



## Study of the Effects of Globalization on Iranian Caviar Export

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### Abstract

Globalization is integration of national economies in global economy and infers on increasing the flow of goods and services. In this study the consequences of globalization were studied through the analysis of Level of International Trade index (LIT) in the caviar export equation. The required data were gathered from Statistical Yearbook of Foreign Trade, Statistical Yearbook of fisheries, Statistical Yearbook of the International Monetary Fund, United Nations Food and Agriculture Organization and different issues of Central Bank of Iran over 1974-2007. The results showed that domestic production of caviar have significant and positive effects on its export. In addition, sign of level of international trade variable in the estimated model is positive and indicates trade restrictions remove lead to increase in caviar export.

**Keywords:**

*Globalization, Caviar, Level of International Trade Index (LIT), Autoregressive Distributed Lag Method (ARDL).*

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## INTRODUCTION

The foreign trade of Iran is recognized in terms of the severe dependency on the exchange revenues of oil export and single-product exports (Godarzi, 2004). Because there is uncertainty and fluctuations in realization of oil revenues, extending non-oil export is an avoidable necessity. On this path, exporting goods which have appropriate competitive power in the global markets could provide the export goals. Thus, the Iranian caviar due to high quality considered ones. Both high price and super quality of Iranian caviar are two important factors which show the investment necessity and more attention (Hosseini, *et al.*, 2008). The Caspian Sea sturgeons provide 90 percent of the global caviar (Seyed Naghavi and Babaei, 2010) but investigating its production and operation in the past shows that the caviar production from the 1992 always have been decreasing (Godarzi, 2004). Moreover, the magnitude of caviar export of Iran has been decreased more than 218 ton over the 1991-2007. Some reasons have had the effective impact on the caviar export decrease of Iran in recent years which included: Declining the sturgeons resources, smuggle growth, importing the Europe caviar and misusing in the product (Feizabadi, *et al.*, 2009). Given the dramatic decline in exports of these products are added every day value and the price of caviar. So, examining the effective factors on the export development of this product has special position (Feizabadi, *et al.*, 2009). With respect to considerable extension of the global transactions and countries willingness for joining the World Trade Organization (WTO) can be claimed that the economy globalization is one of the basic ways in extending the trade of different products. Although this matter can be posed that the magnitude of production and export of caviar export is determined under supervision of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), but the globalization affects the caviar export. Generally, this fact should be noted that globalization is a multi-dimensional process. This phenomenon can facilitate relative advantage and transferring new technologies of a country through improving competitiveness.

Given the relative advantage of Iran's caviar production and exports (Hosseini, *et al.*, 2008) joining the WTO can attract foreign investment and technology transfer of new breeding and fishing and caviar package. Additionally, it removes the restrictions imposed by governments on the foreign affairs, transactions growth and international interactions among the members of the WTO countries. The commercial liberalization policies are effective on total structure of economy. Different countries always have tried to support their various economic sectors in the integration process to the global economy through imposing custom tariffs and subsidies payments on export. So that, the agriculture sector (as well fishing subsector) is not separated from this rule. However, the agreements within the WTO have changed the former procedures. In compliance with these agreements, they ratified that non-tariffs and tariffs barriers along with export subsidies should be decreased on agricultural products (Mohammadi and Naghshinehfar, 2006).

The researchers have tried to study on the impacts of globalization in different sectors. In a case study, Makhija *et al.*, (1997) used two criteria including the level of international trade and integration of international trade as indexes for determining globalization impacts on factorial chemical industries of five countries (USA, Japan, France, Germany and UK). Their study demonstrated that despite high level of foreign direct investment in chemical industries, these industries relative to factorial industries are less global. In addition this globalization trend in USA as a globalization representative of industries in the entire world is less than other industrialized countries. Soltani *et al.*, (2005) studied the impact of trade liberalization on Iranian agriculture and rural economy. They concluded those results under the integration of international trade index. Ascending trend of this index showed that Iran is moving toward trade liberalization so that agriculture sector has well trend in this way. Mohammadi and Naghshinehfar (2006) attempted to investigate the impact of trade liberalization on supply, demand, import and export of wheat and pistachio crops. Their

