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# The Estimation of Agriculture Share in Economic Growth of Iran by Using OLS Method

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**Abstract**

**In this article we review the estimation of agriculture share in economic growth of Iran using Eviews 7 software, and current techniques in econometrics. In order to do so first we try to investigate the stationarity of the pattern variables using the Philips Perron (PP) test and after that we assure from stationarity of pattern variables. After this step, the long run and equilibrium relation between these variable were prompted using the Engle Granger cointegration test, and according to the results, the long run and equilibrium relationship exist between variables. Then the studied pattern was estimated by Ordinary Least Squares (OLS) estimate methods and the results confirm to theoretical and statistical expectations .So that the variables of value added of agriculture , services , industry & mining , and oil sectors have positive and meaningful relationship in economic growth. Regarding the studied pattern is a logarithm linear Regression. The coefficients represent the economic growth elasticity relative to value added of variables of agriculture, services, industry & mining, and oil sectors. And also, the economic growth elasticity relative to value added of agriculture sector is 0.09 which in regarding the results, services sector has more influence on economic growth in comparison with agriculture sector. Moreover agriculture sector share in economic growth is not remarkable. For assuring from non- existence of serial correlation and variance heteroskedasticity problem in the pattern , we have proceeded to two issues .The results are reported that two mentioned problems are not in the pattern .**

***Keywords:*** Agriculture, Economical Growth, Iran, OLS estimate method, Value added

## Introduction

The agriculture sector is usually an important economic sector of developing countries. Because production and preparing foodstuff and saving the major part of foreign exchange of country are the responsibility of this sector in many countries . regarding this sector has the great mass of employees , the progress of agriculture should be considered as one of the big economic / social goals . it is clear that any developing countries should be adjusted on economic features of country in estimating of importance agriculture sector at progress and development of every developing countries . Then we conclude and show the way . In based on historic , the agriculture sector has the major role in economic growth in the country from two ways :

- Increasing agriculture utilization
-Using agriculture surpluses

These subjects are related together , because utilization increasing usually causes that agriculture come out from a limited economic unit and changes to an economic unit which is dependent to market .

And from this step to another , agriculture surplus consists of human surplus , real surplus , and financial surplus . the aim of human surplus is that if agriculture sector stands near industry sector , the government can come out surplus forces from agriculture sector by planning . And step by step , put them in the industries .

By this way , in the other hand , it can provide industrial active forces and in the other side , it can increase capitation output by increasing utilization in agriculture sector. It is that removing cryptic unemployment in this sector . The aim of real surplus of agriculture sector is that side of agriculture productions which villagers do not use themselves. And they sell them by agriculture product brokers in the cities . So the real surplus when is created that farmers produce more than their necessity by increasing utilization in this sector .Real surplus usually is presented in two ways :

One of them is the basic foodstuffs , the other provides primal stuff industries . In the explain of financial surplus , it should be noted that by increasing income of employees of agriculture sector , these income are industrialized by government plans or in the form of tax or in the form of saving in the cities . So the agriculture sector can have so delicate relation with industry by three surpluses and it becomes infrastructure part of industry .So the increasing power of production in agriculture can have the main role in economic growth.

Although in the past century lots of efforts are made to develop Iran's industry , yet we find the agriculture to be the main branch in the economic activities among the citizens. Since the Islamic revolution agriculture was known as the main axis for development.

## Materials and Methods

As it is mentioned this article reviews the estimation of agriculture share in economic growth of Iran by using OLS method. In order to do the data analysis and estimations we have used Eviews 7. 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.

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

In other words this mould is as followed.

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

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 falseregression is to test the stationarity of these variables using the Philips-Perron test, and the results are provided in table 1.

Table 1. Results for variable's stationarity test

| Variable | Philips-Perron | |
|---|---|---|
| | Statistic | Critical values |
| LGDP | -3.93 | -3.56<br>-2.92<br>-2.59 |
| LAVA | -8.92 | -3.56<br>-2.92<br>-2.59 |
| LSVA | -4.27 | -3.56<br>-2.92<br>-2.59 |
| LIVA | -6.23 | -3.56<br>-2.92<br>-2.59 |
| LOVA | -5.44 | -3.56<br>-2.92<br>-2.59 |

Source: Test results

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

***Reviewing the variables cointegration***

Now regarding being stationarity of the pattern variables in the first difference, in the next step for estimating the long run relation among pattern variables, the below relationship has been estimated according to Johnston & Mellor ( 1961 ) and Delgado ( 1993 ).

$$LGDP = \beta_0 + \beta_1 LAVA + \beta_2 LSVA + \beta_3 LIVA + \beta_4 LOVA + u_t \qquad (3)$$

Then by using the results of error term , we have proceeded to investigating the mentioned variables cointegration that the results have been come in the table 2 .

