



Local Financial Development and Economic Growth in Iran: An Application of Generalized Method of Moments (GMM)

Rohullah Bayat^{1*}, Somayeh Mohebbi Shirkadehi² and Pegah Bakhshandeh²

¹Assistant Professor of Economics, Imam Khomeini International University (IKIU),Iran.

²Department of Management, Qazvin Branch, Islamic Azad University, Qazvin, Iran.

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*Address for correspondence

Rohullah Bayat

Assistant Professor of Economics,

Imam Khomeini International University (IKIU),Iran.



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ABSTRACT

In recent decades, many economists have shown their interest in studying the economic growth and the factors affecting it. Financial system is one of the most effective elements of economic growth. This study examines the impact of financial market development on the growth of GDP per capita using panel data of 30 provinces during (2001-2011) based on generalized method of moments (GMM) and Granger causality test. The results of GMM estimators state that apart from granted credits of banks to the private sector in relation to GDP, which has a positive relationship to economic growth, financial development has had a negative impact on economic growth of provinces. According to Granger causality test, in short-term, there is no causal relationship between the variables of bank credit granted to the private sector to GDP and GDP per capita of the provinces; but there is a one-way causal relationship from GDP per capita to the financial development index for other two indicators. In the term, a one-way causal relationship has been established from GDP per capita to financial development indicators.

Key words: Local financial development, economic growth, generalized method of moments (GMM), Granger causality test

INTRODUCTION

Economic growth has been a major concern of economists in recent decades. In order to find the determinants of economic growth numerous studies have been conducted by researchers representing increasing importance of economic topics. Most analysts including Mc Kinnon (1973), Shaw (1973), King and Levine (1993) and Levine and Zervose (1996) believe that financial development can increase economic growth. In this viewpoint, financial



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development is regarded as the engine of economic growth; then, policymakers should focus their attention on the creation and promotion of financial institutions for economic development (Abu Noori and Teimuri, 2013).

Financial development is an important determinant of economic growth. Nevertheless, the effect of financial development on economic growth is uncertain due to its broad definition and interdependence with other areas of economic development. Periodical experimental studies have re-evaluated the relationship between financial development and economic growth as a new theory, data collection, and available experimental tools (Ductor & Grechyna, 2015, p. 1). The channels through which financial development leads to economic growth has been widely discussed in economic literature. Associated theories may be specified with the optimistic or pessimistic views. According to the former approach, the best financial systems are systems that facilitate the mobilization of savings and the efficient allocation of resources (Greenwood et al, 2010; King and Levine, 1993), reduce organizational costs and increase innovative activities (Aghion et al, 2005) and help the quick-yielding of investments with sharing risks (Bencivenga & Smith, 1991; Greenwood & Jovanovic, 1990; Saint-Paul, 1992).

According to the new approach, financial development may lead to a high systemic risk (Allen & Carletti, 2006; Gai et al, 2008; Gennioli et al, 2012; Wagner, 2007), suboptimal savings (Jappeli & Pagno, 1994), allocation of labor to the financial sector more than optimal (Bolton et al, 2010; Philippon, 2011), overheat economic capacity (Zeira, 1999), and imposing high inefficient costs on the economy (Santomero & seater, 2000). Based on the structure of this pare, next section is a theoretical review and the third part reviews to the former empirical studies. The fourth part argues the methodology of the study; part five is dedicated to the analysis of research findings. Finally, conclusions and recommendations will be presented.

Theoretical Foundations

Financial development is a process in which quantity, quality and efficiency of the financial intermediary services are improved. It indicates interaction between many activities and institutions. Since it brings an experience of being exposed to a higher growth rates, countries with more developed financial systems are on the path to faster economic growth (Abu Noori and Teimuri, 2013, p. 30).

Financial development and economic growth was first proposed by Schumpeter (1912); it shows how important is financial sector for the development of the capitalist economy. Schumpeterian analysis is based on the idea that credit, when in the hands of "entrepreneurship", is conducive to growth and prosperity. Open looking at credit allows an entrepreneur to change the normal flow of economic through innovation that, in turn, creates growth (Bi encourt, 2012p. 343).

