Survey the Effects of credits granted by specialized banks on economic growth: Case study of Iran from 1997 to 2012

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ABSTRACT: Economic growth along with inflation and unemployment are the main topics discussed in macroeconomics. Achieving a suitable economic growth rate and permanent development are among the most important duties and goals of managers, economists, policy makers and etc. Observing that banks are capable of attracting people's small or great savings which are generally still by absorbing types of deposit also, are capable of using these aggregated resources in productive economic sections and accelerating economic growth process therefore, investigating the relation of banks' endowed credits with economic growth has a particular importance. The present study investigates and evaluates the effect of endowed credits of specialized banks and economic growth in Iran using the data of time series, work force mass, endowed credit mass of specialized banks and, real gross domestic product (GDP) mass during 1997 to 2012. Specification model used for analyzing data in this study is Auto Regressive Distributed Lag (ARDL) method as GDP is a function of endowed credit mass of banks as the substitute of capital and work force in Iran. Results of this study show that endowed credits of specialized banks in Iran has the potential of affecting economic growth in long term and short term but its relation with economic growth in long term is more effective and strong. Results of experimental tests show that these variables satisfy the economic prerequisite also; all of the variables in long term and short term are statistically meaningful and the considered pattern for investigating the relationship between the variables is also constant and convergent.

KEYWORDS: endowed credits, specialized banks, economic growth, Auto Regressive Distributed Lag (ARDL) method.

1 INTRODUCTION

In a monetary economy, individuals are able to hold their income surplus in different ways such as cash, bonds, stocks, and gold. Institutions and individuals who wish to invest can use others' savings. Investors can also pay a part of their earnings to savers. Such a system is beneficial both to investors as they can develop their activities and to savers as they can assign a part of earnings to themselves. Currently, financial markets and institutions are required to develop a mechanism to transfer funds from savors to borrowers. In other words, financial markets must facilitate the cash movement from entities with surplus to entities with deficit. Financial intermediaries (mainly banks in Iran) provide the means of payment between individuals and the economy and make the transfer of funds possible. Such firms perform the task of financial intermediation to fill the gap between the lenders and borrowers by creating markets for two types of securities, one for borrowers (such as

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deposits in financial institutions) and the other for lenders [7]. According to economic theories, capital accumulation is one of the effective factors on the growth of national economy. Accordingly, the financial market is one of the processes used for capital formation and it plays a significant role in collecting the existing saving resources in the national economy and directing them towards productive economic generator consumptions. By mobilizing capital sources and optimal allocation of them, banks provide the ground for economic prosperity. In fact, by collecting existing minor and scattered capitals and the use of stagnant savings for the purpose of improving production and funding financial institutions and the government, banks contribute significantly to employment growth, controlling liquidity and inflation through maintaining the balance inside the country, the equitable distribution of wealth through the development of public ownership, and consequently the gdp growth. In addition, banks and financial and credit institutions provide entities and corporations with benefits such as increased domestic and international credibility which links them to global markets, reduced liquidity risks, increased competitiveness, improved public trust, and the use of the public participation in the development of industries and infrastructures which ultimately will lead to further economic growth by enhancing the investment capacity of firms in manufacturing and service operations [2].

In fact, banks with the help of their credit and financial policies are able to pave the ground for economic growth and development or conversely for the economic downturn and recession in the country. They are also able to accelerate the economic development and growth by granting business, industrial, and production credits and loans. Besides, by granting credits; banks can encourage and develop exports, increase domestic production and agricultural and industrial development, improve domestic and foreign trade, and facilitate transportation to help the import of goods and services and encourage people to contribute to saving, and capital formation and accumulation in the country. The role played by banks in raising small funds, pooling the people's savings and using them in the production and consumption is very important to the extent that the successful implementation of such policies can contribute considerably to economic growth and development. In contrast, the lack of lending by banks or the use of loans in an inappropriate way may lead to stagnation and stunted economic growth and development [19].