findings indicated that the level of international trade variable has positive impact on domestic supplies of wheat and pistachio. While it impact on both above domestic goods demand and wheat import is negative. Mousavi *et al.*, (2009) by using integration of international trade proxy examined the effects of globalization on the saffron export in Iran. Their findings show the Iran doesn't have key role in determining the price of saffron at the global scope despite enjoining high share of saffron production. Meanwhile they concluded that convergence trend of Iran economy toward the global economy has caused positive impact on the saffron export. Wilpert (2009) studied whether the globalization process has positive impact on the nature of work or not. Their results showed that its effect is so effective so that the following indices improved considerably: working place, age flexibility, products diversification, work hours, increase in employment sector and etc. Carletto *et al.*, (2010) at the aim of investigating the globalization effects on the adoption, diffusion, and welfare impact of non-traditional export crops in Guatemala concluded that despite the positive role of government and non-governmental organizations in order to facilitate difficulties but market forces can jeopardize their efforts. Pangarkar and Wu (2011) examined the globalization effects on the China's industries and economic firms as an emerging market. Their results show positive impact of globalization on the industries and especially economic firms so that when such firms which have taken part in globalization process experience slack of resources have better performance than firms which not take part.

At all, it's concluded that firstly, diver's studies have used different indexes to measure the globalization of economy. So that in those papers the level of international trade and integration of international trade are more familiar indicators than other proxies. Secondly the internal studies feature that Iranian agriculture sector enjoys appropriate capacities for global co-integration. On the other hand, it is felt more that examining the different parts of Iranian economy and especially those parts that Iran has relative advantage

on the path of joining the WTO is binding. This paper is trying to study the impact of economy globalization on caviar export of Iran by using the level of international trade criterion.

## MATERIALS AND METHODS

To measure the globalization of economy, it's necessary to be accounted the degree of capital, labor, services and goods markets (Mirjalili, 2001). The globalization measurement of economy is still yet at elementary stages. So there are different views as well various variables as the globalization proxies (Kalbasi *et al.*, 2001). The examination of different studies shows that the level of international trade index is one of the proper criteria for measuring the economy globalization (Mohammadi and Naghshinefard, 2006). This criterion that was introduced by Makhija *et al.*, (1997) shows the extent of international relations for an industry (sector) is defined as follows:

$$LIT = \frac{(X_t + M_t)}{(P_t + M_t - X_t)} \quad (1)$$

Which LIT refers to the extent of international correlation of respective industry (sector),  $X_t$  implies to export,  $M_t$  mentions to import and  $P_t$  term hints the respective production of industry (sector).

General form of model is defining as following function:

$$X = f(P, Y, ER, PRO) \quad (2)$$

The above abbreviations defined as: X: export amount of respective production, P: the average price of respective production, Y: income of importers countries, ER: exchange rate, PRO: domestic products of respective production.

Moreover the level of international trade is added at the aim of investigating impacts of globalization and trade liberalization in model. The final form of export-supply model about the caviar specified as follows:

$$XC = \beta_0 - \beta_1 PC + \beta_2 Y + \beta_3 RER + \beta_4 PROC + \beta_5 LIT \quad (3)$$

Which XC implies the export quantity of Iran caviar, PC: the caviar average price, Y: weighted

average of gross domestic production for the five main caviar importers countries (Germany, France, Spain, Japan and UAE), RER: real exchange rate, PROC: caviar domestic production and finally LIT: level of international trade index for caviar.

### Auto Regressive Distributed Lag method (ARDL)

In general some approaches like Engle-Granger because of neglecting short term dynamic reactions among the variables are not credible for the small observations. Meanwhile estimates of this invalid model are bias. So applying hypothesizes tests by using ordinary statistic like T statistic couldn't be justified (Noferesti, 1999). Due to this reason use of methods which have short term dynamics and caused to gain precisely coefficients in model are becoming popular. At all, the dynamics model is model which involves variables lags as follows:

$$Y_t = aX_t + bX_{t-1} + cY_{t-1} + u_t \quad (4)$$

To decrease estimation bias of model coefficients in small samples is good as much as possible being considered greater lags as following function:

$$\phi(L,P)Y_t = \sum_{i=1}^k b_i(L,q_i)X_{it} + c'w_t + u_t \quad (5)$$

The Above model titled an extensive auto regressive distributed lag pattern which:

$$\phi(L,P) = 1 - \phi_1L - \phi_2L^2 - \dots - \phi_pL^p \quad (6)$$

$$b_i(L,q_i) = b_i + b_{i1}L + \dots + b_{iq}L^q \quad i = 1, 2, \dots, k \quad (7)$$

Which terms defined as: L: lag operator and W: is a vector of fixed variables such as: intercept, dummy variables, time trend or exogenous variables with fixed lag.

