THE CAUSAL RELATIONSHIP BETWEEN EXPORT AND ECONOMIC GROWTH OF PAKISTAN

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Abstract

The nature of the relationship between the export and economic growth is one of the most debated topics among the economists and central of this debate is the question of whether the strong economic performance is growth driven or export led. To find out the answer to this question is very important for any economy because it is essential for policy maker's decision about the appropriate growth and development strategies and policies to adopt. The aim of this study is to examine the export-led growth (ELG) hypothesis for Pakistan through the application of econometric technique Toda and Yamamoto Granger causality and cointegration test by using exports percentage of GDP of Pakistan, GDP of Pakistan and capital formation in Pakistan on the basis of annual data for the period of 1967 to 2015 and the data is taken from (WDI) world development indicators. The empirical results of Toda and Yamamoto Granger causality test clearly indicate that there exists unidirectional causality from (i) exports to GDP (ii) exports to investment (iii) GDP to investment in Pakistan and not vice versa.

Keywords: Exports, Economic Growth, Export-led-Growth, Cointegration, Causality, Pakistan

INTRODUCTION

Economic development is one of the foremost objectives of every country and economic growth is the primary feature of economic development. Thus, increasing gross domestic product is most important for any economy. There are many approaches to accomplish this target to which one possibility is to promote the exports. There exist a vast literature that shows the relationship as well as the direction of causality between exports and economic growth of the country. At this point, an important question clicks in the mind of economists and researchers is that whether the economic growth leads to exports growth or exports promotion leads to economic growth. Thus the different economists have different ideas about the question. One school of thought has a favorable view about the export-led growth hypothesis while the other argues in the favor of growth driven export hypothesis. Some economist also thinks that there is abi-directional relationship between export and economic growth.

The export-led growth hypothesis claims that the export promotion through policies such as exchange rate depreciation or the export subsidies will increase the economic growth. Export-led growth hypothesis is defined by School of neo-classical as it stimulates the production of goods and services through a variety of different production channels as the dissemination of technical knowledge, efficient distribution of resources, competitive atmosphere among business easy access to foreign exchange and increased imports of raw material and capital goods which result in higher capital formation. It creates the competition in the international markets which promotes the economies of scale and increase the efficiency by utilizing the resources in those sectors in which country has a comparative advantage. This positive effect promotes the economic growth. On the contrary, the argument that economic growth promotes the export growth states that increase in the production gives the comparative advantage in certain sectors that lead to export growth.

According to endogenous growth theory long run growth rate is primarily the result of endogenous factors. The physical and human capital both together are presumed to show increasing return to scale (Hossain and Karunaratne, 2004). The endogenous growth models also focused on the role of research and development in a technological change to achieve the economic prosperity (Grossman and Helpman, 1991). According to Krugman (1986) and Lucas (1988), trade promotes an innovation, research and development spillover that leads to higher productivity growth. The export promotion strategies enhance the process of human capital formation (Chuang, 2000).

It is due to these contradicting ideas about the relationship between export and economic growth; many developing countries are still in dilemma whether they should concentrate on economic activities that promote the export or to open up their economies to

promote the international trade which will lead the economic growth. Today a good number of researchers believes that developing countries can achieve the economic growth through the openness of trade while others argue that developing countries should protect their industries and encourage their economic activities which will lead to economic growth.

The objective of this study is to find out the results of export-led economic growth for Pakistan. Export-led economic growth is one of the most important strategies used by developing countries.

The export-led economic growth strategy is mostly important for two reasons. Firstly, it can generate the profit which enables the country to balance their investment and surpass their liabilities, Secondly; the most arguable reason is that export growth can increase the productivity by removing the inefficiencies from the economy.
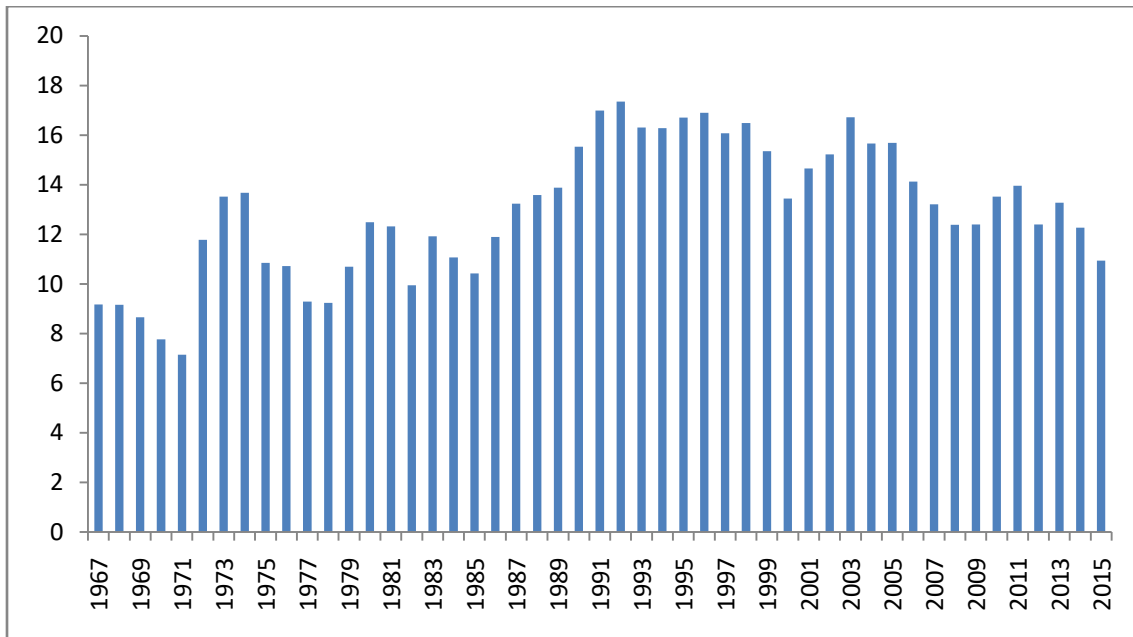
Trends in the exports of Pakistan

