# Classification of Exports, Human capital and Economic Growth: A Causality analysis for Pakistan, 1975-2014

*by*

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# Abstract

The study empirically examines the effects of real primary commodity exports, real semi manufactures exports, real manufactured exports, real total exports and human capital on real GDP growth using time series data for the period 1975-2014 for Pakistan. ARDL bound testing approach is employed to investigate short run and long run relationship. The direction of causality is verified by using error correction model. The results show that real primary commodity exports, real semi manufactures exports, real manufactured exports and real total exports have a significant effect on real GDP growth in short run and long run that supports ELG hypothesis. Short run effect of human capital is not observed but in long run it does effect real GDP growth. The results also support Growth led export (GLE) hypothesis in long run while in short run it validates only for real semi manufactures exports. The significance of human capital proposes government and private enterprises to invest more on education to accelerate exports and economic growth. Government should encourage domestic and foreign direct investment in export sector to raise the output and the productive capacity of the economy.

# Introduction

- Neoclassical export led growth (ELG) theory postulates causation from exports growth to economic growth. ELG has been sponsored as a common approach of industrial development and a substitute to import substitution industrialization.

- Evidence of export led growth hypothesis is helpful in making export promotion policy as a development strategy.

# Introduction

- The vital factor that contributes their exports and economic growth is investment in education which has positive externalities and is a critical input for innovation and R&D activity. Educated and trained labor force not only enhances economic growth but also attract foreign direct investment. Most of the studies have investigated the relationship between human capital and economic growth based on growth accounting framework (Barro, 1991, Barro and Lee 1993) or endogenous growth theory (Lucas 1988, Romer 1990; Grossman and Helpman, 1991). The growth accounting framework conceives that economic growth and productivity can be enhanced by raising human capital stock. The endogenous growth model of Romer (1990) postulates that human capital is directly related to creation of new ideas which is obvious in the form of scientific knowledge. Education which is the investment in human capital causes growth in physical capital and leads to accelerate economic growth. Accumulation of human capital possibly promotes economic growth via enabling technology adaption (Welch, 1970: Foster and Rosenweig, 1996).

# REVIEW OF LITERATURE

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| **Exports and economic growth: Evidence from 19th Century Europe**<br><br>**John Thornton**<br>**Economics Letters, 1997, 55, 235–240** | **Denmark, Germany, Italy, Norway, Sweden and the United Kingdom**<br><br>**Denmark: 1870-1913**<br>**Germany:1980-1913**<br>**Italy: 1861-1913**<br>**Sweden: 1861-1913**<br>**UK: 1850-1913**<br>**Norway: 1865-1913** | **Co-integration and Granger causality tests**<br><br>**Real GNP and Real Exports** | **He finds empirical evidence between exports and economic growth in six European countries for the period around the mid-19th Century to the eve of First World War. The study reveals unidirectional causality from real exports to real GNP in Italy, Norway, and Sweden. Unidirectional causality runs from real GNP to real exports in U.K while bidirectional causality between real exports and GNP in Denmark and Germany.** |

# REVIEW OF LITERATURE

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| Export-led growth hypothesis for Australia: an empirical re-investigation<br><br>Jordan Shan & Fiona Sun<br>Applied Economics Letters, 1998, 5, 423–428 | Australia<br>Quarterly Data<br>Period:1978Q3-1996Q3 | VAR and Granger Causality<br><br>Real growth of manufacturing output, Capital, Labor, Export and Import | Unidirectional causality is evidenced from industrial production growth to exports with one year time lag and also consistent with other lag structures. They reject export-led growth hypothesis but supports growth-driven exports hypothesis in Australia |
| On the export-led growth hypothesis: the econometric evidence from China<br><br>Jordan Shan & Fiona Sun<br>Applied Economics, 1998, 30, 1055 – 1065 | China<br>Monthly Data<br>1987-1996 | VAR framework and Granger no causality procedure developed by Toda & Yamamoto<br><br>Exports , Industrial output, Energy Consumption, Labour force, Imports and Capital expenditure | ELG hypothesis is rejected in China because it is based on unidirectional causality from industrial output to exports. They conclude that growth is an engine of exports in china despite positive contribution of exports to real output. |

