Financial development, savings, and economic growth in Iran

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Abstract: The attainment of development and growth is one of the most important goals of economic policy and decision making. Financial development is one of the policies recommended by many economists to achieve economic development. Accordingly, the aim of the present study was to investigate the causality between financial development, savings and economic growth in Iran from 1973 to 2012. GDP growth rate and the ratio of credits granted to the private sector to GDP were used as an indicator of financial development and real gross national savings. All variables were stationary and the autoregressive model with distributed lags and the Wald test were used to examine the causal relationship between financial development, savings and economic growth. The results of the study indicated that the causality flows from savings and financial development to the economic growth. Besides, there is a causal relationship from savings and economic growth to financial development. The same relationship exists from economic growth and financial development to savings. In other words, there is two-way causality between the three variables under study.

1. Introduction

The significance of financial development is due to the fact that an efficient financial sector can play a vital role in strengthening financial resources to encourage investments, the absorption of foreign investments, and the optimization of the allocation of resources. The achievement of growth and, consequently, the economic development is one of the demands of all nations and governments. The financial development, the enhancement of the ratio of national savings to GDP, and the accessibility of savings for domestic investors can guarantee the more efficient distribution of investments. One of the factors affecting the economic growth is saving. Concerning the relationship between savings and the economic growth, classical economists believe that saving is the precondition of the realization of the investment. Economists such as Hicks and Schumpeter have focused on the development of financial markets and believe that such markets are the driving force and an integral part of the process of economic growth. Besides, experiences of different countries and numerous empirical studies in this area also confirm the fact that the development of the financial sector has had a positive and significant effect on savings, capital formation, and economic growth.

Review of the literature:

The 1980 has seen the attempts made by Romer and Lucas to develop endogenous economic models in which financial institutions are willing to determine the optimal combination of savings for the sake of capital accumulation. Therefore, if the composition of savings can affect the real growth, financial intermediaries will increase economic growth. What has been mentioned about endogenous growth models is that the saving behavior generally affects balanced growth rates. In particular, the development of financial intermediaries with a tendency to increase their investments results in the improvement of economic growth. Pagano has pointed out that financial institutions attract funds in the process of transferring funds from savers to borrowers and the improvement of the efficiency of financial institutions will reduce costs associated with the transfer process. He also added that the efficiency of financial institutions is possible through the development of financial markets. As a result, it is possible to justify the causal relationship between financial development and economic growth. New theoretical frameworks have arisen through these models about the effects of financial development on economic growth based on which it can be concluded that the achievement of financial development through the enhancement of the efficiency of financial institutions, the raise of saving

rates and, consequently, the improvement of investment rate may improve the economic growth. Accordingly, saving and investment can be regarded as two sides of a coin. Under ideal conditions, it is expected that in developing countries with vacant capacities and various potentials for the investment, the rate of the economic growth can be higher and purposeful policies can be formed in this field in the public and private sectors. One of the most important and influential factors for the formation of different kinds of savings and directing them towards the investment is the development of financial markets. However, savings can be increased in long term not only through structural changes made in the financial system but also through the outcomes of financial development (GDP growth and higher income levels).

Interaction of financial development and economic growth:

Economic researchers and scholars have addressed whether economic growth has been the cause of financial development or economic growth has resulted from financial development. Some believe that one of the factors that will lead to economic growth is financial development. In fact, financial development leads to economic growth. Another group of economists have a different view. They believe that economic growth will lead to financial development of countries. Therefore, theses two schools can be totally distinct in terms of financial development and economic growth.

Basic physical theories of development:

Based on physical theories of development, financial development should serve only real economic development and the realization of physical investment. These theories (mainly influenced by Robinson), consider financial development as a product of an increase in physical investment rates. According to these theories, the main goal of the public sector plans is the attainment of physical capital accumulation. In fact, the main cause of economic development and income differences in different countries should not based sought solely in

the production values but in the relation to productivity.

The basic theories of financial development:

The role of financial markets and, in fact, the role of financial development in economic growth is emphasized in these theories. Often thought to be influenced by Schumpeter's views, these theories regard the development of financial institutions and the key role of financial services as the main causes of economic development and put greater emphasis on the development of financial markets as the cause of economic development.