The word 'Export' can be defined as the commercial sale of goods, services and financial assets in the international market. Export refers to a number of goods and non-factor services that a country produces and sells to other countries that include merchandise, insurance, freight, travel, and other non-factor services. In the early years of independence, Pakistan could not exploit the potential of available resources in a better way which later on proved the main reason of slowing down the pace of development. In the decade of 1950, the export of Pakistan was decreased by 43.18%. However, in the decade of development in 1960, the industry was established and nature of production changed that increased the export of Pakistan from 540 million rupees in 1960-61 to 29280 million rupees in the decade of 1970 and reached to 138280 million rupees in 1990-91. The figure rose up to 560947 million rupees in the year of 2000-01, whereas the export of Pakistan was recorded $10001.0 million in the year of 2003-04, that showing the increase of 13.1% from the last fiscal year 2002-03. After 2003-04 the share of export in gross domestic product (GDP) of Pakistan has decreased due to a shortage of electricity, terrorism, and political instability.

Global trade without any quota restrictions has created the opportunities for the emerging and developing countries to increase their export, some countries have availed this opportunity, while others failed to take advantage and Pakistan is one of them who could not get the benefit from the opportunity. Pakistan`s export has been stagnant for last few years, fluctuating around US$ 24-25 billion. The export target of Pakistan for 2016 was set up to $25.5 billion but the export of Pakistan during 2015-2016 stood at US$ 15.6 billion against US$ 17.9 billion during 2014-2015, a decline of 12.9%. However, it is observed that in the last two years slowdown in the global economy has also an adverse effect on the export of Pakistan.

According to UN study covering 30 years from 1980 to 2011, India`s share of world export increased from 0.43% to 1.7%, Malaysia`s from 0.74% to 1.34% and Thailand`s 0.37 to 1.35% while the Pakistan`s share remains stagnant to 0.15 percent. One of the main reasons of this is that Pakistan has only a few and almost same products to export since last thirty-five years and a major share of export of Pakistan are limited to few countries.

Figure1: Exports of goods and services % of GDP

Source: World Bank

The composition of export of Pakistan has changed over the years. The principal change is fall in the share of primary and semi-manufactured goods and increases the share of manufactured goods. In the early years of independence, the export of primary goods was more than semi-manufactured and manufactured goods. In the decade of 1950, 99% of Pakistani export was mainly concentrated on five main primary commodities i.e. raw cotton, raw wool, raw jute, hides, and tea, so Pakistan fits the classical case of an undeveloped and unindustrialized country. On the other side in the recent years, Pakistani export is also concentrated on few items namely cotton, leather, rice, sports goods and synthetic textile.

Table 1. Pakistan`s major export

% share

Commodity	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	July-March	
							2014-15	2015-16
Cotton Manufactures	50.6	52.9	49.6	51.6	53.1	54.5	54.9	58.1
Leather**	4.5	4.4	4.4	4.7	5.1	4.8	5.1	4.6
Rice	11.3	8.7	8.7	7.8	7.6	8.5	8.8	8.8
Sub-Total of three Items	66.4	**66.0**	**62.7**	**64.1**	**65.8**	67.8	68.8	71.5
Other items	33.6	34.0	37.3	35.9	34.2	32.2	31.2	285
Total	100.0	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Pakistan Bureau of Statistics

The first three categories of export accounted for 71.5% of total export during the year of 2015-16, with cotton and cotton manufactured alone contributed about 58.1%. Although Pakistan trades with many countries but its exports are highly concentrated in few countries about 60% of Pakistan`s total export goes to following ten countries.