# REVIEW OF LITERATURE (ELG AND HK)

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| **Human Capital, Exports, and Economic Growth: A Causality Analysis for Taiwan, 1952–1995**<br><br>**Chuang, Yih-chyi**<br>**Review of International Economics, 2000, 8(4), 712–720** | **Taiwan**<br>**Annual Data: 1952-1995** | **Cointegration and Granger Causality**<br><br>**Real GDP, Real Exports, Higher education attainment ratio** | **The study finds positive long run relationship among human capital, exports, and economic growth. Bidirectional causality is evidenced between export growth and higher education accumulation and unidirectional causality runs from higher education accumulation to economic growth.** |

# REVIEW OF LITERATURE

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| Does Export Promotion Increase Economic Growth? Some Cross-Section Evidence<br><br>Turan Subasat<br>Development Policy Review, 2002, 20 (3): 333-349 | 35 high income, 35 middle income and 35 lower income countries | OLS<br><br>GDP growth rate, Export promotion policy index; Exports, Investment, Initial GDP per capita, Government Share in GDP, Social Unrest, Population, Primary enrolment and Political system | The finding does not support export-led development. In middle income countries weak positive correlation between export promotion policy index and growth is observed and no evidence for the benefits of promoting exports in low and high income countries. Promotion of exports may not hurt the economy but heavily dependence on exports to accelerate growth may be misleading. |
| Are Exports the Engine of Economic Growth? An Application of Cointegration and Causality Analysis for Egypt, 1977-2003<br>Fouad Abou-Stait<br>Economic Research Working Paper No 76 (July 2005) | Egypt<br>Annual Data<br>Period: 1977-2003 | VAR,Co-integration, and Granger causality test<br><br>Real GDP, Real Exports, Real Imports, Real GFCF | The study confirms the evidence of export led growth hypothesis. Shocks to exports lead to a significant response in GDP while shocks to exports have a small response on capital formation. Economic reforms and the shift towards a free market economy raises exports which accelerate economic growth. |

# REVIEW OF LITERATURE

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| Testing the Export-Led Growth Hypothesis for Botswana: A Causality Analysis<br><br>André C. Jordaan1 & Joel Hinaunye Eita<br><br>BOJE: Botswana Journal of Economics (2009) | Botswana<br>Quarterly Data<br>Period: 1996-2007 | VAR, Granger Causality<br><br>GDP, Exports of goods and services | The study reveals bidirectional causality between exports and economic growth which supports both export-led growth and growth-driven export hypothesis in Botswana. The finding of results suggest that to enhance economic growth, export promotion policies should be adopted and by the allocation of resources for productive purpose, economic growth can accelerate to raise exports. |
| Export-Led Growth Hypothesis: A Multivariate Cointegration and Causality Evidence for Jordan<br><br>Jamal Husein<br>The Journal of Developing Areas, Volume 42, Number 2, Spring 2009,<br>pp. 253-266 | Jordon<br>Annual Data<br>1969-2005 | Co-integration, ECM<br><br>GDP, Total Exports, Net Barter TOT | The study reveals bidirectional causality between real exports and real GDP in long run which validates ELG as well as Growth driven export hypothesis. In short run causality runs from exports to economic growth. |

# REVIEW OF LITERATURE

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| **The Dynamics of Relationship between exports and economic growth in India**<br><br>**P.K. Mishra**<br><br>**International Journal of Economic Sciences and Applied Research, 2011, 4 (2): 53-70** | **India**<br>**Annual data**<br>**Period: 1970-2009** | **Co-integration and VECM**<br><br>**Total Exports (oil + non oil), Economic Growth** | **The study confirms the existence of long run equilibrium relationship between exports and economic growth but rejects the Export-led growth hypothesis based on Granger causality test. The direction of causality runs from real GDP to exports and the data supports for growth-driven exports in India.** |

