

Exports and Economic Growth: Evidence from Iran

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Abstract: The present study attempts to test the relationship of exports and economic growth in Iran by taking a time-series data for the period of 1976-2010. It applies ordinary least square (OLS), unit root tests and co-integration method to investigate the relationship between gross domestic product, exports, inflation and real exchange rate. The results of the study show that there is positive and significant effect of exports, Inflation and Real exchange rate on economic growth.

Key words: Economic growth • Exports • Iran

INTRODUCTION

The relationship between exports and economic growth in developing countries has been of continuing interest both in theoretical and empirical literature. A large number of empirical studies have been conducted to investigate the role of exports on economic growth or the export-led growth hypothesis.

The export-led growth hypothesis postulates that export expansion is one of the key determinants of economic growth. It reflects the view that export-oriented policies help to stimulate economic growth. Export-expansion can be a catalyst for output growth both directly, as a component of aggregate output, as well as indirectly through efficient resource allocation, greater capacity utilization,

Exploitation of economies of scale and stimulation of technological improvement due to foreign market competition. Exports provide foreign exchange that allows for increasing levels of imports of capital goods and intermediate goods that in turn raise the growth of capital formation and thus stimulate output growth [1].

Furthermore, export growth may promote the diffusion of technical knowledge [2] and enhance efficiency through the international Competition [3]. It may allow the exploitation of economies of scale if domestic markets are too small for optimal scale. All these factors may lead to higher economic growth. The main objective of this study is to investigate relationship of exports and economic growth in Iran, for the period of

1976 to 2010 and the hypothesis states that increase in the export earning leads to more economic growth. We use the ordinary least square (OLS), unit root tests and co-integration technique to investigate the relationship of exports and economic growth.

Literature Review: The export-led growth hypothesis postulates that exports are a main determinant of overall economic growth. There are at least three reasons to support the beneficial effects of export performance on economic growth: firstly, the growth of exports may be a representative of high demand for output of the country. Hence, the state boosts its output. Secondly, exports expansion may endorse specialization in the making of export goods, which in turn may enhance the productivity level. The productivity change may lead to output growth. Thirdly, an increase in exports may relax a foreign exchange constraint. This eases importing input and in turn allows output expansion [4]. Atrkar Roshan (2007) [5] examined the causal relationship between exports and economic growth for the period of 1970-2001. Findings support the export-led growth hypothesis in case of Iran.

Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. The relationship between inflation and economic growth remains controversial findings [6, 7]. Some studies have estimated a negative relationship between inflation and economic growth, such as: Barro (1991) [8], Fisher (1983, 1993) [9, 10], Bruno and Easterly (1998) [11], Farira and Carneiro (2002) [12], Singh and Kalirajan (2003) [13].

While, some studies accounted for the opposite. The work of Tobin (1965) [14], Lucas (1973) [15] and Gillman (2002) concludes positive relationship between economic growth and inflation. Also, several studies indicate that inflation has a mix relationship with economic growth. Recently numerous empirical studies found that inflation growth interaction is non-linear and concave and found that a positive relationship between these two variables exists when inflation rate is slow and a negative relationship exists when the inflation rate is high. Such studies include, Bruno and Easterly (1995) [11], Sarel (1995) [16], Ghosh and Phillips (1998) [17], Lee and Wong (2005) [18], Hwang and Wu (2011) [19]. Dadgar and *et al.* (2006) [20] inspected the relation between inflation and economic growth for Iran, during 1959-2004. Findings show: 1-for low levels of inflation, there is a unilateral and causal relationship between inflation and economic growth, 2-for medium levels, the relationship between inflation and economic growth is sort of positive relationship, 3-for high levels, all inflation rates, above 26 percent, do have neutral and then negative impact on economic growth and 4-finally, it is shown that there is a significant relationship from inflation to growth.

Real exchange rate has prominent role in the literature on export-led growth. Therefore, the empirical literatures are replete with studies that link the real exchange rate with GDP. Rodrik (2008) [21] pointed out that overvaluation hurts growth and it is strongly supported by different researchers such as: Razin and Collins (1997) [22], Johnson, Ostry and Sub-ranian (2007) [23]. Rodrik (2008) [21] argued that undervaluation facilitates growth and having constructed an index of undervaluation based on a purchasing power parity real exchange rate for countries, demonstrates robust evidence of growth-enhancing effect of undervalued currencies. He argues that tradable sectors are more severely affected by bad institutions and market failures, resulting in their size being smaller than optimal. Undervaluation of national currencies helps overcome these problems.

