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Examine the Relationship between Financial Development and Economic Growth with Emphasis on the Agricultural Sector in Iran

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ABSTRACT

Relationship between financial development and economic growth, particularly for developing economies is an important topic in macroeconomics and development in literature over the past decade. Iran's agricultural sector which allocated a major share of GDP to itself is a major sector. So the basic aim of this study is examining the effects of financial development on growth in agriculture. In this case the difference between Liquidity and the volume of money, and value-added agriculture and volume of money in the period 1976 to 2010 was used. Result of this study shows that there is no causal relationship between agricultural growth and financial development, but there is unidirectional causality relationship between agricultural growth and the volume of money and there is bilateral feedback causality relationship between financial development and volume of money.

Keywords: Financial development, Economic growth, VAR, Agricultural sector, Iran.

INTRODUCTION

Many developing countries are faced with the problem of capital shortage. Since capital accumulation is one of the most important sources of sustained economic growth of a country, there is possibility through the financial markets to accelerate the process of capital formation (3). In fact the existence and the main function of financial markets is establishing communication between the investors and depositor. Communication between these two categories of people can increase economic efficiency by the effects on product and economic supply and creating financial context for entrepreneurs. In Numerous studies on the relationship between financial market development and economic growth, it is expressed that the stock market development promote economic growth through its positive effects on capital flows, creating diversify in investment risk, Merge Budget for long-term industrial projects and liquidity (9). Advanced financial markets such as financial markets of advanced industrial countries control a considerable volume of financial capital in the economy. This market control incentive to saving and converting savings into investment with goal of capital formation and in this case have an important role in accelerating economic growth. (5) However, the relationship between financial development and economic growth in two basic approaches are discussed (10):

First point: has been established by Schumpeter (1911). Schumpeter pointed out the importance of money and credit in the economic development process and believes that financial development is essential for economic growth. In this view of the supportive role in promoting the growth of financial services and economic development have been emphasized.

This approach suggests that financial development is a factor for economic growth. In this case, the creation and development of new financial institutions is an important tool for capital accumulation and economic growth. On the other hand the development of the financial system also led to increased demand for financial services and scarce resources of small savings will lead to large investors and expands the financial sector and real sector of economy will grow.

The second view states that development of the real sector of economy increased demand for financial services and financial sector will lead to the development. This view first was emphasis by Robinson (1952). This hypothesis states that real sector growth has encouraged domestic financial markets and economic development will lead to a dynamic process. In some studies the negative role of financial development on economic growth has been stated. The results of these studies demonstrated that the development of financial markets, effect available funds for domestic manufacturers and the cause eliminating credit.

Generally, studies on the relationship between financial development and economic growth in different countries create different results. Some studies refer to causal relationship from financial development to economic

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growth[1], in some studies are referring to in relation in opposite[2]. Even the bilateral feedback causality relationship has also been reported in studies from different countries[3]. However, there isn't a consensus among economists about the impact of financial market development on growth (1).

Agricultural sector in Iran allocate a major share of GDP and is an essential part, so the aim of this study is the effects of financial development on growth of agricultural sector.

The main issue of this study is examining this subject that if there is causal relationship between growth of agricultural sector and financial development and if it exist, in which way?

Several studies conducted in different countries in this area that in continues we mention some of them.

Noula and Cletus Yah (2012) in their research examine the relationship between financial development and growth of agriculture sector in Cameron. This study using time series data from 1973 to 2009 and applying the Granger causality test. Results shows that there is no causal relationship or long-term balance between financial development and growth of agriculture sector in the Cameroon.

Eslamloueian and Sakhaee (2011) examine the causality relationship between financial development and economic growth in short and long term in the Middle East. Results showed that there is bilateral feedback causality between financial development and economic growth in the short and long term for these countries.

Ibrahim (2011) examine the relationship between stock market development and economic performance at the macro level in Thailand. In this study using quarterly time series data from 1993 to 2007 and results showed that the bilateral causality relationship between economic growth (real GDP) and the ratio of investment in financial markets (stock market development) exists.

Shahbaz et al (2011) in their study examine the relationship between financial development and growth of agricultural sector in Pakistan. This study was conducted by using time series data for the years 1971-2011 and VACM, ARDL Methods was used. The results suggest that financial development has positive and effect of on growth in agriculture sector.