# REVIEW OF LITERATURE (Pakistan)

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY /VARIABLES | CONCLUSION |
|---|---|---|---|
| An Analysis of Exports and Growth in Pakistan<br><br>Muhammad A Quddus, Ikram Saeed<br><br>The Pakistan Development Review 44 : 4 Part II (Winter 2005) pp. 921–937 | Pakistan, Annual Data Period: 1971-2004 | Co-Integration Engle Granger, ECM<br><br>Real GDP, Real Exports, Investment/GDP ratio, Labor Force | The impact of exports to GDP is limited and its coefficient is statistically insignificant while Investment to GDP ratio effect on GDP is strong and its coefficient is statically significant. The Granger causality relationship is confirmed from export to economic growth for the long run period. The study validates ELG hypothesis. |
| A Dynamic Analysis of the Relationship among Human Development, Exports and Economic Growth in Pakistan<br><br>Muhammad Afzal, A. Rauf Butt, Hafeez ur Rehman and Ishrat Begum<br><br>The Pakistan Development Review 48 : 4 Part II (Winter 2009) pp. 885–920 | Pakistan Annual Data Period: 1971-2009 | ARDL Bound Testing approach of Co-integration<br><br>GDP, Capital Stock, Real Exports, HDI | They find that inclusion of human development explanatory variable in augmented growth model increases the robustness of the model. The study supports the growth-driven exports hypothesis but the export-led growth and human capital based endogenous growth are not found applicable for Pakistan. Real GDP is a key source to explain the real exports and human development both in short and long run. |

# REVIEW OF LITERATURE (Pakistan)

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY/ VARIABLES | CONCLUSION |
|---|---|---|---|
| Exports-Led Growth Hypothesis in Pakistan: Further Evidence<br><br>Muhammad Shahbaz, Pervaz Azim and Khalil Ahmed<br>Asian Economic and Financial Review, 2011, 1(3), pp.182-197 | Pakistan<br>Quarterly Data<br>Period: 1990-2008 | ARDL bound testing approach of Co-Integration, ECM<br><br>Real GDP, Real Exports, Capital Stock and Real Effective Exchange Rate | Positive correlation between exports and economic growth. The study validates export led hypothesis during trade liberalization period. Capital stock is a major determinant of economic growth and currency depreciation improves economic growth via exports. |
| An Econometric Analysis of Export - Led Growth Hypothesis: Reflections from Pakistan<br><br>Hassan Mobeen Alam<br><br>Interdisciplinary Journal of Contemporary Research in Business, April 2011, Vol 2, No. 12 | Pakistan<br>Annual Data<br>Period: 1971-2007 | Co-Integration, ECM<br><br>GDP, Exports, Imports | The study validates export-led growth hypothesis. Long run relationship between GDP and trade (exports and imports) is evidenced and exports and imports coefficient are statistically significant. The elasticity of imports to GDP is 0.49 while exports to GDP is 0.34. |

# REVIEW OF LITERATURE (Pakistan)

| ARTICLE/AUTHOR | COUNTRY/ DATA | METHEDOLOGY /VARIABLES | CONCLUSION |
|---|---|---|---|
| Export Diversification and the Structural Dynamics in the Growth Process: The Case of Pakistan<br><br>M. Akbar & Zareen Naqvi<br><br>The Pakistan Development Review 39 : 4 Part II (Winter 2000) pp. 573-589 | Pakistan<br>1972-73 to 1997-98 | Cointegration Granger Causality<br><br>Exports, Income, Imports | Export diversification enhance Pakistan growth performance.<br><br>The study shows that exports do not lead growth in any of the Granger-causality test. On the contrary, growth lead exports in all most all the test. |
| Human Capital and Economic Growth in Pakistan: A Cointegration and Causality Analysis.<br><br>Nabila, Awan and Rehman, H.<br><br>International Journal of Economics and Finance Vol. 4, No. 4; April 2012 | Pakistan<br>Annual Data:<br>1974 – 2009 | VECM and VECM based Granger causality test<br><br>Per capita income, Education index, Health index | Based on Toda Yamamoto causality test, they determine three uni directional causalities which run from economic growth to education index, economic growth to health index and education index to health index. |

# THEORETICAL FRAMEWORK

## 1. The neoclassical supply-side model

Feder (1982) was the first who provides formal rationalization of incorporating export variable to explain growth of the following form.