The following equation is specified to demonstrate the dynamic form of model in order to determine the effect of globalization on the caviar export of Iran:

$$XC_t = C - \sum_{i=1}^{n_1} \beta_{1i} PC_{t-i} + \sum_{i=1}^{n_2} \beta_{2i} Y_{t-i} + \sum_{i=1}^{n_3} \beta_{3i} RER_{t-i} + \sum_{i=1}^{n_4} \beta_{4i} PROC_{t-i} + \sum_{i=1}^{n_5} \beta_{5i} LIT_{t-i} \quad (8)$$

The model should be estimated for all states and for all possible amounts. In a sense model should be fitted in the order of (m+1). M is maximum lag which determined by researchers and K also is number of explained variables. At the next stage according to one of the following criteria, suitable equation specified: Akaike, Schwarz-Bayesian, Hannan-Quinn and adjusted R square (Tashkini, 2005). Pesaran and Shin (1995) offer that Schwarz-Bayesian criterion for specifying lags of model is the best standard because it doesn't unhand greater degree of freedom. To account the coefficients of long-term model applied the dynamic model. The long-term coefficients concerning the X variables are computing as follows:

$$\theta_i = \frac{\hat{b}_i(1, q_i)}{1 - \hat{\phi}_i(1, p)} = \frac{\hat{b}_{i0} + \hat{b}_{i1} + \dots + \hat{b}_{iq}}{1 - \hat{\phi}_1 - \dots - \hat{\phi}_p} \quad i = 1, 2, \dots, k \quad (9)$$

To investigate whether the long-run relationship gained from this approach is not spurious, Pesaran *et al.*, (1996) present F statistic. In this way, to test the significance of lagged levels of variables in order to examine the long-run relationship used from F statistic in the form of Error Correction Model. Pesaran and Pesaran (1997) calculated the appropriate critical values corresponding the number of estimators and whether model includes intercept and trend or no. They presented two groups of critical values which: The first is based on stationary of all variables while another demonstrates non-stationary of all variables (but they become stationary in the first difference). If computing F statistic places outside of these borders, regardless the order of variables stationary (which are I(0) or I(1)) a decisive decision can be made. Where accounted F statistic is beyond the upper bound, so null hypothesis (no long-run relationship) rejected and where it places below the lower bound leads to be accepted the null hypothesis.

But if calculated F statistic locates within the two bounds, the inference results depend on this issue whether variables are I(0) or I(1) (Tashkini, 2005).

The outstanding advantage (applicable trait) of autoregressive distributed lag which separate it than other co-integration approaches is that it no consider the stationary of variables of model which be I(0) or I(1). So, it means ARDL approach doesn't need to divide variables into correlated variables from the zero or first degree.

This study used the date from Statistical Yearbook of Foreign Trade, Statistical Yearbook of fisheries, Statistical Yearbook of the International Monetary Fund, United Nations Food and Agriculture Organization and different issues of Central Bank of Iran over 1974-2007.

### RESULTS

Investigating variable stationary is the first step to estimate a time-series regression. In general where a time series is the stationer whom its expected value and its variance over the time be fixed. As well co-variance quantity within the two terms only has a dependency on interval or lag value, and it not has any relation with the real value of co- variance (Noforesti, 1999). Due to testing variable stationary this study employs Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The results show that except of the logarithmic form of caviar domestic products variable which is stationer by level (by considering the effect of structural break at the help of dummy variable for the following years from 1994) other variables are not stationery by level but they became stationery in the first difference. Thus because there are mixture of I(0) and I(1) variables in model, offered that auto regressive distributed lag approach is the best way to investigate the co-integration relation among the variables (Pessaran and Pessaran, 1997). To select the best form among linear, linear-logarithmic, logarithmic-linear and logarithmic forms, we applied DOX

Given these indices, the logarithmic form of caviar export is selected, so that the following

Table 1: Elaborative results gained from estimating model coefficients by using ARDL(1, 0, 1,0, 0, 1).

Variable	coefficient	t statistic	prob
LXC(-1)	0.56 ***	5.84	0.000
LPC	-0.01	-0.55	0.568
LY	0.06	1.10	0.282
LY(-1)	0.08	0.88	0.383
LER	0.02	0.06	0.943
LPROC	0.89 ***	3.19	0.000
LLIT	0.12	1.47	0.184
LLIT(-1)	0.25	1.22	0.237
C	1.40 *	2.04	0.052
DU94	-0.07 *	-1.77	0.091

\*\*\*, \*\*, \* Significant in level 1%, 5%, 10%

part of study only shows the logarithmic model results. The elaborative results are seen in table 1.

