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Investigating the Relation between Financial Development and Economic Growth Using ARDL Approach Case study: Iran

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ABSTRACT

Considering the importance of financial markets and the role of financial development in the economic growth, in this paper we investigated the importance of financial development in the economic growth of Iran in 1975-2008. To estimate the effects of financial development on the economic growth, we used ARDL approach and Bound Test (Pesaran et al. (2001)) long term relation. We also used the credits paid to non-governmental sector as the proxy of financial development. The results show that there is a long term relation between domestic gross production growth without oil and financial development and other variables such as oil incomes, capitalization and labor. The results of estimation show that there is a positive and significant relation between financial development and economic growth both in short and long terms.
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1. INTRODUCTION

As economists such as Bagehot (1873), Schumpeter (1912), Shaw and Gurley (1955), Goldsmith (1969) and Mckinnon (1973) have pointed out, financial development has important impacts on economic growth so that we cannot satisfactorily explain the process of economic growth with no heed to financial development.

In this way, by referring to economic literature we may observe some patterns in which it is shown that how the increase of efficiency to equip saving resources for investment through financial institutes can speed up the economic growth and can improve economy performance as compared to the condition in which each person individually gives the financial resources of his saving to the applicant capitalists (Bencivenga and Smith (1991)). Moreover, it can be seen in the theoretical patterns that how motivations such as increase of efficiency or decrease of liquidity loss risk leads to creation of financial markets. As the result of creation of financial markets, investment motivations change and financial resources allocation finds a new form that ultimately affects economic growth (Levine (1991)). In this way, it can be found how financial repression or inappropriate policies of intervention in financial markets could affect economic growth (Roubin and Sala Martin (1992)).

The objective of this study is to examine the impact of financial development on economic growth of Iran during the period 1975-2008. To estimate the effects of financial development on the economic growth, we used ARDL approach and Bound Test (Pesaran et al. (2001)) long term relation.
In the second section of this paper, we briefly review the literature. The econometric methodology is discussed in the forth section. Section 4 presents empirical results. Section five concludes the paper.

2. LITERATURE REVIEW

Mckinnon (1973) and, Gurley and Shaw (1955) showed that financial development is an important determinant of economic growth and restrictions created by government on the financial sector (such as control of interest rate, high rate of reserve imposed by central Bank, administrative allocation of bank credits, etc.) can damper the growth of real sector of economy.

Goldsmith (1969) was the first who dealt with experimental study in this regard (the relation of financial development and economic growth) and referred to a positive relation between financial development and economic growth.

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After the studies made by Goldsmith (1969), economists such as King and Levine (1993a), showed that there was a positive and significant statistical relation between financial development and economic growth. Jung (1986), used Granger causality method to investigate the relation between per capita income and financial development indexes. The results show that whenever the developed and developing countries are taken into consideration separately, the importance of financial development in economic growth will be acknowledged. Rioja and Valev (2004), showed that the effect of financial development on the growth in different levels of financial development was not the same and its size and direction was different. In a low level, improvement of financial markets has an ambiguous effect on the economic growth. In a medium level, financial development has a positive and large effect on the growth. Finally, that effect in a high level will be positive but small. Hondroyiannis, Papapetrou and Lolos (2004), experimentally evaluated the relation between development of banking system and securities market and the performance of real economic sector for Greece during 1986-1999 through VAR and VECM models. The results show that there is a mutual casualty between the activity of real economic sector and investment of securities market and also between the activity of real economy and bank credits and that the effect of securities market on the growth process was poorer as compared to the banks.

Abdul Jalil and Ying Ma (2008) Showed that financial development has positive effects on economic growth and for this purpose we have been using the ARDL approach.

Also Muhammad Atif et al. (2010) by using the ARDL approach showed that long-term financial development and liberalization has positive effects on economic growth.

3. RESEARCH METHODOLOGY

Considering that this paper aims to investigate the role of financial development in the economic growth of Iran, we selected effective variables on economic growth along with financial development for 1975-2008 considering theoretical fundamentals and previous studies. In this study, we used the credits allocated to private sector as the proxy of financial development. We also used real gross domestic production (Real Gdp) without oil as an index for economic growth and used other variables such as capital, oil revenue and labor in the economic growth equation. To estimate the effects of financial development on the economic growth, we use Auto Regressive Distribution Lag Method (ARDL).

3.1) ARDL Method

Generally, use of methods such as Engle-Granger (1987) in the studies dealing with small samples (few observations) lack the necessary credibility because they don't consider the short term dynamic reactions between the variables. This is because they had bias in their estimations. For this reason, use of those patterns with short term dynamics that lead to estimation of more accurate coefficients of pattern will be considered.

3.2) Bound Testing for Co-integration

For the existence of a long term relation between the variables under investigation by Wald test, F-statistics is used in the error correction form for the significance test of levels with the lag of variables.

$$\Delta \text{Log(GDP)}_t = \beta_0 + \sum_{i=1}^{p} \delta_i \Delta \text{Log(Credit)}_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta \text{Log(Oil)}_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta \text{Log(Capital)}_{t-i} + \sum_{i=1}^{p} \theta_i \Delta \text{Log(Labor)}_{t-i} +$$
$$\beta_1 \text{Log(GDP)}_{t-1} + \beta_2 \text{Log(Credit)}_{t-1} + \beta_3 \text{Log(oil)}_{t-1} + \beta_4 \text{Log(Capital)}_{t-1} + \beta_5 \text{Log(Labour)}_{t-1} + \varepsilon_t$$

null and alternative hypothesis of the existence of a long term relation based on equation 5 will be as follows:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$$

$$H_a : \beta_1 \neq 0, \beta_2 \neq 0, \beta_3 \neq 0, \beta_4 \neq 0, \beta_5 \neq 0$$

The important point is that distribution F of the long term relation is not standard. Pesaran et al. (2001) calculated appropriate critical levels corresponding to the number of regressors and that if the model included original width and trend: One of them was based on that fact that all variables were durable and the other was based on the fact that all variables were not durable I(1). If F goes higher than

the upper limit, null hypothesis indicating a long term relationship will be rejected and if F goes down the lower limit, the aforesaid hypothesis will be accepted.

