The Relationship between Exports and Economic Growth in Saudi Arabia

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Abstract
One of the most important objectives of an economy is to achieve high rate of economic growth so as to improve the well-being of their citizen. For the purpose, export-oriented policy measures are more preferably prescribed in the recent past. The present study aims at to find the linkages between exports and economic growth in case of Saudi Arabia. The study uses the most efficient unit root, cointegration and causality tests to find the true relationships between exports and economic growth. The study tries to examine the dynamic association for exports and economic growth in Saudi Arabia. Applying more popular time series technique of long run relationship and causality, the paper finds the long-run cointegration relationships in our export-growth model. Further, we have found feed-back effect in export-growth relationships and suggest the further export-promotion to foster economic growth in Saudi Arabia.
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1.1 Introduction

Exports are engine of economic growth as it provides the foreign exchange earning to any country to accelerate its growth and development. By this foreign exchange, a country can purchase the technology to raise the productivity of its labor and welfare level may also rise due to the consumption of imported goods which are not available locally or expensive to produce locally. The association of export-growth has been remained an important issue to examine and to discuss among economists. The idea of trade promoting economic growth has been traced back to the classical and neo-classical economist. The proponents of export-led growth (ELG) support their arguments giving successful examples of East Asian countries and also of second stage of newly industrialized countries (NIC) which have achieved significant level of development under export-led industrialization strategies.

However, numbers of reasons are put forward in support of hypothesis that exports promote growth. First, in order to export the products in competitive world market, the exporters have to produce at competitive prices. This forces them to adopt new and innovative technology. Second, adoption of new technology by exporter- firms causes demonstration effects. As a result, other domestic-firms also imitate these technologies and improve their efficiency level. All these efforts lead to better utilization of economic resources and fasten the pace of economic growth. Third, ELG strategy gradually liberalizes the economy and enables market to allocate resources efficiently. Fourth, export expands the market size. Large size of the market enables the firms to produce at large scale and exploit the benefits of economies of scale. Fifth, exports bring foreign exchange into country which helps country to buy foreign capital and to increase the productive capacity of country.

However questions raised by some economists about the sustainability of such growth-strategy for all economies as the international markets of rich economies may not be large enough to absorb exports from other economies. Further, the volatility and unpredictability of developed market also raise doubt about the sustainability of export-led strategy for exporting countries. Moreover export-led growth strategy is also charged for hindering growth of domestic market. Country has to excessively depend upon external markets. At the time when recession occurs in international market, country finds it difficult to maintain its growth. Therefore, the relationship between exports and economic growth is not certain for all economies and requires empirical investigation to conclude about this relationship.

On the other hand, association between export-growth may not have one direction from exports to economic growth. There is possibility that growth-led export may also be there. An increase in economic growth may bring about by increase in productivity and efficiency, makes exportable more competitive in international markets and also may generate more surpluses to export. Resultantly, this may also stimulate export-growth of a country.

1.2 Problem Statement

Industrial and tertiary sectors growth is a desire of every country in the world to provide the maximum consumption and welfare level to society. This growth can be augmented through international trade through the two international trade policies. One is the import-substitution policy through imposing the trade barriers to support the local industry to grow. But, this policy

makes the local industry lazy in becoming the competitive according to the world economy. Therefore, this policy has not been appreciated by world trade organization i.e. WTO. It may disturb the trading relationships of the countries. Therefore, export-promotion and export-led growth remain only solution for the industrial and economic growth in a country. That also promotes the efficiency in the local industry to compete with the world market and can foster to economic growth.

1.3 Research Objectives
The present study has the objectives to check the nature and direction of causal relationships among exports and economic growth after testing cointegration and to suggest the most appropriate policies to foster the economic growth for present and future generations of Saudi Arabia after investigating the link between exports and economic growth.

1.4 Significance of the Study
International trade remained an engine of economic growth from the early growth history of world. Even, trade surplus have helped the most developed nations to develop in the early stages of their development. All inventions have been the result of investment of nations' trade revenue to foster the economic growth in the history. The modern shape of world is a blessing of international trade at large. But, in case of Saudi Arabia, there has been limited work which addresses the importance of international trade and particularly, the impact of exports in economic growth of this region. Exports may have a good effect on the local economic growth and its impact can be insignificant. Therefore, it seems pertinent for the present study to investigate this important issue in case of Saudi Arabia. The present study tries to find this relationship by applying the most efficient and modern unit root, cointegration and causality tests and contribute significantly to the body of existing literature.

