

The impact of Trade Liberalization on the growth of agricultural sector in The Islamic Republic of Iran

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Abstract: The research attempts to study the impact of trade liberalization and resulting factors on the growth of agricultural sector. We used in this paper, Solow's model is determined for the economy of Iran with the assistance of subject literature and the anticipation is accomplished for the future with the contribution of econometric methods VECM, VAR. Modern theories of growth, protecting the matter of positive impact of the trade liberalization on the growth of agricultural sector. But we explore that: Trade liberalization in the early period possess negligible effect on the agricultural growth section. The results of long-term analysis can be indicative of negative and also the less effects in trade liberalization on agricultural section production.

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Introduction

Explanation of the affair:

Globalization is a developing process which involves all the social, Economic and political arenas and in economic areas, consists of integration and conjunction of the national economics with the deployment of trade and market economies. The main instruments of liberalization is the elimination of trade barriers such as quota and other non-tariff barriers (NTBs) and to tariff the omitted trade barriers together with gradual reduction of the tariff and deduction of export subsidies.

The vulnerability of agricultural products in the arena of globalization, competitive pressure of price reduction, the rate of food products & raw material exchange, compared with the industrial products indicates the status and susceptibility of the support in this sector and makes it more visible and obvious.

In the countries like Iran, holding medium incomes, the contribution of the agricultural sector in Gross Domestic production has been reduced to some extent. Although agriculture is mostly counted as undeveloped, but the reality is that it provides several opportunities to improve technology. Agriculture while preserving related importance in the economic growth, plays a significant role in countries holding medium incomes in respect with social justice and distribution of the income.

The necessity of accomplishing the research:

Nowadays different countries of the world, are following after increasing the abilities of national economics and struggle to increase their own bulk of foreign trades, to exploit the advantages. Trade liberalization is one of the effective factors which is forcible in the foreign trade discussion and related augmentation. On one hand, the specific significance of Agricultural sector in Iran, producing different varieties

of the crops and their exports; and on other hand, the better as possible interactions with the world economics and the globalization of economics reveals the necessity of pertinent transaction accomplishment.

Fundamental aim and method of the research:

The aim of this paper, is to study the relation of trade liberalization with the growth of agricultural sector in Iran which considers about financial phenomena and liberalization due attention. Thus, in this research, Solow's model is determined for the economy of Iran with the assistance of subject literature and the anticipation is accomplished for the future with the contribution of econometric methods VECM, VAR.

Trade liberalization in the Agricultural Sector

The Uruguay Round and Doha Round

Agricultural trade liberalization on international level was introduced into the GATT in 1986 during the Uruguay Round. One of the most remarkable agreement negotiated in Uruguay Round is The Agreement of Agriculture (AoA). The mission of AoA was to remove agricultural trade barriers, open up markets, alleviate subsidies and include the highly protected agricultural sector into the free market. Its long term objective was to establish "a fair and market-oriented agricultural trade system through substantial progressive reductions in agricultural support and protection." [13]

The Doha Round started in 2001. The Doha Development Agenda (DDA) emphasizes the significance of the amalgamation of developing countries and supporting the least developed among them. The main feature of the new round of negotiations was the diminution of the export subsidies- with a view to phasing out- the improvement of market access, and the substantial reduction of the trade twisting domestic support.

The major provisions of the agreements fall into three categories: Market Access, Export Competition, and Domestic Support categories.

Background Research

Roberto Chang et al[9] (2005) in their article explained how the effect of trade openness on economic growth depends on complementary reforms and used a simple Harris-Todaro model. They find that the growth effects of openness are positive and economically significant if certain complementary reforms are undertaken.

Susan Senior Nello[11] (2007) has elaborated the role of agriculture in determining many of the controversies and problems of the current phase of globalization. This first entails presenting key statistics indicating the main developments in world agricultural trade, illustrating how there has been a relative deterioration of the export performance of developing countries.

John Romalis[5] (2007) in a study investigated the causal effect of openness to international trade on growth using tariff barriers in the United States as instruments for the openness of developing countries. It was stated that trade liberalization by a large trading partner causes an expansion in the trade of other countries. Trade expansion induced by greater market access appears to cause a quantitatively large acceleration in the growth rates of developing countries.

Sang-Wook (Stanley) Cho and Juli'an P. D'iaz[10] in their paper discussed that the potential effects of two ongoing trade liberalization experiences: Ecuador signing a Free Trade Agreement with the United States and Slovenia joining the European Union as a full member. The paper finds that different forms of trade liberalization have different implications on the patterns of trade and welfare.

