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The Experimental Investigation of Financial Development on Economic Growth in Iran using Vector Auto Regressive Approach

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ABSTRACT

Economic growth is one of the three macroeconomic goals. Financial markets in developing countries, especially Iran, due to lack of competitive markets and imperfect capital mobility, are less developed. In this study, we experimentally examined the effect of financial development on economic growth in Iran for the period of 1979-2009 using vector Auto Regressive Approach (VAR). Indicators used to investigate financial development are "Liquidity to GDP growth ratio" and "Credits granted to the private sector to GDP growth ratio". Results showed that, two convergence vectors could be derived from this method, and using these two vectors, the effect of financial development on economic growth evaluated to be positive and significant.
KEYWORDS: financial development, economic growth, vector Auto Regressive, liquidity, credit

1. INTRODUCTION

Economic growth is an important goal of every country and always will be of a matter of interest for planners and policy makers. Therefore, investigating the causes of economic growth has a special importance. Simple approach to financial markets has led some people just call it, wins and losses caused by fluctuations in financial asset prices, while the effect of financial structure on economic structure is so important that today, there is a belief that, without an efficient financial sector, economic growth cannot be achieved. In this regard, economists such as, Hicks and Schumpeter focus on developing the financial structure and consider it as an engine and inherent component of economic growth process. In fact, one can say that, optimal performance of economic system in any society is depended on both efficient real and financial sectors. Activity of these two parts together is a necessary and sufficient condition for economic system, because the performance of these two sectors, affect the performance of other sector. In this study, we tried to answer the question whether development of financial sector leads to increase of economic growth.

Since the economic models that determine the exchange market through money supply and demand functions are not able to examine the role of other financial instruments on economic variables, so the majority of theories that focus on this area are placed in the form of endogenous growth models, which introduced in 1986. These patterns claim that, aside having internal consistency, can explain the differences in the level of economic development of countries or the difference in their growth rates. Since in these models, the marginal product of capital is positive, financial development through capital increase can increase economic growth. Generally, the theories about the effect of financial sector on economic growth could be classified into two groups.

The first group of comments inspired by Robinson, (1952) believes that, the financial sector only acts as an intermediary between the depositors and economic sectors to transfer deposits and has a passive mode and growth factors are the classic factors.

The second group including scholars like Goldsmith, 1969 McKinnon, 1973 and Shaw, 1973 argue that, financial development enhance economic growth through increasing deposits (increasing investments), capital deepening (capital efficiency increasing) or both, and the difference between the quantity and quality of services provided by this sector, can explain an important part of the differences between inter-country economic growths. This group believes that, the financial sector could affect economic growth through the following ways.

i. Facilitate risk, financial markets can lower risks (liquidity and firms' individual projects) through diversification of their activities, and cause to move of selective portfolio towards projects with higher returns so that, Hicks, 1969 believes that reduced liquidity risk arising from capital market developments, which reduce liquidity risk, was the cause of industrialization revolution in Britain.

ii. Acquiring information about investment and resource allocation, certainly, not all people have required time and capacity to collect and evaluate projects. This fact create motivation for the existence and expansion of

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financial intermediaries increase so that, though these institutions, the cost of collecting and processing information is reduced and the best projects are selected in terms of efficiency.

iii. Monitoring and controlling managers, in addition to reducing data collection costs, intermediaries and financial markets can reduce monitoring and group control costs for the period after the investment. As Diamond, 1984 says, if the borrower wants to borrow his required loan from many investors, all investor must pay for monitoring charges; while financial intermediaries decreases supervisors reduce monitoring costs because, the borrower firm are monitored only by financial intermediaries, not all individual investors.

iv. Accumulation and mobilizing deposits, certainly, not all depositors have enough capital to invest in large and profitable investments or the required capital for a project is so enormous that is beyond the capability of a single investor, and consequently, financial sector development can prevent unemployment of a part of the resources by collecting deposits.

v. Trade facilitation, financial systems that reduce transaction costs, can lead to specialization of activities and technological innovation as Adam Smith expressed in Wealth of Nations ((lower transaction costs will lead to job specialization)). If you consider the mutually beneficial exchange system, due to high costs, including transport costs of goods, little exchanges was done, but after the generalizing currency and reducing costs, exchange rate has increased (Nili, Rastad, 2003).