This finding is supported by several studies including Cooper (1971) [24], Gylfson and Schmid (1983) [25], Paul (2006) [26] and Gala (2007) [27]. While, some evidence exist on the negative impact of depreciation on economic growth [28, 29, 30 and 31]. Studies on exchange rate about Iran including theoretical and empirical work and conducted to real and nominal exchange rate, such as: Abdullah- Milani, Masjedi and Mohammadi (1996) [32], Khattaei and Gharbali Moghaddam (2004) [33], Mehrara and Sarkhosh (2010) [34].

Data: This study uses annual time series data over the period 1976 to 2010 for Iran. The four variables are used in this article which are: Gross domestic product (GDP), Exports (EXP), Real Exchange Rate (RER) and Inflation (INF). The data are obtained from World Development Indicators Online.

Economic Growth (GDP): There are many ways of measuring economic growth in a country. These include real gross domestic product, real per capita GDP and growth in real gross domestic product. This study however uses real gross domestic product to measure economic growth. This is because other researchers have used it in their work as dependent variable. In present study, GDP measured at constant 2005 US\$ (GDP), have been used.

Exports (EXP): Role of export is sufficiently more important in economic growth. The demand of the country has risen when export is increased. An increase in the export of the country takes the central part to enhance the interest in the more production of export products, which boost the efficiency of the export sector. Export that based on the relative advantage would authorize the exploitation of economic of scale. This could lead to rise in economic growth [8, 35].

In recent wave of country case studies, most empirical evidence seem support for export-led growth hypothesis, including Shan and Sun (1998) [36], Darrat *et al.* [37], Pahlavani (2005) [38], Chen (2007) and Taban and Akhtar (2008) [39]. In present study, exports of goods and services measured at constant 2005 US\$ (EXP) is used as proxy for exports and expected a positive impact of this variable on GDP growth.

Real Exchange Rate (RER): Rodrik's assessments have come under close scrutiny with subsequent studies [40, 41 and 42], however generally confirming the positive association between higher growth and undervalued exchange rate. Gulzmann *et al.* [40] provides results to argue that depreciated exchange rate does not influence the tradable sectors as suggested by Rodrik, but it is through increased saving and investment that growth is facilitated. In contrast, Mbaye (2012) finds the evidence of total factor productivity growth as a result of undervaluation. Mario *et al.* [41] unearths further evidence that higher RER helps diversify exports and raise technological intensity of exports. However, it needs to be pointed out that the notion of undervaluation is essentially based on a "norm" or equilibrium rate.

In present study real effective exchange rate index (2005=100) is used as proxy for real exchange rate and expected a positive relationship between real exchange rate and GDP growth during the study period.

Inflation (INF): To date, the relationship between inflation and economic growth remains controversial or somewhat inconclusive, such that several empirical studies confirm the existence of either a positive or negative relationship between these two major macroeconomic variables [43]. Mundll (1963) [44] and Tobin (1965) [14] are of the view that inflation causes the investment positively and predict a positive relationship between the rate of inflation and the rate of capital accumulation, which in turn, implies a positive relationship to the rate of economic growth. They argued that since money and capital are substitutable, an increase in the rate of inflation increases capital accumulation by shifting portfolio from money to capital and thereby stimulating a higher rate of economic growth. Lupu D. V. (2007) [45] established that there is a positive relationship between inflation and GDP growth in Romania in the short run. This implies that, as inflation increases GDP must also increase in the short run. Also, Mallik *et al.* [46] established a long run positive relationship between GDP growth rate and Inflation among four South Asian Countries. Fisher (1993) [10] andres and Hernando (1997) [47] and Singh and Kalirajan (2003) [13] obtained a negative relationship between inflation and economic growth. In this study, Consumer price index (2005 = 100) is used as proxy for Inflation and we expect mixed sign of Inflation on GDP during the study period.

MATERIALS AND METHODS

The study adopts the method of Ordinary Least Squares (OLS) econometric statistical technique as an analytical technique, unit root tests and Johansen co-integration approach. Also, [48] E. views computer software has been used for results derivation. In this study, gross domestic product (GDP) is the dependent variable, while the variables of exports of goods and services (EXP), real exchange rate (RER) and inflation rate (INF) are the independent variables or the explanatory variables.

The following model is suggested for estimating the effects of exports on gross domestic product along with real exchange rate and inflation during the study period of 1976-2010.

$$GDP = f(EXP, RER, INF)$$

The symbolic form of the log linear regression model of above equation is given as follow:

$$\ln(GDP) = \alpha_0 + \alpha_1 \ln(EXP) + \alpha_2 \ln(RER) + \alpha_3 \ln(INF) + \mu$$

where, GDP, EXP, RER and INF stand for the gross domestic product, exports of goods and services, real effective exchange rate and inflation respectively.

