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A Causal Relationship between Selective Economic Growth Determinants in Pakistan (A Causality Analysis)

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Abstract
This research paper aims to explore the causal relationship between economic growth determinants in Pakistan during the study period from 1990-2021. For this purpose, log linear regression model was analyzed. For analysis purpose descriptive statistics analysis, correlation analysis, and Pair-wise Granger Causality test has been utilized. Pair-wise Granger Causality test of economic growth model indicates that one-way causality exists between GDP and foreign remittance; GDP and imports; FDI inflows and inflation; FDI inflows and exports; foreign remittance and exports; foreign remittance and imports; exports and imports; exports and labour force participation rate; interest rate and exports; labour force participation rate and imports; interest rate and imports; and labour force participation rate and interest rate. While bidirectional causality exists between labour force participation rate and GDP.

Keywords: FDI Inflows, Economic Growth, Correlation, Pair-wise Granger Causality, and Pakistan.

Introduction

Gross Domestic Product (GDP) growth rate is widely used as a measure of economic performance of a nation (Hasan et al., 1997; Nilofer and Qayyum, 2018). Factors which are determining and affecting the economic progress of a country are both internal and external. These internal and external factors are inflation with high rates, constantly slow growth, imbalances of current and fiscal account, instability of exchange rate of capital outflows and very low investment (Tamilselvan and Manikandan, 2015).

Economic growth is determined by investment, consumption, net exports & services through increase in productivity. Among most of economies, Pakistan is a consumption-oriented economy. For producing skilled labor and enhancement of productivity, investment in education, training and technical advancement is required. In developing nations like Pakistan, government investment is helpful in overcoming market failures related to private sector investment, through technological advancement for long-run sustainable growth (Nilofer and Qayyum, 2018).

Problem Statement

In Pakistan, a situation of turbulence has been created in the entire state which was originated by the political conflicts among the political parties. As a result of which numerous foreign delegate's important visits are held cancelled just because of abrupt law and order situation and life threats, mostly in the capital

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city, Islamabad, Pakistan. Since for the last one decade as a result of political disorders and severity of energy crisis, the tendencies, and GDP growth rate patterns of Pakistan are not that much stable and appreciable. The 3.5 percent rate of growth which has been targeted has not been yet achieved by the government of Pakistan. Foreign investors in such regions like Pakistan before their thinking to invest their heavy capital have to look at the state of economic growth which is depressed and accompanied with other macroeconomic challenges.

Significance and Scope of Study

Pakistan being a young country having an ancient historical background and population which is rapidly growing. Pakistan's economy is mainly dependent on agriculture sector, its income per capita is at very low level, in addition majority of its inhabitants are living in the state of poverty. Hence, the most important aims of the macroeconomic policy makers are to draw Foreign Direct Investment (FDI) inflows and to slow down inflation rate in the country. Pakistan is amongst those countries of the world which is striving its best in making its way in the modern-day globe and existing as the leading member of South Asian Association for Regional Cooperation (SAARC) in addition amongst the utmost significant countries of this specific locality which is fortunate with having huge number of natural resources in the shape of agriculture technology, population (manpower), mineral assets, and with other natural resources which is God gifted. Foreign Direct Investment (FDI) inflows along with Inflation performs an incredibly dynamic title role in its development and future growth.

Objective of the Study

The specific objective of the study is to explore the causal relationship between economic growth determinants in Pakistan during the study period from 1990-2021.

Research Hypothesis

H_0: Economic growth determinants in Pakistan have no causal relationship.
H_1: Economic growth determinants in Pakistan have causal relationship.

Literature Review

Ahmad et al. (2012) investigated the causal relationship among economic growth and FDI in Pakistan and for the purpose of finding the relationship between FDI and GDP co-integration and error correction model was used. In this model as a dependent variable GDP was taken whereas as an independent variable quantity domestic capital, FDI, and labor force were taken. According to the results of the model it has been suggested that there exists affirmative relation among FDI and GDP in the short run as well as in the long run. Based on the results it has been recommended that if economic progress is required then foreign investors should be invited for the purpose of investment because FDI strengthens and give spur to GDP which is also known as economic growth.