In following section, brief review of literature has been presented. Sources of data, description of variables and methodology used for analysis has been elucidated in section-3. Results have been displayed in section-4 and conclusion in section-5.

2. Literature Review
Over the last forty years since late seventies, exports have been regarded as a significant tool of countries' growth. World Bank and IMF propagated case for export-led industrialization strategy and opening of economies for trade. However, reasons for success of these economies also lie in factors specific to those countries not necessarily applicable to other countries. Moreover, this strategy was also questioned by many economists. Number of empirical studies has been conducted to enquire whether export causally influences growth of an economy or not. Some studies found that exports stimulate the economic growth of the country, while others found that the economic growth promotes exports of the country. In some cases bidirectional relationship has also been found while in others no association between economic growth and exports could be established. A review of these studies has been given below.

Jung and Marshall (1985) found causal relation of exports with economic growth for only four economies out of 37 developing countries in analysis. Many economists are of the view that there are some factors which are country-specific and they determine the degree of association between the two. Similarly, composition of exports has also been found to be important determinant along with aggregate. Rana (1985) found positive contribution of exports in economic growth of 14

Asian developing countries. This result is augmented by the spillover effect of exports that gives accelerating effect to economic growth. Helpman and Krugman (1985) also comprehended the same version of analysis. They also favor one-direction of relationship from exports to growth. They argued that most of local industry other than exporters has been enjoyed the spill-over effect from exports. For example, export-earning gave the foreign-exchange to buy modern technology through importation of machinery. That raised the labour-productivity and resultantly helps in fostering economic growth.

El-Sakka et al. (2000) examined the existence of such relationship for 16 Arab countries using data of 1970-1999. After conforming the level of integration one, they performed the long-run analysis. They do not find any cointegration between exports and growth. Further, they performed the causality analysis and obtained mixed evidence regarding causality in said countries. In the case of Saudi Arabia their study found one way causality from export to growth and no otherwise and this relationship has also found in case of Algeria, Bahrain, Egypt, Iraq, Jordon, Oman and Syria. Hatemi (2002) investigated this issue in case of Japan by using augmented-causality analysis for a period 1960-1999. They found feedback causality between exports and economic growth in Japan and conclude exports as a compulsory component of Japanese economic growth. Tsen (2007) examined such relationship of Middle East countries by including effective local demand and investment in analysis during the period 1968 to 2004. They found bidirectional relationship of export-growth for the most of middle-east countries. Further, he claimed that a higher liberal-trade is responsible for growth in these countries and consumption and investment are also generating better effects on economic growth. On the basis of Johansen cointegration method, Abbas (2012) found cointegrating relationship between growth and export in Pakistan using a period 1975-2010. Further, causal relation from production to export direction and not otherwise was found by Abbas, both in short- and long-run. Mishra (2011) investigated the export-growth relationship for India using data of 1970-2009. After doing unit root and cointegration analysis, he indicated that Indian exports are not causing growth but growth has been caused exports. Tingvall and Ljungwall (2012) investigated the export-growth relationship by doing meta-analysis on Chinese exports. They concluded a causal relationship from exports to growth and further claimed that this relationship has found better than other transitional economies. Agrawal (2014) found bi-directional relationship between export-growth during post liberalization period of India. However, taking entire pre- and post-reform period, the study found only uni-directional causal relation from GDP to export direction.

Based on our literature review, it is cleared that there is no certain consensus in relationship of exports and economic growth. Therefore, it is necessary to do empirical analysis for a particular country to conclude the relationship. Further, in case of Saudi Arabia, one-direction relationship has been found by El-Sakka et al. (2000) due to limited number of variables in the model. Growth cannot be described through a very few numbers of variables. Therefore, the present study's analysis has extended the model of growth for analyzing the relationship between these important variables by including import, real exchange rate and FDI in the model.

