THE EXPORT-LED GROWTH: A CASE STUDY OF CHINA

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Abstract

China has been one of the world's fastest growing economies in recent years. Export is a key factor in promoting economic growth. The export- led growth hypothesis assumed that exports are the chief determinant of overall economic growth and the exports positively contribute to economic growth. This study empirically investigates the export-led growth hypothesis for China using the annual data for the period 1982 to 2014. This study investigates the causal relationship between exports and economic growth by using Johansen cointegration and Granger causality approach. Based on the findings of cointegration approach this study concludes that there exists long run equilibrium relationship between exports and GDP per capita. Granger causality test show that unidirectional causality from economic growth to export.

Keywords: Export-Led Growth, China, Johansen Co-Integration, Granger Causality.

I. Introduction

Export-led growth hypothesis is empirically investigated for determination of impact of exports on economic growth. Export-led growth hypothesis assume that export expansion is one of the key determinants of economic growth.

The export-led growth hypothesis predicts that exports have an indirect growth effect and direct effect on output through productivity. There are several ways in which exports can affect productivity. Firstly, exports can increase productivity by concentrating investment in the most efficient sectors of economy. Secondly, export can ensure the foreign exchange to finance imports that incorporate knowledge of foreign technology and production know-how. Thirdly, an expansion of export allows countries to benefit from economies of scale. Fourth, the export sector can ensure positive externalities on the non-export sector (Dreger and Herzer, 2011: 6). Export-led growth is one of the most important economic strategies which are used by many developing countries. This strategies is significant for mostly two reasons. Firstly the strategy can produce profit, enabling a country to balance their investments. Secondly, export growth can support greater productivity (Iqbal et al., 2012: 455). If the causality runs from export to GDP which mean that exports oriented policies contribute to the economic growth. Unlike causality running from GDP to export which mean GDP growth promotes exports.

There is a excessive empirical literature available on the export-led growth hypothesis. This study aims to investigate relationship between exports and economic growth of China. Selected variables namely export and GDP per capita. The annual data were drawn from the World Bank database. The rest of the article is organized as follows. Section II discusses literature review, section III discusses data, methodology and emprical results. Section IV summarizes and concludes.

II. Review of Literature

The importance of exports as a driver of economic growth has been a subject of debate. There are several studies that investigated Export-led Growth Hypothesis. The studies in the literature can be summarized as follows:

Srivastana and Kapoor (2007), examined the relationship between export and economic growth in the Indian from 1951 to 2004. The study employed Granger causality test using annual time series data. The estimation results did not support the export-led growth hypothesis for India. And the results showed the unidirectional causality from economic growth to export.

Ray (2011), analyzed the relationship between export and economic growth in India from 1972-73 to 2010-11. The cointegration test confirmed that economic growth and exports cointegrated. The Granger causality test showed that bidirectional causality from economic growth to export and vice versa.

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Shahbaz et al., (2011), examined the exports-led growth hypothesis using quarterly data over the period 1990-2008 in Pakistan. ARDL bounds testing approach had been applied. The empirical results indicated that exports positively correlated with economic growth.

Iqbal et al., (2012), investigated the causality between exports and economic growth of Pakistan through the application of Granger causality. The empirical results indicated that there existed unidirectional causality from GDP to exports in Pakistan but not vice versa.

Khan et al., (2012), examined the relationship between imports, exports and economic growth in Pakistan for the time period 1972-2009. The empirical results showed that the existence of long run correlation among exports, imports and economic growth. Economic growth had an important impact on exports and imports.

Sahri and Atri (2012), analyzed export-led growth in India by taking a time series data from 1980-81 to 2008-09. It applied Ordinary Least Square method to investigate the relationship between gross national product, total exports, manufactured exports and investment. The results of this study supported the export-led growth hypothesis in India.

Niishinda and Ogbokor (2013), investigated the relationship export and economic growth in Namibia. The Johansen cointegration test, the vector error correction model and the Granger causality tests employed. The Granger causality test indicated a unidirectional causation from export to economic growth.

Chimfwembe and Seshamani (2014), investigated the validity of the export-led growth hypothesis in Zambia for the period 1990-2011. A causal relationship between exports and economic growth in Zambia analyzed using the Granger causality test and Vector Error Correction Model. The results indicated that the export-led growth hypothesis was valid for Zambia.

Bilas et al., (2015), examined the relationship between gross domestic product and exports of goods and services in Croatia from 1996 to 2012. The empirical results confirmed unidirectional Granger causality from the exports of goods and services to gross domestic product.

Al- Assaf and Al- Abdulrazag (2015), investigated the export-led growth hypothesis for Jordan over the period 1980-2012. The Autoregressive Distributed Lag model to cointegration approach was used in this study. The empirical results showed that the exports are a significant stimulus of the economic growth. In additional, exports effected output growth positively in both the short run and the long run.