According to the theory of economic growth (Lucas, 1988; Romer, 1986, Solow, 1956), the basic elements of per capita growth are initial level of GDP, human capital, and the accumulation of physical capital. Economic growth per capita should have a negative relationship to the initial level of GDP because economies tend to converge to a stable state with a reduction in the rate of accumulation of capital (which is known as the convergence effect); it should also have a positive relationship to the level of human capital in the country because higher human capital means more innovative ideas and potentially faster economic growth. In addition, experimental models include many of the economic, political, institutional, and geographic elements of growth (see Durlauf et al, 2005).

The available literature regards the effect of financial development on economic growth as a specific set of control variables related to government policies and economic stability of a country; indicators of fiscal policy, measurement of trade openness, and measurement of price stability (for example, Levine et al, 2000) are associated with actions of financial development. Recently, Arcand et al, 2012 has used a quadratic regression model for growth and they have found a nonlinear relationship between financial development and economic growth.





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Theoretical justification for the effect of financial non-uniformity on growth can be included in the following:

1. Financial development can reduce economic growth by increasing economic fragility. The accumulated systematic risk is the result of financial innovation and financial liberalization, both of which have been adopted by financial development (Allen & Carletti, 2006; Allen & Gale, 2004; Gennioli et al, 2012; Wagner, 2007). The higher systemic risk implies frequent or more severe crisis, which, in turn, weaken economic growth in the short and medium periods.

2. Financial development can reduce economic growth through resource misallocation. A fast growing financial sector increases rent and makes the resources more interesting; in the ideal case, these resources should be used in other sectors (Bolton et al, 2011; Philippon, 2010; Santomero & seater, 2000). Optimal allocation of resources suggests that possible short-term and long-term growth rate may not be accessible. For example, if the financial sector employs too much skilled workers to help its development, other sectors suffer from depression along with backwardness in development due to the absence of sufficient human resources. The second case has a negative effect on growth of economic input and output.

Indexes Measuring Financial Development

With respect to the various components, there are several indices to measure financial development. Levine et al have presented several indicators of financial development, these indicators are:

Financial deepening :This indicator measures the size of financial intermediaries and is equal to the ratio of cash liabilities and debts of financial system (coins and bills plus interest-bearing liabilities of banks and non-bank financial intermediaries) to GDP.

Growing of banks :This indicator measures the degree to which the central bank allocates credit for commercial banks and it is obtained by the ratio of banking credits to the sum of credit and local assets of central bank. Two main disadvantages are presented for these indicators. First, banks are not the only financial intermediaries providing valuable financial functions; second, banks may also lend to the government and state-owned companies.

Credit allocation index: This is the ratio of credits allocated to private companies and institutions to total domestic credit (excluding credit to banks).

Performance index: This index is the ratio of given credit to private companies and institutions to GDP. This index assumes that financial systems giving more funds to private companies insist more on investigations and inspection of companies, applying corporate control, providing risk management services, mobilizing savings and facilitate transactions; this is not true for financial systems centralizing credit to government or state-owned companies. The index presents information of funds allocated to the private sector by commercial banks compared to the size of economy.

Renewed interest in the relationship between financial development and economic growth stems mainly from the insights and techniques of endogenous growth models. It shows that sustainable growth takes place without exogenous technical progress. In this manner, growth rate may be related to preferences, income distribution and institutional arrangements and it can present a theoretical ground for financial markets (financial intermediaries) to use surfacing advantages and growth effects. In order to evaluate the potential effects of financial development on economic growth, this research uses the simplest model of endogenous growth, or AK model, where total product is a linear function of the total saving capital.





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$$Y_t = AK_t^\alpha \tag{1}$$

This function of production is the reduced form of one of two following forms. First, competitive economy is associated with exogenous savings where each technologic firm faces a constant scale, but efficiency is an ascending function of total saving capital of K_t . For instance, imagine an economy with N similar firms producing $y_t = \beta k_t^\alpha$ products by saving capital K_t ; if every firm regards β as the index, the average amount of capital will be $\beta = Ak_t^{1-\alpha}$ and $Y_t = Ny_t$ will be as Function (1). AK model can be obtained by another formula. As Lucas assumed K_t as a combination of human and physical capitals; both capitals have the ability to be reproduced with the same technology.