LITERATURE REVIEW

Today in most developed countries, financial markets and instruments are greatly expanding and they play a major role in economic growth and development so that the diffusion of electronic money and deepening of stock markets and the spread of communications between financial markets and unions in different countries have increased the significance of financial markets and institutions. Besides, the process of a financial liberalization has been introduced in many developing countries with the aim of achieving economic growth and development. These countries are trying to turn away from the traditional systems of financial markets and move towards broader and more influential financial markets by creating competitive markets and financial institutions, privatizing public enterprises and banks, boosting the stock market and securities, eliminating unnecessary and cumbersome regulations and unwanted bureaucracy in mobilizing people's savings and resources, and clarifying information flows. Similarly, given the particular economic structure of Iran in which oil revenues account for a major share of the country's income and since the financial market in Iran is a bank-centered market and a major part of it is owned and run by the government, increasing emphasis is being put on the role of financial liberalization in mobilizing public savings and optimal allocation of resources. Therefore, an analysis of the previous position of the banking system and its role in the economic development as well as the exploration of the existing obstacles and shortcomings can play an important role in finding appropriate solutions to achieve progress and development which is the main motive behind conducting the present study. Although, it seems that that specialized banks play an effective role in the economic growth, empirical evidence indicates that such relationship can be positive or negative, as well as neutral. Some researchers have explored this relationship in a number of countries and some have examined it in a given country. Besides, methodologies used by these scholars have not been the same. Using econometric techniques, the present study aims to explore the impact of credits granted by specialized banks and also the effects of other influential factors such as labor on the economic growth. The main hypothesis developed in this study to explore the effectiveness of credits granted by specialized banks on the economic growth, stated: "Credits granted by specialized banks have a positive significant impact on the economic growth".

Most experimental studies indicated that banking loans and facilities have a positive effect on production and employment. For instance, Saeedi (2009) in a study on "The role of duty and non-duty facilities of specialized banks in the economic growth" examined the effectiveness of credits provided by specialized banks on the economic growth in Golestan Province from 1997 to 2006 using the mixed data technique. The results indicated that non-duty facilities of specialized banks are more effective than duty facilities in this regard. Besides, it was noted that generally banking facilities have the potential to increase investments and accelerate the economic growth in the region under study.

Levine and Beck (2002) in their study on the relationship between stock markets, banks, and economic growth, evaluated the impact of exogenous factors of banking development on economic growth using GMM method. The results of the study confirmed that banking development and increased credit volume have a positive significant impact on economic growth. Burgess and Panda conducted a study in India investigated the effectiveness of the increase in the branches of the banking system on the rural development. Their results indicated that this increase may result in production and employment restructuring and reducing poverty and inequality[5].

2 MATERIALS AND METHODS

A qualitative research methodology was used in this study. Besides, the present study is a descriptive study of a cause and effect type. Concerning the research questions and testing research hypotheses, it is a statistical research. However, it is an econometric study as it is based on an economic perspective. In addition, the scope of the study deals with the Iranian economy from 1997 to 2012.

Most studies have used the production function to explore the impact of the banking system on the economic growth [5]. Consequently, the present study employed the general form of the production function that focused on labor and capital to investigate the extent to which and the way credits granted by specialized banks affect the economic growth in Iran. Although the production process requires a wide variety of factors, models used to investigate the impact of macroeconomic factors on the production are simplified as much as possible so that the production is seen as a function of labor and capital and is defined as a process which creates a value added[3]. Some features of the productions are summarized as follows:

$$y = f(l, k) \tag{1}$$

$$\frac{\partial y}{\partial l} > 0 \quad , \quad \frac{\partial y}{\partial k} > 0$$

As shown in the above equation, production is a progressive function of the inputs of production such as labor and capital [9]. Another striking feature of production is the distinction between short and long terms. In the short term, factors of production are somewhat considered as fixed. However, all factors of production are variable in the long term. In addition, one of the important features of production is that efficiency is explored by scale. In other words, it is of interest to know if factors of production are multiplied by λ, how the production volume will change. Efficiency is defined by scale in three ways: Progressive efficiency to scale, constant efficiency to scale, and decreasing efficiency to scale[1]. In Model 1, the production system is shown by a set of causal relationships among the variables. The econometric model selected for the above theoretical model may be linear or nonlinear. The linearity of the model means that the model is linear with respect to parameters and this is significant for the confirmation of mathematical and statistical theories as well as for the calculation of the parametric values. The initial models are convertible to linear models using algorithms or the Taylor series [20].