Wong and Zhou (2011) examine the relationship between financial market development and economic growth in China, Japan, United states and United Kingdom. Results of autoregression test indicate a positive causal relationship from the financial markets development to economic growth in the countries.

Parivash and Torkamani (2007) in their study examine the role of financial development on growth of the agricultural sector for the years 1959 to 2005 in Iran. In this study, vector autoregression method was used. The results showed that the total financial impact on agricultural growth has been positive and the expanse of financial structure has played an important role in the growth of value-added agricultural. Also there is unidirectional causality relationship from the financial market development to the value added of agricultural sector.

2- RESEARCH METHOD

In the present study, we try to examine the relationship between financial development and the agricultural sector growth.

Since money in developing economies is a valuable and important source, volume of money Variable is into the model, With its entry, access to capital accumulation to be completed in the current financial interventions.

Thus, time-series data for volume of money, value-added agriculture, differences between liquidity and volume of money annually from 1976 to 2010 was collected from the Statistical Center of Iran.

This study use the vector autoregression (VAR) method to examine relationships between variables. problems with the system of simultaneous equations, including judgments about the variables presented endogenous or exogenous, create a new model (VAR) by Sims (1980).

Multivariate dynamic analysis, including benefits such as considering the issue of simultaneity between the variable. It is also observed that provided forecasts based on VAR model is better than the forecasts provided by the simultaneous equations models (6). So examine the possible causal relationships between these variables and value-added agriculture, can be used causality test through a vector autoregression model if all variables are stationary.
The VAR model in matrix form as follows:

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[1] Levine (1997), King and Levine (1993, 1993), Rajan and Zingales (1998), Darrat, (1999), Ghali, (1999), and Luintel and Khan (1999), Arestis et.al, (2001); Jalilian and Kirkpatrick, (2002); Bhattacharya and Sivasubramanian, (2003); Abu- Bader and Abu-Qarn, (2005) and Habibullah and End, (2006).

[2] Agbetsiafa (2003), Waqabaca, (2004), Odhiambo (2004) and Odhiambo (2008).

[3] Patrick (1966), Greenwood and Jovanovic (1990), Wood (1993), Greenwood and Bruce (1997) and Luintel and Khan (1999). Other empirical studies that are consistent with the bi-directional causality response are Akinboade (1998), Al-Yousif (2002) and Demetriades and Hussein (1996).

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p} + U_t$$

Y_t and its lags and U_t are $K \times 1$ vectors and A_i are matrices $K \times K$ from coefficients of model. Thus, vector autoregression models (VAR) in this study are as follows.

$$x_{1,t} = \alpha_{1,0} + \sum_{i=1}^{k} a_{1,i} x_{1,t-i} + \sum_{i=1}^{k} b_{1,i} x_{2t-i} + \sum_{i=1}^{k} c_{1,i} x_{3,t-i} + u_{1,t} \quad (1)$$

$$x_{2,t} = \alpha_{2,0} + \sum_{i=1}^{k} a_{2,i} x_{1,t-i} + \sum_{i=1}^{k} b_{2,i} x_{2t-i} + \sum_{i=1}^{k} c_{2,i} x_{3,t-i} + u_{2,t} \quad (2)$$

$$x_{3,t} = \alpha_{3,0} + \sum_{i=1}^{k} a_{3,i} x_{1,t-i} + \sum_{i=1}^{k} b_{3,i} x_{2t-i} + \sum_{i=1}^{k} c_{3,i} x_{3,t-i} + u_{3,t} \quad (3)$$

Where x_1, x_2, x_3 are agricultural value added variable (as a measure of growth in agricultural), volume of money and the differences between liquidity and volume of money (as a measure of financial development).

3- RESULTS AND DISCUSSION

Before doing any action in using time series data, we must ensure the stationary of time series. The nonstationary of statistical data increases Spurious regression. To determine the stationary of time series, Augmented Dicky-Fuller Test was used and the results shown in Table 1.

Table 1 - Summary of the stationary of time series

Variable	stationary	level of Significant
measure of growth in agricultural	With trend and intrecept	%1
Measure of financial development	With intrecept	%1
volume of Money	With intrecept	%1

According to results of Dicky-Fuller Test , Time series are stationary, so the unrestricted VAR model can be used in this study, And Granger causality and Wald test can be used to determine the causal relationship between variables. Before applying the VAR approach, should optimize the length of the lag by the Statistics Schwarz – Bayesian, Hanan-Queen or Akaike criterion. The maximum amount of each of these statistics indicates the optimal lag length. In this study, the optimal lag length was determined using the *Microfit software*. As can be seen in Table 2, the optimal lag length is 5.