This study has five sections. After introduction in section 2 we overview the research literature. In Section 3 research methodology is presented. In section 4 we presented results and finally in section 5, the research summarizes will be presented.

2. LITERATURE REVIEW

Abu-Bader and Abu-Qarn, 2007 in a study for Egypt using vector auto regressive framework, found bidirectional causality between financial development and economic growth. Hao's work, 2006 using Generalized Method of Moments (GMM), showed the positive effect of financial intermediary development on economic growth of China over the period 1985 - 1999. Lian and Teng, 2006 using multivariate vector auto regressive framework showed unilateral causality from economic growth to financial development in China during the period 1952-2001. Ansari, 2002 using vector auto regressive (VAR) investigated the effect of financial development, money, and public costs on economic growth of Malaysia during the period 1960 - 1996. The results show that, financial development has a positive and significant effect on economic growth. Choe and Moosa, 1999 using non-nested models and Granger causality test, investigated causal relationship between development of financial systems and economic growth in South Korea during the period 1975-1992. In this study, the financial sector divided into two parts 1) financial intermediaries and 2) the capital markets division. The results indicate that, financial development lead to economic growth and in this regard, financial intermediaries are more important than capital market. Akbarian and Nejati, 2006 showed that, there is unilateral causality from financial development to economic growth in Iran during period 1951 - 2004. Kazerooni (2003) using Johansen convergence test investigated the relationship between financial development and economic growth in Iran during the period 1954-1996. Johansen test results indicate the existence of long-run relationship between financial development and economic growth, but this relationship is not statistically significant and Granger test confirms the unilateral causality from financial development to economic growth.

Shiva (2001) in a study on Iranian financial institutions during the period 1951-1998 and their effect on economic growth and development using OLS method concludes that, Financial development variables have a positive and significant effect on economic growth. There is unilateral causality from financial development to economic growth. Seifi Pour and Khtayi, 2000 using vector auto regressive (VAR), investigated causal relationship between financial development and economic growth in Iran during the period 1984:4 - 1995:4, relying on Patrick theory. The results showed a positive effect of financial development economic on economic growth and unilateral causality from financial development to economic growth. Nazifi, 2004 using OLS method, investigated the effects of financial development and transfer channels on Iran's economic growth. These results indicate that, financial development has a negative effect on economic growth. Moreover, the transfer channel of these effects is increasing the efficiency of investment.

Results of Liu and Hsu, 2006 for the countries of Taiwan, South Korea, and Japan during the period 1981:1 - 2001:3 shows that, higher investment leads to economic growth in Japan while, this is not true for Taiwan and South Korea and financial development has a positive effect on Taiwan's economy, but a negative effect on economies of Japan and South Korea, also capital market development has a positive effect on Taiwan's economy growth.

Results of McCaig 21 and Stengos, 2005 for several European countries during the period 1960-1995 showed a positive effect of financial intermediaries on economic growth. Andres et al., 2004 investigated the effect of inflation and financial development on economic growth of OECD countries during the period 1961 - 1993 using combined and individual data of each country. In this study, financial sector divided into two banking and capital

market. Results indicate that, long-term effects of inflation on economic growth do not arise only from fiscal policies, and all financial development variables have a positive effect on economic growth.

Christopoulos and Tsionas, 2004 using well-adjusted OLS method, investigated long-term relationship between financial depth and economic growth in 10 developing countries during the period 1970-2000. The results indicated the existence of long-run relationship and unilateral causality from financial development to economic growth. Results of Fase and Abma, 2003 for 9 South East Asian countries showed unilateral causality from financial development to economic growth. Calderon and Liu, 2003 using Goike analysis, investigated the direction of causality between financial development and economic growth in 109 developing and industrialized countries from to aspect of all countries and separated into two groups during the period 1960-1994. The results are as follows.

1. Economic development strengthens economic growth in all countries.
2. When countries are divided into two groups of developing and industrialized countries, there is bilateral causality between financial development and economic growth.
3. The effect of financial depth on economic growth of developing countries is more than industrial countries.
4. Financial development increases economic growth via accelerated capital accumulation and technological changes.