3. Model Specification and Methodology
To examine the growth-export relationship, gross domestic output (GDP); exports (X); imports (M); FDI; and REER variables have been included in our extended model. GDP has been used to measure the economic growth. All the variables have been taken in real terms. Terms of trade is

considered an important variable that affects the GDP of a country. Some economists are of the view that the developing countries suffer deterioration in terms of trade while pursuing export-led growth. That adversely affects country's GDP as well. Because the data on terms of trade for Saudi Arabia is not available for the entire period that present paper intends to cover, we have used REER. Since REER influence the price of exports as well as imports, it may explain variation in GDP. Export is an important source of foreign exchange earning of a country that enables these countries to import necessary inputs required for its economic growth. Imports are also considered as essential component of economic growth by increasing the productivity and productive capacity of a country. Further, the study has also included an important variable; foreign direct investment as this influences the productive capacity and productivity of a country.

In our study, log-lin model has been chosen as it takes care of heteroscedasticity and also reduces the problem of multicollinearity. We have used annual data from 1980 to 2013 for the purpose. We are using VECM model to estimate causality for export-growth if cointegration is found between these variables. To know whether the variable is stationary or integrated of less than second order, Augmented Dickey-Fuller (ADF) test has been used which further has been verified by Philips-Perron (PP) test. If the explained variable is integrated of order one and explanatory variables have mixed of order (zero and one), we can estimate the cointegration between them with the help of ARDL test established by Pesaran et al. (2001). In case of same integration level, ARDL is also very suitable. ARDL model of our model as follows:

$$
\Delta lGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta lGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta lX_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta lM_{t-i}
$$
$$
+ \sum_{i=0}^{n} \alpha_{4i} \Delta lFDI_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta lREER_{t-i} + \beta_1 lGDP_{t-1} + \beta_2 lX_{t-1}
$$
$$
+ \beta_3 lM_{t-1} + \beta_4 lFDI_{t-1} + \beta_5 lREER_{t-1} + \varepsilon_{1t}
$$
(3.1)

$$
\Delta lX_t = \delta_0 + \sum_{i=0}^{n} \delta_{1i} \Delta lGDP_{t-i} + \sum_{i=1}^{n} \delta_{2i} \Delta lX_{t-i} + \sum_{i=0}^{n} \delta_{3i} \Delta lM_{t-i}
$$
$$
+ \sum_{i=0}^{n} \delta_{4i} \Delta lFDI_{t-i} + \sum_{i=0}^{n} \delta_{5i} \Delta lREER_{t-i} + \gamma_1 lGDP_{t-1} + \gamma_2 lX_{t-1}
$$
$$
+ \gamma_3 lM_{t-1} + \gamma_4 lFDI_{t-1} + \gamma_5 lREER_{t-1} + \varepsilon_{2t}
$$
(3.2)

In above equations, Δ indicates change and l measures logarithm of variables. Long run parameters are represented by β_i and γ_i; and short run parameters are represented by α_{ji} and δ_{ji} in respective equations. To estimate the above equation, the maximum number of lags for the variables in level has been set equal to one to save a reasonable degree of freedom. The appropriate number of lags for the first differenced variables is determined on the basis of AIC, from maximum of three lags. After estimating equation 3.1 and 3.2, cointegration is examined on the basis of the Wald coefficient test i.e. we test the null hypotheses of β_i and γ_i equal to zero that at least one of β_i and γ_i is different from zero for respective equations or not. If calculated F-value is less than the critical lower bound, then we infer that there is no cointegration. If the calculated F-value is higher than the critical upper bound, we conclude that cointegration among the variables exist. Result is inconclusive if calculated F-value lie between the two extreme values.

If variables are found to be cointegrated, then we use test of causal relationship by following VECM.

$$\Delta lGDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta lGDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta lX_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta lM_{t-i}$$

$$+ \sum_{i=0}^{n} \alpha_{4i} \Delta lFDI_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta lREER_{t-i} + \gamma_1 ect1_{t-1} + \mu_t \qquad (3.3)$$

$$\Delta lX_t = \delta_0 + \sum_{i=0}^{n} \delta_{1i} \Delta lGDP_{t-i} + \sum_{i=1}^{n} \delta_{2i} \Delta lX_{t-i} + \sum_{i=0}^{n} \delta_{3i} \Delta lM_{t-i}$$

$$+ \sum_{i=0}^{n} \delta_{4i} \Delta lFDI_{t-i} + \sum_{i=0}^{n} \delta_{5i} \Delta lREER_{t-i} + \gamma_2 ect2_{t-1} + v_t \qquad (3.4)$$

$ect1_{t-1}$ and $ect2_{t-1}$ are lagged ECM from cointegrating equations. μ_t and ϑ_t are standard errors. In order to examine normality and property of white noise of error term of the VECM, various diagnostic tests has used. Ramsey RESET test will be done to check the specification of model. The significant negative error correction term will show that explanatory variables are causing change in dependent variables in the long run or not. Further, Wald test on parameters are indicating the statistical significance of short run causality.