Haseeb et al. (2014) empirically observed the interrelationship among economic growth, exports and FDI in Malaysia. For this purpose, annual time series data was taken from year 1971 to 2013. For empirical investigation purpose ARDL model had been applied after testing stationarity of the data. The

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pragmatic outcomes indicate that the externality result of exports on the non-export sector and productivity factor were positive as well as statistically significant. While exports were showing positive influence on FDI as well as on the nation's economic growth.

Najaf and Najaf (2016) analyzed the FDI impact on the economic development of central Asian countries in general while on Afghanistan and Pakistan in particular. Findings showed that FDI inflows in some of the nations were increasing. The most profitable area for investment purpose according to the findings is information technology, power sector, telecom sector, and education sector. It had been suggested in the light of the findings that for increasing the FDI inflows the government of both countries should remove the terrorism and political instability and emphasis on the development of physical infrastructure.

Carkovic and Levine (2005) used advanced statistical methods and two new databanks to reexamine association in between FDI and economic growth. Subsequently determining prejudices plaguing past work, it had been found that the exogenous constituent of FDI does not apply a vigorous, unrestricted effect on growth.

Abushhewa and Zarook (2016) analyzed the causative association among FDI inflows and the growth of economy. For examining the hypotheses of Export Led-Growth (ELG) and FDI Led-Export (FLE) empirical analysis has been used. Data was collected for the time-period from 1992 till 2010 in Libya. In the Libyan economy the majority of FDI inflows are concentrated in the oil sector, which directed Libya as one of the Petroleum Exporting Countries all over the world. But still in Libya there prevails uncertainty in the association of GDP growth, FDI inflows, and oil exports. Consequently, for exploring this association among GDP growth, FDI inflows, and oil exports Vector Autoregressive (VAR) Model was employed. From the findings of the study, it has been confirmed that in Libya there exists a long-term association amongst rising oil exports, FDI inflows and growth of economy.

Davcev et al. (2018) examined the effects of rates of interest and inflation on the growth of economy. For quantitatively evaluating the significance of these two variable quantities for economic growth, data was collected from Romania, FYROM, and Bulgaria. For examining the association between these three variable quantities i.e., GDP growth, interest rate, and inflation, an analysis of co-integration and Granger causality were carried out. For the examination of the association among the variables, unit root tests were applied. The time period for data collection was taken from 2000 and onwards. Study was particularly designed for emerging nations that are struggling for growth of economy and are lacking a sound domestic currency with the basic objective is to examine the association among fiscal and monetary procedures.

Gap in the Existing Literature

Previous studies examined the economic growth determinants from different approaches such as associations or correlations rather than causal relationships. Their results are still ambiguous. This study has presented a fresh viewpoint on the economic growth determinants in Pakistan by taking into consideration the dynamic fluctuations in the distinctive macroeconomic factors in the economy and used updated analysis comprising enhanced econometric techniques i.e.

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Pairwise Granger Causality test. This study is comprehensive from the view point as the most recent data from the period range from 1990 to 2021 have been used by analyzing more recent shocks and tendencies.

Methodology

Theoretical Basis for the Economic Growth

Economic growth is amongst one of the indicators which is important for all nations of the world. It possesses an abundant importance in literature related to economics and considered as a crucial and extensively debated research topic. Economic growth indicates superfluous productivity as well as economic development and the nations formulate numerous special policies and plans since upsurge in economic growth demonstrates rise in social welfare as well as increase in the long-term economic development of a country. In economics, there are numerous variables such as human capital, physical capital, technology, and so on that have an effective role in the economic growth while foreign capital is amongst those variables which results in the economic growth.

In the neoclassical economics, it is believed about the association amongst economic growth and FDI that FDI only effects GDP per capita and have no effects on economic growth which means that in the long term, FDI is not the engine of economic growth. While in contrast, it is believed in the modern theory of economic growth that FDI have effects on economic growth and production per capita (Falki, 2009).

Although there are many theories which shows that economic growth is the result of FDI through some factors for instance technology spillover, increase of productivity, and transition of technology. According to the neo-classical growth models, FDI inflows can increase the capital stock, consecutively, increase in the capital stock expands economic growth.