2. Model specification

The following equations have been used in the present study:

(1):

$$LMGDP_t = \alpha_2 + \beta_2 \sum_{i=1}^{m} LMGDP_{t-i} + \varepsilon_{2t}$$

(2):

$$LRYN_t = \alpha_1 + \beta_1 \sum_{i=1}^{m} LRYN_{t-1} + \varepsilon_{1t}$$

(3):

$$LS_t = \alpha_3 + \beta_3 \sum_{i=1}^{m} LS_{t-i} + \varepsilon_{3t}$$

Where, **L** at the beginning of each variable represents the logarithm of that variable, **LRYN** is economic growth derived from GDP growth rate, **LMGDP** shows Financial Development Index determined as the ratio of credits granted to the private sector divided by GDP. Besides, **LS** is the real net national saving. To determine it, gross national saving is first deduced by fixed capital depreciation and the resulting value is divided by the ratio of Consumer Price Index to the Fixed Price 76.

Finally, ε_t is the lag element and i and j are the number of lags.

Stationary Test:

Table 1: The results of the stationary test on variables with the intercept and trend

Symbol	Variables	Statistics	Optimal lag	Results
LRYN	Economic growth	- 4.2	0	Stationary
LMGDP	Financial Development Index	-1.11	0	Non-stationary
LS	Real saving	-2.25	0	Non-stationary
ADF at the level of 5% is – 2.94				

Source: Research findings

Time series econometric modeling is based on the assumption of stationary nature of time series variables. To examine the stationary of each variable,

the Augmented Dickey-Fuller Test was used in this study to test (H0); H_0: P=1 (the existence of a unit root) versus the alternative hypothesis (H1); H_1:

$|\rho| < 1$. In the case that the absolute value of the Augmented Dickey-Fuller Test statistics is greater than the critical value in the table, the null hypothesis is rejected and variable in question is stationary. Otherwise, the variable is non-stationary and the stationary test must be done on the first differential of the variable. The results of the stationary test on variables used in the model with intercept and intercept and trend are shown in tables (1) and (2).

Table 2: The results of the stationary test on variables with the intercept

Symbol	Variables	Statistics	Optimal lag	Results
LRYN	Economic growth	- 5.23	0	Stationary
LMGDP	Financial Development Index	-0.99	0	Non-stationary
LS	Real saving	-2.25	0	Non-stationary
ADF at the level of 5% is – 3.54				

Source: Research findings

Table (3): indicates that non-stationary variables become stationary by taking the first order differential

Symbol	Variables	Statistics	Optimal lag	Results
LMGDP	Financial Development Index	-4.43	0	stationary
LS	Real saving	-3.32	0	stationary
ADF at the level of 5% is – 2.94				

Source: Research findings

Estimation of the relationships between all variables using the Autoregressive Distributed Lags (ARDL) Model:

After determining the values of optimal lag *m*, they will be inserted into model to obtain the following equations Then the two additional variables are added. Since the equations consist of the two variables I (0) and I (1), the Autoregressive Distributed Lags (ARDL) Model will be used as follows:

Economic growth with an optimal lag of 1:
(4):

$$LRYN_t = \alpha_4 + \sum_{i=1}^{1} \beta_i LRYN_{t-i} + \sum_{j=1}^{n} \gamma_j LMGDP_{-j} + \sum_{j=1}^{n} \theta_j LS_{t-j} + \varepsilon_{4t}$$

Financial development with an optimal lag of 2:
(5):

$$LMGDP_t = \alpha_5 + \sum_{i=1}^{2} \beta_i LMGDP_{t-i} + \sum_{j=1}^{n} \gamma_j LRYN_{-j} + \sum_{j=1}^{n} \theta_j LS_{t-j} + \varepsilon_{5t}$$

Savings with an optimal lag of 2:
(6):

$$LS_t = \alpha_6 + \sum_{i=1}^{3} \beta_i LS_{t-i} + \sum_{j=1}^{n} \gamma_j LRYN_{t-j} + \sum_{j=1}^{n} \theta_j LMGDP_{t-j} + \varepsilon_{6t}$$

Autoregressive Distributed Lags (ARDL) Model to determine economic growth as the dependent variable:

To do so, the optimal lag is determined through the Schwarz-Bayesian Test (as shown in Table 3, above). Then it is needed to perform the convergence test of the variables. In Table (3) the null hypothesis i.e. the lack of convergence between the variables used in the model (Eq. 4) is tested.