In the present study, the production function was used as a structural equation to assess the impact of credits granted by specialized banks on the economic growth. Given that credits granted by specialized banks are a part of the capital stock, credits of specialized banks were used as a proxy for the capital formation in this study. Based on the previous studies and the conditions stipulated for the calculation of the elasticity by the structural analysis, the conceptual model of the study is expressed as follows:

$$\log(y) = \beta_0 + \beta_1 \log(L) + \beta_2 \log(K) \tag{2}$$

The above model is a determined model. In order to obtain an econometric model with the potential of performing empirical analysis using realities available in the collected data, a stochastic term is added to the model. The stochastic term in Model (3) possesses some special properties that are representative of some of possible variables affecting the dependent variable, which are not listed on an algebraic model:

$$\log(y) = \beta_0 + \beta_1 \log(L) + \beta_2 \log(K) + \varepsilon \tag{3}$$

In the above model, log (y) presents GDP as a proxy for economic growth . In addition, given that the econometric model of the study is a log-log model, the estimated parameter i.e. elasticity shows the economic growth relative to labor and credits granted by specialized banks. Therefore, the sign and the value of banking credits will be useful to test the main research hypothesis.

The following abbreviations were used in the model under study: *LY* is the logarithm of the real GDP in Iran, *LL* represents the labor population in Iran, and *LK* stands for credits granted by the specialized banks in Iran.

3   RESULTS

To estimate equation (3) using the common econometric techniques, it is important to note that the use of traditional and conventional econometric methods to estimate the model coefficients through time series data is based on the assumption that the model parameters are stationary [1]. A time series process is stationary when its mean and variance remain constant over time. If the time series variables used to calculate the model coefficients are stationary, the efficient of determination may be high and make the research make incorrect inferences about the relationship between variables while there may be actually no significant relationship between them. In such cases, the regressions performed in are real but they are spurious[8]. Moreover, when the model variables are not stationary, the other critical values of conventional statistics such as t and F are not applicable [11]. Therefore, in stationary conditions, the research variables were examined using the Augmented Dickey Fuller Test as shown in Table 1:

Table1 . Results ADF test for the variables included in the model at significance level of 5%

Variables	Intercept Without Trend			Intercept and Trend			No Intercept and No Trend		
	Critical Value	ADF Value	Stationary/Non-Stationary	Critical Value	ADF Value	Stationary/Non-Stationary	Critical Value	ADF Value	Stationary/Non-Stationary
LGDP	-3.081	-1.6372	Non-Stationary	- 3.759	0.6387	Non-Stationary	-1.966	4.7455	Non-Stationary
LL	-3.081	-2.5416	Non-Stationary	3.759	-0.6518	Non-Stationary	-1.966	3.5768	Non-Stationary
LK	-3.081	-0 .874	Non-Stationary	-3.791	-4.7984	Stationary	-	-	-
DLGDP	-3.098	-1.1169	Non-Stationary	-3.791	-1.4964	Non-Stationary	-1.968	-1.1111	Non-Stationary
D (LGDP, 2)	-3.119	-3.1038	Non-Stationary	-3.933	-5.6820	Stationary	-1.970	-3.1817	Stationary
D (LL)	-3.098	-2.5255	Non-Stationary	-3.791	-2.9736	Non-Stationary	-1.970	-1.1104	Non-Stationary
D (LL, 2)	-3.119	-5.7601	Stationary	-3.828	-5.49342	Stationary	-1.9709	-6.02436	Stationary

A general conclusion of the Augmented Dickey Fuller Test concerning that the variables in question is that the logarithm of credits granted by specialized banks is stationary while the logarithm of GDP and the logarithm of labor are non-stationary and they do not become stationary even with a difference is not viable, so the second-order difference of the above variables was used. The results of the Augmented Dickey Fuller Test show the above variables become stationary by two differences. Therefore, it can be suggested that since the research variables are not of the same order, the use of cointegration techniques is very useful. Numerous models have been proposed to test cointegration. One of the most common of them is the Dickey Fuller (DF) or the Augmented Dickey Fuller (ADF) on u_t terms estimated by the cointegration regression which is known as the Engle-Granger (EG) or the Augmented Engle-Granger (AEG). Other models are Johansen Model and Johansen-Juselius Model[13]. As these models have a low explanatory power and a number of other disadvantages, Autoregressive-Distributed Lag (ARDL) Model have been used more frequently in the recent years to test cointegration.

Banerjee and Inder , using Monte Carlo simulation, found that the estimation bias may be substantial in small samples. Therefore, a model estimated that has the short-term dynamism so that the model coefficients are estimated more accurately [11]. The Autoregressive-Distributed Lag (ARDL) and the Error Correction Model (ECM) have this advantage. Therefore, ARDL was used in this study as it tries in addition to the short-term estimation of the model dynamisms, to determine the relationship between the model parameters.