Table 2: Major Exports Markets

(Rs. billion & Percentage Share)

Country	2010-11		2011-12		2012-13		2013-14		2014-15		July-March 2015-16	
	Rs	**% share**	**Rs**	**% share**	**Rs**	**% share**	**Rs**	**% share**	**Rs**	**% share**	**Rs**	**% share**
U.S.A	338.3	16	315.3	15	341.3	14	381.5	15	276.5	15	270.5	17
China	139.7	7	195.9	9	252.5	11	249.0	10	169.9	9	134	8
U.A.E	154.6	7	205.6	10	205.4	9	180.0	7	80.5	4	633.9	4
Afghanistan	199.6	9	200.6	10	200.0	8	192.5	7	143.6	8	116	7
United Kingdom	103.1	5	105.7	5	121.2	5	161.5	6	120.7	7	123.9	8

Table 2...

Germany	108.8	5	94.0	4	93.6	4	117.9	5	90.1	5	87	5
France	34.1	2	29.8	1	93.7	4	42.7	2	28.3	2	24.5	2
Bangladesh	86.8	4	56.6	3	68.7	3	71.8	3	53.2	3	55.6	3
Italy	67.6	3	51.6	2	52.2	2	75.6	3	50.6	3	48.6	3
Spain	48.9	2	43.7	2	51.0	2	72.0	3	60.6	3	62	4
All Other	839.3	40	811.9	39	887.0	38	1,039	39	738.8	41	637.8	39
Total	**2,120.8**	100	**2,110.6**	100	**2,366.5**	100	**2,583.5**	**100.0**	1812.8	100	1623.8	100

Source: Pakistan Bureau of Statistics

Problem Statement

It is widely accepted that the countries have a better export performance also well in its growth of GDP and vice versa. Above said statement raises an important question concerning the direction of causality between GDP and exports. The present study will be conducted to find out the answer to the above-said question in the context of Pakistan.

Research Question

- Is there export-led growth (ELG) in the case of Pakistan?
- Is there growth led export (GLE) in the case of Pakistan?

Research Purpose

- To analyze the empirical link between export and GDP of Pakistan
- To investigate the export-led growth hypothesis
- To investigate the Growth led export hypothesis

Hypotheses

Our study is based on the following hypotheses for testing the causality relationship and co-integration between GDP, investment and export in Pakistan (i) whether there exists a long-run relationship between GDP, investment and export in Pakistan, (ii) whether there is bi-directional causality relationship between GDP, investment, and export, (iii) whether there is unidirectional causality relationship between the three variables, (iv) whether there is no causality relationship between GDP, investment,and export in Pakistan.

Significance

- This research work may provide help to understand the presence or absence of ELG in the case of Pakistan.
- To figure out the importance of export in the economy of Pakistan.
- The key findings may help the policy makers to set a suitable policy for Pakistan.

LITERATURE REVIEW OF RELATED STUDIES

In any study of the global economy, one of the key elements is the total quantity of goods and services produced over a period of time. The measure is called the nominal gross domestic product (GDP). This is the market value of the total quantity of final goods and services produced during the specified period. GDP is measured quarterly, but the number is multiplied by four, so the amount is expressed in annual terms (Mankiw 2011).

The components of GDP are consumption (C), investment (I), public expenditure (G) and net exports (NX). Net exports represent the monetary value of domestically produced goods that are sold outside the country (exports) minus the purchase of goods and services produced in other countries (imports). Exports are part of our domestic production, so obviously we will have to include it in our GDP, while imports are subtracted here because they are goods and services produced by other countries, but imports are already included in our consumption, investment and government spending. Thus, $Y = C + I + G + NX$.

The relationship between export and economic growth is complex by nature most of the studies shows the connection between export and economic growth. Through trade, countries can specialize in that product in which they have a comparative advantage in order to gain more profit which brings the efficiency in the economy which leads to economic growth. (Adam Smith and David Ricardo)

A large number of studies have been conducted by different economists to test the Export-Led Growth (ELG) hypothesis, by performing different econometric procedures, ranging from simple OLS to multivariate co-integration, but all previous empirical studies have produced mixed and conflicting results on the nature and direction of the causal relationship between economic growth and export.

Rana (1985) estimates an export-augmented production function for 14 Asian developing countries including Pakistan. The result shows that exports contribute positively to economic growth.

Khan and Saqib (1993) analyzed the relationship between economic growth and exports in Pakistan by estimating a simultaneous equation model, and the result reveals the strong correlation between these two variables.

Khan et al. (1995) explored the direction of causality and cointegration between gross domestic product (GDP) growth and export for the Pakistan. The empirical results confirmed that there is the cointegration between exports and output growth.

Sinha (1999) investigated the relationship between export instability, investment and economic growth in Asian by using co-integration methodology framework. The study reveals that most of the variables are not cointegrated. In the case of Japan, Malaysia, Philippines and Sri Lanka, the study shows the negative relationship between export instability and economic growth while for Pakistan, South Korea, Myanmar, and Thailand; the study shows the positive relationship between the two variables and in the case of India it shows the mixed results.

Hatemi and Irandoust (2000) studied the causality between economic growth and export of the Nordic economies. The results show Granger's unidirectional causality from economic growth to export growth in Denmark and bidirectional causality in Finland, Norway, and Sweden.

Anwar and Sampath (2000) investigated the export-led growth hypothesis for 97 countries including Pakistan for the period of 1960–1992. They conclude that there is unidirectional causality in the case of Pakistan from export to economic growth.