Besides, in another paper, published by Tengku Mohd Ariff[12] and et al in 1999 defined that the effects of agricultural trade liberalization are analyzed from two main Perspectives. The first is from a commodity perspective, where consumers' and producers' welfare were evaluated. Subsequently, the study analyzed the effects of liberalization on the farmers involved with the commodity.

In the same way, a paper written by Xiaohe Liu[15] in 2007. The results from this study could be of great value for policy makers to identify courses of action for enhancing the positive income distributional outcomes and reducing any unfavorable effects from further changes in trade policy.

The paper "Trade Liberalization and Agriculture: Does it Ensure Food Security and Food Sovereignty in Developing World?" published by Ataharul Huq Chowdhury[1] in 2008 declared that free trade policy promoted by WTO worldwide in developing world.

In the same manner, Rizwana Siddiqui[8] (2007) illustrated that Pakistan is an agrarian country. A larger proportion of its exports are agro based. Higher agriculture trade is expected to contribute larger to growth of agriculture as well as non agriculture sector due to strong linkages between agriculture and non agriculture economies. The objective of the research is to examine the growth effects of liberalized trade.

In an article published by M. Bruna Zolin[6] (2008) explained that in the trade policy debate, the complete liberalization of world trade for agricultural products is one of the most relevant issues. The elimination of trade barriers among the EU member states has achieved European self-sufficiency in food and a strong integration in the European market.

The process of trade liberalization in Iran

Liberalization is an undeniable trend these days which countries cannot evade that. It will effect on all aspects of economics in the world. As about 150 countries have signed up as WTO members now, the world seems set for further trade liberalization. Iran boasts the world's third largest petroleum reserves and the second largest gas reserves. Iran's economic growth was slow in 2009, owing to the decline in international oil prices in late 2008, domestic economic mismanagement, and limited oil revenue savings to weather the recent global economic turnaround.[3]

During the 20 last years, economic growth was driven by government spending on priority sectors, expansionary monetary and fiscal economic policies, increased growth in credit, and private consumption. Iran's international relationships have faced a lot ebb and flow so that its efforts to reform its economic structures have not been welcomed internationally. As a result, the internal trend of reforms has encountered with instability as well. Simultaneously a great portion of the paid subsidies here goes to urban consumers not to rural producers.

Economic Sectors

Iran's economy has a number of key sectors. In 2008, the oil sector which includes oil and gas, petrochemicals, represented about 28% of the Iran's GDP. The services sector, including financial services, estimated 46% of Iran's economy. Industry includes steel, textile, and automotive manufacturing represented about 18% of the Iran's GDP. Agriculture constituted about 8% of Iran's economy. Agriculture continues to be one of the economy's largest employers, representing 22.8% of all jobs in 2007 [14]. Iran's economic sectors remain heavily dominated by the state, but there are some privatization efforts under way.

Economic Policy and Reform Efforts

Significant strides toward trade liberalization, economic diversification, and privatization since 1997. The government introduced some structural reforms

such as tax policy changes and adoption of new foreign investment laws to promote Iran's global market integration and attract investment. Iran shifted to a unified managed float exchange rate system in March 2002. [7]

Since 2005, fiscal and monetary policy has been expansionary. The government provides extensive public subsidies on gasoline, food, energy and housing. In addition to subsidies, the government has provided cash handouts to the poor. In January 2010, the legislation reduces state subsidies by \$20 billion. A goal of the reforms is to reduce overconsumption. The government has provided low-interest loans for agriculture, tourism, and industry and has instituted loan forgiveness policies. Other activities include the creation of a number of social programs to assist farmer and rural residents.

In 1995, Iran asked to join WTO, but the accession to be delayed till in 2005 and through nuclear negotiations with EU, Iran was accepted as an observer member in WTO. Today, Iran is the biggest observer economy in the WTO. It is 204 percent bigger than the next economy, i.e. Algeria and 790 percent bigger than Syrian. (WTO, Trade Profiles 2009)

Accession to the WTO is a stated priority of the Iranian government. The United States repeatedly blocked Iran's bids to join the WTO over concerns about Iran's nuclear program and support for terrorist activities. On the other hand, many European Union countries and developing countries have supported Iran's accession.[2] However, the most recent negotiations for accession have ceased because of political reasons and Iran continues to not be a member of the WTO.[4]

Analyses And Results

Aspect of Research Innovation

Limited researches has conducted on the effects of liberalization on agricultural productions. But, so far, Solow's model has not considered based on this analysis. It should be noted that, Solow's model is more capable in conformity with the actual situation of the developing countries economy. So, this research compared to other models can provide better results. In addition, in connection with the applied econometric techniques, should said that, the other studies have been attempted to station the nonstationary time series of model. (Rahmati&esmaeili,2007).

