A Study Examining the Effect of Export Growth in Iran

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Abstract

Economic growth and its related factors, both theoretical and experimental aspects have been considered economists and policy makers of countries. Also, more than two decades the relationship between exports and economic growth has been had special importance. The theoretical framework was designed based on this assumption that the total product in the economy was divided into two parts, production for inside (N) and production for exports (X) and each two section production is a function of factors allocated capital and labor. The data were collected from 1961 to 2006 and were analyzed using Ordinary Least Squares (OLS) model. Hence in this article, we want to do Feder model and econometrics conventional methods to survey effect of exports on economic growth (industry & mining sector, services and agriculture). The results of this study show that each section export growth has a positive effect on the growth of value added in the same section. But the effect of export growth on the value added in industry and mining sector is more than other sectors. Together the independent variables explained 87% of the variance in the dependent variables. The remaining 13% was due to unidentified variables. In relation to that, we can conclude that explanatory power is high for the equation.

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INTRODUCTION

Economic growth is a phenomenon that normally to express it as percentage changes increasing national income in comparison the previous year or previous period. Myrdal defined economic growth as an increase in Gross Domestic production (GDP). Continued economic growth enables level life higher for population and Economic development with improve the material prosperity, creates the necessary transformation all institutions and processes social and cultural rights, so that the development process, be prevented return community to earlier stages. The proposed definitions of the words growth and development show the differences between these two concepts, the difference between these two words rooted in the characteristics and causes of changes. According to the commandment Schumpeter, development consists of continuous changes and spontaneous in developing countries after political independence, have lost available Balance in the economy. While growth is the following slow changes and gradual in economic conditions in the long-term is caused result of gradual increase in savings rates and population. Opinions Schumpeter about economic growth and development has been widely accepted by new classical economists. Because of the importance of exports in economic growth in two dimensions theoretical and experimental the study using a practical approach explains to review important goals of economic growth.

In Iran such as other countries, growth and achieve the high rate is one of the goals of government. Hence review factors impact on growth including exports can be the way for economic policy maker's framework

intended purpose. In this study we want to estimate model the using Ordinary Least Squares (OLS) and time-series data of 1961-2006 published by central bank of Iran and statistical center of Iran and then to test hypotheses related to research based on statistical inference and also we want to answer this question, can be export a cause for economic sectors growth?

(1) The Oil Export Process[3]

Oil incomes are one of the important and effective variables on macroeconomics variables in Iran's economy and they have a direct effect on the Gross Domestic Product (GDP) as part of the export consequently GDP have decreased in years that economic was faced decreasing oil price and oil incomes and GDP have increased in years increasing world oil prices. Estimation of correlation variables between increasing oil incomes and GDP indicates that there is significant correlation between oil incomes growth, government spending growth, GDP growth and pure exports and imports but statistically there is no significant correlation between oil incomes growth and growth in private consumption and investment sector. The amount correlation between oil incomes growth and GDP growth was showed in table 1.

Table 1
The Amount Correlation Between Oil Incomes Growth and GDP Growth

	Pure exports and imports	investment	Government consumption expenditure	Private sector consumption	GDP
Correlation coefficient	0.37	0.04	0.46	0.02	0.24
Z statistic	3.05	0.98	2.45	0.69	2.42

Based on showed in table 1, there is the most amount correlation between oil incomes growth and government spending growth therefore increasing oil incomes in addition to direct effects on GDP, those affect on other components of GDP as part of effective variable.