$G = a(I/Y) + b(dL/L) + [\delta/(1+\delta) + F_X] (X/Y) (dX/X)$ Where:

G = Growth rate of output

I/Y = the investment to output ratio

dL/L = growth rate of the labor force

dX/X = growth rate of exports

X/Y = share of exports in GDP

$\delta/(1+\delta)$ = differential productivity effect

$F_X$ = externality effect

# THEORETICAL FRAMEWORK

**2. The balance of payments constrained growth model**

The simplest way to explain the relationship between export and output growth is as follows:

Export growth ↑ => eases BOP constraint on demand => (C + I +G) ↑ without having BOP problems => GDP growth ↑. The growth rate of output of a country can be expressed as:

$g = x/\Pi$

Where

g = output growth

x = growth of export volume (determined by the growth of world income and income elasticity of demand for exports)

Π = income elasticity of demand for imports.

# THEORETICAL FRAMEWORK

**3. The virtuous circle model of export-led growth**

Due to diminishing returns to scale, neoclassical growth theory predicts slower growth in rich countries than poor countries for equal amount of investment. But returns to scale can be static and dynamic including learning by doing the so-called Verdoorn Law. According to this induced productivity growth model, following functional relationships can be described as:

(i) Output growth is a function of export growth i.e., GrY= f(GrX).

(ii) Export growth is a function of price competitiveness and foreign income growth i.e., GrX = g(Pc, $Y_f$).

(iii) Price competitiveness is a function of wage growth and productivity growth i. e., Pc = h( GrW, GrP).

(iv) Productivity growth is a function of output growth i.e., GrP = i(GrY).

# Study Objective

The objective of this study is to examine export led growth hypothesis and determine the effect of human capital on exports and economic growth in Pakistan.

# Hypotheses

- Primary commodity exports granger cause GDP
- Semi Manufactures exports granger cause GDP
- Manufactured exports granger cause GDP
- Total exports granger cause GDP
- Human capital granger causes GDP

# DATA & Variables

Time series data from 1975-2014 of real gross domestic product (RGDP), primary commodity exports, semi manufactures exports , manufactured exports, total exports, GDP deflator, adult literacy rate, gross enrolment rates are taken from Economic survey of Pakistan (various issues) . Exports variables are deflated by GDP deflator to obtain real exports variables. i.e., real primary commodity exports (RPE), real semi manufactures exports (RSME), real manufactured exports (RME) and real total exports (REXP). Education index is used as proxy of human capital which is computed by UNDP methodology

# ARDL

$$\Delta RGDP_t = a_0 + \lambda_1 RGDP_{t-1} + \lambda_2 XP_{t-1} + \lambda_3 HK_{t-1} + \sum_{i=1}^{n} \alpha_i \Delta RGDP_{t-i} + \sum_{i=1}^{n} \beta_i \Delta XP_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta HK_{t-i} + u_{1t} \quad (1)$$

$$\Delta XP_t = a_1 + \theta_1 RGDP_{t-1} + \theta_2 XP_{t-1} + \theta_3 HK_{t-1} + \sum_{i=1}^{n} \Phi_i \Delta RGDP_{t-i} + \sum_{i=1}^{n} \pi_i \Delta XP_{t-i} + \sum_{i=1}^{n} \delta_i \Delta HK_{t-i} + u_{2t} \quad (2)$$

$$\Delta HK_t = a_2 + \Omega_1 RGDP_{t-1} + \Omega_2 XP_{t-1} + \Omega_3 HK_{t-1} + \sum_{i=1}^{n} \mu_i \Delta RGDP_{t-i} + \sum_{i=1}^{n} \sigma_i \Delta XP_{t-i} + \sum_{i=1}^{n} \psi_i \Delta HK_{t-i} + u_{3t} \quad (3)$$

with $u_{1t}$, $u_{2t}$ are $u_{3t}$, $\sim$ iid $N(0, \sigma^2)$, $\Delta$ is first difference operator and n is lag length.

Where XP is the real primary exports, real semi manufactures exports, real manufactured exports and real total exports.

# Co-integration

To test no cointegration among variables in ARDL equations from (1) to (3), following null hypotheses are stated as follows:

Null Hypothesis: $\lambda_1 = \lambda_2 = \lambda_3 = 0$
Null Hypothesis: $\theta_1 = \theta_2 = \theta_3 = 0$
Null Hypothesis: $\Omega_1 = \Omega_2 = \Omega_3 = 0$

Rejection of above stated null hypotheses implies cointegration. However as the null hypothesis is 'No Cointegration' the tests does not have the standard 'F' or 'Chi-Square' sampling distribution.

