The study of factors which have impact on export of agricultural products to Armenia; regarding the actual exchange rate

Ali Asghar Tatlari[1], Toros Torosyan[2]

[1.] Department of International Economics, Faculty of Economics, Yerevan State University, Armenia
[2.] Department of International Economics, Faculty of Economics, Yerevan State University, Armenia
Aliasghar_tatlari@ymail.com

Abstract: The inappropriate political relations with neighbours and the cultural and historical similarities have made Armenia as a suitable market for export of agricultural products from Iran. The aim of this study is to review the current situation of the export of agricultural products from Iran to Armenia, between 1999-2010 and the factors which have impact on it. However, there is a need to estimate the actual exchange rate during this specific period beforehand. Therefore, the actual exchange rate between 1976-2010 has been estimated through the VECM model and data based on the basic economic variables. Ultimately, the trading data between Iran and Armenia during 1999-2010 has been used in order to specify the effective factors on the export of agricultural products to VAR. According to the result, the variables of Gross Domestic Product (GDP) in Armenia and the actual exchange rate have positive effect on the export. Therefore, we suggest strategy of the increase in the Nominal exchange rate to raise it up to the actual exchange rate in addition to investing in Armenia, to increase the export.
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Introduction

Agricultural sector has special position among all the economic sectors. Dispersion of the natural resources and production factors, workforce regulation, capital and technology in all over the world, and different quality and quantity of the production factors lead to a viewpoint in developing countries. According to this viewpoint, economic development could not keep on devoid of the foreign trade.

As a result, developing countries have decided to develop the foreign trade and be more active in world markets. If developing countries such as Iran intend to be more active in the world markets, they need to have the appropriate trading strategies.

Moreover, it is not possible to develop export devoid of evaluation of facilities, potentialities, tendencies, and production structure of the country (Safavi and Ahmadi, 1384). One of the possibilities of the export marketing for any countries is neighbours of those countries. Exportation to neighbours has two advantages. Firstly, it has low transportation cost, secondly, there are equal priorities.

There are many trades between Iran and its neighbours as they have common borders and common priorities. Common priorities could be rooted in the cultural, historical, and religious structure of these countries.

In addition to the given similarities, there is another phase of trading between Iran and Armenia. As Armenia has dark relations with other countries such as Azerbaijan (because of the war of Ghare bagh), Georgia (because of close relations and trades between Turkey and Azerbaijan) and Turkey (because of Armenian genocide), and it is economically and politically isolated, therefore, Iran remains as the only way for trading (business).

Therefore, it has made these two countries much more dependent on each other. Significance of the agricultural sector of Iran, in addition to a commercial partner such as Armenia because of several similarities, have made the exportation of Iran and its effective factors for commercial policy-making, significant. It should be considered which country has exportation of the agricultural products to Armenia except from Iran.

The other competitors of Iran in exportation of agricultural products are displayed in the following table.

Resource: Research calculations by statistics of FAO website

As it shows, the exportation of agricultural products of Iran to Armenia has been decreasing. Earlier, as Russia has introduced itself as a significant competitor, role of Iran has been gradually decreasing.

Afterwards, essence of the other competitors such as Ukraine, Brazil and Germany has made the market more competitive. But obviously, Iran has less exportation in compare with the first years. We should see if this situation has happened because of decreasing value of the Iran commercial products?

Therefore, trend of changes in exportation of the agricultural products from Iran to Armenia between 1997-2010, has been presented in the following

diagram.

Table 1. Ranking, share and competitors of Iran in exportation of the agricultural products to Armenia Competitors

Year	Ranking	Share of Iran in total agricultural imports of Armenia	
1999	1	16	US, UK, Turkey, China
2000	2	14/5	US, Germany, UK, China
2001	1	15/5	Swiss, UK, Ukraine, Italia
2002	2	12/2	Russia, Ukraine, Brazil, US
2003			
2004	5	6/2	UK, Ukraine, Russia, Georgia
2005	6	5/9	Russia, Ukraine, Swiss, UK, Georgia
2006	3	5/2	Russia, Ukraine, Georgia, Brazil
2007	5	3/7	Russia, Ukraine, Georgia, Brazil
2008	7	3/4	Russia, Ukraine, Brazil, Germany, US, India
2009	7	2/7	Russia, Ukraine, Brazil, US, India, Indonesia
2010	5	3/1	Russia, Ukraine, Brazil, US

Diagram1.