Alaoui (2015), investigated the relationship between export, import and economic growth in Moroccan economy over the period 1980-2013. The cointegration technique employed to see the long run equilibrium relationship among variables. The cointegration results confirmed the existence of the long run relationship among these variables. For the short run causality the findings suggested bidirectional causality between economic growth and import; unidirectional causality that run from export to import, and no-directional causality between economic growth and export.

Allora (2015), analyzed the causal relationship between export and economic growth in Ethiopia's for the period 1974 to 2009. This study used Granger causality test and the results of the study showed that there was evidence of unidirectional causality between export and economic growth for Ethiopia.

Bashir et al., (2015), examined the export-led growth hypothesis in Pakistan for the period of 1972-2012. This study applyed Unit root test, Cointegration, Vector error model and Granger causality tests. The results revealed that there was a strong positive long run as well as short run relationship between exports and economic growth in Pakistan.

Hye and Siddiqui (2015), investigated the relationship between exports and economic growth by using the Autoregressive Distributed Lag approach from 2000 to 2008. The empirical findings indicated that long run relationship real GDP and exports.

Kumar (2015), investigated the relationship between GDP and exports in India for the period of 1980-2009. Granger causality test applied. The empirical results showed that there was a bilateral causality between GDP and exports.

Saaed and Hussain (2015), investigated the impact of exports and imports on the economic growth of Tunis over the period 1977-2012. The results showed that there was unidirectional causality between exports and imports and imports and between exports and economic growth.

Saleem and Sıal (2015), investigated the exports-growth nexus using annual time series data for the period 1973-2013 for Pakistan. The ARDL approach used to determine both the short run and long run relationships. Moreover the Granger causality test was used to explore causal direction among the variables. The Granger causality analysis showed that bidirectional causality running between exports and GDP growth in the short run and the long run.

Sing (2015), investigated the relationship between export and economic growth from 2005 to 2014. Johansen cointegration and Granger causality test applied to explore the long run and short run equilibrium relationship between export and economic growth. The empirical analysis revealed that export and

economic growth cointegrated and Granger causality test showed that bidirectional between export and economic growth in both long run and short run.

III. Model and Methodology

The main title is divided into two sections. In the first part, model used in this study has been introduced. In the second part, econometric methods used in this study has been mentioned. Then, describes some of the empirical results.

A.Model

Time series analysis is used for annual data for 1982-2014 periods. The annual data of GDP per capita and exports are taken from World Bank database and variables are all constant at 2005 USD prices. The natural logarithms of variables are taken. Estimation model is, mathematically presented as:

$$\ln GDP_t = \beta_0 + \beta_1 \ln EXPORT_t + \varepsilon_t \tag{1}$$

Where; GDP Gross Domestic Product Per Capita, EXPORT Exports of goods and services, β_0 is the constant term, t is the time trend, ε is a random error term.

Figure 1. The Plots of the Series (1982-2014)
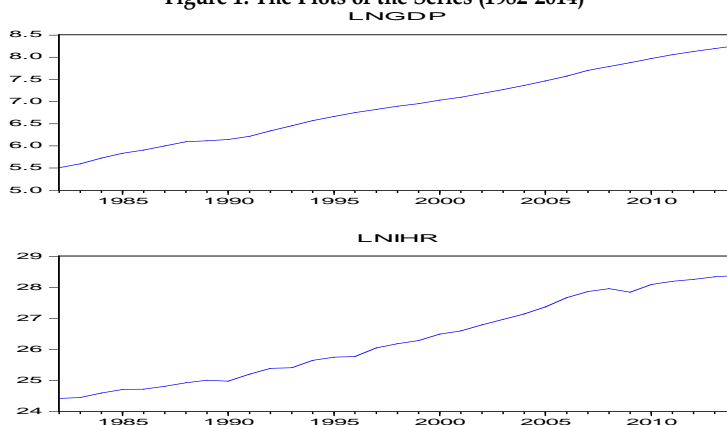
B. Econometric Methodology And Empirical Findings

Unit Root Tests: Researchers have developed many technique for the test of order of integration. The most popular one is Augmented Dickey Fuller (ADF) test. The general form of ADF test is estimated by the following regression:

$$\Delta X_t = \lambda X_{t-1} + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \varepsilon_t \tag{2}$$

Where; Δ denotes first difference operator, p denotes lag operator, t denotes time subscript and ε denotes the error term. Augmented Dicky-Fuller (ADF) test is based on following three possible forms:

- Without intercent and trend

$$\Delta X_t = \lambda X_{t-1} + \sum_{i=1}^{p} \beta_i \Delta X_t + \varepsilon_t \tag{3}$$

- With intercent

$$\Delta X_t = \alpha_0 + \lambda X_{t-1} + \sum_{i=1}^{p} \beta_i \Delta X_t + \varepsilon_t \tag{4}$$

- With intercent and trend

$$\Delta X_t = \alpha_0 + \lambda X + \beta_t + \sum_{i=1}^{p} \beta_i \Delta X_{t-i} + \varepsilon_t \tag{5}$$

The null hypothesis: The variable has unit root. The alternative hypothesis: There is no unit root. Results of unit root test are reported in table 1. ADF results show that the GDP per capita and export series are not stationary at level but the first differences of series are stationary.