Ahmed, *et al.* (2000)examine the relationship between exports, economic growth and foreign debt for Bangladesh, India, Pakistan, Sri Lanka and four South East Asian countries using a trivariate causality framework. He rejects the export-led growth hypothesis in his study for all the countries (except for Bangladesh) included in the sample.

Akbar and Naqvi (2000) examined the performance of gross domestic product (GDP) growth, diversification and structural change in exports over the period 1973-1998 or the Pakistan and results reveal that variables are co-integrating with each other.

Vohra (2001) examined the relationship between the export and growth over the period of 1973 to 1993 for Pakistan, India Philippines, Malaysia, and Thailand. The paper reveals that when a country has achieved some level of economic development than the exports can put the positive impact on economic growth.

Nidugala (2001) investigated the ELG hypothesis for India He concludes that export expansion has a significant impact on GDP growth. Further, his study shows that expansion of manufactured exports has a significant positive relationship with GDP growth, while the growth of primary exports had no such influence on the GDP growth.

Hatemi (2002) investigated the causal relationship between economic growth and export growth in Japan by using augmented Granger-causality test. The results show that the Granger-causality is bidirectional; it means the enhancement of exports is an essential part of the economic growth process in Japan.

Kemal, *et al.* (2002) investigate export-led growth hypothesis for five South Asian Countries including Pakistan. The study reveals that there is no evidence of causation in the short run for Pakistan in either direction. However, they find a strong support in the case of long-run causality from export to GDP for Pakistan.

Sharazi and Manap (2004) show the impact of export on economic growth of Pakistan, by performing multivariate Granger causality test for the period of 1960 to 2003. The result confirms thevalidity of export-led growth hypothesis for the economy of Pakistan.

Din, M. (2004) investigated the export-led-growth hypothesis for the five largest economies of the South Asian region by using panel data framework. The result of study reveals that in India, Bangladesh, and Sri Lanka there is bidirectional causality between exports and output growth in the short-run, while long-run equilibrium relationships among exports, imports, and output for Bangladesh and Pakistan and there is no evidence of a long-run relationship among the variables for India, Nepal, and Sri Lanka.

Shirazi (2004) studied the relationship between the real export, real import, and economic growth by using the co-integration and multivariate Granger causality developed by Toda and Yamamoto (1995) over the period of 1960 to 2003.This study reveals that the long-run relationship between the import, export and economic growth and also found unidirectional causality among the variables from export to economic growth while did not find any significant causality between import and export.

Wong (2007) investigated the relationship of exports, domestic demand and economic growth in the Middle East countries, namely Iran, Bahrain, Oman, Saudi Arabia, Qatar, Syria, and Jordan by performing the Granger causality test. The results show that export expansion can lead to economic growth when a country has a higher ratio of openness to international trade. Therefore, economic growth will increase exports and domestic demand.

Chen (2007) investigated the Export-led Growth (ELG) and the Growth-driven Export (GDE) hypotheses for Taiwan by estimating the Vector Error Correction Model (VECM) and Granger causality test. The empirical results conclude that the long-run relationship exists among exports, output growth, terms of trade and labor productivity of the model and that Granger causal flow between real exports and real output is bidirectional.

Ullah and Asif (2009) studied the export-led-growth hypothesis for Pakistan by performing time series econometric techniques (Unit root test, Cointegration, and Granger causality through Vector Error Correction Model) over the period of 1970 to 2008. He concludes that export expansion leads to economic growth. They also checked the direction of causality that whether there is unidirectional or bi-directional causality between economic growth, real exports, real imports, real gross fixed capital formation and real per capita income. The result of

traditional Granger causality test shows that there is unidirectional causality between economic growth, exports, and imports. On the contrary, Granger causality through vector error correction was also checked with the help of F-value of the model and t-value of the error correction term, which partially reconciles the traditional Granger causality test.

Afzal et al. (2009) examined the export-led growth hypothesis for Pakistan. The results were against the export-led growth hypothesis while in favor of growth-driven exports.

Shafaqat and David (2012) conducted a study on Pakistan`s exports at the regional level and revealed a long-run relationship between GDP and exports of Pakistan to SAARC. Furthermore, the result of Granger causality test revealed that GDP does granger cause Pakistan's exports to SAARC.

Shafaqat Mehmood (2013) did his research in which he considered the case of Pakistan and showed the link between the export to OECD and economic growth of Pakistan for that he collected annual data from 1975s to 2012, and in order to examine the long run relationship between export and economic growth empirically he used vector error correction model (VECM) and concluded that there is the positive relationship between export to OECD and economic growth.

Saleem, A. and M. H. Sial (2015) studied the export-growth nexus in Pakistan by performing time series econometric techniques (Unit root test, Cointegration, and Granger causality through Vector Error Correction Model under ARDL methodology) over the period of 1973 to 2013. He concludes that there is cointegration among the variables. They also checked the direction of causality that whether there is unidirectional or bi-directional causality between economic growth, exports, human capital and gross fixed capital formation. The result of Granger causality test shows that there is bi-directional causality between economic growth, exports, and human capital.