Table 4: Model estimation through ARDL technique

Variables	Coefficient	t-statistics
Intercept	-0.32	-1.8
LRYN (-1)	0.81	16
LMGDP	0.28	2
LMGDP (-1)	0.55	3.44
LS	0.004	2.52
$\bar{R}_2$	0.92	

Resource: Research findings

$$H_0: \sum_{i=1}^{p}(a_i - 1 \geq 0)$$
$$H_1: \sum_{i=1}^{p}(a_i - 1 < 0)$$

Since the value of the optimal lag for the dependent variable is 1, therefore the value of p is 1 and the value of *t* which is used to perform the above test is determined as follows:

$$t = \frac{a_1 - 1}{s_{a_t}} = \frac{0.81 - 1}{0.047} = -4.04$$

The critical value proposed by Banerjee, Dolado, and Mestre at the level of 5% is equal to – 3.57. Consequently, the null hypothesis is not confirmed and the existence of a long-run relationship is confirmed when economic growth is considered as the dependent variable. The long-run relationship between the variables is shown as follows:

$$LRYN = -3.21 + 4.29\,LMGDP + 0.043\,LS$$

The coefficients in the above equation are significant. The relationship between financial development and economic growth is estimated to be positive. In other words, if financial development is increased by 1%, the economic growth will be increased by 4.29%. On the other hand, one percent increase in the savings rate will result in a 0.043 increase in the economic growth. Since the existence of co-integration in the model has been confirmed, the vector error correction model is used to determine the short-term error correction relationship using the lag element in the long relationship.

Table 5: Model estimation through ECM technique

Variables	Coefficient	t-statistics
Intercept	-0.32	-1.8
dLMGDP	0.28	2
dLS	0.7	3.93
ECM (-1)	-0.1	-2
dLMGDP	0.32	-1.8
$\overline{R}_2$	0.88	

Resource: Research findings

The value of ECM (-1) coefficient is equal to -0.1, so it can be said that if a shock enters the model, it will take almost 10 years to reach equilibrium.

Autoregressive Distributed Lags (ARDL) Model to determine the Financial Development Index as the dependent variable:

To do so, the optimal lag is determined through the Schwarz-Bayesian Test (as shown in Table 3, above). Then it is needed to perform the convergence test of the variables. In Table (3) the null hypothesis i.e. the lack of convergence between the variables used in the model (Eq. 5) is tested.

Table 6: Model estimation through ARDL technique

Variables	Coefficient	t-statistics
Intercept	0.25	1.4
LRYN (-1)	0.5	4.4
LMGDP	0.06	2.6
LMGDP (-1)	0.06	2.5
LS	0.014	2.3
$\overline{R}_2$	0.98	

Resource: Research findings

$$H_0: \sum_{i=1}^{p}(a_i - 1 \geq 0)$$
$$H_1: \sum_{i=1}^{p}(a_i - 1 < 0)$$

Since the value of the optimal lag for the dependent variable is 1, therefore the value of p is 1 and the value of *t* which is used to perform the above test is determined as follows:

$$t = \frac{a_1 - 1}{s_{a_t}} = \frac{0.5 - 1}{0.11} = -4.54$$

The critical value proposed by Banerjee, Dolado, and Mestre at the level of 5% is equal to – 3.57. As a result, the null hypothesis is not confirmed and the existence of a long-run relationship is confirmed when economic growth is considered as the dependent variable. The long-run relationship between the variables is shown as follows:

$$LMGDP = -0.59 + 0.06\,LRYN + 3.4\,LS$$

In the above equation, the coefficients are significant. The relationship between financial development and economic growth is estimated to be positive. In other words, if financial development is increased by 1.5%, the economic growth will be increased by 0.2%. Since the existence of co-integration in the model has been confirmed, the vector error correction model is used to determine the short-term error correction relationship using the lag element in the long relationship.

Table 7: Model estimation through ECM technique

Variables	Coefficient	t-statistics
Intercept	0.25	1.4
dLMGDP	0.5	3.2
dLS	-0.06	-2.6
ECM (-1)	-0.1	-2.18
dLMGDP	0.25	1.4
$\overline{R}_2$	0.70	

Resource: Research findings

The value of ECM (-1) coefficient is equal to -0.1, so it can be said that if a shock enters the model, it will take almost 10 years to reach equilibrium.