Specification of the Economic Growth Model

The functional form of the theoretical model according to the objective is as:

$$GDP = f(FDI, INFL, REM, EXPO, IMPO, LBFPR, INTR)$$

The log linear regression model following the theoretical model is as:

$$\text{Ln GDP} = \alpha_0 + \alpha_1 FDI + \alpha_2 INFL + \alpha_3 \text{Ln REM} + \alpha_4 \text{Ln EXPO} + \alpha_5 \text{Ln IMPO} + \alpha_6 LBFPR + \alpha_7 INTR + \varepsilon_i$$

The expected signs of the coefficients of the independent variables are:

$\alpha_1 > 0$, $\alpha_2 < 0$, $\alpha_3 > 0$, $\alpha_4 > 0$, $\alpha_5 < 0$, $\alpha_6 > 0$, $\alpha_7 < 0$.

Whereas:

Ln GDP: Gross Domestic Product used as a proxy for economic growth (in natural log form); FDI: Foreign Direct Investment inflows (% of GDP); INFL: inflation rate (%); Ln EXPO: exports (in natural log form); Ln IMPO: imports (in natural log form); INTR: interest rate (%); Ln REM: foreign remittance (in natural log form); and LBFPR: labor force participation rate (%).

Methods of Data Collection

Annual secondary time series data for the variables of economic growth model were extracted from the World Bank Database. The time span of the required data ranges from 1990 to 2021.

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Data Analysis Methods

The present research study used descriptive statistics analysis, correlation analysis, and Pair-wise Granger Causality test has been utilized.

Data Analysis and Results

Descriptive Analysis

Table:4.1 indicates the statistical details of the Economic Growth Model that contains Median, Mean, Minimum, Maximum, Skewness, Standard Deviation, Probability value of Jarque-Bera and Kurtosis.

Table:4.1 Descriptive Analysis of Economic Growth Model

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera (Prob.)
LNGDP	18.64657	18.67044	19.69080	17.50465	0.716112	0.014244	1.554090	0.248004
FDI	1.054997	0.754028	3.668323	0.375528	0.812571	2.141015	6.650505	0.000000
INFL	8.485317	9.057729	20.28612	2.529328	3.948462	0.552121	3.665932	0.330040
LNEXPO	16.61352	16.72005	17.35847	15.59335	0.535935	- 0.172724	1.547552	0.226285
LNIMPO	16.94822	17.04124	18.05023	15.90743	0.735845	0.066659	1.366324	0.166774
INTR	3.598481	4.019397	10.27000	- 5.079301	4.002479	- 0.366258	2.670873	0.650551
LBFPR	53.04969	52.73500	55.73000	50.50000	1.359491	0.280524	2.166649	0.510261
LNREM	15.44232	15.35916	17.11501	13.81150	1.137838	0.043599	1.472783	0.210137

Source: Author's Own Calculation

According to the descriptive statistics of variables which are shown in Table:4.1, average value of GDP in Pakistan is US$ 18.64657 during the study period 1990-2021 with standard deviation of 0.716112. Average value of FDI inflows is 1.054997 and standard deviation is 0.812571. Mean values of inflation, exports, imports, interest rate, labor force participation rate, and foreign remittance are 8.485317, US$ 16.61352, US$ 16.94822, 3.598481, 53.04969, and US$ 15.44232 respectively. However, standard deviations of inflation, exports, imports, interest rate, labor force participation rate, and foreign remittance are 3.948462, 0.535935, 0.735845, 4.002479, 1.359491, and 1.137838 respectively.

The values of skewness of GDP, FDI inflows, inflation, imports, labor force participation rate, and foreign remittance are positive and right-skewed, while the values of skewness of exports, and interest rate are negative and left-skewed. The values of kurtosis of GDP, exports, imports, interest rate, labor force participation rate, and foreign remittance shows that the distribution is said to be platykurtic and is light tailed while the value of kurtosis of inflation shows that the distribution is said to be mesokurtic (medium peak). However, the value of kurtosis of FDI inflows shows that the distribution is said to be leptokurtic and is more heavy-tailed. The value of Jarque-Bera (Prob.) shows that the distribution of GDP, inflation, exports, imports, interest rate, labor force participation rate, and foreign remittance are normally distributed. However, the value of Jarque-Bera (Prob.) shows that the distribution of FDI inflows is not normally distributed.

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Correlation Analysis

Correlation or bivariate correlation is the interdependence between two variables. Table:4.2 indicates results of correlation analysis of Economic Growth determinants. The correlation analysis of Economic Growth determinants results state that the series of GDP, FDI inflows, Inflation, Exports, Imports, Interest Rate, Labor Force Participation Rate, and Foreign Remittance are correlated.