El Alaoui, A. (2015)explored the direction of causality and cointegration between export, import and economic growth in the case Morocco by performing time series econometric techniques (Unit root test, Co-integration, Vector Error Correction Model and the Granger causality test) over the period of 1980 to 2013. He concludes that export, import, and GDP have co-integration with each other. They also checked the direction of causality that whether there is unidirectional or bi-directional causality between economic growth, exports, and imports real imports. The result of Granger causality test shows that there is no causality between exports economic growth and imports in short run On the contrary in the on run there is bidirectional causality among the variables.

Tahir, M., H. Khan, et al. (2015) investigated the export-led-growth hypothesis for Sri Lanka by performing time series econometric techniques (Unit root test, Cointegration, and

Granger causality through Vector Auto Regression (VAR) Model) over the period of 1981 to 2012. He concludes that there is no cointegration among the variables, export-import, GDP, GDP net of exports, investment and unemployment. They also checked the direction of causality that whether there is unidirectional or bidirectional causality between, exports, imports, gross fixed capital formation and unemployment. The result of Granger causality test shows that there is no causality among the variables so in the case of Sri Lanka export-led Growth hypothesis is not valid.

OVERVIEW OF PAKISTAN`S TRADE POLICY

Trade strategy can be classified into two parts, import substitution (inward oriented policy) and export promotion (outward-oriented policy). Import substitution (IS) can be defined as the package of policies which aim to protect the infant industry by overvaluing the exchange rate, import controls, high tariff and quantitative restriction on imports. These policies discriminate against the exporters and force them to pay more than the actual price for the inputs they want. On the other hand, export promotion (EP) policy does not discriminate between the production of domestic market and export.

The choice of trade strategy mostly depends on the resource endowment of a country. In 1947, at the time of partition, the industrial base of Pakistan was weak and narrow it consists of only 34 units, includes few textile mills, some sugar mills, and some cement factories but rich in agricultural resources. Therefore in 1950, the policy makers of Pakistan opted for the import substitution policy to protect their domestic industries. The incentives of policy were designed in such way that domestic manufacturer can buy the agricultural raw material at below the world price and used to sell their products domestically at above the world price. These policies resulted in an anti-agricultural and export biased, so the number of changes was made in the trade policy during the Ayub Khan`s regime in the 1960s. The export bonus scheme was introduced by the government in late 1959 to subsidize the export. The industries with export potential were selected for special treatment such as preferential access to foreign exchange and significant import liberalization was instituted. The firms having a good previous record of export were given preference for import licenses. As a result of these policies, the share of manufactured export increased from 43% in 1960 to 67% in 1970.

Pakistan took three most significant measures of trade liberalization in 1970 that includes the end of restrictive licensing, devaluation of currency and the elimination of export bonus scheme. The purpose of end of export bonus scheme was to adopt the uniform exchange rate for the exporters; by implementing these measures the manufactured export of Pakistan increased 26% per annum. Despite these measures, the anti-export policies existed in the

overall industrial and trade policies in the shape of non-tariff barriers, so Pakistan removed these barriers in 1986 by explicit the import quota on non-capital imports and slowly liberalized the banned and restricted imports.

The Government's continued focus on export promotion was also reflected in some positive measures introduced by the New Trade Policy in June 1987. These included: (i) import liberalization of certain raw materials and intermediate inputs in export industries; (ii) opening of rice and cotton exports to the private sector; (iii) the creation of a Special Credit Wing for exporters at the State Bank of Pakistan; (iv) the provision of foreign exchange for promoting marketing of goods abroad; and (v) connecting the tax concession on profits for export to the content value-added exports.

Despite various measures were taken in 1980s for the trade liberalization but still some anti-export bias factors were present in the trade policy, so in the late 1980s, the government of Pakistan has launched a broad macroeconomic adjustment program and structural reforms to end the anti-export bias in trade policies and liberalize economy to make it more efficient and competitive. In the result of that, almost all the non-tariff barriers were replaced with tariff and the maximum level of the tariff has been reduced to 45% in 1997-98 from 225% in 1986-87. In 1996-97 Pakistan launched a radical trade liberalization program which eliminates nearly all remaining quantitative restrictions in 2003, while significantly reducing the level and simplifying the structure of import tariff. During the 1990s the government committed itself to export-led growth hypothesis and to achieve that objective, it offered a number of incentives to exporters and a number of export measures were adopted to stimulate exports.