Table 2 . Results for error term stationarity test

| error term | ADF[1] Statistic | Critical values | | |
|---|---|---|---|---|
| | | 1% | 5% | 10% |
| LAVA, LSVA, LIVA, LOVA | -7.45 | -2.61 | -1.94 | -1.61 |

Source: Test results

In based on the results of mentioned table , the error term is stationary for three assurance level : 90% , 95 % , 99% . So we can concluded that cointegration relationship are in the Engle Granger method between pattern variables .

***Serial Correlation LM test***

In the fact , this test is the Breusch – Godfrey test which was for determining and lack of the serial correlation problem , the error terms are used .The Durbin – Watson statistic is used for investigating first

[1.] Augmented Dickey-Fuller (ADF)

difference serial correlation that in this regression , the current statistic presents the lack of this problem in this pattern . And also , we can use the Breusch – Godfrey test for investigating serial correlation in the highest difference. The second difference of serial correlation is not in this regression in based on this test and according to F ,$nR^2$ statistic and quantities of prob calculated ( prob = 0.99 and prob = 0.99 ).

***ARCH LM test***

One of the commen tests in variance heteroskedasticity is the ARCH LM test .
In this test by using error terms squares of an auxiliary regression is estimated. And then by using two statistic F, $nR^2$ , we judge about existence and non- excistence
of this issue , according to the results and amounts of calculated Prob ( Prob = 0.25 , Prob = 0.24 ) $H_0$ is accepted. In the end , we can say that this pattern does not have variance heteroskedasticity problem .

***Model estimate***

Model in ordinary least squares method means OLS , then the serial correlation was removed by using the first difference Autoregressive Model ( AR (1)) and the first difference Moving – Average Model ( MA (1)) according to the below pattern has been estimated in the form of logarithm linear.

$$LGDP = \beta_0 + \beta_1 LAVA + \beta_2 LSVA + \beta_3 LIVA + \beta_4 LOVA + u_t \qquad (4)$$

$$LGDP = 2.55 + 0.09LAVA + 0.44LSVA + 0.19\ LIVA + 0.15\ LOVA \qquad (5)$$

$$t: \quad (5.15) \quad (2.91) \quad (12.60) \quad (8.42) \quad (14.75)$$

$$R^2 = 0.99 \qquad \bar{R}^2 = 0.99 \qquad D.W = 1.99$$

It is necessary to explain that in based on logarithm models , the obtaining coefficients for every independent variables show the economic growth elasticity relative to that variables. So the economic growth elasticity relative to value added of agriculture , services, industry and mining and oil sectors are 0.09 , 0.44 , 0.19 , 0.15 marshal .

## Conclusion

Regarding done calculations and remarks which reported in the mentioned model , the below results were achieved .

1-Model variables were stationary in the first difference. The existence of long run and equilibrium relation in cointegration test was confirmed by using Engle Granger method

2-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.

3-The calculations show $R^2$ = 0.99 . It means that 99 percent of economic growth changes have been explained by independent variables model .In econometrics discussions , the high level of $R^2$ coefficient is one of the best indexes of value model .

We had used the first difference Autoregressive Model ( AR (1)) and the first difference Moving – Average Model (MA (1)) for removing serial correlation .The Durbin – Watson (D.W ) equals 1.99 and the serial correlation problem has been removed .

4-Regarding the mentioned pattern is a logarithm linear regression , the coefficients present the elasticity of economic growth relative to the independent variables .

5-The value added coefficient of agriculture sector equals 0.09 , and it shows this point that by the thesis of fixing other variables , if the value added of agriculture sector is increased one percent , the economic growth will be increased 0.09 percent .From this view , regarding the results , services sector has more influence on economic growth in comparison with agriculture sector , and the share of agriculture sector is not remarkable .Also regarding t statistic among value added of agriculture sector and economic growth is the meaningful relationship.

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