4. Empirical Analysis

To investigate cointegration between export-growth, it is necessary to test the stationary nature of the variables. Application of cointegration method needs fulfillment of certain criteria about the degree of integration. ADF and PP test are used here. The results are mentioned in table 1a and 1b. It is obvious from the tables that all the variables have unit root at level as the estimated t-values of coefficients are low. When we take first difference of the variables, they are found to be stationary.

Table 1a
ADF Test

	Level			First Difference			I(?)
	C	C&T	None	C	C&T	None	
lGDP	2.2361	-2.3263	3.3425	-3.7354	-5.1426	-3.1795	I(1)
lX	-1.3030	-3.1331	0.0097	-5.2920	-5.5084	-5.3763	I(1)
lM	0.3134	-1.3630	1.4818	-3.8793	-4.1712	-3.8279	I(1)
lFDI	0.4589	-2.0121	1.3042	-27.800	-26.603	-28.564	I(1)
lREER	-2.5257	-0.7947	-1.9448	-3.2141	-3.7190	-3.1022	I(1)
Critical Level	1%	-3.6463 (C)		-4.2627 (C&T)		-2.6369 (None)	
	5%	-2.9540 (C)		-3.5529 (C&T)		-1.9513 (None)	
	10%	-2.6158 (C)		-3.2096 (C&T)		-1.6107 (None)	

Table 1b
PP Test

	Level			First Difference			I(?)
	C	C&T	None	C	C&T	None	
lGDP	1.571	-2.3283	2.2451	-3.8967	-5.2598	-3.3224	I(1)
lX	-1.674	-3.2432	-0.0308	-5.4241	-5.6580	-5.4979	I(1)
lM	0.3134	-1.3787	1.2701	-3.8548	-3.9420	-3.8578	I(1)
lFDI	-7.3308	-8.9657	0.4125	-23.3928	-28.555	-22.747	I(1)
lREER	-2.5257	-1.0249	-1.4973	-3.1761	-3.3953	-3.0649	I(1)
Critical Level	1%	-3.6463 (C)		-4.2627 (C&T)		-2.6369 (None)	

5%	-2.9540 (C)	-3.5529 (C&T)	-1.9513 (None)
10%	-2.6158 (C)	-3.2096 (C&T)	-1.6107 (None)

On the basis of above findings, we have applied cointegration. Since the result of cointegration might be affected by number of lag period. Therefore, we have selected these through AIC & SC. Since annual data has been used in the study, a maximum of three lag period has been selected Based on minimum AIC and SC values (see table 2a and 2b), three lag periods has been selected for equation 3.1 and 3.2 respectively.

Table 2a
Lag Order Selection Criteria (Eq: 3.1)

Lag	AIC	SC	HQ
0	-4.849781	-4.396293	-4.697196
1	-4.789121	-4.102057	-4.561379
2	-4.981459	-4.056306	-4.679882
3	-6.270462*	-5.102798*	-5.896916*

Table 2b
Lag Order Selection Criteria (Eq: 3.2)

Lag	AIC	SC	HQ
0	-1.635505	-1.182018	-1.482921
1	-1.780229	-1.093165	-1.552486
2	-1.899778	-0.974625	-1.598201
3	-2.270485*	-1.102820*	-1.896939*

The result of estimated bound-test F-values are given in table-3 based on selected ARDL model. The estimated F-value for lagged level coefficients of ARDL in equation-3.1 is 25.6. That is significant at 1% inference and showing a cointegration in equation-3.1. Thus the result suggests that there is a long-run cointegration in growth model. The result is same when we take export as dependent variable. The F-value for lagged level coefficients of ARDL in equation-3.2 is 8.1. That is again significant at 1% inference and validates a cointegration in export's model.

Table 3
Bound Test Analysis

Dependent Variables	GDP	Export
F-Values	25.86*	8.10*

* shows significant at 1%.