For simplicity, it is assumed that it has the population of static status and economy produces only one production that is consumed or invested. If it is invested while depreciation rate for each period is δ , gross investment is equal to:

$$I_t = K_{t+1} - (1 - \delta)K_t \tag{2}$$

In a closed economy without government, capital market equilibrium requires the equity of S_t gross saving to I_t gross investment. For reasons that will become clear later, $(1 - \phi)$ of savings flow is eliminated in the process of financial intermediation; capital market equilibrium means $\phi S_t = I_t$. According to Formula (2), the growth rate in t+1 is:

$$M_{t+1} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{K_{t+1}}{K_t} - 1 \tag{3}$$

Using Formula (2) and eliminating time index, sustainable growth rate is:

$$g = A \frac{1}{Y} - \delta = A\phi \cdot s - \delta \tag{4}$$

Equation (4) is pressed to show that financial development can have positive effect on growth through influencing ϕ , a fraction of the savings that can be directed towards investment, s , rate of private savings (both parts affect capital accumulation), and A , final outcome and product of social capital (which represents changes in technology innovations).

In the process of converting savings into investment in firms, financial intermediaries (agents and brokers) receive sources in the form of fees and commissions so that a dollar saving by households creates less than a dollar investment. If financial development reduces this fees, ϕ will enhance and growth rate is accelerating. The main function of financial intermediaries to allocate funds to projects with highest final product of capital (improvement of capital allocation). It is achieves in two ways: (A) gathering information to evaluate various investment projects; (B) providing risk partnership by encouraging people to invest in technologies with high risks are but with greater return instead. In contrast to individual investment, financial intermediaries can choose the technologies with their



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diverse portfolios that can best counteract shocks of total return. In fact, financial intermediaries (banks) can increase the efficiency of investment by directing capital to technologies with high efficiency and reducing investment losses due to cashing before maturity.

The third factor that affects the growth is changes in the savings rate (s); the financial development effect on this factor is ambiguous. Preliminary studies of Mc Kinnon (1973) and Shaw (1973) assume that savings rate is positively correlated with interest rates. Then, they presuppose that financial repression or lack of competition, which determines interest rate paid on savings under the competitive market, leads to lower savings, and it restricts growth. On the contrary, financial market liberalization in financial development increases savings and accelerates growth. However, the effect of the real interest rate on savings is ambiguous (because of the substitution and income effects) (Kazeruni, 2003).

Financial development includes improvement in (1) presenting intended information about possible investments; (2) investment monitoring and implementation of the regulatory system; (3) trade, diversification and risk management; (4) mobilization and integration of savings; (5) the exchange of goods and services. Each of these financial functions can affect savings and investment decisions and hence influence on economic growth (Levine, 2005).

The research question is:

How is the relationship between financial development and economic growth in the provinces of Iran?

REVIEW OF LITERATURE

Some Studies Conducted in the World

Andrea Vaona and Roberto Patuelli (2008) examined the relationship between financial development and local economic growth in Italy. The results show while local economic development is a key factor for economic growth, it may lead to a reduction in economic growth in regions with inefficient credit due to opportunistic behaviors and misallocation of funds.

Xiaoqiang Cheng and Hans Degryse (2009) analyzed the relationship between finance and economic growth in a rapidly growing country such as China. Using data from 27 provinces of China during the period (1995-2003), they studied the effect of financial development of two different types of financial institutions (bank and non-bank) on economic growth. The results indicate that development of banking has a more significant statistical and more prominent economic impact local economic growth.

Jalil & Feridun (2011) have addressed the effects of financial sector development on economic growth in Pakistan for 1975 to 2008. They used principal component analysis (PCA) to build composite index of financial depth; moreover, they performed cointegration test using auto regression with distributed lag (ARDL). The findings showed that there is a positive and significant relationship between financial development and economic growth in Pakistan's economy.

Bi encourt (2012) discussed the theory of Schumpeter about the financial development and economic growth in four countries in Latin America during 1980-2007. Based on analysis of time series panel, results confirm Schumpeterian estimation that entrepreneur can invest in productive activities and hence economic growth is created. In addition, not only the importance of freedom, competition and active financial sector is outstanding in transferring financial resources for entrepreneurs but also the relationship between economic stability and institutional framework



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(including the independence of the central bank and financial responsibility laws) highlight structural reforms in 90s as necessary condition for economic development, sustainable growth and prosperity in the region.

Jake Kendall (2012) investigated the relationship between the development of the banking sector, human capital and economic growth in India using exclusive data of economic growth in the region. Results suggest that local regions are limited financially due to the underdevelopment of the banking sector and the possible relationship is non-linear. In addition, an increase in human capital can reduce financial constraints.