Table:4.2 Correlation Analysis of Economic Growth Determinants

	FDI	INFL	INTR	LNEXPO	LNGDP	LNIMPO	LNLBFPR	LNREM
FDI	1.000000	0.363839	- 0.178135	0.076577	0.020202	0.093074	- 0.202197	- 0.018934
INFL	0.363839	1.000000	- 0.390923	- 0.016481	- 0.090792	0.049045	- 0.211979	- 0.014375
INTR	- 0.178135	- 0.390923	1.000000	- 0.447775	- 0.432974	- 0.436634	- 0.434718	- 0.524273
LNEXPO	0.076577	- 0.016481	- 0.447775	1.000000	0.980633	0.974989	0.872370	0.947175
LNGDP	0.020202	- 0.090792	- 0.432974	0.980633	1.000000	0.979802	0.914574	0.959565
LNIMPO	0.093074	0.049045	- 0.436634	0.974989	0.979802	1.000000	0.868006	0.956322
LNLBFPR	- 0.202197	- 0.211979	- 0.434718	0.872370	0.914574	0.868006	1.000000	0.926011
LNREM	- 0.018934	- 0.014375	- 0.524273	0.947175	0.959565	0.956322	0.926011	1.000000

Source: Author's Own Calculation

In the LNGDP series, the highest coefficient of correlation is of LNEXPO which is 0.98% as shown in Table:4.2. In this case some of the variables have values above 0.80% meaning that there exists strong relationship between the variables. According to the Table:4.2, in Pakistan the coefficient of correlation among the variables FDI inflows and GDP is only 0.02 indicating positive and weak correlation between variables. While the coefficient of correlations between FDI inflows and the other variables are within the range 0.01 to 0.36. However, FDI inflows has a moderate level of correlation with inflation.

The coefficient of correlation among the variables inflation and GDP is only -0.09 indicating an inverse and weak correlation between variables. While the correlations between inflation and the other variables are within the range 0.01 to 0.39. However, inflation has a moderate level of correlation with FDI inflows, and interest rate.

The coefficient of correlation among the variables interest rate and GDP is only -0.43 indicating an inverse and moderate correlation between variables. While the correlations between interest rate and the other variables are within the range 0.17 to 0.52. However, interest rate has a moderate level of correlation with inflation, exports, imports, labor force participation rate, and foreign remittance.

The coefficient of correlation among the variables exports and GDP is only 0.98 indicating positive and strong correlation between variables. While the coefficient of correlations between exports and the other variables are within the range 0.01 to 0.97. However, exports have a high level of correlation with imports, labor force participation rate and foreign remittance.

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The coefficient of correlation among the variables imports and GDP is only 0.97 indicating positive and strong correlation between variables. While the coefficient of correlations between the imports and the other variables are within the range 0.04 to 0.97. However, imports have a high level of correlation with exports, labor force participation rate and foreign remittance.

The coefficient of correlation among the variables labor force participation rate and GDP is 0.91 indicating positive and strong correlation between variables. While the correlations between labor force participation rate and the other variables are within the range 0.20 to 0.92. However, labor force participation rate has a high level of correlation with exports, imports, and foreign remittance.

The coefficient of correlation among the variables foreign remittance and GDP is only 0.95 indicating positive and strong correlation between variables. While the coefficient of correlations between foreign remittance and the other variables are within the range 0.01 to 0.95. However, foreign remittance has a high level of correlation with exports, imports, and labor force participation rate.

Granger Causality Test

In Table:4.3, key findings of the Pairwise Granger Causality test with two lags are given. According to the findings the null hypothesis of (variable x does not Granger Cause variable y) is rejected for GDP to foreign remittance, GDP to imports, FDI inflows to rate of inflation, foreign remittance to exports, foreign remittance to imports, exports to imports, exports to labour force participation rate, interest rate to exports, labour force participation rate to imports, interest rate to imports, and from labour force participation rate to interest rate, which demonstrates that unidirectional causality (→) is running from GDP to foreign remittance, from GDP to imports, from FDI inflows to rate of inflation, from foreign remittance to exports, from foreign remittance to imports, from exports to imports, from exports to labour force participation rate, from interest rate to exports, from labour force participation rate to imports, from interest rate to imports, and from labour force participation rate to interest rate. While in case of labour force participation rate and GDP, the null hypothesis of (variable x does not Granger Cause variable y) is rejected, which indicates that there exists bidirectional causality (↔) between labour force participation rate and GDP.