Table 2 – Summary of determine the optimal length of the lag

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model

Based on 31 observations from 1976 to 2010. Order of VAR = 5
List of variables included in the unrestricted VAR:
X1 X2 X3
List of deterministic and/or exogenous variables:
CON TR

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	-829.8793	-880.8793	-917.4459	------	------
4	-857.8180	-899.8180	-929.9318	CHSQ (9) = 55.8775[.000]	25.2350[.003]
3	-888.1617	-921.1617	-944.8225	CHSQ (18) = 116.5650[.000]	52.6422[.000]
2	-919.4422	-943.4422	-960.6501	CHSQ (27) = 179.1259[.000]	80.8956[.000]
1	-974.4930	-989.4930	-1000.2	CHSQ (36) = 289.2276[.000]	130.6189[.000]
0	-1063.4	-1069.4	-1073.7	CHSQ (45) = 467.0912[.000]	210.9444[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

After determining the optimal lag, VAR model was estimated in the *Microfit software*. Table 3 shows estimation results of VAR model when the agricultural value-added is as the dependent variable. Coefficient of determination and adjusted R^2, showing a goodness of fit and the F- statistics with the significance level, shows that the overall model is significant. The rows in the below of table shows the results of diagnostic tests. As we can see, absence of autocorrelation and heteroscedasticity and specification error. As seen in Table, value added

variable in the first and fourth lags, volume of money variable at the second lag and financial development variables in the second lag have positive and significant impact.

Table3- Estimation results of VAR model (the agricultural value-added is the dependent variable)

Regressor	Coefficient	T-Ratio[Prob]
X1(-1)*	0.39241	2.1666[.047]
X1(-2)	0.16596	.77519[.450]
X1(-3)	-0.23579	-1.0995[.289]
X1(-4)*	0.63537	2.9476[.010]
X1(-5)	0.26682	.89502[.385]
X2(-1)	-0.64072	-3.2295[.006]
X2(-2)*	0.6288	2.5154[.024]
X2(-3)	0.12118	.34947[.732]
X2(-4)	-0.45675	-1.8805[.080]
X2(-5)	1.2478	1.6609[.117]
X3(-1)	0.045709	.79495[.439]
X3(-2)*	0.58429	2.1245[.051]
X3(-3)	-0.65964	-2.0162[.062]
X3(-4)	-0.55045	-1.4211[.176]
X3(-5)	-0.14954	-.14627[.886]
constant	-1421.1	-.46378[.649]
R-Squared: .99164	R-Bar-Squared: .98328	F-stat.: 118.6340[.000]
Diagnostic Tests		
$F_{\text{Serial Correlation}}$=1.1234[.307]		
$F_{\text{Functional Form}}$ = 3.6739[.076]		
$F_{\text{Heteroscedasticity}}$ =.98991[.328]		

Table 4 shows estimation results of VAR model where the volume of money is as the dependent variable. It can be seen that volume of money Variable in the first, fourth and fifth lags and financial development variable in first lag have positive and significant impact on the dependent variable.

Table 4- Estimation results of VAR model (the volume of money is the dependent variable)

Regressor	Coefficient	T-Ratio[Prob]
X1(-1)	-0.099343	-.30728[.763]
X1(-2)	0.30232	.79111[.441]
X1(-3)	0.11854	.30969[.761]
X1(-4)	0.42177	1.0962[.290]
X1(-5)	-1.0789	-2.0275[.061]
X2(-1)*	1.6881	4.7668[.000]
X2(-2)	-0.34368	-.77023[.453]
X2(-3)	-0.69852	-1.1286[.277]
X2(-4)*	1.4889	3.4343[.004]
X2(-5)*	2.9918	2.2310[.041]
X3(-1)*	0.63638	6.2005[.000]
X3(-2)	0.058187	.11853[.907]
X3(-3)	-0.99496	-1.7038[.109]
X3(-4)	-0.12736	-.18421[.856]
X3(-5)	-3.6433	-1.9964[.064]
constant	4496.8	.82216[.424]
R-Squared: .99982	R-Bar-Squared: .99964	F-stat.: 5518.5[.000]
Diagnostic Tests		
$F_{\text{Serial Correlation}}$=1.2295[.286]		
$F_{\text{Functional Form}}$ = .37099[.552]		
$F_{\text{Heteroscedasticity}}$ =1.9210[.176]		

Table 5 shows estimation results of VAR model where financial development is as the dependent variable. It can be seen that volume of money Variable in the third lag and financial development variable in the first lag has significant and positive impact.