METHODOLOGY

Data and Variables

The objective of this paper is to investigate the causal relationship between export and economic growth in Pakistan using the annual data for the period, 1967 to 2015 which includes the 49 annual observations. The rationale to select this particular time period is that before the 1960s, Pakistan was using strict import substitution policy but after the 1960s, they start to introduce the number of changes in the trade policy to favor the export , therefore we are selecting this time period to study the impact of export on the economic growth of Pakistan. The main variables of this study are economic growth and export but also we used the investment as an additional variable to see the impact of investment on other two variables. The Gross Domestic Product (GDP) is used as the proxy for economic growth in Pakistan. All necessary data for the sample period are obtained from World Development Indicators (WDI). All the variables are taken in their natural logarithms to avoid the problems of heteroscedasticity. The

estimation methodology used in this study is the cointegration, vector error correction modeling and the Toda and Yamamoto Augmented Granger causality test. The whole estimation process consists of four steps: (i) Unit root test; (ii) Johansen co-integration test; (iii) Vector error correction model; and (iv) Toda and Yamamoto Augmented Granger causality test.

Model Specification

The empirical model used to study the causal relationship between gross domestic product, exports and investment can be specified by a simple model as:

Y=f(X, I)Where Y is GDP at current US$, X is the export % of GDP and I is the capital formation % of GDP. The link between gross domestic product, investment, and export in Pakistan can be described using the following model in linear form:

$$\text{Log } (y)_t = \alpha_0 + \alpha_1 \log (x)_t + \alpha_2 \log (I)_t + \text{€}_t$$

Where,

α_0 and α_1, α_2 represent the slope and coefficients of regression while €_t represents the "noise" or error term. The coefficients of regression, α1 and α2   indicate that how a unit changes in the independent variables export and investment will affect the dependent variable gross domestic product. The error term €t is included in the equation to account for other factors that could affect GDP

The purpose of the study is to investigate the causal relationship between the GDP and export in Pakistan. The first step for an appropriate analysis is to check the data either it is stationary or not.

Stationary Test (ADF TEST)

It is suggested that "when dealing with time series data, a number of econometric problems may affect the analysis of parameters using ordinary least squares (OLS)". The regression of a time series variable to another time series variable using the ordinary least squares (OLS) can obtain a very high value of R^2, although there is no significant relationship between the variables. This reflects the problem of spurious regression between totally independent variables generated by a non-stationary process. Therefore an econometric technique needs to examine the stationarity of each and every variable before testing the co-integration and implementing the Toda and Yamamoto augmented Granger Causality test because most macroeconomic data are non-stationary, that is to say, they tend to have a deterministic or stochastic trend. Therefore, it is recommended to perform a stationary (unit root) test to determine the order of integration. In order to check the stationarity of variables, we will use the Augmented Dickey-Fuller (ADF) test.

The following equation will check the stationary of data in this study:

$$\Delta y_t^n = \alpha_1 + \alpha_1 t + \beta \, y_{t-1} + \gamma \, \Sigma \Delta y_{t-1} + \text{€}$$

t=1

Where,

€_t represents the "noise" or error term, with the null hypothesis that variable is non-stationary. The null and alternative hypothesis for the variable Y, whether it is stationary or not is $H0_: \beta=0$ versus $H1: \beta \le 0$. Rejection of null hypothesis defines that our variable is stationary.

If the value of t statistics in Augmented Dickey Fuller (ADF) is less than the Mackinnon critical t value than null hypothesis cannot be rejected for the time series, so one can conclude that variable is non-stationary at level. The next step before applying the Johansen co-integration test is to select the number of appropriate lags to be used in the estimation by using the vector autoregression system.

Co-integration Test (Johansen Approach)

Co-integration is an econometric technique used to test the relationship between non-stationary time series variables. "If two or more variables are non-stationary with themselves and become stationary at differenced I (1) series but the linear combination of them is stationary, then the variables are said to be cointegrated." The Johansen co-integration test is used to determine the number of cointegrated variables for any given number of non-stationary variables of the same order. This test can be considered as a long run equilibrium relationship among the variables. The objective of the Co-integration test is to investigate that a group of nonstationary variables are cointegrated or not. It is mentioned above that most macroeconomic data is non-stationary, that is said to be integrated of order one I (1), we proceed to next step which demands that the variables should be co-integrated with each other in order to investigate whether the long run relationship exists between the variables are not.

Causality Test (Toda and Yamamoto augmented Granger Causality Test)

Granger causality test is a statistical hypothesis test to determine whether one-time series is useful to forecast another, first proposed in 1969 by Clive Granger. Granger causality test measures the information of one variable to explain the latest value of another variable. In addition, it also suggests that variable Y is Granger caused by variable X if variable X helps in the prediction of variable Y, it means that the lagged values of variable X are statistically significant to explain variable Y. In the Granger causality test the null hypothesis (H0) is that variable X does not Granger cause variable Y and variable Y does not Granger cause variable X, while the alternative hypothesis (H1) is the variable X Granger causes variable Y and

variable Y Granger-causes variable X, In short, the variable (Xt) is said to be granger cause to variable (Yt) if the lagged values of Xt can forecast Yt and vice-versa. Granger causality test is very sensitive in lag selection criterion so Toda and Yamamoto introduced one technique to solve the problem of lag selection criterion; they said that estimate VAR (dmax+k) in order to solve the problem of lag selection. Here dmax is the no of integration at which your data become stationary and k is no of the lag period which you have selected by using VAR system for the co-integration technique. In fact, the Gross domestic product, investment, and Export are interlinked and co-related with each other through the various channel. There is no theoretical or empirical evidence that can conclusively indicate the sequence of direction. For this reason, Toda and Yamamoto augmented Granger Causality test was applied to check the direction of causality between the gross domestic product (GDP), investment and Export.