However, according to the findings the null hypothesis of (variable x does not Granger Cause variable y) is accepted for GDP and FDI inflows, inflation and GDP, exports and GDP, interest rate and GDP, foreign remittance and FDI inflows, exports and FDI inflows, imports and FDI inflows, labour force participation rate and FDI inflows, interest rate and FDI inflows, foreign remittance and inflation, exports and inflation, imports and inflation, labour force participation rate and inflation, labour force participation rate and foreign remittance, and between interest rate and foreign remittance, which indicates that there exists no causality between GDP and FDI inflows, between inflation and GDP, between exports and GDP, between interest rate and GDP, between foreign remittance and FDI inflows, between exports and FDI inflows, between imports and FDI inflows, between labour force participation rate and FDI inflows, between interest rate and FDI inflows, between foreign remittance and inflation, between exports and inflation, between imports and inflation, between labour force participation rate and inflation, between labour force participation rate and foreign remittance, and between interest rate and foreign remittance.

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Table:4.3 Results of Pairwise Granger Causality Test

Sample: 1990-2021

Lags: 2

Null Hypothesis:	Obs	F-	Prob.	Conclusion
FDI does not Granger Cause LNGDP	30	0.58215	0.5661	
LNGDP does not Granger Cause FDI		0.44319	0.6469	
INFL does not Granger Cause LNGDP	30	0.86408	0.4336	
LNGDP does not Granger Cause INFL		0.08021	0.9232	
LNREM does not Granger Cause LNGDP	30	1.43192	0.2578	
LNGDP does not Granger Cause LNREM		4.02149	0.0306**	LNGDP → LNREM
LNEXPO does not Granger Cause LNGDP	30	0.94031	0.4039	
LNGDP does not Granger Cause LNEXPO		0.56362	0.5762	
LNIMPO does not Granger Cause LNGDP	30	0.83078	0.4474	
LNGDP does not Granger Cause LNIMPO		4.25400	0.0257**	LNGDP → LNIMPO
LBFPR does not Granger Cause LNGDP	30	2.64065	0.0911*	LBFPR → LNGDP
LNGDP does not Granger Cause LBFPR		4.18293	0.0271**	LNGDP → LBFPR
INTR does not Granger Cause LNGDP	30	0.40787	0.6694	
LNGDP does not Granger Cause INTR		1.76009	0.1927	
INFL does not Granger Cause FDI	30	1.52256	0.2377	
FDI does not Granger Cause INFL		3.07835	0.0638**	FDI → INFL
LNREM does not Granger Cause FDI	30	0.17106	0.8437	
FDI does not Granger Cause LNREM		0.04669	0.9545	
LNEXPO does not Granger Cause FDI	30	0.80089	0.4601	
FDI does not Granger Cause LNEXPO		0.00504	0.9950	
LNIMPO does not Granger Cause FDI	30	0.55621	0.5803	
FDI does not Granger Cause LNIMPO		1.34874	0.2778	
LBFPR does not Granger Cause FDI	30	0.00663	0.9934	
FDI does not Granger Cause LBFPR		0.82294	0.4507	
INTR does not Granger Cause FDI	30	0.78711	0.4661	
FDI does not Granger Cause INTR		0.78476	0.4671	