This difference, will make that, variables not examine in level, and this makes to lose some information about long-term behavior. In some studies, a simple econometric models such as OLS have been used that require to stationary variables by taking first difference. Thus, in total, can be said : The present study in terms of modeling based on Solow's model, and also applied econometric methods VECM ,VAR, has been

differentiated from done researches and this can be considered as a new work.

Importance of The Topic

An agricultural section has a special and important positions in the economy of many countries including Iran. Particularly, in Iran, this section is one of the powerful sections of country in GDP, which about 20 % of GDP, about 3.5 percent of economy s total exports and 20 and 22.7 percent occupation and Iran's non-oil export respectively has been allocated to it. In addition, an agricultural section is supplier of a noteworthy section of employment in the country. On the other hand, this section in Iran, placed over a period of transition from traditional method to modern methods, which led to communication this section with other economic section of country. Thus, considering to the raised issues, this section by economic policymakers should be considered. But, today, one of the issues, which is considered by an economists and policymakers, is Trade Liberalization. "In general, the trade liberalization process, is obtaining the interests, resulting from the development of international exchanges. (Tayebi & Mesrinejad, 2007). Indeed, Trade liberalization through the establishment of foreign competition can lead to development of exports and improving productivity. Also through Trade liberalization, technology can be improved and achieved to the economy of scale (Mesrinejad & Ebrahimi, 2006). In addition, it should be noted that, WTO (world Trade Organization) which the large part of trade allocated to it, and many countries have been joined to this organization, or in adhering to it. Indeed, the globalization of trade is like a train that, in each time the speed will increase. Iran considering external and internal conditions is in joining to WTO.

Now considering the mentioned contents, the importance of the study of trade liberalization impacts in agricultural section productions can be realized. Because, on the one hand , liberalization of a process is inevitable and the other side, an agricultural section is very important section in Iranian economy. what should be added to above contents, is that, the mentioned relationship should be examined, in a close framework to the growth model of developing countries . Thus, in this study, the Solow's Model is used for modeling.

Stipulates of Model

As mentioned, a basis for modeling in this study is Solow's model . Hence the production function :

$$Q = AK^\alpha L^\beta \quad (1)$$

Can be said that, the research variables are, agricultural section production, Active population, Capital Stock, the government size in both developing and current section and Degree of trade freedom. It should be noted that the basic equation of Solo's model is shown following:

$$\Delta k = sy - (\delta + n)k \tag{2}$$

Where $k = K / L$ capital per capita worker, n the population growth rate, δ the depreciation rate of capital stock, y production's per capita labor, and s is the amount of savings in each period.

Active population (AP)

Given that agriculture section is a user section, therefore, expected that active population should have an effective role on this section products. Specially in Iran, that this section is in transition toward to modernization of production. In fact, Solow's assumption, is that, the effective factors of production are capital and labor. That in this study, active population is intended as a substitute for labor.

Capital Stock(K)

The other variable which Solow considered, is the amount of capital. Indeed, the accumulation of capital, will have a positive impact in increasing production of each worker.

Government Size in both Developing and Current Sections(GDC,CGE)

Government expenditures will generally placed in the fields of developing and Current. Ratio of developing and current costs of government to GDP, both have been another explanatory variables which have been entered into the model.

On the other hand, the current budget can show its inflationary effects, and thus, affects on the production of agriculture. Developing budget by directing towards the infrastructure of agricultural section in the development of transport, can help to the production growth of agricultural section.

Trade Liberalization(TL)

As described earlier, trade liberalization is an inevitable process and is effective on production growth of various economic sections, including the agricultural section. In fact, by entering this variable, are following to find a solution for a basic question in this research, namely, how the impacts of trade liberalization in agricultural sections products. Indeed, it should be examined, whether, liberalization is more in favor of agricultural product's import or in favor of agricultural product's export in Iran? It should be noted that, the replaced variable of Trade liberalization, is the degree of commercial freedom, which based on definition include: the ratio of total export and import to GDP.