Zeynep Onder and Suheyyla Ozyildirim (2012) analyzed the relationship between the credits of state and non-state sectors and local economic growth in Turkey during the crisis and election year. They concluded that the share of state-owned banks during the crisis and in local elections in the credit market is significantly higher than their share in non-crisis periods and non-elections. Real per capita credit provided by state-owned banks during the crisis is accompanied with positive local growth in all provinces. The results also indicate although state-owned banks may loan for political reasons during the elections, it appears that these loans will also play an important role in modulating the adverse effects of economic shocks, especially in the developed provinces.

In "Economic growth and financial development in Asian countries: A bootstrap panel Granger causality analysis, Economic Modelling," Hsueh et al (2013) examined the causal relationship between economic growth and financial development in ten Asian countries between 1980 and 2007. Their results suggest that causality direction to the variables of financial development is more sensitive in the ten countries. Furthermore, the results confirm Supply-leading hypothesis where financial development variables lead economic growth in the ten countries, especially China.

Bayar et al (2014) studied the effect of stock market development on economic growth of Turkey during 1999 to 2013 using Johansen-Juselius cointegration and Granger causality tests. Experimental results showed a long-run relationship between economic growth to stock market value, the total value of traded shares, and turnover of stock transactions. Moreover, there is a one-way causality from the market value of shares, the total value of shares traded and the trading stock turnover ratio to economic growth.

Wadad Saad (2014) investigated the relationship between financial development and economic growth of Lebanon from 1972 to 2012 using the model of vector error correction. He examined the Granger causality relationship between financial development and economic growth. Evidence shows that credit markets were still underdeveloped in the country and the distribution of growth had been limited. The article focuses on measuring the financial development of the banking sector. There was a positive two-way causal relationship between financial development and economic growth in short run; but this relationship was not significant in the long run. However, the results revealed that the efficiency of the banking sector plays an important role in Lebanese economic growth. Using data on 101 developed and developing countries for the years 1970 to 2010 and with the use of panel data methods, Ductor & Grechyna (2015) examined the association of financial development with production of the real sector as well as their impact on economic growth. The results of the study indicate that the effect of financial development on economic growth is negative if the rapid growth occurs in private credit, not growth in the real sector. Furthermore, consequences support theories that emphasize financial desired level.

Caporale et al (2015) observed the relationship between financial development and economic growth of 10 new members of the Europe Union. They estimated the relationship between for a period of 1994-2007 using dynamic panel. The findings reveal that capital and stock markets are still undeveloped in these countries and economic growth is still distributed limited due to lack of deep financial sector although one banking sector may increase rapidly.



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Nazifi (2004) examined the relationship between financial development and economic growth in the period (1959 - 2002) using indicators of financial efficiency; he showed that financial development had a negative impact on economic growth of Iran. Based on the results, financial development had a negative impact on economic growth due to poor management of the financial system, lack of the formation of an integrated financial market, taking advantage of the rules, and the release mode of the financial markets.

Asari, Naseri and Khondabi (2008) studied and compared the relationship between financial development and economic growth in non-oil producing countries and OPEC countries. The investigation was conducted based on a dynamic panel model using GMM estimators during the period 1990 to 2004. The results of these estimates and comparisons state that financial development in the oil producing countries of OPEC have a negative impact on economic growth in the period under review because of oil revenues and inefficiency of financial institutions in the mobilization of financial resources. The effect of financial development on capital accumulation in these countries is negative.

Akbarian and Heidari Pour (2009) looked into the impact of financial market developments on economic growth of Iran in the short-term and long-term period (1966-2007). For this purpose, two different indicators of financial market development (the ratio of financial savings to GDP and the ratio of domestic credit to GDP) is used in two distinct models in form of auto regression with distributed lag (ARDL). The results of estimating equations of show that in both models, financial indicators have negative impact on economic growth in the short-term; but in long-term, the relationship between indicators of financial development and economic growth reveal lack of close supervision in the banking system on the facilities.

Sadeqi et al (2012) studied the relationship between financial development and economic growth in the period 1973-2009. In this regard, vector auto regression model (VAR) and Johansen-Juselius cointegration were used to peruse long-term relationship between financial development and economic growth. The results of the model imply the existence of a significant relationship of financial development and variables of physical capital stock, real interest rates and revenues from oil exports with economic growth. One-way causal relationship from financial development to economic growth reflects the consistency of results with some experimental studies in this field.