# Table 1: Unit root tests

| Variable | ADF Test | | | PP Test | | |
|---|---|---|---|---|---|---|
| | Constant | Trend and Constant | No Trend and Constant | Constant | Trend and Constant | No Trend and Constant |
| RGDP | -2.410 | -1.756 | 3.408 | -2.994** | -1.339 | 8.929 |
| RPE | -1.835 | -3.108 | 0.570 | -1.641 | -3.154 | 0.823 |
| RSME | -1.952 | -1.616 | 1.584 | -1.994 | -1.559 | 1.705 |
| RME | -2.340 | -0.394 | 3.734 | -2.632* | -0.032 | 3.307 |
| REXP | -1.652 | -1.006 | 3.064 | -1.782 | -0.847 | 3.084 |
| HK | -0.416 | -1.598 | -5.588 | -0.422 | -1.859 | -4.999*** |
| DRGDP | -3.951*** | -4.671*** | -1.327 | -4.014*** | -4.675*** | -0.956 |
| DRPE | -7.184*** | -7.089*** | -7.162*** | -7.621*** | -7.499*** | -7.458*** |
| DRSME | -6.869*** | -6.902*** | -6.516*** | -6.843*** | -6.898*** | -6.491*** |
| DRME | -5.780*** | -7.001*** | -1.485 | -5.792*** | -7.564*** | -4.294*** |
| DREXP | -5.988*** | -6.361*** | -4.820*** | -5.991*** | -6.587*** | -4.898*** |
| DHK | -6.064*** | -5.967*** | -1.231 | -6.0958*** | -5.998*** | -3.591*** |
| *, **, *** Significant at level 10%, 5% and 1% respectively | | | | | | |
| All values are in natural logarithm, D is first difference operator | | | | | | |

# Table 2: ARDL Bounds cointegration test

| | Dependent Variable | F Statistics | Cointegration |
|---|---|---|---|
| ARDL Primary Commodity Export | RGDP\RPE,HK | 4.525 | Yes |
| | RPE\RGDP,HK | 6.132 | Yes |
| | HK\RGDP,RPE | 5.466 | Yes |
| ARDL Semi Manufactures Exports | RGDP\RSME,HK | 3.929 | Inconclusive |
| | RSME\RGDP,HK | 5.239 | Yes |
| | HK\RGDP,RSME | 3.984 | Inconclusive |
| ARDL Manufactured Export | RGDP\RME,HK | 3.524 | Inconclusive |
| | RME\RGDP,HK | 3.547 | Inconclusive |
| | HK\RGDP,RME | 5.388 | Yes |
| ARDL Total Export | RGDP\REXP,HK | 3.912 | Inconclusive |
| | REXP\RGDP,HK | 5.465 | Yes |
| | HK\RGDP,REXP | 5.754 | Yes |

# Table 3: Results of Long run model

| Long run coefficients | | | | | | |
|---|---|---|---|---|---|---|
| Dependent Variable RGDP | | | | | | |
| | Constant | RPE | RSME | RME | REXP | HK |
| Equation | 16.543*** | 0.095** | | | | 1.86*** |
| Equation | 17.102*** | | 0.020 | | | 1.902*** |
| Equation | 14.737*** | | | 0.230*** | | 1.245*** |
| Equation | 15.191*** | | | | 0.193*** | 1.50*** |
| *, **, *** Significant at level 10%, 5% and 1% respectively | | | | | | |

# Table 4: Diagnostic test based on ECM

| | Lagrange Multiplier test statistics | | | F- test | |
|---|---|---|---|---|---|
| | Diagnostics | Test Statistics Value | p-value | F-Statistics Value | p-value |
| Dependent variable = ΔRGDP Regressors (ΔRPE,ΔHK) | Serial correlation | 2.152 | 0.341 | 0.931 | 0.405 |
| | Hetroscedasticity | 9.989 | 0.266 | 1.293 | 0.286 |
| | Normality (JB) | 0.609 | 0.738 | Not Applicable | |
| Dependent variable = ΔRGDP Regressors (ΔRSME,ΔHK) | Serial correlation | 3.122 | 0.265 | 1.388 | 0.265 |
| | Hetroscedasticity | 8.486 | 0.387 | 1.042 | 0.428 |
| | Normality (JB) | 0.409 | 0.815 | Not Applicable | |
| Dependent variable = ΔRGDP Regressors (ΔRME,ΔHK) | Serial correlation | 1.071 | 0.585 | 0.586 | 0.563 |
| | Hetroscedasticity | 10.587 | 0.226 | 1.4 | 0.238 |
| | Normality (JB) | 1.635 | 0.441 | Not Applicable | |
| Dependent variable = ΔRGDP Regressors (ΔREXP,ΔHK) | Serial correlation | 2.878 | 0.237 | 1.234 | 0.305 |
| | Hetroscedasticity | 10.69 | 0.219 | 1.41 | 0.231 |
| | Normality (JB) | 0.401 | 0.818 | Not Applicable | |

