

Agricultural impact on economic growth in Iran using ARDL approach co integration

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ABSTRACT: This paper tries to study the role of agriculture on economy growth in Iran using Microfit software, and some other techniques available for evaluating econometrics. To this end, first the Dickey-Fuller GLS (DF-GLS) test and then the ARDL cointegration test were applied respectively to study the stationarity and long run and equilibrium relation of the pattern variables. The results indicate that there is a long run and equilibrium relation between the variables and according to this fact, the long run relationship was estimated. The results were totally as expected in the theories and statistics in Iran and the value added variables in agriculture, services, mine and industry and oil sectors had a positive and meaningful relationship to economical growth. The economy growth rate is 0.09 percent per agricultural value added growth, and among these variables the effect of services sector is much more than the other variables, and agriculture's contribution to economic growth is negligible. In addition, Error Correction Model (ECM) has been used to investigate the relation between short and long run fluctuations in economic growth.

Keywords: Agriculture, ARDL approach Cointegration, ECM Model, Economical Growth, Iran,

INTRODUCTION

During the past decades about agriculture role in the economic growth and economic development, different points of view had been given. In the basis on these points of view, the agriculture sector has been changed from inactive role in the past decades to the active and dynamic role in the recent decades. How that nowadays, the standard point of view is that the agriculture sector has the main importance in the economic development and economic growth; it needs more attention specially in the foodstuff and raw materials presentation, not withstanding, its share is reducing in the engagement and in the Gross National Product (GNP). The importance of agriculture sector increases in parallelism of urbanismity development. Because, with economic growth and income increase, the requirement is also increased for high in protein of materials. Although, the domestic products can not respond to this requirement, the society will have to devote the rare internal foreign exchange to the agricultural crops imports.

The foodstuff increase which are presentable to the towny markets in the developing countries, is very important. First, the towny consumer population in these countries is increasing quickly because of engagement development in industry and other non-agricultural activities. And second, the final tendency of consumption is high in the these population because of nutrition level is fallen. And many part of income is used for foodstuff. Finally, the industrial level wages and other non-agricultural jobs are related to the foodstuff distribution can not increase with request at the same time, the price of foodstuff is increased. And at the end, its pressure on industrial wages and inflation, reduce the agricultural productions finally; it causes the lag of economic growth. In addition of foodstuff distribution, the agriculture sector can help to the development and splendor of the portable industries (such as: loom industries, wool-spinning, carpet-weaving, and lump sugar production, etc) in the developing countries. Moreover, production increase, and distribution of these materials, decrease the expense of producing these industries. And it prevents from imports of raw materials for these industries. And of course, if we have mass production, we can export its surplus. In addition, the economic growth can be also achieved.

The agriculture has also a lot of capacities in Iran that should proceed to them .The agriculture is always mentioned as growth and development axis .So , the economic growth of developing countries has near relations with total development of agricultural sector .

Ghatak & Ingersant (1984) have demonstrated that according to Solo model the agriculture contributions to development is regressive and it has a very low impact in the ending stages of the development; the gross production proportion between the non-agriculture sector and agriculture sector is highly dependent to the country's development degree, and it is a bit higher in developed countries and the growth rate in non-agriculture sectors are higher than the agriculture sector's.

By reviewing the relationship between agriculture sector and economy, Erh-cheng (1988) came into this conclusion that agriculture has a great positive impact on economic growth through influencing the Total Factor productivity.

Fat'Hi (1993) also reviews Iran's agriculture sector role during 1974-1990 using the Kuzentes formula. According to these results, it was indicated that, unlike the usual, the agriculture sector growth rate unlike other sector's growth rate, was increasing. Samadi (1999) also confirmed this fact.

Steven (1999) made a four phase numerical simulation model to review agriculture's sector growth on other economy sectors in Ethiopia. The sectors reviewed in his model are as followed: Agriculture, Services, traditional Industry and modern Industry. Then Steven calculated the macroeconomic growth coefficients in Agriculture, Services, traditional Industry and modern Industry sector by shocking the incomes, and used the estimation model. The results of his studies indicate that the agriculture sector has the highest growth coefficient after industry sector.

Haji rahimi and Torkamani (2003) tried to review the role of agriculture in Iran's economic growth and the results showed that service sector's value added, private sector's investment in agriculture, government's investment in agriculture, oil sector's value added and technology developments had a positive and meaningful relation and terms of trades had a negative meaningful relation to agriculture sector's value added.

MATERIALS AND METHODS

As it is mentioned this article reviews the agricultural impact on economic growth in Iran using ARDL approach cointegration. In order to do the data analysis and estimations we have used Microfit software. we will introduce the variables and model structures

Variables

This mould variables are as followed:

GDP= Gross domestic product with stable price 100=1376 (Billion Rials)

AVA= Agriculture value added with stable price 100=1376 (Billion Rials)

SVA= service sector value added with stable price 100=1376 (Billion Rials)

IVA= Industry and mining sector value added with stable price 100=1376 (Billion Rials)

OVA= Oil sector value added with stable price 100=1376 (Billion Rials)

These variables are extracted from Islamic republic of Iran's central bank statistics for 1959 to 2010.

Mould structure

According to researches done by Johnston & Mellor (1961) and Delgado (1993) the following mould is taken into consideration.

$$\text{Log(GDP)} = \beta_0 + \beta_1 \text{Log(AVA)} + \beta_2 \text{Log(SVA)} + \beta_3 \text{Log(IVA)} + \beta_4 \text{Log(OVA)} + u_t \quad (1)$$

In other words this mould is as followed.

$$\text{LGDP} = \beta_0 + \beta_1 \text{LAVA} + \beta_2 \text{LSVA} + \beta_3 \text{LIVA} + \beta_4 \text{LOVA} + u_t \quad (2)$$

In the above function, LGDP, LAVA, LSVA, LIVA, LOVA are respectively logarithms for gross domestic product (economic growth), value added logarithm for agriculture, services, industry and mining and oil sectors.

