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Causality Between Financial Development and Economic Growth in Iran

[1]N. Shahnoushi, [2]A.G. Ebadi, [1]M. Daneshvar, [1]E. Shokri and [1]M. Motallebi

[1]Department of Agricultural Economics, College of Agriculture,
Ferdowsi University of Mashhad, Mashhad, Iran
[2]Department of Biological Sciences, Islamic Azad University, Sari branch, Sari 48164-194, Iran

Abstract: In this study the causality relation between the financial development and the economical growth in Iran is studied using time series data of 1961-2004. in order to study of present or absent long run relationship between financial development and economic growth, first determinants degree of co integration variables in study using Augmented Dickey-Fuller test (ADF) determined and then deterministic number of co-integrating vectors with trace test when the model includes intercept and no trend. Next step is estimated coefficient of co-integrating vector and determination of Granger causality in short run and long run the results of this study showed that there is not any mutual relation between financial development and the economical growth in Iran and only the economical growth leads to financial development. Therefore, the financial development will not be an effective factor to the economical growth.

Key words: Economical growth · Financial development · Causality · Iran

INTRODUCTION

One of the most important goals of every economical development is achieving economical growth and development. One of the most important dimensions of economical developments is financial development. Because of having an advanced financial system beside other economical parts, provide the possibility of better funds and savings transition in society. It can also leads to increase the generating investments, investment in social and economical substructure and investment in human resource and increase the skill and expert level of human force. In such a way it can help the economical development in society. In fact, the effect of a good financial structure on the economical structure is very important that the economical growth and development will have trouble without it [1-2].

For the first time, in this direction the great economists like Schumpeter [1] explained the importance of financial system rather than the economical growth. Goldsmith [2] also indicated the positive relation between financial development, economical preferences in the case of 35 advanced and advancing countries and also showed that the economical growth of these countries had been affected by financial development based on the increase of average finances ratio in financial institutions. Mackinnon [3] and Shaw[4] believed that the government interferences in financial development system is an obstacle for the economical growth process also the financial development has an affective role on the economical growth and the financial systems with better operations have faster growth. King and Levine [5] began to analyze the correctness of Schumpeter theory which was based on the importance of financial development in a study with the title "financial development and economical growth". Their results showed that better financial development cause better economical growth.

In recent years many studies had been done on the effects of financial development on the economical growth using some economical techniques. Levin and Zervos [6] showed that there is a positive and significant relation between the components for developing the stocks and for growing the gross domestic product. Colderon and Liu [7] said at first all of financial development leads to economical growth in general, second there is a mutual Granger causality between the economical growth and financial development, third financial development share in developed countries, in a causality relation is more than the developing countries.

Financial development can also leads to economical growth by forming more investment and more efficiency. Hondroyiannis and Lolos [8] showed that there is a

Corresponding Author: N. Shahnoushi, Department of Agricultural Economics, College of Agriculture,
Ferdowsi University of Mashhad, Mashhad, Iran.

mutual Granger causality between financial development and economical growth in Greece. Nieuwerburgh *et al.*[9] showed that the increasing of the market stocks led to economical growth in Belgium. Such studies had been done in Iran. Tourkey and Hadian [10] said that the theory of supply leadership had been rejected but the demand fallowing is confirmed in Iran. Results of financial indexes also showed the instability in financial system of Iran economy. Shiva [11] declared that the economical growth in Iran had a positive relation with financial development indexes. The relationship between economical growth and developing financial market is also one side and is from economical growth toward financial development in Iran. Nazifi [12] began to analyze the effects of financial development on economical growth and he studied transferor channel for the effects using granted credit indexes in private sector and the results of this model showed that during the studies, the financial development had negative effect on economical growth. And with due attention to importance of financial structure in economical growth process we are trying to know that weather the financial development leads to economical growth or the economical growth can be a factor for financial development.

MATERIALS AND METHODS

In order to examine the short run and long run relationship between economic growth and financial development following relationship is specified:

$$FD = g(Y, R)$$

Where, FD is the indicator of financial development, y is the indicator of economic growth and R is the real interest rate (deflated by inflation). Different indicators like real interest rate, different definition of monetary aggregate and deposit ratio in gross domestic production in other countries were examined as indication of financial development. But studies show that, these indicators are not suitable indicators to show degree of financial development [12]. In this paper annual data of real GDP as indicator for economic growth and data of granted credit of banks to private sector as the indicator of financial development, for 1961 to 2004 are used. Also real interest rate for above period calculated. All of the variables in model are to real price (1998=100) and specified in following form:

LGDP Is natural logarithm of the real GDP, *LBCR* is the natural logarithm of granted credit of banks to private sector and R(-1) is the real interest rate with one lag. Two variables of granted credit of banks to private sector and real interest rate have been one lag because of impact of these two variables usually does not show instantaneous in the same year.