Empirical Result

Regression Analysis: Regression through logarithmic technique prescribes relationship between independent and dependent variables. Table (1) reveals that there is a positive relationship between gross domestic product and exports, real exchange rate and inflation.

P- value shows the probability value for significance of variables. All of independent variables are representing significant part in economic growth. R^2 shows how much variation in dependent variable is because of independent variables. Value of R^2 is 0.9017 in this result, it satisfies the required range. F-statistics is the true explanatory of the goodness of model. It is significant as its P-value is 0.000. While the Durbin Watson (DW) statistics is very low, indicating the presence of auto-correlation, hence, accepting the result may be misleading given that time series data are prone to error and high serial dependence on the error term due to fluctuation in economic activities. [49] Thus, there is need for a unit root test and co-integration analysis. To achieve a long run relationship, we begin by conducting instability or unit root test. These tests show the number of times required for a variable to be stabilized [50].

Unit Root and Co-Integration Tests: The Augmented Dickey-Fuller (ADF) unit root test was applied to the logarithms of the four time series employed in the study (GDP, INF, EXP and RER) with and without time trend.

Table (2) indicates that none of the variables were stationary at ordinary level. But at first difference, all the variables: real gross domestic product, exports, real effective exchange and inflation rate were stationary.

Further, the long run relationships among the variables were examined Using Johansen co-integration framework. The result of the co-integration test is reported in Table (3).

From the above, we fail to reject the null hypothesis of no co-integration between gross domestic product, exports, exchange rate and inflation rate at a 5% significant level. In other words, the results indicate that there is a long run relationship between these variables in Iran for the period of 1976-2010.

Table 1: Simple Regression Model

Dependent Variable: GDP				
Method: Least Squares				
Sample: 1976 - 2010				
Included observations: 35				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.72409	1.558044	11.18331	0.0000
INF	0.123619	0.012831	9.634060	0.0000
EXP	0.305721	0.058701	5.208129	0.0000
RER	0.071077	0.039629	1.793570	0.0826
R-squared	0.901787		Mean dependent var	25.56368
Adjusted R-squared	0.892283		S.D. dependent var	0.325808
S.E. of regression	0.106931		Akaike info criterion	-1.526057
Sum squared resid	0.354461		Schwarz criterion	-1.348303
Log likelihood	30.70599		Hannan-Quinn criter.	-1.464696
F-statistic	94.88069		Durbin-Watson stat	0.427435
Prob(F-statistic)	0.000000			

Source: Author's computation from E- views version 7

Table 2: Unit Root Test Result using ADF Procedure

Variable	5% critical value		Level ADF statistic		First Difference ADF test statistic		Order of integration
	Without Trend	With Trend	Without Trend	With Trend	Without Trend	With Trend	
GDP	-2.960411	-3.562882	1.247647	-3.066123	-4.190197	-5.114895	I(1)
INF	-2.957110	-3.557759	-0.935844	-1.762011	-4.181782	-4.188554	I(1)
EXP	-2.954021	-3.552973	-1.579505	-3.273384	-4.257557	-4.362921	I(1)
RER	-2.954021	-3.552973	-1.491830	-2.081795	-4.191154	-4.127386	I(1)

Source: Author's computation from E- views version 7

Table 3: Johansen Co-Integration Test Result

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	5% Critical Value	Prob.**
None*	0.655041	62.55412	47.85613	0.0012
At most 1	0.442030	27.43119	29.79707	0.0915
At most 2	0.199798	8.177351	15.49471	0.4466
At most 3	0.024600	0.821960	3.841466	0.3646

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level.

* denotes rejection of the hypothesis at the 0.05 level.

** MacKinnon-Haug-Michelis (1999) p-values.

CONCLUSION

The main purpose in this study tries to find out the effect of exports on real economic growth in Iran from 1976-2010. Study had adopted the ordinary least square approach. The empirical results of this study assent the export-led economic growth hypothesis. The result of our analysis indicates that there is a significant positive relationship between export and economic growth of Iran. This implies that rise in this variable encourage better performance while a fall reduces economic growth. Growth of economy can be boosted up by export through accessing the markets globally that in turn enhances economies of scale. Iran can expand its market by exporting products to the international markets. Countries

can be successful in the global arena that with an outward oriented strategy, able to account for an important share of the global market. So, policies focusing on export promotion should be used effectively to fabricate export capacity in order to enhance economic growth. In this context, Trade barriers should be over come through proper policies and transition from traditional exports to exports with high-technology should be considered. Export promotion should not be considered as limiting imports. Positive attitude to imports must be created. Indeed, import of goods is other aspect of export promotion. The other issue is that the most influenced the growth of value added in industry caused by industrial exports, so, industrial policy is needed to encourage the export of industrial exports more than agricultural exports.

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