Time series of all variables has been annual form in (1984-2008) period and has been extracted from central bank internet base. All variables, in the form of logarithm have been entered to model. For preventing from false regression unit root test has been done for variables of model. According to results of these tests, all variables of model are in a stationary first degree. Means that, by making difference, it has not unit root and are stationed.(Table 1)

As mentioned earlier, the VAR approach will be used to analyze the relationship Trade Liberalization on agricultural section production. In VAR procedure, variables are written in matrix form, and by multiplying equation 2 in C^{-1} , can reach to a general equation like equation 3.

$$(3) \begin{pmatrix} c_{11} & c_{12} & c_{13} & c_{14} & c_{15} \\ c_{21} & c_{22} & c_{23} & c_{24} & c_{25} \\ c_{31} & c_{32} & c_{33} & c_{34} & c_{35} \\ c_{41} & c_{42} & c_{43} & c_{44} & c_{45} \\ c_{51} & c_{52} & c_{53} & c_{54} & c_{55} \end{pmatrix} \begin{pmatrix} gdp \\ oilp \\ exr \\ cpi \\ m_2 \end{pmatrix} = \begin{pmatrix} b_{10} \\ b_{20} \\ b_{30} \\ b_{40} \\ b_{50} \end{pmatrix} + \begin{pmatrix} b_{11} & b_{12} & b_{13} & b_{14} & b_{15} \\ b_{21} & b_{22} & b_{23} & b_{24} & b_{25} \\ b_{31} & b_{32} & b_{33} & b_{34} & b_{35} \\ b_{41} & b_{42} & b_{43} & b_{44} & b_{45} \\ b_{51} & b_{52} & b_{53} & b_{54} & b_{55} \end{pmatrix} \begin{pmatrix} gdp_{t-p} \\ oilp_{t-p} \\ exr_{t-p} \\ cpi_{t-p} \\ m_{2t-p} \end{pmatrix} + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \\ \varepsilon_5 \end{pmatrix}$$

Or

$$C_{3*3}Z_{t3*1} = \Gamma_0 + \Gamma_1 Z_{t-1,3*1} + \varepsilon_{t3*1}$$

$$Z_t = D_0 + D_1 Z_{t-1} + e_t$$

Furthermore, in these models, explanatory variables exhibiting strong multicollinearity with each other, and so, T statistic relating to individual

coefficients, does not count as a reliable tool for deletion or reducing variables.(ENDERS, 2004, P.270).

After entering data, the test of optimal lag number was performed, according to HQ,SC,AIC,FPE,LR indexes. According to statistics LR and HQ and SC one lag and based on statistics AIC and FPE two lag confirmed.

Table 1 - Grade accumulation of model variables

		t-Statistic	Prob.*	Accumulation degree
Active Population Logarithm				I(1)
Augmented Dickey-Fuller test statistic		-3.137343	0.0337	
Test critical values:	1% level	-3.65373		
	5% level	-2.95711		

	10% level	-2.617434		
Ratio logarithm of Current expenses to GDP				I(1)
Augmented Dickey-Fuller test statistic		-5.764545	0.0000	
Test critical values:	1% level	-3.646342		
	5% level	-2.954021		
	10% level	-2.615817		
Ratio logarithm of development expenses to GDP				I(1)
Augmented Dickey-Fuller test statistic		-6.589109	0.0000	
Test critical values:	1% level	-2.636901		
	5% level	-1.951332		
	10% level	-1.610747		
Logarithm of liberalization degree				I(1)
Augmented Dickey-Fuller test statistic		-5.939562	0.0000	
Test critical values:	1% level	-2.636901		
	5% level	-1.951332		
	10% level	-1.610747		
Logarithm of capital stock				I(1)
Augmented Dickey-Fuller test statistic		-2.947978	0.0045	
Test critical values:	1% level	-2.636901		
	5% level	-1.951332		
	10% level	-1.610747		
Logarithm of agricultural products				I(1)
Augmented Dickey-Fuller test statistic		-6.261840	0.0000	
Test critical values:	1% level	-3.646342		
	5% level	-2.954021		
	10% level	-2.615817		

It should be noted that, in this research to determine the optimal interruption length, AIC and FPE has been used. According to these two Tests,

model should be possessed two interrupt. Considering the number of optimal interruption, VAR model is estimated as follows:

$$\begin{aligned} \log AGRI = & -1.054 + 0.062\log AGRI(-1) - 0.077\log AGRI(-2) + 0.097\log GDC(-1) \\ & + 0.04\log GDC(-2) + 3.693\log AP(-1) - 2.412\log AP(-2) - 0.166\log CGE(-1) - 0.243\log CGE(-2) \\ & + 0.005\log TL(-1) + 0.004\log TL(-2) - 0.727\log K(-1) + 0.656\log K(-2) \end{aligned}$$

The effect of Shock on the variable of added value of agricultural sector on of variable TL Using Impulse response function .