# Stability Tests

*Primary Exports*

Figure 2(a)

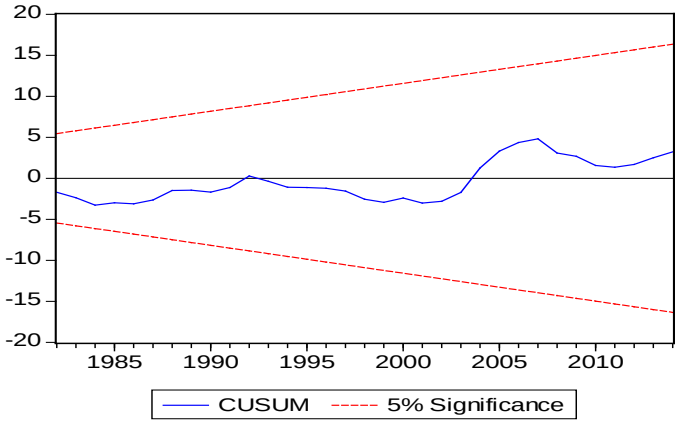
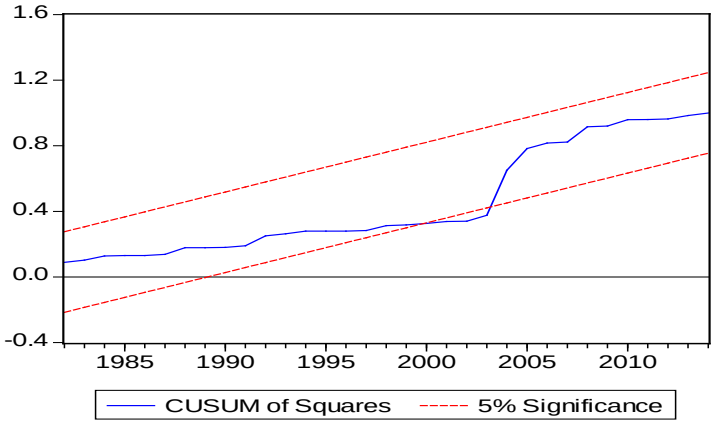



Figure 2(b)




*Semi Manufactures Exports*

Figure 3(a)

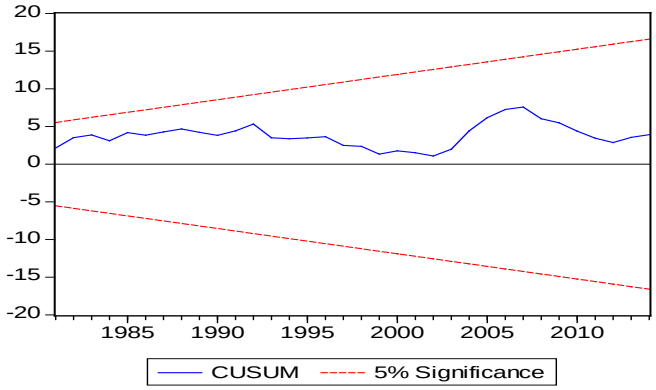
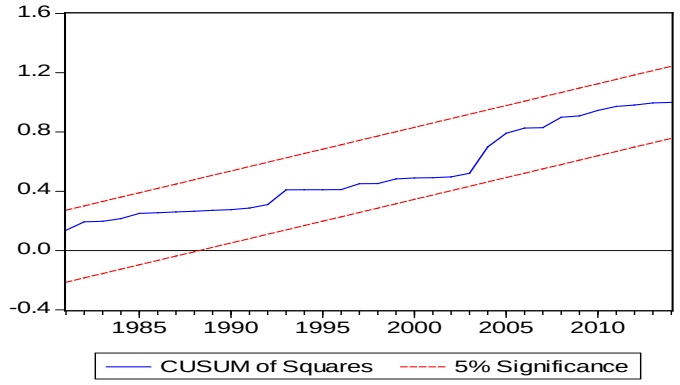