The most important advantage of ARDL is its flexibility which means to obtain consistent estimates of the long-term coefficients regardless of whether the variables are I(0) or I(n). In other words, the model can be used when the variables are of different integration order [13]. Pesaran and Shin demonstrated that if the convergence vector is obtained through the least squares method based on the ARDL whose lags are specified accurately, the estimator has the minimum normal distribution. In addition, it show less bias and is more efficient for small samples. One of the other advantages of this model is that it contains a sufficient number of lags for the data generation process in the framework of a general-to-specific modeling [15].

Besides, the model can estimate simultaneously the short and long-term patterns within the model and eliminates the problems associated with autocorrelation and the exclusion of variables. Therefore, the estimates obtained by the ARDL are unbiased and efficient as the model avoids problems such as autocorrelation and endogeneity [16]. The use of the ordinary least squares (OLS) on small-sized samples produce unbiased estimates of the long-term relationships within the sample as this technique does not consider the short-term dynamic reactions between variables under study. The general form of ARDL (p, q1, q2, …, qk) can be expressed as follows:

$$\varphi(L, P)Y_t = \sum_{i=1}^{k} \beta_i(L, q_i)X_{it} + \delta W_t + \mu_t \tag{4}$$

Where, i equals 1, 2, 3, …, and k; Q(L,P) is equal to $1 - \phi1L - \phi2L2 - … - \phi pLp$; βi(L,qi) is βi0 + βi1L + … + βiqiLqi.

Beside, in the above equation, L shows the subscript for the operator of the first-order time lag, $LY = Y_{t-1}$ shows the dependent variable, X_{it} shows the vector of explanatory variables, qi (i = 1, …, k) is the number of the optimal lags for each explanatory variable, P is the number of the optimal lags for the dependent variable, and Wt shows the vector for deterministic (non-stochastic) variables such as intercept, seasonal factors, time trends or exogenous variables with fixed lags[17].

3.1 SHORT-TERM DYNAMIC MODEL

To estimate the short-term model, the maximum number of lags considered for the variables to estimate the model fit equals to one (m = 1). In addition, the number of the explanatory variables included in the main model to explain the causes of economic growth equals two (k = 2). Therefore, Microfit Software was used to determine the structural model fit. Accordingly, a total number of $(1 +1)^{2+1} = 8$ regressions were estimated. Finally, based on the Schwarz- Bizin Standard, the best model was fitted in the form of ARDL (1,0,0). Table 2 shows the total estimates for the short-term model:

Table 2. Results of estimating ARDL (1,0,0) model

Variables	Coefficient	Std. Error	t-Statistic	Prob
Constant	1.7436	1.0985	1.5873	0.144
LY(-1)	0.45125	0.12766	3.5348	0.005
LL	0.45784	0.10718	4.2716	0.002
LK	0.07711	0.02453	3.1431	0.010
R-squared	0.99734	Akaike info criterion		37.6813
R-Bar-Squared	0.99654	Schwarz criterion		36.4032
S.E. of regression	0.01458	h-Durbin-Watson stat		-1.16[.243]

$$LY_t = 1.7436 + 0.4512 * LY_{t-1} + .04578 * LL_t + 0.0771 * LK_t \tag{5}$$

The value of the coefficient of the log of credits granted by specialized banks in the structural equation (5) equals 0.077 which is significant at the significance level of 5%. It should be noted that this coefficient is based on theoretical expectations of economics. As a result, the credits granted to different economic sectors can direct production activities towards improvement, competition, and development of such activities, ultimately resulting in creating value added in different economic sectors and accelerating the economic growth.

3.2 DIAGNOSIS TESTS AND HOW TO INTERPRET THEM

The diagnosis tests includes tests used to analyze serial correlations between stochastic terms, testing the functional forms of the model, normality of stochastic terms, and testing heterogeneity of stochastic terms. Such tests are especially significant for the econometric estimates of equations as the rejection of the null hypothesis in each test indicates the violation of one of the assumptions provided by the classic regression. When these assumptions are rejected, the obtained results are no longer reliable.

Table 3. Results of model diagnosis tests

Values	Diagnosis tests			
	Serial correlation	Functional form	Normality	Heterogeneity
F-value	1.8498	.01289	-	3.4211
Critical value	[.207]	[.912]	-	[.089]
LM value	2.3868	.02002	.7337	3.1058
Critical value	[.122]	[.887]	[.693]	[.07]

The results of the diagnosis tests in the above model indicate that:

- There is no serial correlation between stochastic terms.
- The functional form of the model has been chosen appropriately.
- Stochastic terms are normally distributed.
- Stochastic terms variances are homogenous.