By using VAR estimation ,can be gained the Impulse response function , in the form of following diagram and tackles to description it .

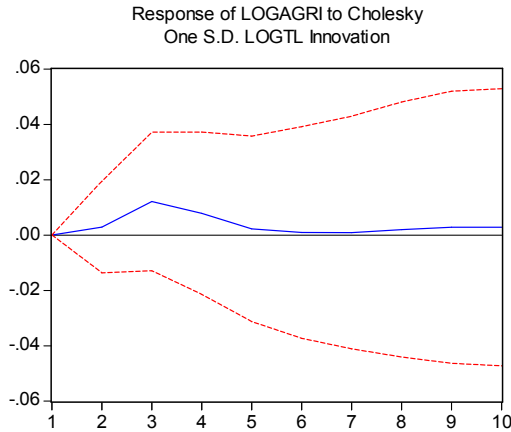
The Effect of an incoming shock logAGRI variable on LogTL

If a shock, enter in the logAGRI variable, according to following shape , its effect were positive and its effect in the first period is about 0%. The effect of this shock is increased about 0.01% at the third periods. In other words, Trade liberalization in the early period possess negligible effect on the agricultural

growth section . The effect of this shock at the third period until the tenth period is very negligible and zero.(0.002%)

Vector Error Correction Model(VECM)

The concept of error correction mechanisms, first, has been used by Phillips in 1957 . In his interpretation, the Error correction model, are method of adjusting policy tool, in order to approaching target variable to its desirable amount. In other words, these models can determine the method of adjusting control variable with regard to error deviation or imbalance in situation's variable.



Graph 1: Response log AGRI to log TL

The last interpretation of ECM, by Granger and colleagues is presented based on accumulation's analysis. ECM, shows the adjusting system variables, in the short term (relating to imbalance) for achieving long-term equilibrium relationship. Indeed, if no

$$\log AGRI = 0.321 \log GDC + 1.189 \log AP - 0.564 \log CGE - 0.029 \log TL + 0.352 \log K$$

(13.8) (14.14) (18.21) (6.63) (7.13)

Results:

In this section the results of long-term estimation and error correction relationships, that respectively there are in Tables 2 and 3, has been analyzed.

Trade Liberalization:

The results of long-term analysis can be indicative of negative and also the less effects in trade liberalization on agricultural section production. It can be said clearly: The institute of agriculture doesn't influence Iran's trade balance, therefore, the liberalization effects in negative form affect on the agricultural products . It seems that, the agricultural product's import in the long-term can fulfill negative impact on agricultural production. In other words, Trade Liberalization has been more beneficial to agricultural product's import; consequently, this situation in the long run will undermine the agricultural section . Of course, the low coefficient of this variable

mechanism are there, that variables with regard to imbalance (deviation from long-term balance relationship) be adjusted, such relationship in long-term doesn't establish between variables, so, integration needs ECM.

Indeed ,VECM model is a VAR model with restriction. These restrictions, in fact are phrase relating to the long-term relationship of Johnson.

For analyzing long-term impacts of present variables in model, one Vector Error Correction Model (VECM) for this economic model has been estimated , to support, the impacts of variables in short-term and long-term are compared . Based on the obtained results of Test of Number of Cointegrating Relations, the number of 2 to 3 co integrated vector are confirmed for VECM model . So we can say that at least one co integrated vector is used in the estimation of the VECM model. consequently, the VECM model is estimated, that the estimation's results based are as follows:

arises from the presence of some agricultural commodities in the export section, that partly decrease the effect of liberalization on production.(**Table2**)

Table2 -Relationship integrated equation of Johnson

LOGAGRI	LOGGDC	LOGAP	LOGCGE	LOGTL	LOGK
1	-0.321	-1.189	0.563	0.029	-0.352
Se	0.023	0.084	0.030	0.004	0.049
t-statistic	-13.8	-14.14	18.21	6.63	-7.13

It should be noted that, all values coefficient at 99%level has been significant. At the end of this section , it should be added that the results of error correction model shows that, in each time series,-0.7 are corrected from imbalances toward to long-term. (Table3).

Table 3 - Results of Vector Error Correction Model

Dependent Variable	CointEq1	D(LOGGDC)	D(LOGAP)	D(LOGCGE)	D(LOGTL)	D(LOGK)
D(LOGAGRI)	-0.700	1.290	0.031	0.098	-20.890	0.167
Se	0.158	1.098	0.054	0.541	5.300	0.101
t	[-4.432]	[1.175]	[0.568]	[0.182]	[-3.941]	[1.646]

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