(2) Oil Prices Fluctuations

Oil prices fluctuations are the main economic fluctuations resources in oil producer countries such as oil prices surge after 1973 year that influenced on economic in oil producer countries. Increasing oil price can affect on prices by various methods such as by increasing goods price imported or by increasing transportation cost due to increasing fuel cost, prices of imported raw materials, technology and production machines Imported. With rising oil prices, demand increase due to increasing oil incomes and since increasing domestic product has limited in short term consequently the main part of oil incomes increased leads to excess demand by importing and On the other hand with increasing demand, domestic product Can be increase during in the few years if investment be suitable. Also editing economic- Social development plans and Setting the annual national budget is required to recognition and doing accurate predictions of the impact of oil price fluctuations on macroeconomic variables so that planners can be reduce the impact it on macro variables during occurred the oil shock and adopt the correct policies. Oil export makes more country's export incomes so that based on these incomes are regulated more economic programs. In during 1968-1970, oil export has climbed fairly balanced and in 1974 oil incomes has increased immediately due to price shock so that became almost fourfold than previous year and in 1977 reached to highest level and this incremental process has continued to 1978 year. In 1980 oil incomes decreased by Iraq attacks on Iran and the occupation of oil-rich regions and in 1986 reached to the lowest. After the war, oil export has climbed but in 1998 decreased again due to economic boycott in South East Asia and rising OPEC production ceiling and after these years oil export increased to 2006 year because increasing oil price due to political problems in Venezuela and America's war in Iraq.

(3) Exports and Value-Added Process in Economic Sectors in Iran

In this section we review processing economic sectors exports and value added in Iran. The following tables show the average annual of exports and value-added and growth it in economic sectors in the period of 1961-2006.

Table 2
Average Annual Export and Export Growth Rates in Economic Sectors

Period	Average annual exports (million dollars)				Average annual export growth (percent)			
	Oil	Services	Agriculture	Industry and mining	Oil	Services	Agriculture	Industry and mining
1961-1971	16.9	36.41	18.24	20.32	1535.44	127.19	131.82	37.23
1972-1977	46.5	63.08	12.52	15.01	16857.83	2176	407.1	407.1

To be continued

[3]Summary of balance sheet and bank economic report years 1961-2006.

Continued

Period	Average annual exports (million dollars)				Average annual export growth (percent)			
	Oil	Services	Agriculture	Industry and mining	Oil	Services	Agriculture	Industry and mining
1978-1988	2.84	-16.58	13.98	15.32	14741.09	1435.91	527.07	527.07
1989-1993	10.6	24.69	29.57	52.08	15451	930.4	1676.38	1676.38
1994-1999	9.51	23.81	-12.29	6.47	15373.4	1466.8	1537.76	1537.76
2000-2004	18.5	39.28	5.52	19.67	26050.91	4735.7	1750.95	1750.95
2005-2006	31.7	11.30	26.43	42.97	57915.5	8138.81	2778.48	2778.48

Source: The Islamic Republic of Iran Customs Administration (IRICA)

Table 3
The Average Combined Share of Exports in Economic Sectors (Percent)

Period	Oil	Agriculture	Industry and mining	Services
1961-1971	84	7	2	7
1972-1977	85	3	1	11
1978-1988	88	4	1	7
1989-1993	83	9	3	5
1994-1999	76	9	8	7
2000-2004	73	5	9	13
2005-2006	74	4	11	10

Source: The Islamic Republic of Iran Customs Administration (IRICA)

Table 4
Average Annual Value Added and Growth Value-Added Economic Sectors

Period	Average annual growth of value added (percent)			Average annual value added (billion Rials[4])		
	Services	Agriculture	Industry and mining	Services	Agriculture	Industry and mining
1961-1971	8.79	3.17	13.08	32298	10058.55	7724.73
1972-1977	16.26	6.74	16.95	93012.67	15656	24234.17
1978-1988	-2.05	4.71	-0.44	117373	23834	30816.82
1989-1993	6.52	6.45	10.62	118625	35205.6	41899.2
1994-1999	4.16	2.25	5.39	151466	43849	55599.2
2000-2004	5.69	4.01	10.23	189306.45	49625	83280.22
2005-2006	6.52	6.93	10.48	236185.5	59761.5	116712.5