Abu Noori and Teimuri (2013) investigated and compared effect of financial development on economic growth in the 26 countries of the Organization for Economic Co-operation and Development (OECD) and 23 countries with upper-middle-income (UMI). Models' estimation was carried out using panel data econometrics during the period 1980-2009. The results showed that financial development has a significant negative effect on economic growth in selected countries. Since the members of Organization for Economic Co-operation and Development are more developed, the impact for these countries is fewer. Besides, the effect of other variables including government size, inflation and real GDP per capita gap, investment and openness is consistent with theoretical expectations.

Elmi and Ariani (2013) studied effect of the development of financial markets on income distribution in Iran using panel data of 28 provinces of Iran in the years 2000 to 2006. According to the results obtained from the alternative variable of development and financial depth, performance Index has a significant effect on reducing inequality in provinces of Iran. Unlike inflation rate, public spending is among the factors driving inequality reduction. In addition, Kuznets inverted U relationship was confirmed in the provinces of Iran and it is reasonable to claim that financial development in Iran reduces inequality.

Ehsani (2014) looked at the effect of effect of stock market development on economic growth, as well as variables such as savings, physical capital, human capital and ... using panel data of D8 countries during the period 1988-2011.





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Stock market development was described by 5 agents and was estimated by 5 models. The results indicate the existence of significant positive effect of stock market on economic growth in these countries.

Mohammadi et al (2014) compared the causality among financial development, trade openness and economic growth in Iran and Norway using vector error correction model (VECM). The analyzed period in Iran is 1967-2009 and in Norway is 1967-2006. Research results indicate that indicators of financial development and trade openness are the reasons for short-term economic growth in Iran. In long-term, there is a two-way casual relationship between both indicators of financial development and economic growth. The results of causality in Norway suggest that there is a one-way causality from economic growth to the index of granted credit to the private sector in short-term. In addition, there is a two-way casual relationship between indicators of granted credit to the private sector and commercial intensity; there is also a one-way relationship from economic growth to index of granted credit the private sector in long-term. Therefore, it can be said that the idea of supply side is true about Iran and the idea of demand side is true about Norway.

Recent studies about the relationship between financial development and economic growth has been based on cross-country studies; thus, the important issues are target countries, estimation methods, the frequency of the data, consequential form considered for the production (growth), and substitute variables that are often very different. This research examines the relationship between economic growth and financial development in the provinces of Iran.

METHODOLOGY

One can define models in which financial development is an independent variable and the dependent variable is economic growth. The general model is as follows:

$$GDP_{it} = f(FD_{it}, Z_{it}) \quad (5)$$

The variables of this equation are GDP per capita as the best explanation of economic growth (GDP_{it}), local financial development (FD_{it}), and a vector of the other independent variables (Z_{it}). The definition of other independent variables in the model depends on the economic conditions of each province in Iran. The size of government associate with its intervention in social and economic aspects. The government size refers to the volume of operations carried out by organizations, agencies and the affiliated institutions including regional, state, municipal and social security organizations. The state budget, as an important national economic document that indicates the program and goals of the government, can show the size of government. Currently, the expenditure of the public sector to GDP is one of the most common indicators to measure the size of government. Many studies claim that the best scale for measuring the size of government is the ratio of total government spending to gross domestic product. Therefore, this study regards indicators of ratio of current government expenditure to GDP, and ratio of government construction spending to GDP as other affecting factors on economic growth in the provinces. As a result, the research equation can be expressed as follows:

$$LGDP_{it} = \alpha + \beta_1 LGDP_{it-1} + \beta_2 FD_{it} + \beta_3 GR_{it} + \beta_4 GO_{it} + U_{it} \quad (6)$$

Where U_{it} is error term, index of "i" indicates the number of provinces (i=1, ..., 30), t reflects period from 2001 to 2011, α intercept, β_k coefficients of the explanatory variables so that (k=1, ..., 4), $LGDP_{it-1}$ the logarithm of GDP





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per capita for provinces i at time $t-1$, FD_{it} financial development index of province i at time t , GK_{it} ratio of government current expenditure to GDP in the province i at time t , and GQ_{it} is the ratio of government construction spending to GDP in the province i at time t .