Autoregressive Distributed Lags (ARDL) Model to determine the Financial Development Index as the dependent variable:

To determine the Financial Development Index, the optimal lag is determined through the Schwarz-Bayesian Test (as shown in Table 3, above). Afterward the convergence test of the variables is performed. In Table (3) the null hypothesis i.e. the lack of convergence between the variables used in the model (Eq. 5) is tested.

$$H_0: \sum_{i=1}^{p}(a_i - 1 \geq 0)$$
$$H_1: \sum_{i=1}^{p}(a_i - 1 < 0)$$

Since the value of the optimal lag for the dependent variable is 1, therefore p = 1 and the value

of *t* which is used to perform the above test is determined as follows:

$$t = \frac{a_1 - 1}{s_{a_t}} = \frac{0.59 - 1}{0.09} = -4.4$$

The critical value proposed by Banerjee, Dolado, and Mestre at the level of 5% is equal to − 3.57. As a result, the null hypothesis is not confirmed and the existence of a long-run relationship is confirmed when economic growth is considered as the dependent variable. The long-run relationship between the variables is shown as follows:

$$LS = 7 + 1.5 LRYN + 0.2 LMGDP$$

Table 8: Model estimation through ARDL technique

Variables	Coefficient	t-statistics
Intercept	2.2	2.2
LS (-1)	0.59	0.59
LRYN	0.46	0.46
LMGDP	0.06	0.06
$\overline{R}_2$	0.89	

Resource: Research findings

In the above equation, the coefficients are significant. The relationship between financial development and economic growth is estimated to be positive. In other words, if financial development is increased by 1 %, the economic growth will be increased by 0.2%. Since the existence of co-integration in the model has been confirmed, the vector error correction model is used to determine the

short-term error correction relationship using the lag element in the long relationship.

Table 9: Model estimation through ECM technique

Variables	Coefficient	t-statistics
Intercept	2.2	1.33
dLRYN	0.46	2.3
dLMGDP	0.064	2.85
ECM (-1)	-0.3	-2.5
$\overline{R}_2$	0.87	

Resource: Research findings

The value of ECM (-1) coefficient is equal to -0.3, so it can be said that if a shock enters the model, it will take over three years to reach equilibrium.

Granger Causality Test using error correction model:

After performing vector error correction model for all dependent variables of economic growth, financial development index, and savings, in the next stage the causality test is performed on the results of vector error correction model for all variables. If the causality is rejected in the both tests then there will be a two-way causality between variables under study. On the other hand, if causality is rejected in one test and not in the other, then there is a one-way causality between variables under study. Finally, if the causality is confirmed in the both tests then there will be no causality between the two variables. Table 8 shows the results of the independent variables causality test on the dependent variables of economic growth, financial development index, and savings.

The Wald Test was employed to do so:

Dependent variables	Independent variables	Wald test (X^2)	Prob	Results			
LRYN	LMGDP	4.9	0.037	LMGDP LRYN	LMGDP		
LRYN	LS	5.2	0.020	LS LRYN	LRYN	LS	
LMGDP	LRYN	3.9	0.047	LRYN	LMGDP		
LMGDP	LS	7.4	0.000	LS	LMGDP		
LS	LRYN	6	0.012	LRYN LS	LS	LRYN	
LS	LMGDP	8.6	0.000	LMGDP LS	LS	LMGDP	

Resource: Research findings

3. Results

The results of the Wald Test indicated that there is a causal relationship from savings and the ratio of credits granted to the private sector to economic growth. Besides, there is a causal relationship from economic growth and the ratio of credits granted to the private sector to savings. As a result, the research hypotheses are confirmed, suggesting that there is a two-way causal relationship between financial development and economic growth. In addition, there

is a two-way causal relationship between savings and financial development. Finally, according to the third hypothesis, there is a two-way causality between economic growth and savings.

4. Suggestions

one of the objects followed by all developing countries is the realization economic growth. According the results of the present study, the following suggestions are offered to achieve economic

growth in Iran. The Iranian Central Bank is recommended to support all financial institutions to grant credits to the private sector in order to enhance financial development and, subsequently, economic growth. The increased banking interest rate may also encourage people to save money and therefore banks can collect the public savings and direct them towards the manufacturing sector to increase the investments made in this sector, leading to the realization of economic growth. The development of more efficient financial infrastructures to optimally diversify saving resources, to provide more financial incentives for returns on investment in order to increase the net return on financial instruments, to improve the financial statements with the goal of improving public savings, productivity, and the capacity of savings can be regarded as appropriate policies to accelerate savings.

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10/25/2018