Source: central bank of Iran

(4) Process Industry and Mining (Exports and Value Added Sector)[5]

The most important disorder that occurred in the first Five-year Development Plan (FYDP) was oil shock in 1974 and increasing exchange incomes obtained from exports so that was leaded to the release of uncontrolled boundaries for imports and much damage had exposed industries that compete with similar foreign products. In during 1979-1988 with Islamic revolution, export in industrial and mining sector has had several fluctuations due to: investment impairment, get out a number of capitalists and revenue operators, macro debt companies, factories to the banking system and imposed war and economic boycott. During 1979-1982 export in industrial and mining sector was a decreasing trend but from 1982 onwards exchange requirement and decreasing incomes result of crude oil exports by export incentive policies. During this period, export from 173.9 million dollars in the beginning period has reached to 265.5 million dollars in the end. In during 1989-1993 (end of war and beginning first-year development plan) export value has climbed in industry and mining sector due to fluctuations in the amount. In second-year development plan became more attention to export in industrial and mining sector and has climbed according to developments in 1994-1995, exchange rate fluctuations and uncontrolled price increases. In third-year development plan trade liberalization and realization of export mutants was the desired goals. In this period export

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[4]IRR is monetary unit in Iran. Based on ISO-4217 standard Iran's Rial is shown with the symbol IRR In global trading.
[5]Summary of balance sheets and economic reports central bank in the years 1961-2006.

value in industrial and mining sector from 2299.5 million dollars in 2000 reached to 4955.6 million dollars in 2004.

Industry and mining section have involved effective during 1961-1968 in Iran's economic development. In1970 industry prospered in High level by government's support of industry and donations industrial Bank and increasing investment. Hence growth in industry and mining sector reached to 13.8 percent. Value added growth in industry and mining section reached to the 13.5 percent in 1971 and was more than predicted goal in the fourth development plan. With widespread strikes in 1998, industrial and mining activities was decreased too much, therefore economic in Iran was faced with the relative stagnation by the Islamic Revolution and problems such as shortages of imported raw materials in small industries. In despite of these conditions the added value in industry and mining section increased about 5.1 percent. Industry and mining section in first Five-year Development Plan (FYDP)[6] III executive (2000) situation was relatively stable. Improving government financial, country's balance of current account surplus and monetary policy supplier financing economic development leaded to fixed Price and exchange rate and to fall inflationary expectations and provided the appropriate to support this sector and the value added in this section grew amount of 9.5 percent than 1999 year.

(5) Process Agricultural and Services (Exports and Value Added Sector)[7]

The export of traditional and agricultural products is as one of the main pillars in non oil export so that during 1961-1965 agricultural export has climbed continuously and during 1973-1978 domestic demand has increased strongly due to increasing oil incomes and the unprecedented growth and in this period agricultural export has negative grown and from 505.1 million dollars in 1973 reached to 367.9 million dollars in 1978 year. In during 1980-1988 agricultural export growth was low because of terms of revolution and war and various boycotts economic. The export of traditional and agricultural products from 770 million dollars in 1988 reached to 2516 million dollars in 1993 so that being included over 70 percent of total non oil export and during third-year development plans the export of traditional and agricultural products from 1463.2 million dollars in 2000 reached to 1892 million dollars in 2004 due to favorable weather conditions, supportive government policies and rising oil incomes. In during 1968-1977 export in services sector has climbed but during 1979-1988 has climbed down due to terms of revolution and war and various boycotts economic and during 1995-1998 has climbed to

2023 million dollars in 1998 and also during 2000-2006 has climbed from 2012.17 million dollars in 2000 reached to 8554 million dollars in 2006 due to rising oil price.

Generally, from the Islamic Revolution to 1990 (except 1988) value added in only agriculture sector has had always uptrend, especially in 1985-1988 years agricultural sector has had an effective role to prevent increasing economic recession while more economic sectors have had negative growth because there was war Problems and shortages of raw materials and economic recession society. Share of services value added sector have decreased during the period 1982-1990 from 58.3% in 1982 to 50.9% in 1990 year. In 2004 services value added sector has reached the highest growth (8.1% growth) during these few years and has increased to 51.7%.