In order to study of causality relationship between economic growth and financial development and for reason of using time series statistics, beginning determinants degree of integration of variables in our study with Augmented Dickey Fuller (ADF) test. On next step for study of co-integration relationship and long run relationship between variables from Johanson method and in order to causality and short run relationship between variables in model used from vector error correction model (VECM). Johanson s method is framework of vector autoregressive model (VAR) as following:

$$x_t = \sum_{i=1}^{k} A_i x_{t-i} + e_t \quad (1)$$

Where, ε_t is a vector column of error terms and x_t is a vector of variables. With add the terms x_{t-1}, x_{t-2}, ..., x_{t-k} and $A_1\ x_{t-2}$, $A_2\ x_{t-3}$,...., $A_{k-1}\ x_{k-3}$, to bout side of the above equation, Equation (1) can be expressed in first differenced error correction form:

$$\Delta x_t = \sum_{i=1}^{k-1} d_i \Delta x_{t-i} + \pi x_{t-k} + e_t$$

Where, $\pi_{m\times n} = (I_{n\times n}\text{-}A_1\text{-}A_2\text{-}...A_K)$, $I = -I+A_1+A_2+...+A_i$ and I is a $n\times n$ square matrix. In this method the coefficient matrix π contains information about long run relationship between the variables in the data vector. In this way judgment between variables by the number of co-integration vectors, with rank of π matrix and there are three forms: first form there is when rank of π matrix equal with number of variables in vector autoregressive model. Then all of variables co-integrated. There is second form when rank of π matrix equal zero, then π matrix is a null matrix and no long run relationship exit between variables in the x_t vector. The third form is when the rank of π matrix which show with r lower than n (number of variables in model) .usually r<n .in this form $\pi = \alpha'\beta$ where β matrix is a co-integration matrix and their columns if normalized indicates long run relationship between variables. Elements of α indicates adjusted rate in long run relationship. Equation (2) produced as vector error correction model.

Johanson [13] suggests the need to import the variables like intercept and trend have been tested jointly

with determinate rank of matrix. All of models, estimated if exit trend and intercept, no trend and intercept and also exist one of them. Then, hypothesis of existence zero co-integration vector (r=0) and more than respectively tested with the likelihood ratio test statistics (λ_{trace}) and maximal eigenvalue test (λ_{max}) .the likelihood ratio test statistic (trace test) is computed as:

$$\lambda_{trace} = -n \sum_{i=r+1}^{k} \ln(1-\hat{\lambda}_i)$$

In this case null hypothesis that there are r co-integrating vectors against the alternative of more than r co-integrating vectors is tested and when accepted which trace statistic is lower than critical value suggested with johanson and Juselius [14]. Other test is maximal eigenvalue test which is following:

$$\lambda_{max} = -n\ln(1+\hat{\lambda}_{r+1}) \quad r = 0,1,...,k-1$$

This statistic tested for the null hypothesis of r co-integrating vectors against the alternative of r+1 co-integrating vectors. When existence of r co-integrating vector is accepted that maximal eigenvalue statistic is lower than critical value. Then it has been suggested that the likelihood ratio test statistic and maximal eigenvalue test deterministic presence or absence the long run relationship between variables in model. The next stage is determinant of short run and long run causality. If there is one or there are more than one co-integrating vectors between variables, can use error correction model for testing Granger causality. The error correction model for three variables can be written as:

$$\Delta LGDP = a_1 + lag(\Delta LGDP, \Delta LBCR(-1), \Delta R(-1)) + \lambda_1 e(-1)$$

$$\Delta LBCR(-1) = a_2 + lag(\Delta LGDP, \Delta LBCR(-1), \Delta R(-1)) + \lambda_2 e(-1)$$

$$\Delta R(-1) = a_3 + lag(\Delta LGDP, \Delta LBCR(-1), \Delta R(-1)) + \lambda_3 e(-1)$$

where e(-1) is the lagged value of the error correction term e and error correction term indicates the lung run relationship short run dynamics is provided by the lagged values of the difference terms.

RESULTS AND DISCUSSION

Stationary - in order to study of present or absent long run relationship between financial development and economic growth, first determinants degree of co integration variables in study using Augmented Dickey-Fuller test (ADF) determined. A result of this study which is calculated with Microfit 4.0 is reported in Table 1.