Appropriate indicators of financial development should be defined with respect to other studies in the world and conditions in province's financial system. Iranian financial system is formed according to the banking system and securities markets. Iranian stock market has little effect on the economy of the provinces for reasons such as the closure of and recession. In the research, three indexes are presented for financial development; the data are derived from the banking system. Three indexes are:

DGDP: ratio of deposits to GDP

N: Number of bank branches

TGDP: the ratio of total bank credits granted to the private sector to GDP

Consider the following dynamic model to explain algebraic approach of GMM:

$$y_{it} = \alpha y_{it-1} + \beta' X_{it} + \eta_i + \phi_t + \varepsilon_{it} \quad (7)$$

In the above equation, y is the dependent variable, X vector of explanatory variables, η individual or fixed effects of countries, ϕ time constant effects, ε error term, i the country, and t period. In specification of Model (7), it is assumed that error terms are correlated with individual effects or constant effect of countries and dependent variable values is not interrupted. If η is correlated with some explanatory variables, first order differencing will be one of the suitable methods to remove the constant and individual effects of countries because using constant effect method results in biased estimators of coefficients; thus, it first order differencing is necessary for Equation (7). Therefore, Equation (7) is converted to the following formula:

$$\Delta y_{it} = \alpha \Delta y_{it-1} + \beta' \Delta X_{it} + \Delta \phi_t + \Delta \varepsilon_{it} \quad (8)$$

In Equation (8), interrupted difference of dependent variable (Δy_{it-1}) correlates to first order difference of error term ($\Delta \varepsilon_{it}$); in addition, there are endogenous problems related to some explanatory variables that were not included in the model. Hence, it is necessary to fix the problem of instrumental variables used in the model. This study uses method of Arellano-Bond (1991) as a good GMM estimator. The estimation is performed using instrumental variables.

RESEARCH FINDINGS

Model Specification Using Generalized Method of Moments

With regard to the economic structure of the provinces and provincial statistical information, following model is used to evaluate the factors affecting the economic growth in the provinces:





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$$LGDP_{it} = \alpha + \beta_1 LGDP_{it-1} + \beta_2 DGDP_{it} + \beta_3 TGDP_{it} + \beta_4 N_{it} + \beta_5 GR_{it} + \beta_6 GO_{it} + U_{it} \quad (9)$$

Where U_{it} is error term, index of "i" indicates the number of provinces (i=1, ..., 30), t reflects period from 2001 to 2011, α intercept, β_k coefficients of the explanatory variables so that (k=1, ..., 6), $LGDP_{it-1}$ the logarithm of GDP per capita for provinces i at time t-1, $DGDP_{it}$ is the ratio of deposit to GDP for province i at time t, N_{it} is the number of bank branches per every 10000 persons in province i at time t, $TGDP_{it}$ the ratio of total bank credits granted to the private sector to GDP for province i at time t, GR_{it} ratio of government current expenditure to GDP in the province i at time t, and GO_{it} is the ratio of government construction spending to GDP in the province i at time t. variables GR_{it} and GO_{it} are regarded as other effective variables (control variables) on economic growth.

The reliability of the parameters of the model should be examined to avoid estimating false regression. Contrary to what is customary in the case of time series data, Dickey-Fuller test and generalized Dyky- Fuller test cannot be used to check reliability of panel data; but it is necessary to examine the collective reliability of variables. For this purpose, Levine, Lin and Chu test (2002) is used in this study. H_0 hypothesis in this test indicates lack of reliability of variables. According to Table (1), all variables in the order $I(0)$ are static.

GMM estimators' compatibility depends on the validity of applied tools. Statistics suggested by Arellano and Bond (1991), Bondle and Bond (1998) and Arellano and Bower (1995) were used to test the hypotheses. The test, known as Sargan test, measures the total validity of the applied tools.

GMM estimations may be carried out based on one-stage or two-stage estimators. In one-stage estimation, error term (U_{it}) is defined according to independence and random assumption among provinces and times. In two-stage estimation, the remainder of the first stage is used in compatibility form for the estimation of variance matrix of residuals' covariance. The difference between these two methods (Arellano and Bond with Arellano-Bower/Bondle and Bond) lays in the approach considering individual effects. The first method increases precision, reduces bias in sample size restrictions, brings more efficient and accurate estimations. The results of estimating model in a two-step GMM estimator are shown in Table 2.

Sargan test statistics indicate the proper selection of applied tools, the validity of instrumental variable matrix used in the model, and the lack of restrictions over the identification of the estimated model. Wald tests of Chi-square distribution with freedom degree of the explanatory variables number except intercept and virtual variable show that the null hypothesis (zero value of all coefficients except the intercept and virtual variable) cannot be accepted and regression coefficients are significantly different from zero.