Ahmed and Ansari, 1998 using Granger causality test and Cup-Douglas production estimation function, investigated causal relationship between financial sector development and economic growth in three countries: India, Pakistan, and Sri Lanka during the period 1973-1991. The results showed unilateral causality from financial development to economic growth and positive and significant effect of this sector on economic growth. Nili and Rastad, 2005 using data from two groups of 1) oil exporter countries and 2) East Asian counties during the period 1974-1999, investigated the relationship between financial development and economic growth in these countries. Their results indicate that, the positive relationship between financial development and economic growth in oil exporting countries is less than Eastern Asia countries. Naderi, 2003 investigated different financial systems in terms of performance and its results on growth of real sector of the economy. Their results showed the negative short-term effects of financial crises on economic growth. Deidda, 2006 provided a model to investigate the relationship between financial development and economic growth that consists of two parts: 1) households and 2) firm. Results of this study are as follows:

((Credit markets liberalization success indicators may be depend on the ability of countries to attract foreign capital, but domestic deposits are inefficient for financing sustainable economic development process)). Nazmi, 2005 using a general equilibrium model that includes four sections of households, firms, banks, and the government, investigated the effect of banking liberalization and financial deepening on capital accumulation and economic growth in selected Latin American countries during the period 1960 to 1995. The results showed the positive effect of banking liberalization and financial deepening on economic growth.

3. RESEARCH METHODOLOGY AND DATA

Since most studies in Iran have been investigated the characteristics of money market, we investigated the capital market problems in our study including:

- Problems of production units, manufacturing firms in Iran almost face with the financial problems of providing raw materials and amortized machinery, inability to innovation and legal problems. Consequently, they cannot desirably continue their activities. Therefore, when they issue their shares in the stock market, there will not be enough demand to buy their shares.
- Lack of control over management, currently the ability of controlling executive agents by shareholders who their shares are issued in stock market is very poor and consequently, decrease the interest of private sector or even public sector to participate in capital market.
- Absorption of deposits of private sector by government, about 50 percent of legal and natural persons' deposits in banking systems spent to finance the public sector. However, it should be mentioned that, the financial system do not have enough freedom to allocate the remaining 50 percent, which the direct consequence of this limitation is the weakness of financial market. (Khatayi, 1999)

The following three variables used in this study collected from Central Bank's time series statistics (2007). Moreover, the period of this study is from 1979-2009.

1. GDP per capita growth rate to fixed and base prices in 1998 (RGDP)
2. Current growth rate of government expenditure to GDP ratio (GOV)
3. Financial sector development variable, which is composed of the following variables
    a. Liquidity to GDP growth ratio (M2)
    b. Credits granted to the private sector to GDP growth ratio (DCP)

In this section, we first investigated whether the variables are static and then, we determined variables' coefficients in short-term and long-term and finally, using Johansen's accumulation test, long-term vectors between the variables were determined.

4. RESULTS

In traditional simultaneous equations method, variables first will be divided into two endogenous and exogenous groups and in order to estimate the coefficients of structural equations, a series of restrictions by default will be imposed on the coefficients of structural equations. However, in vector auto regressive model, the desired variables considered as function of values with their lags along with other variables and random components (error component). In this method, none of the components of coefficients' matrix is considered equal to zero beforehand. Although in VAR models, we can enter net exogenous variables, but there is no scope to separate endogenous and exogenous variables voluntarily as is usual in traditional methods of simultaneous equations. One of the important steps in vector auto regressive method is determining the optimum lag level that in this study, determined using Schwartz-Bayesian criterion.

In examining the causality between a series of variables, investigating static variables considered as the first step. Therefore, in this study, we used generalized Dickey-Fuller test for this purpose.

Table 1: variables changes during studied period

	lowest	Highest	average
GDP growth rate	-9.1 (1987)	17.6 (1980)	3.6
DCP/GDP growth rate	-2.02 (1984)	49.3 (1991)	23.29
M2/GDP growth rate	5.2 (1985)	49.6 (1985)	23.426

As can be seen in table (2), all variables are in static level. In other words, all variable are I(0).