The results of Table 1 show that all of the variables in level and the first difference are stationary at 95% level of confidence. Thus using of ADF unit root test, all variables in model are non stationary and I (1) since the first difference are I (0). In the next step and in order to applying Johansen s procedure first must set the appropriate lag length of the VAR model in order to ensure don't exit serial correlation problem in model. Microfit 4.0 determines the number of appropriate lag length with Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). In this paper AIC used to select two as the order of VAR and then deterministic number of co-integrating vectors with trace test when the model includes intercept and no trend. These results are presented in Table 2.

Results of Table 2 shows that null hypothesis that there are no co-integrating vector is rejected. In the next step tested the hypothesis that there is one or lower than one co-integrating vector. Because t he test statistic lower than the 90% and 95% critical value, null hypothesis is not rejected. In other mean accepted the exit of one co-integrating vector between variables in model. Therefore, accepted model is model two which have no intercept and no trend in short run and no trend and have restricted intercept in long run and the number of co-integrating vectors is one. The results of estimated coefficient of co-integrating vector are reported in Table 3.

Based on Table 3 normalized relationships, which is gaining from this vector for gross domestic product variable is following:

$$LGDP = 4/6520 + 0/6709LBCR(-1) - 0/07079R(-1)$$

Next step is determination of Granger causality in short run and long run. The results of this causality analysis have been offered in Table 4.

Figures within parenthesis are the marginal p values. The base of result of Table 4, it can be seen that error

Table 1: ADF test for unit roots

	With trend and no intercept		With intercept and trend	
Variable	ADF statistic	95% critical value	ADF statistic	95% critical value
LGDP	-1/94	-2/95	-2/91	-3/54
D(LGDP)	-3/31	-2/95	-3/38	-3/54
LBCR(-1)	-2/57	-2/95	-2/87	-3/54
D(LBCR(-1))	-3/37	-2/95	-3/62	-3/54
R(-1)	-1/46	-2/95	-1/34	-3/54
D(R(-1))	-6/34	-2/95	-6/43	-3/54

Table 2: Trace test of co-integration vectors in var. model with intercept and no trend

Null	Alternative	Statistic value	95% Critical value	90% Critical value
r=0	r>=1	35/18	34/87	31/93
r<=1	r>=2	17/66	20/18	17/88
r<=2	r=3	4/14	9/16	7/53

Table 3: Co-integrating vector estimated in second model (long run relationship)

Variable	Coefficient of co integrating vector
LGDP	-1/3233
LBCR(-1)	0/8877
R(-1)	-0/9367
intercept	6/1559

Table 4: Result of meaning estimated coefficient in multivariate granger causality

Dependent variable	τ static of $\Delta LGDP$	τ static of $\Delta LBCR$(-1)	τ static of ΔR(-1)	F static	Error correction term(ECT)
$\Delta LGDP$	-	0/26(0/79)	-0/41(0/68)	1/9(0/14)	0/29(0/77)
$\Delta LBCR$(-1)	4/03(0/00)	-	-1/7(0/09)	24/9(0/00)	-4/2(0/00)
ΔR(-1)	-1/32(0/17)	1/1(0/27)		0/24(0/86)	0/91(0/36)

correction term with $\Delta LGCP$ as the depended variable insignificant at 10% level. This implies that in long run banks granted credit to private sector and real interest rate does not Granger causality of real income growth or real gross domestic product and only coefficient of error correction term in the equation that $\Delta LBCR$(-1) is the depended variable is 100% significant. Therefore, real income and real interest rate are the Granger causality of growth of granted credit to private sector in long run. This object implies onside causality in long run between financial development and economical growth.

In case of short run relationship, results of Table 4 shows that short run coefficient in equation one are insignificant. That means interest rate and credit in short run dose not effect on real income growth singly, but because of F statistic of these variables are significant, this two variable jointly influenced growth in short run. Coefficient of variables in short run and in second equation, implies that both variable, real income and interest rate in short run singly influenced financial development or credit. Furthermore F statistic shows that these two variables jointly have a significant effect on credit. The variable coefficient in equation three shows that in short run real income and credit dose not influenced on real interest rate [14-15].

CONCLUSIONS

Results of this paper show that in long run financial development does not led to economical growth, but economical growth led to financial development. These results arise from Iran economical situation, saving distribution in society, investment level, a mount of government injection to private and governmental sector. By means that, financial development in Iran to come to an end by level investment in governmental sector and with absorb of benefits of oil sale and the domestic taxes from private sector. In the other word Iranian gross

domestic product colluded to oil and have a exogenously nature and able to have positive effect on financial development. but, because Iran have a lot of problems in financial structure then have not effect on gross domestic product .In other word existent financial structure in Iran don't moving in direction economical growth due to inefficiency. Thus financial structure in Iran must change to enable absorbing saving and facilitating investment. Then, it is able to improve economical growth [14-18].

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