4. EMPRICAL RESULTS

4.1) Unit Root Test

Before estimating ARDL model, we investigate the stationary of variables. The results of Augmented Dickey-Fuller test (ADF) show that all the variables used in the model would become integrated by one differentiation.

Table 1: Unit Root Test Result

ADF Test		
Variables	**levels**	**1st difference**
log(real GDP)	-1.8506	-4.9544**
Log(Credit)	-1.1895	-3.8099**
Log(Oil Revenue)	.081493	-3.1667**
Log(capital)	-2.6327	-3.8099**
Log(labor)	-1.6841	-3.0975**

Note: ** Represents significance at 5 % level of significance

4.2) Co-integration Test

Based on Pesaran et al. (2001) test, the stationary of variables should be investigated first. Since all used variables in a model become integrate by one differentiation (I(1)), we may use Pesaran et al. (2001) test for long term relation. As seen in the table, the calculated F is higher than the critical levels calculated by Pesaran et al(2001). Therefore, the hypothesis of no long term relation is rejected and long term relation is confirmed.

Table 2: F-Statistics Test for Long Run Co-integration

Critical value bounds of the F-statistics				
1% Level		**5% Level**		**Calculated F-statistics**
I(0)	I(1)	I(0)	I(1)	4.91
2.82	4.21	2.41	3.34	

Note: Critical Values are cited from Pesaran et al. (2001), Table CI (iii), Case 111: Unrestricted intercept and no trend.

4.3) The results of short term and long term relations with ARDL approach

Long term relation will be as follows:

$$\text{Log(GDP)}_t = \alpha_0 + \alpha_1 \text{Log(Credit)}_t + \alpha_2 \text{Log(Oil)}_t + \alpha_3 \text{Log(Capital)}_t + \alpha_4 \text{Log(labor)}_t + U_t$$

Error Correction Method (ECM) will be as follows:

$$\Delta\text{Log(GDP)}_t = \beta_0 + \sum_{i=1}^{p} \delta_i \Delta\text{Log(Credit)}_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta\text{Log(Oil)}_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta\text{Log(Capital)}_{t-i} + \sum_{i=1}^{p} \theta_i \Delta\text{Log(labor)}_{t-i} + \text{ECM}_{t-1} + \varepsilon_t$$

The results of estimation of long term and short term relation are presented in the table (3). The results of estimation of long term relation show that financial development index (bank credits to the nongovernmental sector) has a positive and long term relation with real gross net production in Iran. These results also show that oil revenues and capital have a positive and long term effect on gross domestic production. Labor has a reverse relation with gross domestic production.

The results of estimation of ECM model show that economic growth in short term has a positive and significant relation with the growth of financial development index (the ratio of credits paid to the nongovernmental institutions to GDP) and the growth of capital and has a negative and significant relation with oil revenues and labor growth.

Table 3: ARDL Estimate long Run and ECM Results

ARDL Estimate Long-Run			ARDL Model ECM Results		
Dependent Variable : log(real GDP)			*Dependent Variable :Δ(Log(real GDP))*		
Repressors	**coefficient**	**t-Values**	**Repressors**	**coefficient**	**t-Values**
Log(Credit)	0.102	2.64*	Δ(Log(real GDP))(-1)	0.51	4.17*
Log(Oil Revenue)	0.04	3.51*	Δ(Log(Credit))	0.26	3.59*
Log(capital)	0.64	6.41*	Δ(Log(Oil Revenue))	-0.002	-0.14
Log(labor)	-0.64	-3.65*	Δ(Log(Oil Revenue))(-1)	-0.04	-2.36*
Intercept	8.14	3.7*	Δ(Log(capital))	0.66	4.97*
			Δ(Log(labor))	-0.67	-2.99*
			Δ(Intercept)	8.43	2.85*
			Ecm(-1)	-1.03	-5.65*
Diagnostic Test Statistics					
R-Squared:	0.84	RSS:	0.016		
R-Bar-Squared:	0.77	DW:	2.3		

Note: ARDL (2,1,2,0,0) selected on the basic of SBC.
*: Represents significance at 1 % level of significance

5. Conclusion

In this paper we investigated the effects of financial development on the economic growth of Iran in 1975-2008. We considered financial development index as the credits awarded to the nongovernmental sector. We used ARDL approach to estimate the effects of financial development in short and long terms and we used Bound Test of Pesaran et al. (2001) to investigate the existence of long term relation. The results of estimation show that financial development (credit) has positive and significant effects both in short term and long term on the economic growth in the manner that by 1% increase in the bank credits to the nongovernmental sector, real gross domestic production will increase by 0.1% in long term. Also by 1% increase in the growth rate of credits to the nongovernmental sector, economic growth rate will increase up to 0.2% in short term. The results of estimation also show that capitalization and oil revenue have positive and significant effects in long term on the real gross domestic production, but capitalization in short term will have positive effects on economic growth and oil revenue growth will have negative effects on economic growth.

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