According to Table (2), this research investigates autocorrelation order of error terms based on Arellano-Bond test because first order differencing method is suitable for eliminating constant effects when autocorrelation order of error terms is not from stage two.

According to the results in Table 2 it can be stated that autocorrelation order of error terms is one; therefore, Arellano-Bond test is suitable for eliminating constant effects of the model and it has no specified bias.

According to Table 2, the ratio of deposits to GDP of provinces (DGDP) has negative relationship to economic growth, so that for every one percent increase in bank deposits (0.17) percent economic growth decreases. It can be





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due to a high inflation rate in the country. Given that the inflation reduces the purchasing power and reduces the value of money, if accrued interest on bank deposits is below the inflation rate, the value of deposited money in bank will be reduced and banking system will not be able to pay fair rights. In addition, due to the attractiveness of other markets and their higher profitability, the liquidity of the banking system is removed and it goes to other markets; in this case, both bank and economy suffers from deficiencies.

Moreover, the variable N (the number of branches) has a negative relationship to economic growth so that for every one percent increase in the number of bank branches in provinces, economic growth decreases (-0.021) percent. The existence of high liquidity is a reason for increasing the number of banks, or branches. With this increase, banks and institutions try to collect liquidity in community, but it is not useful because the country has not focused on production policies. Investments are allocated into foundation of new branches in a situation that financial resources should be injected directly to production in order to increase employment and efficiency rates. This negative relationship between the number of bank branches and economic growth in provinces may be due to the following reasons:

- Independency and autonomy of banks with minimum supervision of the central bank.
- Lack of adequate supervision of authorities over people's deposits while deposit of people is several times greater than bank capital.
- Higher than the standard employment of public funds by the banks (which is deposited) in order to buy property, management building and maintenance of the property.
- Giving huge loans to ordered and beneficiary persons.
- Irrational evaluations by banks for assessment of the collaterals.

According to Table (2), the variable TGDP (the ratio of total bank credits granted to the private sector to GDP) has positive relationship to economic growth of provinces. One percent increase in credits granted to the private sector enhances economic growth of provinces for 0.086 percent. This means that there is a one sided relationship between credits granted to private sector by bank and economic growth; this can be named as a key factor in the economic growth of provinces. In other words, since the volume of state economy is huge in provinces, strengthening the private sector through this index of economic growth will be more effective. As the index is significant, regulatory and legal defects and problems in the banking system should be eliminated and money market management should be coherent and integrated.

Variable G_R (The ratio of government current expenditure to GDP) is regarded as the real part of economy and control variable. According to the table (2) and as it was expected, government current expenditure has a negative relationship to the economic growth of provinces. It specifies that pathology and economic reforms of the current government expenditures in Iran are more effective in the economic growth of provinces. In addition, According to expectations, the variable G_O (the state construction expenses) has a positive relationship with economic growth.

Granger Causality Test Results

Separate indexes of Granger causality test was used to investigate the casual relationship between the logarithm of financial development indexes and the logarithm of GDP per capita (LGDP). With regard to the the reliability of the



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values of the variables, Granger causality test was performed on the variables. The results of this test indicate short-term causal relationship between GDP and index of financial development.

Table (7) shows the results of Granger causality tests for financial development indexes and the logarithm of GDP non-oil per capita. The figures indicate that reason for short-term economic growth in Iran has been financial development in provinces; but it should be noted that there is no casual relationship between the ratio of granted credits to the private sector by banks to GDP and the ratio of deposits to GDP. Moreover, there has been no causality from financial development indexes to economic growth in Iran. In addition, the casual relationship of LTGDP and LDGDP in short-term changes from LDGDP to LTGDP.

Table (8) shows the results of Granger causality tests for the logarithms of financial development indexes and the logarithm of GDP per capita in long-term. Based on these results at significance level of 5%, long-term casual relationship between the logarithms of financial development indexes and the logarithm of economic growth in provinces is from economic growth to financial development indexes, like causality of short-term. This means that the economic growth in provinces of Iran occurs because of financial development. Long-term casual relationships among explanatory variables are presented in Table (8).