RESULTS AND DISCUSSION

The stationarity test for the variables

One necessary step in estimating the regression mould and avoiding the false regression is to test the stationarity of these variables using the Dickey-Fuller GLS (DF-GLS) test, and the results are provided in table 1.

Table 1. Results for variable's stationarity test

| Variable | DF-GLS Statistic | Critical values |
|----------|------------------|-----------------|
| LGDP | -3.66 | -2.61 |
| | | -1.94 |
| | | -1.61 |
| LAVA | -8.73 | -2.61 |
| | | -1.94 |
| | | -1.61 |
| LSVA | -3.81 | -2.61 |
| | | -1.94 |
| | | -1.61 |
| LIVA | -6.18 | -2.61 |
| | | -1.94 |
| | | -1.61 |
| LOVA | -5.50 | -2.61 |
| | | -1.94 |
| | | -1.61 |

Source: Test results

According to these results all the variables were stationary during the first difference. But it is needed to assure that there is long run and equilibrium relationship between these variables.

Reviewing the variables cointegration

The cointegration survey between variables is one the cointegration methods of two – sided method of Engle Granger (E-G). This method is done by using from estimate method , Ordinary Least squares (OLS). The OLS method will not be presented because it does not consider the dynamic and short – time current reactions between model variables. In addition , OLS method is not reliable in the small samples in the based on researches of Philips & Durlauf (1986) .So , in order to estimate the long – run relations among pattern variables and dynamic analyzes ;It is suitable that use from Auto – Regressive Distribution Lag (ARDL).The optimum lag quantities are determined in this method by one of AIC , SC , HQ , scales .So , the stationarity survey of independent variables is not necessary .The results of long – run coefficients related to the variables in the form of ARDL pattern , are come in the table 2 .

Table2. The results of long-run estimate of economic growth function in ARDL estimate

| Variables | LOVA | LIVA | LSVA | LAVA | C |
|--------------|------|------|------|------|-------|
| Coefficients | 0.15 | 0.87 | 1.51 | 0.09 | 12.70 |
| t-Statistic | 2.07 | 5.55 | 3.80 | 2.01 | 3.28 |

Source : Test results

In the based on obtaining results , the mark of whole coefficients was pursuant to the expectation , and it has meaningful high level of security. So that , value added of variables of agriculture , services , industry & mining , and oil sectors have positive and meaningful relation with economic growth .And also , in recognition of one percent increase of value added of agriculture sector , in the average economic growth is increased 0.09 percent .So , regarding the results , the services sector has more effect on the economic growth in comparison with agriculture sector .And the share of agriculture sector is not remarkable in the economic growth .Before explanation of results , it is necessary that we assure from not being liar of regression which was estimated .For doing this , it is

vital to do cointegration test between the mentioned pattern variables .The calculation procedure of statistic of cointegration test in the ARDL method is as followed :

$$t = ((\sum \hat{r} - 1) / \sum \hat{s}) \quad (3)$$

In that \hat{r} which were the coefficients related to dependent variable with lag and \hat{s} are also the standard error related to them .This quantity with the given critical value by Banergy , Dolado & Master (1992) is compared in the clear level of security (for example 90 % or 95 %).If the obtaining amount is more than critical statistic amount , the cointegration is accepted .According to the obtaining results from dynamic estimates of calculated amount , this statistic equal to :

$$t = (0.24050 - 1) / 0.14444 = -5.26 \quad (4)$$

So that the absolute value of this quantity is more than the absolute value of critical value which was given by Banergy , Dolado & Master in the security level 90 % (nee - 3.64 quantity) ; So the non - existence of cointegration hypothesis between variables is rejected .And it can be inducted a long - run equilibrium relation which is among the pattern variables .

Vector Error correction mold (VECM)

In this mold we will review the move from short term fluctuations to long run and equilibrium. So each short term fluctuation is related to its long run value for different variables. In applied econometrics the error correction mold is available only when the variables are convergent. So the resulted equilibrium coefficient in this mold will show how well these fluctuations move to long run stationarity. In this survey the economic growth adjustment rate is -0.75 which means %75 of the fluctuations will be corrected in short term. And this indicates high speed in economic growth error correction.

CONCLUSION

According to the computations done and the explanations made in this model, the following results are available:

The variables of this model were stationary in the first difference and they were confirmed to be true using the ARDL test for cointegration, as well as the presence of long run and equilibrium relation between the variables.

The results coincide with theoretical and statistical expectations in Iran .So that , the value added variables of agriculture , services , industry & mining , and oil sectors have positive and meaningful relationship in economic growth.

The coefficient of adjustment index is -0.75 by estimating ECM Model which shows the high speed of adjustment fluctuations in the economic growth in Iran .So that , 75 % of the mentioned fluctuations have been removed .

Considering the fact that this mold is a linear logarithm regression, the resulted coefficients show the elasticity of economic growth towards the independent mold variables.

The value added coefficient for agriculture sector is 0.09, which means in case all other variables are fixed, and the agriculture's value added is raised by one percent, the economic growth will increase with 0.09 percent. Which in comparison to other factors, services sector has greater effects on the economic growth, and agriculture's contribution to economic growth is negligible.

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