Classics hypotheses (non-autocorrelation, correct model specification, non-autocollinarity, normal distribution of residual terms and Heteroscedasticity) should be tested under diagnostic statistic. So that they represented in table 2 as follows:

Table 2: Diagnostic Tests

The classics hypotheses	LM test statistic	LM test probe	F test statistic	F test probe
Serial Correlation	0.032	0.856	0.022	0.881
Functional Form	1.17	0.279	0.84	0.367
Normality	0.50	0.777	-	-
Heteroscedasticity	2.163	0.141	2.175	0.150

As seen at table 2, under the probability value at 0.05 intervals distance, all classics hypotheses confirmed.

Now after estimating the dynamic model tried to investigate the existence of long-run relationship. In order to examine the long-run relationship among the variables based on the F test, its results reported in table 3 as follows:

Table 3: investigation the existence of long-run relationship

Calculated F Statistics	Critical Values for F Statistics (Significant in 90%)	
	I(0)	I(1)
3.724	2.141	3.25

As it is shown at above table, because calculated F statistic is more than upper bound of critical value, so null hypothesis rejected which it means the long-run relationship existence in the model.

After long-run relation existence among the variables tried to be discussed those long-term variables coefficients which represented in table 4 as follows:

Table 4: results gained from estimating long-run coefficients by ARDL (1, 0, 1, 0, 0, 1)

Variable	coefficient	t statistic	prob
LPC	-0.52	-1.11	0.276
LY	0.25	1.55	0.134
LER	1.007	0.17	0.859
LPROC	2.09 ***	3.21	0.004
LLIT	0.29 *	1.86	0.088
C	3.14	1.32	0.205
DU94	-1.93 ***	-2.88	0.008

\*\*\*, \*\*, \* significant in level 1%, 5%, 10%

Source: Author's findings

The findings of this table display that the logarithmic variables of global average price, income of importer countries and exchange rate don't have significant effects on caviar export of Iran in long-term. The reason behind disaffecting variables on caviar export coming back to its specific condition in export and production. So that magnitude of this production and export under Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) rules. In compliance with the law of convention, export of caviar fishes include of their caviar or meets is legal only when respective country has been released permits and certificates. By the way all hunts and export statistics should be reported to the CITES secretariat. In Iran the caviar hunts and export belong to government and the CITES only supervises on government activities. Therefore, these reasons have caused that it doesn't have sensitivity relative to other production. So that one percent increase in production led to incline caviar export about 2.09 percent on average. Moreover, though some countries like France and Germany once upon a time imported the caviar of Iran, but nowadays they are competing with Iran growing the caviar and recognized as the main Iranian competitors. As well, because the symptom of

level of international trade variable is significant and positive, so integrating in the global economy and joining WTO through attracting foreign investment, importing new technologies, deregulation and removing additional restrictions can increase the caviar export of Iran.

Co-integration existence among the set of economic variables provides statistical base of using error correlation models. These models are more celebrated in applied activities. The main reason of ECM Fame is that it can correlate the short term fluctuations of variables to the equilibrium quantities of long-term (Nofaresti, 1999). The results attained from ECM estimation seen in table 5.

Table 5: Results gained from ECM coefficients.

Variable	coefficient	t statistic	prob
dLPC	-0.01	-0.55	0.586
dLY	0.06	1.10	0.282
dLER	0.024	0.06	0.942
dLPROC	0.89 ***	3.19	0.000
dLLIT	0.12	1.47	0.184
dC	1.4 *	2.04	0.051
dDU94	-0.07 *	-1.77	0.091
dECM(-1)	-0.47 **	-2.46	0.025

\*\*\*, \*\*, \* significant in level 1%, 5%, 10%

Source: Author's findings

As seen at table 4, despite the positive effect of trade liberalization variable in short term on the Iranian caviar export but it's not significant statistically. Moreover increase in domestic products of caviar in short term has increasing effect on its export. ECM is closed to -0.47 so that it is significant statistically. So if the model derailed from the equilibrium per each year, %47 of disequilibrium adjusted and two years takes time to be returned toward equilibrium.

## RECOMMENDATION

With respect to globalization issue, it is necessary to be recognized which regulations and restrictions are effective on economy because it paves ways for global co-integration. One of the important tools to reach this goal in Iran is that essential investments happen in the productions such as caviar which have comparative advantage. Given the positive effect of production increase on the caviar export suggested that

firstly some measures should be taken to increase the caviar production legally such as: renewing the caviar resources, preventing illegal fishing and smuggling this production. Secondly Iranian officials must target new markets for their product due to losing the former caviar markets which now Germany and France have. On other hand, by consideration to the positive effect of the level of international trade on the caviar export recommended that the process of joining WTO because of gaining greater foreign exchanges to be pursuit more seriously.

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