It seems that trend of the agricultural products exportation from Iran to Armenia has not been decreased during the last several years, but it was instable.

Therefore, reason of the decreasing share of Iran could not be decrease of the exportation.   As commercial value of the agricultural products is not stable, exporters might be confused. Moreover, competitors could strengthen their trading to Armenia, as Iran has unstable situation in this market.

Reason of the instability of the exportation from Iran could be the instability of the total commercial and economic strategies (politics) of Iran. Seemingly, it is necessary to investigate the possible factors which have impact on exportation of the agricultural products from Iran to Armenia.

The aim is to study effective factors on exportation of the agricultural products from Iran to Armenia, in order to provide strategic suggestions to keep Iran as one of the main exporters of the agricultural products to Armenia.

Methodology

Time series models include models which could be divided into two general groups of single-variable and multi-variable models. The main single-variable models could be AR, MA and ARIMA; and the main multi-variable models could be ARDL, VAR and VESM (Hosseini, and colleagues 1389).

We have used VAR model, which is usually applied for prediction of the related Time Series. It is also applicable to analyze effect of the dynamics of the Random Distributions on series of the variables. VAR direction depends on a trend in which each internal variable could be dependent on the amount of all other variable interruptions in the model. The mathematical formula is:

$Y_t = A_1 y_{t-1} + \ldots\ldots + A_p y_{t-p} + B x_t + \varepsilon_t$

In which, Y_t is Matrix, K is a ranking of the internal variables, x_t is Matrix from D ranking of the internal variables, $A_1, \ldots, A_p$ and B are Coefficient Matrix which should be calculated and ε_t is interruption Matrix which might be symmetrically related but it is not related to its interruptions and right-side variables (Hosseini and Colleagues 1389).

We have used statistics of FAO, the World Bank, the Central Bank of Iran (CBI), The Statistics Centre of Iran, and the agricultural Ministry of Iran data.

One of the effective variables on exportation of Iran is the actual exchange rate. In this study, the definition of this rate based on the Purchasing power parity (PPP) theory has been applied to calculate the actual exchange rate. According to this theory, the actual exchange rate could be calculated by product of the ratio of foreign currency to internal currency, and formal exchange rate.

$$E_{PPP} = \sum_{i=1}^{m} w_i \frac{p_i}{p} E_0$$

In which, E_{ppp} is actual exchange rate; P is indicator of internal consumer currency; P_i is indicator of currency in those countries which have the most trading with that country; w_i is share of i country in business of Iran and E_0 is the formal, internal exchange rate. Share of each country for calculating the actual exchange rate could be calculated by dividing value of the imports of Iran from that specific country into the total value of the imports of Iran.

$$w_i = \frac{VM_i}{VM}$$

In which, VM_i is value of the imports of Iran from i Country, and VM is total value of the imports of Iran. The Chosen countries are 18 which include: Germany, France, Japan, UK, Turkey, Korea, Emirate, Italia, China, India, Swiss, Spain, Austria, Brazil, Switzerland, Belgium and Netherland.

Literature review helps us to use the single-equation approach in order to specify the basic

economical factors which have impact on the actual exchange rate. The basic factors could be divided into four categories: 1 Factors based on the internal supply: such as Balassa-Samuelson effect resulting from higher profitability in commercial sector in compare with non-commercial sector. 2 The economic politics such as financial deficit in addition to the change of the governmental costs of the commercial and non-commercial products. 3 The environment of the world economy such as the world exchange rate, capital, and exchange relations. 4 The commercial politics such as commercial freedom and decrease of the tariffs and import fees and export subsidies.

Therefore, the following formula should be used to calculate the actual exchange rate.

$$X = f(RER, GEX, OIL, OPN, IP, TOT, WIR)$$

In which, PER equates with actual exchange rate, GEX is governmental expenses from GDP, OIL is ratio of oil income to GDP, OPN is the amount of the economic freedom, IP means rise of industrial production index, TOT is exchange relations, WIR equates with exchange rate of the commercial partners (as a substitute for the world exchange rate).