Figure 3(b)



# Stability Tests

*Manufactured Exports*

Figure 4(a)

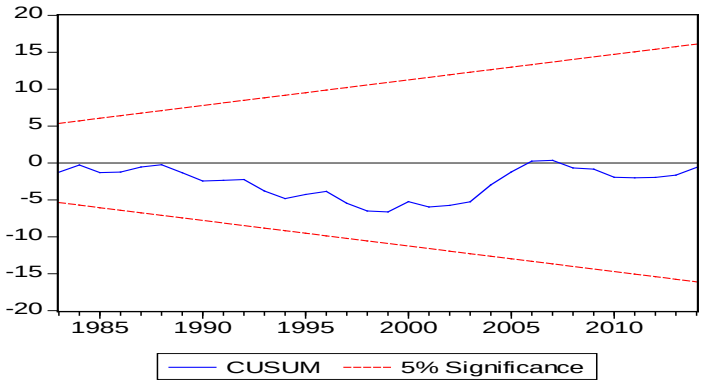
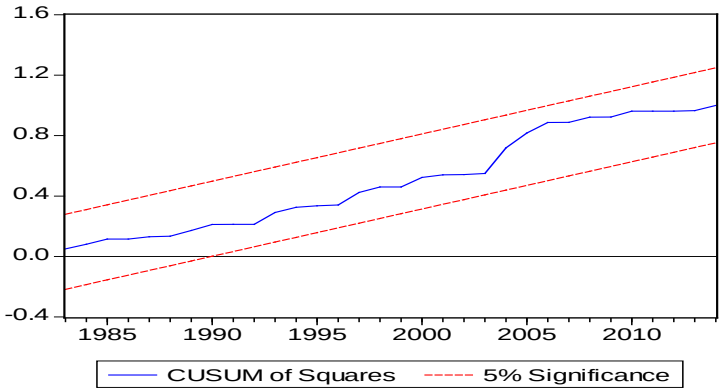



Figure 4(b)




*Total Exports*

Figure 5 (a)

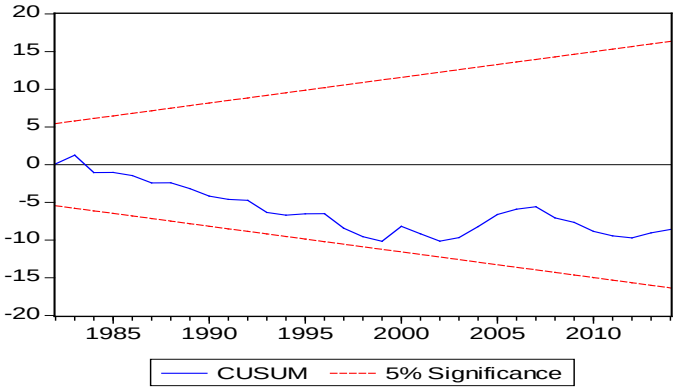
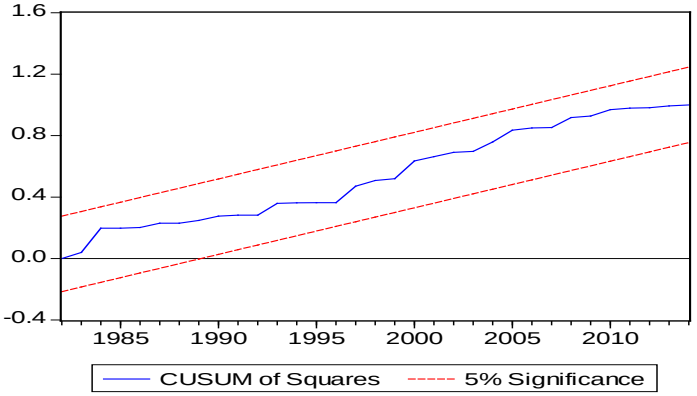



Figure 5 (b)