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LNREM does not Granger Cause INFL	30	0.17456	0.8408	
INFL does not Granger Cause LNREM		0.51116	0.6059	
LNEXPO does not Granger Cause INFL	30	0.41949	0.6619	
INFL does not Granger Cause LNEXPO		0.01448	0.9856	
LNIMPO does not Granger Cause INFL	30	0.14780	0.8633	
INFL does not Granger Cause LNIMPO		0.40645	0.6703	
LBFPR does not Granger Cause INFL	30	0.00946	0.9906	
INFL does not Granger Cause LBFPR		0.19274	0.8259	
INTR does not Granger Cause INFL	30	0.94868	0.4008	
INFL does not Granger Cause INTR		2.50634	0.1018	
LNEXPO does not Granger Cause LNREM	30	2.15469	0.1370	
LNREM does not Granger Cause LNEXPO		5.85328	0.0082***	LNREM → LNEXPO
LNIMPO does not Granger Cause LNREM	30	1.32526	0.2838	
LNREM does not Granger Cause LNIMPO		6.59839	0.0050***	LNREM → LNIMPO
LBFPR does not Granger Cause LNREM	30	1.52113	0.2380	
LNREM does not Granger Cause LBFPR		1.97129	0.1603	
INTR does not Granger Cause LNREM	30	0.26230	0.7714	
LNREM does not Granger Cause INTR		2.34956	0.1161	
LNIMPO does not Granger Cause LNEXPO	30	0.75606	0.4799	
LNEXPO does not Granger Cause LNIMPO		3.61055	0.0419**	LNEXPO → LNIMPO
LBFPR does not Granger Cause LNEXPO	30	1.73252	0.1974	
LNEXPO does not Granger Cause LBFPR		2.92374	0.0723*	LNEXPO → LBFPR
INTR does not Granger Cause LNEXPO	30	3.39409	0.0497**	INTR → LNEXPO
LNEXPO does not Granger Cause INTR		1.45239	0.2531	
LBFPR does not Granger Cause LNIMPO	30	4.21956	0.0264**	LBFPR → LNIMPO
LNIMPO does not Granger Cause LBFPR		2.50853	0.1017	
INTR does not Granger Cause LNIMPO	30	5.41410	0.0111**	INTR → LNIMPO

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LNIMPO does not Granger Cause INTR		1.38336	0.2693	
INTR does not Granger Cause LBFPR	30	0.30173	0.7422	
LBFPR does not Granger Cause INTR		3.27388	0.0546*	LBFPR → INTR

(***) shows significance at 1% level, (**) 5% level & (*) 10% level
Source: Author's Own Calculation

Findings indicates the existence of causality for ten variables both in unidirectional (→) and bidirectional (↔) form. The null hypothesis that LNREM does not Granger Cause LNGDP, has been accepted because the Probability value is insignificant. The result of reverse null hypothesis that LNGDP does not Granger Cause LNREM, indicates rejection because the Probability value is statistically significant at p-value < 0.05 and its alternative hypothesis that LNGDP Granger Cause LNREM is accepted. Result of Granger Causality test specifies one-way causality (LNGDP→LNREM) among foreign remittance and GDP in Pakistan economy implies that GDP and foreign remittance are co-integrated.

The finding of the null hypothesis that LNIMPO does not Granger Cause LNGDP, indicates acceptance. The result of reverse null hypothesis that LNGDP does not Granger Cause LNIMPO, indicates rejection at p-value < 0.05, and its alternative hypothesis that LNGDP Granger Cause LNIMPO is accepted. Result of Granger Causality test specifies one-way causality (LNGDP→LNIMPO) among imports and GDP in Pakistan economy implies that GDP and imports are co-integrated.

LBFPR does not Granger Cause LNGDP, result indicates rejection of the null hypothesis at p-value < 0.10 and its alternative hypothesis that LBFPR Granger Cause LNGDP is accepted. The reverse null hypothesis that LNGDP does not Granger Cause LBFPR is rejected at p-value < 0.05 and its alternative hypothesis that LNGDP Granger Cause LBFPR is accepted. Result of Granger Causality test specifies two-way causality (LBFPR↔ LNGDP) among labour force participation rate and GDP in Pakistan economy means that labour force participation rate caused GDP and GDP caused labour force participation rate.

The finding of the null hypothesis that FDI does not Granger Cause INFL is rejected at p-value < 0.10 and its alternative hypothesis that FDI Granger Cause INFL is accepted. The reverse null hypothesis that INFL does not Granger Cause FDI, cannot be rejected. Result of Granger Causality test specifies one-way causality (FDI→INFL) among rate of inflation and FDI inflows in Pakistan economy implies that FDI inflows and rate of inflation are co-integrated.

LNEXPO does not Granger Cause LNREM, result indicates acceptance of the null hypothesis. LNREM does not Granger Cause LNEXPO, result indicates rejection of reverse null hypothesis at p-value < 0.01 and its alternative hypothesis that LNREM Granger Cause LNEXPO is accepted. Result of Granger Causality test specifies one-way causality (LNREM→LNEXPO) among exports and foreign remittance in Pakistan economy which implies that foreign remittance and exports are co-integrated.