1. THE PREVIOUS STUDIES

Hamuda, Elbeidi and Gazda (2010) studied the relationship between export and economic growth the using time-series data of 1980-2007 in Libya Arabic Union. Results showed that in the short term export growth has positive effect on Gross Domestic product (GDP) growth. Export, GDP and exchange rate are converging and there is long-term bilateral relationship between export and GDP growth. pandey (2006) in his article reviewed export and Economic Growth by causality relationship the using time-series data of 1950-2002 in India. He used the following model:

$$Y_t = a + \sum_{i=1}^{m} \alpha_1 Y_{t-1} + \sum_{i=1}^{n} \alpha_2 X_{t-1} + U_t \qquad (1)$$

$$X_t = b + \sum_{j=1}^{k} \beta_1 X_{t-1} + \sum_{j=1}^{k} \beta_2 Y_{t-1} + V_t \qquad (2)$$

Where Y is GDP and x is exports.

Result show that in short term there is bilateral relationship between exports and GDP and in the long term exports and GDP aren't convergent in constant prices but are convergent in current prices. Jordam (2007) in his article studied exports and Economic Growth the using time-series data of 1970-2005 in Namibia. He used the following models:

$$Export_t = \sum_{j=1}^{p} \alpha_j Export_{t-j} + \sum_{j=1}^{p} GDP_{t-j} + U_t \qquad (3)$$

$$GDP_t = \sum_{j=1}^{p} \alpha_j Export_{t-j} + \sum_{j=1}^{p} Y_j GDP_{t-j} + V_t \qquad (4)$$

The result showed that exports in the short term lead to economic growth. Also, there is positive long-term relationship between exports and economic growth.

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[6]Iran's FYDP was initiated since the end of Iran-Iraq war in 1988. High rates of economic growth for a decade is a strategic approach as well as an outstanding issue in the 4th five-year development plan of Iran (March 2005-2010).
[7]Summary of balance sheets of central banks and economic reports in the years 1961 to 2006.

Shan and Sun (1998) studied causal relationship between exports and growth the using time-series data of 1996-1978 in Hong Kong, Korea and Taiwan by VAR method and they have used the Matrix model. Their results showed that there is a two-way relationship between exports and economic in Hong Kong and Korea but for Taiwan lead to economic growth only by export.

2. METHODOLOGY

In this section we want to estimate the process variables used in the model then introduce the Feder model in the study and then stationary and non stationary variables will be examined by the ADF test. Model used in this study is Feder model. In this model, the total production in the economy is segregated into two parts production for inside (N) and production for exports (X) and production each one of two parts is a function of factors allocated capital and labor. In addition, production the non-export section depends on volume of export:

$$N = F (K_n, L_n, X) \tag{5}$$
$$X = G (K_x, L_x) \tag{6}$$
$$Y = N+X \tag{7}$$

Where N: non export sector, X: export sector, (K_n, K_x): capital stock in two sector, (L_n, L_x): Labor in two sector. We assume that the productivity of production factors is greater in export section and is establish the following equation:

$$\frac{G_k}{F_k} = \frac{G_l}{F_l} = 1+\delta \tag{8}$$

Where δ is a rate difference production factor in the marginal productivity in two sections. For obtain the growth relationship we make differential from equations (1) and (2) and after doing mathematical equations will be as follows:

$$\frac{\dot{Y}}{Y} = \alpha \frac{I}{Y} + \beta \frac{\dot{L}}{L} + \theta \frac{\dot{X}}{X} \tag{9}$$

Where, Y: economic sectors value-added, I: investment in economic sectors, L: employment economic sectors and X: export in economic sectors

