712850
7	1.297676	76.11740	8.350385	7.650401	7.881817
8	1.321658	73.67176	9.718184	7.644816	8.965240
9	1.345343	71.37957	11.00056	7.647334	9.972538
10	1.368601	69.23994	12.19622	7.652101	10.91174
Cholesky Ordering: LNGDP LNEGS LNTE LNTSE					

Table no. 8 reports the results of variance decomposition. In terms of GDP, 100% attribute its increase or decrease to its own specific shock instead of any other variable projected in the model. The findings indicate that lnTE is only the variable which can be considered in explaining the forecast error variance, accounting for 8%. However, lnEGS and lnTSE only contribute 2.2% and 2.5% to forecast error variance. However, from period seven onward, lnEGS contributes 8.3%, 11% and 12%, whereas lnTSE contributes 7.8%, 9.9% and 10.9%. This implies that lnGDP is determined more for the first 6 years by lnTE, but for the next four year, lnEGS and lnTSE replace lnTE as the leading factor to determine economic growth.

Discussion and Conclusion

This particular study mainly aimed to asses and examine the causal relationships among a variety of factors, such as export time, exports of services and goods, services exports, and GDP. The study mainly focused on South Asian countries, and panel time data ranging from 1970-2014 was analysed. In addition, the VECM model was utilised to assess the existence of short term and long-term relationships between previously mentioned factors. Upon the completion of research, a positive relationship was found between InGDP, and InTSE, and InEGS. However, the relationship between InTE and GDP happened to be negative.

This is a very significant finding for corresponding departments like developers, governments, support staff, airports, seaports, cargo agents, and transport planners of SAARC countries. The growth of the average economic region of 6% per year (increasing for many years), along with the increase in disposable income per capita, can result in a rapid increase in the vicinity of plans. Stakeholders also have to overcome logistical issues related to infrastructure, planning, and secure investment. This predictor can improve transportation needs. There is a clear relationship between logistics and levels of development. We have noted that all South Asian countries have not fully converted to the desired level of progress and development. The policy has implications for airlines, governments, logistics companies, freight forwarders and planners in transportation and civil aviation in SAARC nations. The region is having economic growth of more than 6% that will increase in the future. All the policy stakeholders involved in logistics should plan theory structures for meeting more demands for imports and exports along with reducing lead times.

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