Granger Causality Analysis on Exports and GDP: A Case of Indian Punjab

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***Abstract:** The study analyse the relationship between export and economic of Punjab nations since 1989 using the Unit Root Testing, Co-Integration and Granger Causality. The main aim of the study is to analyse the relationship between economic growth and exports using time series data from the period 1989–90 to 2018-19. The main findings of the study were, LOGEXPORT does not Granger Cause LOGGDP and LOGGDP does not Granger Cause LOGEXPORT.*

***Keywords:** GDP, Export, Co-integration, Unit root, Granger causality*

1. INTRODUCTION:

Exports are necessary for an economy. It contributes in economic growth of nation. Exports have become very important particularly when the markets are open. More or less all the economies of the world working on the export promotion because of their importance to the international trade. Exports provide an external market, which endow with chance to attain economic growth, inflow of foreign exchange, generation of employment opportunities, reduce trade deficit, proper utilization of resources etc. The current openness of economy has provided a boost to exports from India to majority of the countries in the world. Now India is also a associate in international trade and business and Punjab economy is a part of Indian economy. International trade from Punjab also influences India's overall external trade. Punjab economy is originally an agricultural economy, but there is deficiency of various minerals, coal, timber and petroleum. The small scale industries are in abundance in Punjab. Punjab has various industrial clusters. Jalandhar which is famous for sports goods, leather products and handtools. Ludhiana is another major industrial cluster and is famous for bicycles, hosiery goods, readymade garments etc.

2. RESEARCH METHODOLOGY:

The study analyse the relationship between export and economic of Punjab nations since 1989 using the Uni Root Testing, Co-Integration and Granger Causality. The main aim of the study is to analyse the relationship between economic growth and exports using time series data from the period 1989–90 to 2018-19.Kaur & Dhami (2016), Jordaan, & Eita (2007),Thornton (1996) were applied Cointegration, causality and export-led growth.

3. ANALYSIS

Table 1.1 GDP, Exports, Ratio of Exports to GDP, and Punjab's Share in Total Exports from India

Year	GDP*	Exports*	Ratio of Exports to GDP	Punjab's Share in Total Exports from India
1989-90	16980	648	3.8	2.3
1990-91	18882	769	4.1	2.4
1991-92	22300	901	4.0	2.0
1992-93	26275	1215	4.6	2.3
1993-94	30928	1816	5.9	2.6
1994-95	34095	2082	6.1	2.5
1995-96	38514	2565	6.7	2.4
1996-97	44163	3025	6.8	2.5
1997-98	48388	4205	8.7	3.2
1998-99	54414	3629	6.7	2.6
1999-00	62700	3676	5.9	2.3
2000-01	66049	4015	6.1	2.0
2001-02	70751	4408	6.2	2.1
2002-03	83795	7014	8.4	2.7
2003-04	90317	8933	9.9	3.0
2004-05	96839	7914	8.2	2.1
2005-06	102556	9656	9.4	2.1
2006-07	112997	11798	10.4	2.1
2007-08	123223	10710	8.7	1.6
2008-09	130431	13888	10.6	1.7
2009-10	138636	15972	11.5	1.9
2010-11	147670	17430	11.8	1.5
2011-12	266628	21302	8.0	1.5
2012-13	280823	19366	6.9	1.2
2013-14	299450	23722.55	7.9	1.2
2014-15	312125	27235	8.7	1.4
2015-16	330052	27747	8.4	1.6
2016-17	353041	29300	8.3	1.6
2017-2018	375535	22221.5	5.9	1.1
2018-2019	397711	39592	10.0	1.7

Source: Statistical Abstract of Punjab (Various Issues)

*value in Rupees crore

Table 1.1 describes that there is an increase in exports from Rs. 648 crore in 1989-90 to Rs. 39592 crore in the year 2018-2019. Openness of the Punjab economy is calculated by ratio of exports to GDP, and there is rise in the ratio from 3.8 in 1989-90 to 10.0 in 2018-19. Although because of liberalization there is an increase in exports from Punjab, but their share in total India's exports is very less. There is no major change in the share from the year 1989-90 to 2018-19. It ranges from 1.1 per cent to 3.2 per cent.