2.1 Unit Root Test by Augmented Dickey – Fuller (ADF)

The review stationary or non stationary for time series is one of the major topics in time series analysis and generally when a time series is stationary that during time Mean, variance, covariance and correlation coefficient remain constant. One of the methods for determining stationary is Unit root test by Augmented Dickey – Fuller (ADF), this test is based on following equation:

$$\Delta Y_t = \alpha + \beta t + m Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \tag{10}$$

Where Δ is operator difference first order and ε_t error pure impaired.

$$\begin{cases} H_0 : m=0 \\ H_1 : m<0 \end{cases} \tag{11}$$

Zero hypothesis is that time series variable has unit root. In fact, this test is the assumption having unit root (non stationary) or having no unit root (stationary).

2.2 Heteroskedasticity and Serial Correlation

One of fundamental acceptability for regression is equality of variance sentences impaired. If variance disturbing sentences not be fixed in different observations, we will be faced to heteroskedasticity problem. Consequences due to heteroskedasticity variance disturbing sentences is that Ordinary Least Square (OLS) estimators are not efficient and estimated variances coefficient slant and also doing heteroskedasticity test and making confidence interval is rejected from the degree of credibility therefore heteroskedasticity test is necessary. Other fundamental acceptability for regression is being non-correlation disturbing sentences in different observations. If fundamental to be violated, we will face to serial correlation problem. Therefore Serial correlation test is necessary.

3. RESULTS

In this section we survey stationary variables used because of to avoid regression false by ADF test and the result of this test has presented in the following table:

Table 4
Result of Unit Root Tests by Augmented Dickey-Fuller (ADF)

variable	statistic	Critical value	variable	statistic	Critical value
LA	-7.19	-3.58[001]	LEI	-6.25	-3.58[001]
LI	-5.24	-3.58[001]	LES	-2.91	-2.60[001]
LS	-5.21	-3.58[001]	LXAXNO	-7.35	-3.58[001]
LIA	-7.12	-3.58[001]	LXIXNO	-5.02	-3.58[001]
LII	-5.02	-3.58[001]	LXSXNO	-5.34	-3.58[001]
LIS	-4.19	-3.80[001]	LXO	-5.63	-3.58[001]
LEA	-2.09	-2.60[001]	LXNO	-4.48	-3.80[001]

3.1 Estimation Model Using the Ordinary Least Square (OLS) Method

In this section we estimate model for industry-mining, agriculture and services sectors by time series data of 1961-2006 and Ordinary least square (OLS) method separately. Then we survey heteroscedasticity and serial correlation problems by Brush - Pakan and LM tests. Estimated Feder model for industry and mining sector is as following:

$$LI = -28.846 + 2.785LEI + 0.049LII + 0.026LXIXNO - 15.56DU67 + 0.392LXO \qquad (12)$$
$$\;\;\;\;\; (-2.49) \;\;\;\; (9.21) \;\;\;\; (1.88) \;\;\;\;\;\;\; (2.88) \;\;\;\;\;\;\; (2.37) \;\;\;\;\;\; (-13.23)$$
$$R2 = 0.88 \qquad R\text{-}2 = 0.81 \qquad F = 30.53 \qquad DW = 2.09$$

Where:

LII: ratio of investment to value added in the mining and industry sector

LXO: ratio of oil exports to total exports

DU67: Dummy variable

Estimated Feder model for agricultural sector is as following:

$$LA = -5.92 + 0.196LIA + 0.181LEA + 0.054LXAXNO + 0.015D\,(VA) + 0.087LXO \qquad (13)$$
$$\;\;\;\;\; (4.08) \;\;\;\; (3.04) \;\;\;\;\;\; (1.91) \;\;\;\;\;\;\; (10.88) \;\;\;\;\;\;\; (3.94) \;\;\;\;\;\; (4.35)$$
$$R2 = 0.87 \qquad R\text{-}2 = 0.79 \qquad F = 33.7 \qquad DW = 2.29$$