Table 2: investigating the statics of variables

Variable	With intercept		With Intercept and time trend	
	Level	First order difference	Level	First order difference
RGDP	-3.753618 *	----------	-3.868869*	----------
GOV	4.004854*	----------	3.954712**	----------
M2	4.141840*	----------	5.097655*	----------
DCP	46.29654*	----------	36.32108*	----------

* And ** mean significant at 1 and 5 percent, respectively.

Among the weaknesses of the vector auto regressive approach, is the lack of theoretical economic basis for this method. Of course, it should not be assumed that, the vector auto regressive models are completely unrelated and needless to economic theories, because model's internal variables determined according to the economic theories. Since in this study, two indices have been used to demonstrate financial sector development, the model also estimated in two steps, which, in each step one financial sector development indicator has been used. As shown in Table 3, the coefficients of financial sector development indicators are consistent with related theory but are not statistically significant. Coefficient of GOV variable is positive in the former model and is negative in the latter, but is not statistically significant in both cases.

Table 3: Coefficients of variables using VAR method

Financial sector development variable					
Intercept	GOV(-1)	DCP(-1)	M2(-1)	RGDP(-1)	
1.35	5.047	0.058	-------	**0.371	RGDP dependent variable
1.02	-99.84	-------	35.88	**0.362	

**: Significant in 5% level

$$RGDP(-1) = 1453.31 + 5337.76M2(-1) - 30108.82GOV(-1)$$

As is apparent from above estimation, the effect of financial development on growth in long-term is positive as well as short-term. Error correction coefficient (ECM) in this case is equal to -0.002 indicating the slow adjustment in the short-term toward long-term.

$$RGDP(-1) = -206.66 + 1441.3DCP(-1) - 645.99GOV(-1)$$

As is apparent from above estimation, the effect of financial development on growth is positive in the short-term as well as long-term, but the effect of current government expenditure, which was positive in the short-term, will be

negative in the long-term. Error correction coefficient (ECM) in this case is equal to -0.016 indicating the slow adjustment in the short-term toward long-term.

Table 4: Johansen test results in DCP variable mode

Prob	0.05 Critical Value	Trace Statistic	Eigenvalue	No. of CE(s)
0.0034	24.27	32.77	0.48	None*
0.0582	12.32	11.92	0.30	At most 1
0.4465	4.12	0.74	0.02	At most 2

Despite the existence of DCP variable in long-term relationship investigation, as shown in table 5, there are two convergence vectors, that are not statistically significant, but their signs are consistent with economic theories i.e. the development of financial sector has a positive effect on economic growth.

Table 5: Johansen test results in M2 variable mode

Prob	0.05 Critical Value	Trace Statistic	Eigenvalue	No. of CE(s)
0.0071	24.27	30.75	0.43	None*
0.423	12.32	12.75	0.32	At most 1 *
0.5963	4.12	0.38	0.01	At most 2

In this study, to investigate existence of convergence vectors (long-term relationship between financial development variables and economic growth), we used Johansen test.

Despite the existence of M2 variable in long-term relationship investigation, as shown in table 4, there is one convergence vector, that is not statistically significant, but its signs is consistent with economic theories i.e. the development of financial sector has a positive effect on economic growth.

5. Conclusion

In this study, we investigated the effect of financial development on economic growth using two indicators of Liquidity to GDP growth ratio" and "Credits granted to the private sector to GDP growth ratio". The results indicated the positive effect of financial development on economic growth. Therefore, our conclusions outlined as follows. In traditional growth models, that there is more emphasize on capital accumulation through deposits and investments, development and improvement of financial markets performance can mobilize deposits and facilitate investments. In new growth models, known as endogenous growth models, technological changes and technical improvements are determined within the model and consequently, role of financial markets will be broader. The average GDP growth rate is equal to 3.6 and the average growth rate of financial development variables is equal to 23.3. Financial sector development variables have a positive effect on economic growth but are statistically insignificant. In determining co-accumulation vectors in M2 and DCP variable modes, there are two and one co-accumulated vectors, respectively.

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