# *Results of Short run and long run causality*

| Table 5(a): Primary Exports | | | |
|---|---|---|---|
| **F- statistics** | | | |
| **Lags of independent Variables** | Dependent Variables | | |
| | ΔRGDP | ΔRPE | ΔHK |
| **ΔRGDP** | 0.688 | 0.380 | 8.078*** |
| **ΔRPE** | 3.107* | 0.068 | 0.124 |
| **ΔHK** | 1.226 | 0.128 | 21.959*** |
| **$ECT_{t-1}$** | 0.029** | -0.526*** | -0.558*** |
| | | | |
| ***, **, *** Significant at level 10%, 5% and 1% respectively** | | | |

# *Results of Short run and long run causality*

| Table 5(b): Semi Manufactures Exports | | | |
|---|---|---|---|
| **F statistics** | | | |
| **Lags of independent Variables** | Dependent Variables | | |
| | ΔRGDP | ΔRSME | ΔHK |
| **ΔRGDP** | 1.032 | 6.904** | 10.176*** |
| **ΔRSME** | 3.771* | 38.565*** | 4.674** |
| **ΔHK** | 1.137 | 8.400*** | 4.601** |
| **$ECT_{t-1}$** | 0.021** | -0.00016*** | -0.219*** |
| ***, **, *** Significant at level 10%, 5% and 1% respectively** | | | |

# *Results of Short run and long run causality*

| Table 5(c): Manufactured Exports | | | |
|---|---|---|---|
| **F statistics** | | | |
| **Lags of independent Variables** | Dependent Variables | | |
| | ΔRGDP | ΔRME | ΔHK |
| **ΔRGDP** | 5.535** | 2.564 | 0.009 |
| **ΔRME** | 6.780** | 18.362*** | 2.882* |
| **ΔHK** | 0.023 | 3.461* | 14.368*** |
| **$ECT_{t-1}$** | -0.015** | -0.058*** | -0.168*** |
| ***, **, *** Significant at level 10%, 5% and 1% respectively** | | | |

# *Results of Short run and long run causality*

| Table 5(d): Total Exports | | | |
|---|---|---|---|
| **F statistics** | | | |
| **Lags of independent Variables** | Dependent Variables | | |
| | ΔRGDP | ΔREXP | ΔHK |
| **ΔRGDP** | 7.031** | 1.593 | 0.485 |
| **ΔREXP** | 2.873* | 15.381*** | 1.841 |
| **ΔHK** | 0.216 | 7.529*** | 12.386*** |
| **$ECT_{t-1}$** | -0.009** | -0.107*** | -0.133*** |
| ***, **, *** Significant at level 10%, 5% and 1% respectively** | | | |

# CONCLUSION

To explore causal relationship among export growth, human capital and output growth, three classifications of exports (primary commodity exports, semi manufactures exports, manufactured exports) are taken. All variables are stationary at first difference. The empirical results show that real primary commodity exports, real semi manufactures exports, real manufactured exports and real total exports have a significant effect on real GDP growth in short run and long run that supports ELG hypothesis. Short run effect of human capital is not observed but in long run it does effect GDP growth. The causality results show unidirectional causality runs from real primary export to real GDP, real manufactures exports to real GDP and real total exports to real GDP while real semi manufactures exports and real GDP have bidirectional causality. The results also support Growth led export (GLE) hypothesis in long run while in short run it validates only for semi manufactures exports. The study, therefore recommends that Pakistan should identify export potential of industries and frame policies to promote exports. Special attention should be given to growth of manufactured exports as its effect on output growth is the highest among all classification of exports. Timely credits to exporters can ease exporters to raise its output. Government should encourage domestic and foreign direct investment in export sector to raise the output and the productive capacity of the economy and for that purpose stability in macroeconomic policies, adequate energy resources, sufficient infrastructure, political stability and appropriate law and order situation are essential. The significance of human capital proposes government and private enterprises to invest in education for accelerating exports and economic growth. Pakistan should pay more attention to raise primary school enrolments, reduce dropout rates, increase quantity and quality of teaching and non-teaching staff and maintain school buildings and infrastructure. Government of Pakistan should increase research grants to public sector universities and R&D institutes, and facilitate private sector universities to conduct research and development.

# Policy Implications

- Target export industries
- Industrial Strategy
- Investment on Education
- Attract FDI in export sector

# Thank You