Where:

LIA: ratio of investment to value- added in the agricultural sector

LXAXNO: ratio of agricultural exports to non-Oil exports

D (VA): Changes in agricultural value Added

LEA: Ratio of agricultural employment to total employment

Estimated Feder model for services sector is as following:

$$LS = -13.81 + 1.595\,LES + 0.293\,LIS + 0.031\,LXSXNO - 23.85\,DU1971 + 0.981\,AR\,(1) - 0.877\,MA\,(4) \qquad (14)$$
$$\;\;\;\; (-6.26) \;\;\;\; (9.705) \;\;\;\;\; (5.18) \;\;\;\;\;\;\;\;\; (2.78) \;\;\;\;\;\;\;\;\;\; (-10.83) \;\;\;\;\;\;\; (8.93) \;\;\;\;\;\;\; (-20.92)$$
$$R2 = 0.87 \qquad R\text{-}2 = 0.81 \qquad F = 35.13 \qquad DW = 2.08$$

Where, LIS is ratio of investment to value- added in the services sector and DU1971 is dummy variable for 1971-1973 year.

3.2 DISCUSSION

The result of ADF test show that all variables are stationary and regression can be performed on variables without fear of being pseudo. According to estimating Feder model in industry and mining sector, positively and significantly related to the coefficient of export growth show positive role of exports on value added and also show that industry and mining value added increase to 0.049 percent due to a one percentage increase in industry and mining export. Variable coefficients in ratio of oil export to total export show that industry and mining value added increase to 0.087 percent due to a one percentage increase in ratio of oil export to total export. Based on F and t statistic, in the whole regression and all coefficients are significant and based on Durbin Watson (D.W) statistic, there is no serial correlation problem between error sentences. Also result of Brush - Pakan and LM tests in industry and mining sector show that there is no serial correlation and heteroskedasticity problem between error sentences.

According to estimating Feder model in agricultural sector, positively and significantly related to the ratio of agricultural export to non oil export coefficient show positive role of the ratio of agricultural export to non oil export on agricultural value added and also show that agricultural value added increase to 0.054 percent due to a one percentage increase in ratio of agricultural export to non oil export. Also result of Brush - Pakan and LM tests in agricultural sector show that there is no serial correlation and heteroskedasticity problem between error sentences. According to estimating Feder model in services sector, positively and significantly related to the coefficient of GXSER variable show positive role of export on value added in services sector and also show that services value added increase to 0.031 percent due to a one percentage increase in services export. According to result of the estimating models in industry and mining, agricultural and services sectors is confirmed the first hypothesis[8].

CONCLUSION AND RECOMMENDATIONS

In every three models the estimating performed showed that all variables coefficients are significant and their marks conform to theoretical debates. Variable Coefficient of export growth is positive and equal to 0.049 in industry and mining sector and variable Coefficient of the ratio of agricultural export to non oil export is positive and equal to 0.034 and variable Coefficient of services sector is positive and equal to 0.031, so second hypothesis[9] is not confirmed. Therefore increase in explanatory power models with login export variable states that increasing export lead to improvement in condition of economic sectors because export development leads to attract the part of the exchange incomes result of exports to relevant sections provides economic growth areas. So

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[8] The first hypothesis is that export growth lead to growth of economic sectors.

[9] The second hypothesis is that the effect of export growth on services sector is more than other sectors.

is recommended applying policies that will be provided growth areas economic sectors, for this purpose a few policies of encouraging exports has included: policy of export subsidies, policy of support for agricultural inputs, reduce taxes on exports, reduce customs tariff, bond cut for outsourcing in goods export, exchange rate adjustment by the rate reductions, using of bank credit and establishment export guarantee funds. Survey the effect each of the mentioned factors on export growth depends on doing research separately. General suggested in this study is that strategy of economic sectors should be based on exporting products policy.

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