To examine the causal relation, Granger suggested that VECM method is more appropriate method in case of cointegration in the model. There are two sources of causation - long run through lagged residual and short run through Wald test. The result of VECM based on equation-3.3 & 3.4 are given in table-4. All p-values of our diagnostic tests are greater than 0.1. Therefore, diagnostic tests are confirming a good health of our export's and growth's models with any econometric problem. The null hypothesis (long run export does not cause increase in GDP) is rejected as $ECT1_{t-1}$ is negative and significant. The coefficient of ECT is very low (-0.07) and significant only at 10 percent level. This implies a low impact. However, we can conclude that export is

significantly causing economic growth in long run. GDP is also causing export in long run as ECT1$_{t-2}$ is negative (-0.75) and significant. Therefore, we find a feedback-effect in the relationship of exports and growth in the case of Saudi Arabia in the long run though it is weak from export to GDP. The F-values also suggest short-run causality in both the direction. Thus the results imply that economic growth in Saudi Arabia brought about by adoption of efficient technology and better allocation of resources by export earnings. Further, economic growth is also stimulating exports in turn. In the short run causality tests, imports, FDI and real exchange rate are also causing to economic growth and exports in the both model. Therefore, our selected supporting variables are also showing a good contribution in explaining the economic growth and exports in our analysis.

Table 4
Results of Error Correction Model

		GDP	Export
Explanatory Variable	ECT$_{t-1}$	-0.0745*** (-1.7214)	-0.7545* (-6.3994)
	GDP	--	[20.24*]
	Export	[21.84*]	--
	Import	[15.7*]	[34.46*]
	FDI	[17.97*]	[46.12*]
	REER	[23.7*]	[30.8*]
Diagnostic Test			
Adjusted R square		0.8700	0.8874
B-G serial correlation LM (1)		0.5491 (0.4656)	0.4019 (0.5350)
B-G serial correlation LM (2)		0.3370 (0.7172)	0.2221(0.8034)
B-G serial correlation LM (3)		0.2629 (0.8514)	0.2639 (0.8502)
Hetroskedasticity Test: Breusch-Pagan-Godfrey		0.6789 (0.6679)	0.4622 (0.9182)
Hetroskedasticity Test: ARCH		0.4977 (0.4859)	0.3921 (0.5362)
Hetroskedasticity Test: White		0.8389 (0.5513)	0.7112 (0.7302)
J-B test		0.8670 (0.648)	0.1070 (0.9477)
Ramsey RESET Test		2.3752 (0.1358)	0.3111 (0.5847)

- Values in square brackets [] refer to F-values of differenced variables
- Value in small parenthesis () shows t-value

5. Conclusions and Policy Recommendations

Export-growth has been attracted an important theme of discussion in the recent decades. The growth of newly industrialized East-Asian economies has further attracted the attention of many countries and also provided a good ground for liberal economists to talk about relationship between the two. Saudi Arabia is a country which majorly relies upon external sector. The present paper has tried to empirically verify this relationship of export-growth for Saudi Arabia. Pesaran et al. (2001) framework has been used to estimate cointegration. The study has also taken imports, FDI and REER as additional variables in the model. For this purpose, data has been taken from 1980 to 2013. The results have approved the cointegration. Further, causality results show feedback effect in short- and long-run. It implies that not only increase in GDP leads to increase in exports

but exports have also affected on growth in Saudi Arabia. Real exchange rate, imports and FDI are also significantly causing to economic growth and exports. Therefore, these supporting variables are also very helpful in fostering economic growth and exports in Saudi Arabia.

The policy implications of feedback results reveal that country should continue to follow a policy of trade liberalization and joining WTO is a positive step in that direction. However, Saudi Arabia is oil-based economy and its economy is highly dependent upon production and export of oil. Depending upon few products makes a country highly vulnerable to external shocks. That has happened in 2008-09 due to recession caused by a declined in the price of oil. Saudi Arabia has suffered negative growth of exports and almost stagnant GDP after this shock. Thus country should try to diversify its production base, and also of its exports in terms of products and destination. This requires that the government and its agencies should devise prudential policy to attract domestic and foreign investors to invest in non-oil sectors and stimulate their growth as FDI is positively causing to exports and economic growth in our analysis. Secondly, we have found a complementarity between exports and economic growth as feedback hypothesis has been found in our study. That is directed to policy maker towards enhancing further exports by investing the surplus of economic growth in enhancing the diversification of Saudi' exports. That will, in turn, enhance economic growth as well.

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