ANALYSIS AND RESULTS

Augmented Dickey Fuller Test (ADF)

As we have mentioned in the preceding section that before applying the co-integration test we need to check whether our data is stationary or not, so for that purpose we used the Augmented Dickey-Fuller (ADF) test to check the stationarity of data in level and at 1st difference in both cases (only intercept and intercept and trend).

Table 3. Augmented Dickey Fuller Test Output (a)

Series	Intercept at level		
	Value of t states	Mackinnon critical Value at 5%	Value of probability
Ln-GDP	0.186	2.923	0.9330
Ln-Export	2.171	2.923	0.218
Ln-Investment	2.103	2.923	0.244
Series	Intercept and trend at level		
	Value of t states	Mackinnon critical Value at 5%	Value of probability
Ln-GDP	2.343	3.506	0.403
Ln-Export	1.922	3.506	0.627
Ln-Investment	2.047	3.506	0.561

The result shows that all the variables are non-stationary in levels, this can be seen by comparing the value of T states and Mackinnon critical value, as it shows that the value of T states is smaller than the Mackinnon critical value which means that all the variables are non-stationary in the levels and the value of probability is also higher than 5% which also prove that

the variables are non-stationary in level, so in order to make them stationary we have applied the ADF test at the 1st difference of all variables and the results are presented in below table.

Table 4. Augmented Dickey Fuller Test Output (b)

Series	Intercept at 1st difference		
	Value of t states	Mackinnon critical Value at 5%	Value of probability
Ln-GDP	5.856	2.925	0.000
Ln-Export	6.199	2.925	0.000
Ln-Investment	7.078	2.925	0.000
Series	Intercept and trend at 1st difference		
	Value of t states	Mackinnon critical Value at 5%	Value of probability
Ln-GDP	5.759	3.508	0.000
Ln-Export	5.566	3.510	0.000
Ln-Investment	7.012	3.508	0.000

As the results are showing that after taking the 1st difference the values of T states are higher than the Mackinnon critical value and value probability is also lower than 5% for all variables which can be interpreted as the variables are stationary at the 1st difference.

Johansen Co-integration Test

Before applying Johansen co-integration test, we need to select the optimal lag length period by estimating VAR system and the results are presented in below table.

Table 5. Johansen Co-integration Test Output

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-13.86070	NA	0.000425	0.749364	0.869809	0.794265
1	145.4971	290.3853	5.33e-07	-5.933203	-5.451426*	-5.753601
2	157.6649	20.55018*	4.66e-07*	-6.073997*	-5.230888	-5.759694*
3	161.5576	6.055194	5.93e-07	-5.847003	-4.642561	-5.397999
4	167.2161	8.047658	7.08e-07	-5.698492	-4.132718	-5.114787

 * indicates lag order selected by the criterion

I prefer the Akaike information criterion and choose the lag period 2, now we move toward the Johansen co-integration test. We use the maximum Eigenvalue test under the null hypothesis that no co-integration between the variable. If the probability is less than 5% than we will reject the null hypothesis otherwise fail to reject and the results are presented in the following table.

Table 6. Hypotheses Testing

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value 0.05 CV	Probability
None*	0.383459	22.73060	21.13162	0.0295
At most 1	0.054692	2.643492	14.26460	0.9676
At most 2	0.007045	0.332292	3.841466	0.5643

* indicates the rejection of null hypothesis

As the result shows that in first hypothesis that no co-integration exist between the variables the value of probability is less than 5% and also the value of Max-Eigen Statistic is greater than critical value at 5% so we can reject the null hypothesis and accept the alternate that there exist one cointegration equation between the variables, in other words, we can say that variables will move in the same direction in long run relationship.

Vector Error Correction Model

Engel and Granger suggest that if the co-integration exists between the variables than proper technique to determine the relationship between the variables is vector error correction model (VECM), because it tells us about the both long run and short run relationship between the variables, but it has one limitation that we cannot conclude that either the lag variable have significant result on dependent variable or not due to absence of probability value so in order to check the significance of model we will estimate the ordinary least square method and the results are presented below.

Table 7. VECM Testing

D(LY) = C(1)*(LY(-1) - 8.004587528*LX(-1) + 10.2301929*LI(-1) - 33.25224496) + C(2)*D(LY(-1)) + C(3)*D(LX(-1)) + C(4)*D(LI(-1)) + C(5)

	Co-efficient	Std. Error	t-Statistic	Prob.
C(1)	-0.02372	0.010153	-2.336896	0.0243
C(2)	0.093861	0.166633	0.563282	0.5762
C(3)	-0.26828	0.159179	-1.68541	0.0993
C(4)	0.036556	0.243939	0.149855	0.8816
C(5)	0.069406	0.020167	3.441492	0.0013

In the result, the term C(1) is known as the error correction term or the speed of adjustments towards equilibrium and it shows the long run relationship between the variable. If the value of

C(1) is negative and the probability is less than 5% than we can say there is along-run relationship between the variables and our results are satisfying both conditions so we can say that there is long run relationship from export and investment to GDP. In order to check the short run relationship between the variables we will apply the Wald test with the null hypothesis that C(3)=C(4)=0, if the value of probability of Chi-square is below 5% then we will reject the hypothesis and accept the alternative and vice versa, the results are presented below.