GEX (the governmental expenses from GDP): if the government spends more on non-commercial products, the excess demand for this sector will lead to increase of non-commercial products. As a result, the actual exchange rate will be decreased. To study this subject, ratio of the governmental expenses to GDP has been used as it follows:

$$GEX = \left(\frac{EGEX}{GDP} \right)$$

In which, GDP is Gross Domestic Product and EGEX is governmental expenses.

OIL (Ratio of the oil income to GDP): Increase of the oil income will increase demand for all the commercial and non-commercial products. As there is less demand for non-commercial products over a short period and there is more demand for commercial products, price of the non-commercial products will be higher rather than the commercial products. This situation will decrease the actual exchange rate. The following formula has been used to study effect of the oil income on the actual exchange rate:

$$OIL = \left(\frac{Ioil}{GDP} \right)$$

Ioil is oil income from oil export and GDP is Gross Domestic Product.

OPN (Open Economy): 'Commercial boundaries' is one of the significant factors which have impact on the actual exchange rate. It also could be effective on

the actual exchange rate over the long period. Imposing tariff on importing the different products is one of these boundaries. Decrease of the tariff will decrease internal price of the imports and resulting in increase of the demand for imports.

Increase of the imports will lead to the external imbalance, the external missing balance. It will decrease the external sources and wealth of the central bank. Accordingly, if we suppose Marshall Lerner condition is right to keep balance of the external sector of economy the actual exchange rate needs to be increased. To specify effect of the commercial politics (import tariffs and export subsidies) on the actual exchange rate, the following formula should be used:

In which, VX is Export Value and VM Import Value.

(Exchange relations): Commercial shocks have impact on the actual exchange rate through TOT, their effect on the relative prices. Commercial exchange relations are based on the ratio of index of the export product prices to index of the import product prices. External changes of the exchange relations, such as its improvement, will decrease the actual exchange rate. The following formula has been used to show effect of the exchange relations on the actual exchange rate:

$$TOT = \left(\frac{XUV}{MUV} \right)$$

In which, XUV is export price index and MUV is import price index.

(Productivity change LPRO): Changes in Productivity resulting from technical improvement has impact on the actual exchange rate. In order to show this effect, variable of the industrial production growth has been used as ratio of the industrial production over a year to the production over the year before (Chang and Ordon 2007).

$$LPRO = Ln \left(\frac{IP_t}{IP_{t-1}} \right)$$

The actual interest rate (WIR): The world interest rate is a variable which reflects the effect of world changes on exchange rate of one country. If the actual interest rate becomes higher than the actual exchange rate in the country, Input trend will be decreased and the actual exchange rate will be increased. To study effect of the world interest rate on the actual exchange rate of Iran, the actual interest rate of the commercial partners should be used:

$$WIR = NIR - \left(\frac{CPI^S - CPI^S_{-1}}{CPI^S_{-1}} \right)$$

NIR is Nominal interest rate of the commercial partners.

As four variables are the first degree variables and

long-term relations between variables, VECM is suitable to calculate the equal exchange rate. To calculate long-term level of the actual exchange rate, Time series techniques have been used to estimate model and regression has been calculated. Afterwards, continual and stable amount of the fundamental variables have been calculated by HP and fit with the related regression. Therefore, result (actual exchange rate) could be calculated through this method (the long-term equal level).

$$\sum_{t=1}^{T}\left(x_t - \mu_t\right)^2 + \lambda \sum_{t=2}^{T-1}\left[\left(\mu_{t+1} - \mu_t\right) - \left(\mu_t - \mu_{t-1}\right)\right]^2$$

HP and BP filter could be calculated by minimizing total deviation squares of the time series variable (X_t) out of it trend (μ_t). In other words, the HP and BP filter values are ones minimizing the following formula:

In which, T is observation numbers and λ is balance factor which signifies trend stability (Hodrick–Prescott, 1997).