LNIMPO does not Granger Cause LNREM, result indicates acceptance of the null hypothesis. LNREM does not Granger Cause LNIMPO, result indicates rejection of reverse null hypothesis at p-value < 0.01 and its alternative hypothesis that LNREM Granger Cause LNIMPO is accepted. Result of Granger

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Causality test specifies one-way causality (LNREM→LNIMPO) among imports and foreign remittance in Pakistan economy which implies that foreign remittance and imports are co-integrated.

LNIMPO does not Granger Cause LNEXPO, result indicates acceptance of null hypothesis. LNEXPO does not Granger Cause LNIMPO, result indicates rejection of reverse null hypothesis at p-value < 0.05 and its alternative hypothesis that LNEXPO Granger Cause LNIMPO is accepted. Result of Granger Causality test specifies one-way causality (LNEXPO→LNIMPO) among imports and exports in Pakistan economy which implies that exports and imports are co-integrated.

LBFPR does not Granger Cause LNEXPO, result indicates acceptance of the null hypothesis. LNEXPO does not Granger Cause LBFPR, result indicates rejection of reverse null hypothesis at p-value < 0.10 and its alternative hypothesis that LNEXPO Granger Cause LBFPR is accepted. Result of Granger Causality test specifies one-way causality (LNEXPO→LBFPR) among labour force participation rate and exports in Pakistan economy which implies that exports and labour force participation rate are co-integrated.

INTR does not Granger Cause LNEXPO, result indicates rejection of null hypothesis at p-value < 0.05 and its alternative hypothesis that INTR Granger Cause LNEXPO is accepted. The reverse null hypothesis that LNEXPO does not Granger Cause INTR is accepted. Result of Granger Causality test specifies one-way causality (INTR→LNEXPO) among interest rate and exports in Pakistan economy which implies that interest rate and exports are co-integrated. Similar results of one-way causality are also reported earlier by Mehmood and Faridi (2013).

LBFPR does not Granger Cause LNIMPO, result indicates rejection of null hypothesis at p-value < 0.05 and its alternative hypothesis that LBFPR Granger Cause LNIMPO is accepted. The reverse null hypothesis that LNIMPO does not Granger Cause LBFPR is accepted. Result of Granger Causality test specifies one-way causality (LBFPR→LNIMPO) among labour force participation rate and imports in Pakistan economy which implies that labour force participation rate and imports are co-integrated.

INTR does not Granger Cause LNIMPO, result indicates rejection of null hypothesis at p-value < 0.05 and its alternative hypothesis that INTR Granger Cause LNIMPO is accepted. The reverse null hypothesis that LNIMPO does not Granger Cause INTR is accepted. Result of Granger Causality test specifies one-way causality (INTR→LNIMPO) among interest rate and imports in Pakistan economy which implies that interest rate and imports are co-integrated. Similar results of one-way causality are also reported earlier by Mehmood and Faridi (2013).

INTR does not Granger Cause LBFPR, result indicates acceptance of null hypothesis. LBFPR does not Granger Cause INTR, result indicates rejection of reverse null hypothesis at p-value < 0.10 and its alternative hypothesis that LBFPR Granger Cause INTR is accepted. Result of Granger Causality test specifies one-way causality (LBFPR→INTR) among interest rate and labour force participation rate in Pakistan economy which implies that labour force participation rate and interest rate are co-integrated.

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Conclusion

According to the Pairwise Granger Causality test of economic growth model there exists unidirectional causality running from LNGDP to LNREM and LNIMPO, from FDI inflows to INFL and LNEXPO, from LNREM to LNIMPO, from LNEXPO to LNIMPO and LBFPR, from INTR to LNEXPO and LNIMPO, and from LBFPR to LNIMPO and INTR in Pakistan economy. So, on the basis of above results, null hypothesis is rejected and alternate hypothesis is accepted that there exists one-way causal relationship. While there exists bidirectional causality between LBFPR and LNGDP in Pakistan economy. So, on the basis of above results, null hypothesis is rejected and alternate hypothesis is accepted that there exists two-way causal relationship between labour force participation rate and economic growth in Pakistan economy. However, there exists no causality between LNGDP and FDI inflows, between INFL, LNEXPO, INTR and LNGDP, between LNREM, LNEXPO, LNIMPO, LBFPR, INTR and FDI, between LNREM, LNEXPO, LNIMPO, LBFPR and INFL, and between LBFPR, INTR and LNREM. So, on the basis of above results, null hypothesis is accepted that there exists no causal relationship.

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