Table 1. Result of Unit Root Test

Variable	ADF	
	Level	1st Difference
LnGDP	0.383	-4.310*
	(-2.963)	(-2.963)
LnEXPORT	0.341	-5.705*
	(-2.957)	(-2.960)

Note: *, Indicate significance at 5 percent.

Johansen Cointegration Test: In order to select the lag lenght of the VAR model the selection criteria is used, Sequential Modified Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQ) are employed. It's clear from table 2 that AIC and HQ statistics are chosen lag of 4 is used for estimation purpose.

Table 2. VAR Lag Order Selection Criteria

Log	LogL	LR	FPE	AIC	SC	HQ
0	-7.788146	NA	0.007279	0.752934	0.849711	0.780803
1	89.29215	171.7574*	5.67e-06	-6.407088	-6.116758*	-6.323484
2	94.63136	8.624872	5.15e-06	-6.510104	-6.026221	-6.370763
3	100.5029	8.581490	4.54e-06*	-6.654069	-5.976633	-6.458992
4	**106.4295**	**7.750151**	**4.04e-06***	**-6.802268***	**-5.931278**	**-6.551455***
5	109.4764	3.515686	4.59e-06	-6.728955	-5.664412	-6.422405
6	114.1780	4.701618	4.73e-06	-6.782926	-5.524829	-6.420639
7	114.8013	0.527393	6.96e-06	-6.523178	-5.071528	-6.105155

Johansen and Juselius (1990) have derived two test for cointegration as Trace test and Maximum Eigen value. The trace test statistics can be specified as:

$$\pi_{trace} = -T \sum_{i=r+1}^{k} \log(1-\lambda_i) \tag{6}$$

Where λ_i, is the ith largest eigen value of matrix π and T is the number of observations. In the trace test, the null hypothesis is that the number of distinct cointegrating vector(s) is less than or equal to the number of cointegration relations (*r*).

The maximum eigenvalue test examines the null hypothesis of exactly *r* cointegrating relations against the alternative of *r* + 1 cointegrating relations with the test statistic:

$$\pi_{\max} = -T \log(1-\lambda_{r+1}) \tag{7}$$

Where λ_{r+1} is the $(r+1)^{th}$ largest squared eigen value. In the trace test, the null hypothesis of $r = 0$ is tested against the alternative of $r + 1$ cointegrating vectors.

The null hypothesis of no cointegration between economic growth and export is tested towards alternative hypothesis of existence of cointegration. This result of cointegration presented in table 3 below. The cointegration results show that Trace statistic is upon the 5 % critical values so refuse it rejects null hypothesis of no cointegration in favor of one cointegrating vector. Maximum Eigen Value test statistic is also upon then 5 % critical values, that reject null hypothesis of no cointegration. This results show that there exists long run stable relationship between GDP and exports.

Table 3. Results of Johansen Julsius Cointegration

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No.of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Porb**
None*	0.517807	25.76934	18.39771	0.0039
At most 1*	0.173804	5.345861	3.841466	0.0208
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No.of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob**
None*	0.517807	20.42348	17.14769	0.0161
At most 1*	0.173804	5.345861	3.841466	0.0208

The null hypotheses of the Granger-Causality test are:

$H_0 = X \neq Y$ (X does not granger cause Y)

$H_1 = X \neq Y$ (X does granger cause Y)

Results of Pairwise Granger Causality Test are presented in table 4. The results imply that exports Granger doesn't cause GDP per capita while GDP per capita Granger cause exports. Hence results show that causality is unidirectional.

Table 4. Pairwise Granger Causality Tests

Null Hypothesis	Obs	F-Statistic	Prob
LnIHR does not Granger Cause LnGDP		1.21621	0.3351
LnGDP does not Granger Cause LnIHR	29	3.10682	0.0385

CONCLUSION

Export-led growth hypothesis emphasises the role of export in promoting economic growth and development. The export-led growth hypothesis states that the growth of exports has an accelerating influence on the economy though the spillovers of technology and other externalities. This study examines

the relationship between exports and GDP per capita in China using time series data stemming from 1982 to 2014. The results of unit root tests indicated that the two variables are stationary in their first differences. After confirming the stationarity of the variables at I(1), we begined the cointegration analysis by using the Johansen and Juselius cointegration test. The cointegration test confirm the existence of long run equilibrium relationship between exports and GDP per capita. The Granger Causality test gives evidence that there exists unidirectional causality running from GDP per capita and exports.

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