Fig 1.1 Ratio of Exports to GDP, and Punjab's Share in Total Exports from India
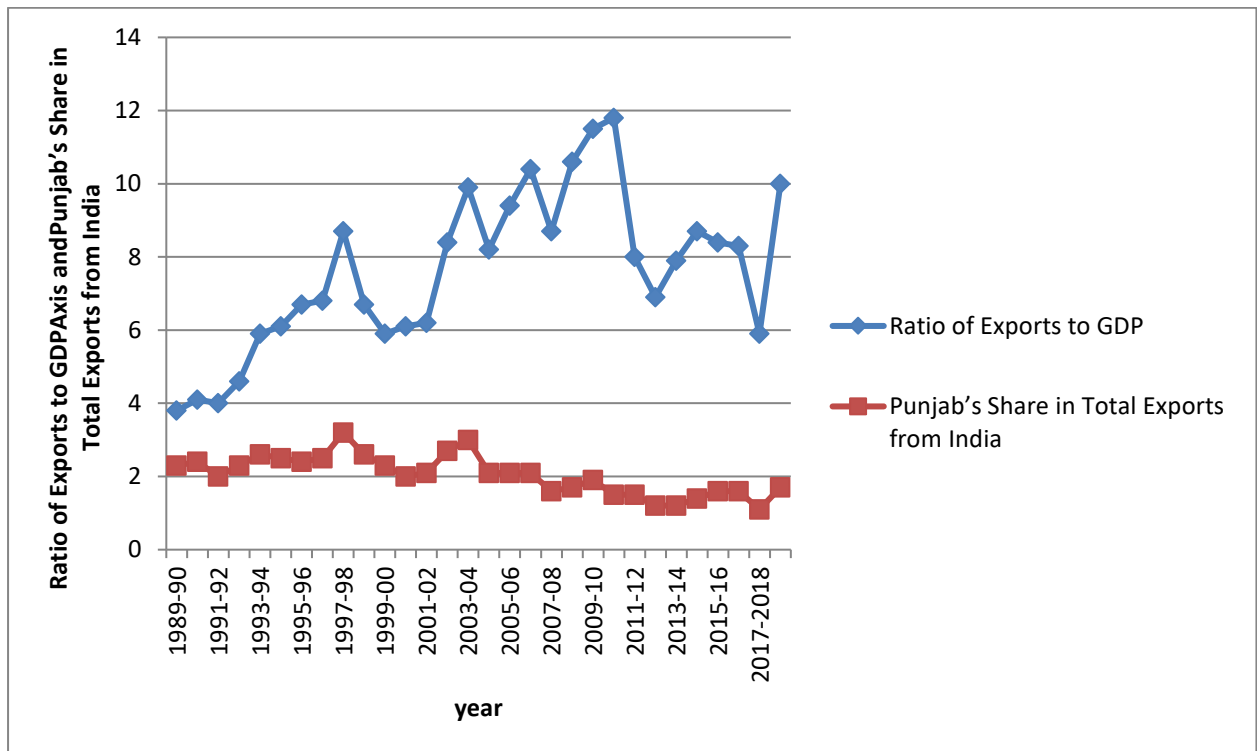
Hypothesis of GDP strategy led by exports and exports led by GDP.

ADF Test for Unit Root
Null Hypothesis: D(LOGGDP) has a unit root

Table 1.2 Augmented Dickey-Fuller for testing of Unit Root(GDP)

			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.497674	0.0001
Test critical values:	1 per cent		-3.7	
	5 per cent		-3.0	
	10 per cent		-2.6	
*MacKinnon (1996) one-sided p-values.				
Durbin-Watson stat	1.99			

Table 1.2 describes the ADF Unit Root Test on GDP of Punjab. To check the reliability of test the value of Durbin-Watson Statistics is analysed and it has been found that there is no autocorrelation present among the residuals. The value of ADF is -5.497674, which is less than p value. The null hypothesis is rejected and it is concluded that series is stationery at first difference.

Null Hypothesis: D(LOGEXPORT) has a unit root

Table 1.3: Augmented Dickey-Fuller test statistic (Exports)

			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.830757	0.0000
Test critical values:	1 per cent		-3.7	
	5 per cent		-2.9	
	10 per cent		-2.6	
*MacKinnon (1996) one-sided p-values.				
Durbin-Watson stat	1.920302	Durbin-Watson stat	1.920302	

Table 1.3 describes the ADF Unit Root Test on Exports of Punjab. To check the reliability of test the value of Durbin-Watson Statistics is analysed and it has been found that there is no autocorrelation present among the residuals. The value of ADF is -5.830757, which is less than p value. The null hypothesis is rejected and it is concluded that series is stationery at first difference.

Johansen Co-integration Test:

H0: there is no conintegration between Log GDP and Log Export

Table 1.4 Johansen Co-integration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen Value	Statistic	Criticalvalue	Prob.**
None *	0.515966	22.71047	12.32090	0.0007
At most 1	0.081936	2.393676	4.129906	0.1439
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Criticalvalue	Prob.**
None *	0.515966	20.31680	11.22480	0.0010
At most 1	0.081936	2.393676	4.129906	0.1439
**MacKinnon-Haug-Michelis (1999) p-values				

Co-integration test examine the existence of long run relationship between GDP and exports

from Punjab. The p value is less than 0.05 and this explains the rejection of null hypothesis. In case of GDP and Export of Punjab has a long run relationship**.**

Granger Causality

The results disclose that whether there is an existence of a bi-directional causality between GDP to EXPORT and vice versa.

Hypothesis

H0: LOGEXPORT does not Granger Cause LOGGDP
H0: LOGGDP does not Granger Cause LOGEXPORT

Table 1.5 Granger Causality

NULL HYPOTHESIS	Obs	F-Statistic	Prob.	Null Hypothesis
LOGEXPORT DOES NOT GRANGER CAUSE LOGGDP	28	0.84366	0.4430	ACCEPTED
LOGGDP DOES NOT GRANGER CAUSE LOGEXPORT		1.03198	0.3722	ACCEPTED

The main findings are LOGEXPORT does not Granger Cause LOGGDP and LOGGDP does not Granger Cause LOGEXPORT.

4. CONCLUSION:

Exports are important for the economic growth of nation. In case of Indian Punjab more reliable policies are required for strengthen the foreign trade and Industrial development. More importance is needed to develop duty free zones and special economic zones specifically in Punjab.

5. REFERENCES:

[1] Kaur, G., & Dhami, J. K. (2016). Empirical analysis between export and GDP: A case of BIMSTEC as a regional trading bloc. *Arthshastra Indian Journal of Economics & Research*, *5*(6), 8-20.
[2] Jordaan, A. C., & Eita, J. H. (2007). Export and economic growth in Namibia: a Granger causality analysis. *South African Journal of Economics*, *75*(3), 540-547.
[3] Thornton, J. (1996). Cointegration, causality and export-led growth in Mexico, 1895–1992. *Economics Letters*, *50*(3), 413-416.