Table 5- Estimation results of VAR model (the financial development is the dependent variable)

Regressor	Coefficient	T-Ratio[Prob]
X1(-1)	0.86509	1.3649[.192]
X1(-2)	-1.1841	-1.5805[.135]
X1(-3)	1.1852	1.5793[.135]
X1(-4)	0.75268	.99781[.334]
X1(-5)	-1.8881	-1.8099[.090]
X2(-1)	-0.94923	-1.3672[.192]
X2(-2)	0.16854	.19266[.850]
X2(-3)*	2.3655	1.9494[.070]
X2(-4)	0.52424	.61676[.547]
X2(-5)	-3.8642	-1.4698[.162]
X3(-1)*	1.7344	8.6194[.000]
X3(-2)	0.55933	.58115[.570]
X3(-3)	-3.7346	-3.2619[.005]
X3(-4)	0.67497	.49794[.626]
X3(-5)	4.3223	1.2081[.246]
constant	2065.7	.19264[.850]
R-Squared: .99982	R-Bar-Squared: .99972	F-stat.: 7208.1[.000]
Diagnostic Tests		
$F_{\text{Serial Correlation}}$=.52128[.482]		
$F_{\text{Functional Form}}$ = .17325[.684]		
$F_{\text{Heteroscedasticity}}$ =.98696[.329]		

Table 6 shows results of Wald test on coefficients of autoregression models from 1 to 3. As we can see, hypothesis H_0 based on significant coefficients being zero in all three models can be rejected with 99% confidence that states the effectiveness of these coefficients to estimate the models.

Table 6- results of Wald test on coefficients of VAR models

Wald Test : Equation: EQ 1			
F-statistic	9.086582	Probability	0.000619
Chi-square	36.34633	Probability	0.000000
Wald Test : Equation: EQ 2			
F-statistic	28.88709	Probability	0.000001
Chi-square	115.5484	Probability	0.000000
Wald Test : Equation: EQ 3			
F-statistic	40.10016	Probability	0.000001
Chi-square	80.20031	Probability	0.000000

After estimating the VAR model to test the causal relationship between financial developments, volume of money and economic growth variables, Granger causality test was used and the results are presented in Table 7. Granger causality test results expressed that there is no causal relationship between agricultural growth and financial development variable, but there is unidirectional causality relationship from the agricultural growth to volume of money and there is bilateral feedback causality relationship between financial development and volume of money.

Table 7 - Results of Granger causality test

Null Hypothesis	Obs	F-Statistic	Probability
X2 does not Granger Cause X1	31	1.99810	0.12281
X1 does not Granger Cause X2		3.10937	0.03089
X3 does not Granger Cause X1	31	1.68901	0.18326
X1 does not Granger Cause X3		1.80924	0.15677
X3 does not Granger Cause X2	31	86.2554	7.8E-13
X2 does not Granger Cause X3		16.4272	1.8E-06

4- Conclusions and recommendations

This study sought to examine the relationship between financial development and economic growth with emphasis on the agricultural sector in Iran. In this case time series data of value-added agriculture, volume of money and the difference between liquidity and volume of money in the period 1976 to 2010 is taken from the Statistical Center of Iran and by using Ganger causality test and VAR method, relationship between variables was examined.

The results indicate no causal relationship between the value added of the agricultural sector and financial development in Iran, but there is unidirectional causality relationship from agricultural growth to volume of money and also there is bilateral feedback causality relationship between financial development and the volume of money in Iran.

Results of VAR test also showed that financial development and volume of money in the second lag have a positive and significant impact on the agricultural sector growth, although there is no causal relationship between these variables and Agricultural sector growth. Also financial development in the first lag has positive and significant impact on volume of money , and volume of money in the third lag is effective on financial development.

Despite the positive effects of financial development on growth in agriculture sector, as well as diversification of financial markets in general and the allocation of financial markets in the agricultural sector in particular, can cause further growth of the agricultural sector. Capital markets, which is emerged in stock market is one of main component of the financial market. In this case stock market development can play an effective role in empower the country's financial markets and consequently economic growth.

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