CONCLUSION

There are many ideas about economic growth and financial development. First, financial development leads to economic growth; it is known as supply theory. Second, economic growth creates demand for financial services and the need for new financial instruments. Therefore, economic growth is a reason for formation of financial development. Third, the relationship between economic growth and financial development is not significant. Fourth, the relationship between economic growth and financial development is simultaneous and mutual; in other words, both supply theory and demand theory are ongoing. In this regard, further experimental researches are required for accurate identification of these relations in the economy. The results of this study using GMM estimator show the negative influence of deposit to GDP ratio and the number of bank branches on the economic growth of provinces during 2001-2011. In addition, the ratio of credit granted to the private sectors by banks has a positive relationship to the economic growth of provinces. In this regard, financial development of the private sector has been more efficient than financial development of the banking sector. It means that the ratio of private sector credit to GDP has increased so that the increase refers to improvement of the private sector productivity. Based on the results, there has been a negative relationship between ratio of deposit to GDP and economic growth during 2001-2011. It could be due to the lack of sufficient development of the capital market in Iran that has led money market to carry out the duties of capital market and supply resources needed for long-term investments. Therefore, it has been unable to provide demand for short-term funds.

The structure of current and development expenditures of the government of Iran in the economy is very important. The relationship of aggregate demand components including consumption and private investment to current and construction costs of state is not negligible so that components of aggregate demand react to current and development expenditures of the government. The estimated coefficients for the variables of government current expenditure show that the government has a large and inefficient consumptive body in the provinces. This is due to expelling the private sector and allowing economic rent opportunities as one of the main obstacles to economic growth in the provinces.

The results of this study reflect the positive impact of the increase in development expenditure on the increase of per capita GDP in the provinces. Given these results, it can be stated that if the government of Iran increases its development expenditure more than consumption expenditure, it will help more to the economic growth of provinces.





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Granger causality test results indicate that according to indexes of deposit ratio to GDP and synthetic indicator, economic growth is the only reason for financial development in the provinces of Iran. Moreover, there is no casual relationship between index of the credit granted to the private sectors ratio to GDP and economic growth in the provinces of Iran. However, there is a long-term causality between the logarithm of financial development index and the logarithm of economic growth of the provinces from the economic growth to the financial development index at significance level of 5%. In other words, economic growth results in financial development in the provinces of Iran. In addition, causality in the short-term and long-term between the indexes of deposits ratio to GDP and the private sector credit to the GDP is from deposit to the credit granted to private sectors by banks. This means that a change in bank deposits in the provinces of Iran (financial savings) results in a change in credit to the private sectors.

It is suggested that the banks of provinces optimize their activities and try to lead more credits to productive investment projects which is implemented by the private sector by private sector.

With regard to the negative effect of financial development indexes on economic growth, it can be due to weakness of expertise and lack of proper supervision of the banking granted facilities, so, it is suggested to banking system to employ skilled forces and supervise more accurate on the appropriate use of granted facilities for production.

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Table 1: Testing panel unit root using Levine, Lin and Chu in GMM method

Variable	Level					
	With an intercept			With intercept and process		
	Test statistic	Probability	Status	Test statistic	Probability	Status
LGDP	-5.19081	0.0000*	Static	-9.27163	0.0000*	Static
DGDP	-9.76883	0.0000*	Static	-12.1933	0.0000*	Static
TGDP	-7.59952	0.0000*	Static	-11.8292	0.0000*	Static
N	-5.59288	0.0000*	Static	-6.42466	0.0000*	Static
GO	-7.70591	0.0000*	Static	-9.50146	0.0000*	Static
GR	-2.54640	0.0054*	Static	-9.37694	0.0000*	Static

Source: The findings of the researchers, * significant at 5%

Table 2: Results of two-stage GMM model estimation (dependent variable: logarithm of GDP per capita)

Variable	Coefficient	Standard deviation	Z score	Probability
LGDP(-1)	0.972731	0.0029096	344.32	0.000*
DGDP	-0.1764876	0.0226283	-7.89	0.000*
TGDP	0.0863733	0.00981212	8.80	0.000*
N	-0.0215221	0.0007435	-28.95	0.000*
GR	-0.1431781	0.0276371	-5.18	0.000*
GO	0.0402939	0.0000737	546.94	0.000*
AR(1)	-	-	-3.5624	0.004*
AR(2)	-	-	-1.6279	0.1036
Diagnostics Test				
Test	Statistics		Probability	
Sargan	j-statistic =29.5943		0.4345	
Wald	06e+4.30		0.0000*	

Source: The findings of the researchers, * significant at 5%