Table 8. Chi-square Statistics

Test Statistic	Value	df	Probability
F-statistic	1.5176	(2,42)	0.2310
Chi-square	3.0352	2	0.2192

The result shows that the value of probability is more than 5% it means that there is no short-run relationship between the variables.

Toda and Yamamoto Augmented Granger Causality Test

VECM can tell us only about the long run and short run relationship between the variables but it doesn't show the direction of causality that either export causes the GDP or GDP causes the export so to check the direction of causality we estimate the Toda-Yamamoto Augmented Granger Causality Test. Toda and Yamamoto told us that estimate VAR(K+Dmax), here K is the optimal lag order and D is the order of integration at which your data became stationary, so in this study d=1 and by choosing Akaike information criterion K=2 so we have estimated VAR(2+1) and from that we have estimated the Granger causality test with the null hypothesis that export X and I (investment) cannot cause Y(GDP) and vice versa. Now by considering Y as a dependent variable and X and I as independent variable, the results are presented below.

Table 9. Toda-Yamamoto Augmented Granger Causality Test Output (a)

Dependent variable: LY			
Excluded	Chi-sq	Df	Prob.
LX	7.660371	2	0.0217
LI	0.389852	2	0.8229
All	7.833224	4	0.0979

 As the table shows that value of probability of X is less than 5% means that we can reject the null hypothesis and accept the alternative that export causes the GDP, while in the case of investment the value of probability is more than 5% so we cannot reject the null hypothesis.

Now by considering X as dependent variable and Y and I as independent variable the results are presented below.

Table 9. Toda-Yamamoto Augmented Granger Causality Test Output (b)

Dependent variable: LX			
Excluded	Chi-sq	Df	Prob.
LY	4.461371	2	0.1075
LI	0.836300	2	0.6583
All	5.119843	4	0.2752

As the result shows that the value of probability in the case of both variables is higher than 5% so we cannot reject the null hypothesis that both the GDP and investment cannot cause export. Now by considering I as dependent variable and X and Y as independent variable the result are shown below.

Table 9. Toda-Yamamoto Augmented Granger Causality Test Output (c)

Dependent variable: LI			
Excluded	Chi-sq	Df	Prob.
LY	10.11958	2	0.0063
LI	8.219689	2	0.0164
All	17.48826	4	0.0016

We can see in the table that value of probability of Y and X is less than 5% means that we can reject the null hypothesis and accept the alternative that GDP and export cause the investment.

CONCLUSION

The objective of this paper is twofold. First analyze the relationship between exports, economic growth, and investment in the particular context of Pakistan over the period of 1967 to 2015. Second, if such relationship exists to investigate the direction of causality among the considerable variables. To attain these objectives Toda and Yamamoto Granger causality, vector error correction model and co-integration test employed in the empirical analysis using augmented ducky fuller test to check the stationarity of data.

The result of ADF test proves that all the variables under consideration were nonstationary at the level and become stationary at first difference I (1). Johansen co-integration test proves that the variables are co-integrated with each other it means that they have a long relationship with each other and by using the Wald test we conclude that variables under consideration do not have a short run relationship with each other. It is surprising that there is

no causality among export, economic growth, and investment in the short run. It can be referred to the fact that Pakistani economy depends on conditions in short run such as political stability, law and order situation and mainly in the climatic conditions because 58.1% of total Pakistan`s exports is based on the cotton and cotton manufactured goods.

To determine the direction of causality among the variables Toda and Yamamoto Granger causality test employed and the result of test confirmed the unidirectional causality among the variables (i) running from export to GDP, (ii) running from export to investment (iii) running from GDP to investment.   Thus the results of the study confirm the presence of export-led growth hypothesis in the case of Pakistan.

Therefore it recommends that Pakistan would adopt and enforce the export promotion policies in order to boost the GDP growth. The production of commodities with export potentialities should be increased. Pakistan can enhance the market size for exports by maintaining good and long term relations with other countries. The modern and improved infrastructure and human capital accumulation are very important for domestic development strategies. The government would focus especially on public investment projects like education sector such as primary, secondary, technical education and job training programs, and allocate sufficient amount of budget for the improvement and development of human capital because it has a direct relationship with the productivity. As far as subsequent research is concerned, it would be interesting to study the separate relationship between the decomposition of exports (primary and manufactured exports) and GDP growth. It can provide more appealing results. Therefore, further research on this relationship is strongly needed to derive the stronger policy implications.

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