Results

The following table shows result of VECM model to calculate the actual exchange rate.

Table 2. Result of VECM model to calculate the actual exchange rate

Year	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Actual exchange rate	3394	3189	3005	2717	2318	2325	2049	2077	2041	1733	1262	890
Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Actual exchange rate	687	591	557	498	9358	8736	7990	5491	4630	4022	3369	3062
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	-
Actual exchange rate	2769	2681	1185	10025	9647	9266	8817	7996	7154	6903	7200	-

Resource: Research findings

Therefore, the exchange rate and the other variables could be used in order to signify factors affecting export of the agricultural products from Iran to Armenia. The following table shows result of the VAR model.

Table 4. Result of VAR model to signify factors affecting export of the agricultural products from Iran to Armenia

LARINF	LEXCH	LIRINF	LARGDPCU	LIREX	
-0.184018	0.832753	0.007551	-0.111265	-0.549272	LIREX(-1)
(1.70354)	(0.38817)	(0.43386)	(0.14938)	(0.38175)	
[-0.10802]	[2.14535]	[0.01740]	[-0.74486]	[-1.43884]	
0.379969	-0.028275	-0.081457	0.959387	0.285803	LARGDPCU(-1)
(0.74455)	(0.16965)	(0.18962)	(0.06529)	(0.16685)	
[0.51033]	[-0.16666]	[-0.42957]	[14.6948]	[1.71296]	
0.172411	-0.878124	0.194462	-0.723038	-0.125375	LIRINF(-1)
(2.53977)	(0.57871)	(0.64683)	(0.22270)	(0.56914)	
[0.06788]	[-1.51738]	[0.30064]	[-3.24663]	[-0.22029]	
0.459864	0.556718	0.010494	0.222922	0.57594739473	LEXCH(-1)
(1.26972)	(0.28932)	(0.32337)	(0.11134)	(0.28453)	
[0.36218]	[1.92425]	[0.03245]	[2.00222]	[2.02419]	
-0.018051	0.035806	0.051041	0.062311	-0.085181	LARINF(-1)
(0.72400)	(0.16497)	(0.18439)	(0.06349)	(0.16224)	
[-0.02493]	[0.21704]	[0.27681]	[0.98151]	[-0.52503]	
-9.940026	-1.213537	3.771468	2.060950	14.44136	C
(20.7439)	(4.72670)	(5.28310)	(1.81897)	(4.64852)	
[-0.47918]	[-0.25674]	[0.71387]	[1.13303]	[3.10666]	
0.172374	0.742692	0.132457	0.985793	0.527383	R-square

Obviously, LARGDPCU variable is logarithm of GDP variable of Armenia to the external currency and LEXCH is logarithm of the actual exchange rate, which all have positive impact on export of the agricultural products from Iran to Armenia (LIREX). On the other hand, logarithm of the inflation rate of Armenia (LARINF) and logarithm of the inflation rate of Iran (LIRINF) variables do not have a meaningful effect.

Suggestions

Regarding the inappropriate relations which Armenia has had with its neighbours, except from Iran, over the last years, refinement of the internal economic system could improve the exportation from Iran to Armenia. If we aim to use this potential, there is a need to identify factors affecting export of the agricultural products from Iran to Armenia.

The actual exchange rate between 1999-2010 has been calculated and it signified factors affecting export of the agricultural products of Iran. The actual exchange rate was more than the nominal exchange rate, and it also has positive effect on the export. Therefore, the increase in the exchange rate could be justifiable in order to increase export from Iran to Armenia.

It seems that the Iran government has kept nominal exchange rate lower than the actual exchange rate, in order to keep purchasing power parity of the importers. While, practically this policy has a negative impact on the exportation of Iran. The results acknowledge the theory. GDP of Armenia has a meaningful impact on exportation of the agricultural products to it. Therefore, if Iran invests in Armenia in order to increase its GDP, it will increase the agricultural products exportation from Iran to Armenia.

As a whole, there are some policies could be useful to increase exportation from Iran to Armenia; two policies such as increase of the nominal exchange rate and raise it up to the actual exchange rate and provide a context for the foreign investment in Armenia.

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