4   DISCUSSIONS

4.1   LONG-TERM EQUILIBRIUM RELATIONSHIPS

After estimating the short-term model, the same short-term coefficients were used to test the presence of the long-term relationships. Accordingly, the consistency of the long-term coefficient of the t-test and the Banerjee statistics were tested. The absolute value of the Banerjee statistics is equal to 4.3, which is higher than the absolute critical value in the Banerjee, Dolado and Master's Table (-3.27). Therefore, the null hypothesis indicating the non-existence of the long-term relationships is rejected. In other words, there are long-term relationships between the variables included in the model under study.

4.2   LONG-TERM MODEL ESTIMATE

The model long-term coefficients were estimated using ARDL. As the results of the model estimation through ARDL indicated, it is not possible to determine the long-term effects of the variables on the economic growth using the model short-term estimates as the lagged values of the dependent variable affect the economic growth. The results of estimating the long-term model coefficients for the ARDL (1,0,0) model based on the Schwarz- Bizin Standard are shown in Table 4:

Table 4. Results of estimating the long-term model using ARDL

Variables	Coefficient	Std. Error	t-Statistic	Prob
Constant	3.1774	1.5637	2.0320	0.070
LL	0.8343	0.0180	4.6126	0.001
LK	0.1405	0.0185	7.5590	0.000

$$LY_t = 3.1774 + 0.834 * LL_t + 0.140 * LK_t \qquad (6)$$

The results of estimating the long relationships between the research variables indicate that the coefficients of the explanatory variables in the model are statistically significant. Besides, the coefficient of the volume of credits granted by specialized banks in the equation equals 0.077 which is positive, indicating that the credits granted by specialized banks to the different economic sectors would provide the grounds for the growth of the Iranian economy in the long run. In addition, given that the structural model of the study is a log-log model, the estimated coefficients in the long-term model show the long-term elasticity. As such, the long-term elasticity of the economic growth relative to the credits granted by specialized banks in Iran is equal to 0.14. The elasticity of the economic growth relative to the banking credits suggests that an increase of about 14% in the credits granted by specialized banks will result in a 1% rise in the economic growth in the long term. It should be noted that according to economic theories the value of the long-term elasticity must be greater than the short-term elasticity. In this study, the long-term elasticity of the economic growth relative to the long-term elasticity is higher than its short-term elasticity and this is consistent with economic theories. In addition, the long-term elasticity of the economic growth relative to labor is 0.83, indicating that an increase of about 1% in the labor will result in a 0.8% increase in the economic growth in the long term. The long-term elasticity of the economic growth relative to labor is also higher than its long-term elasticity.

4.3   ERROR CORRECTION TEST FOR THE SELECTED MODEL USING ARDL

The estimation of equilibrium relationship in the long and short terms is only one of the objectives of the empirical modeling[17]. Generally, lengthy adjustments over environmental changes must also be formulated. The error correction model seems more appropriate for such an analysis as it demonstrate short-term changes. The results of the error correction model for the short-term dynamic model are presented in the following table. In addition, the error correction model concerning the equilibrium relationship determined by ARDL indicated that the coefficient of determination (the error correction model) is -0.54. Since the sign of ECM (-1) in the error correction model is negative, it shows that the above model

is convergent to the long-term equilibrium value. In addition, if a shock is applied to the data and disrupts its equilibrium, this disequilibrium will be adjusted in almost two periods. Therefore, it can be suggested that the model has a relatively high adjustment rate.

Table 5. Results of error correction model estimation

Variables	Coefficient	Std. Error	t-Statistic
dConstant	1.7436	1.0985	1.5873[.144]
dLL	0.4578	0.1071	4.2716[.002]
dLK	0.0771	0.0245	3.1431[.010]
ecm(-1)	-0.5487	0.1276	-4.298[.002]

4.4   THE CONSISTENCY OF THE DYNAMIC FITTED MODEL

According to ARDL, the consistency of the estimated model coefficients and the residual terms can be examined using the graphical CUSUM test. The results of the test are shown graphically. The results of the CUSUM test for the consistency of the estimated ARDL (1,0,0) are shown in Figure 1:

Plot of Cumulative Sum of Recursive Residuals

The straight lines represent critical bounds at 5% significance level
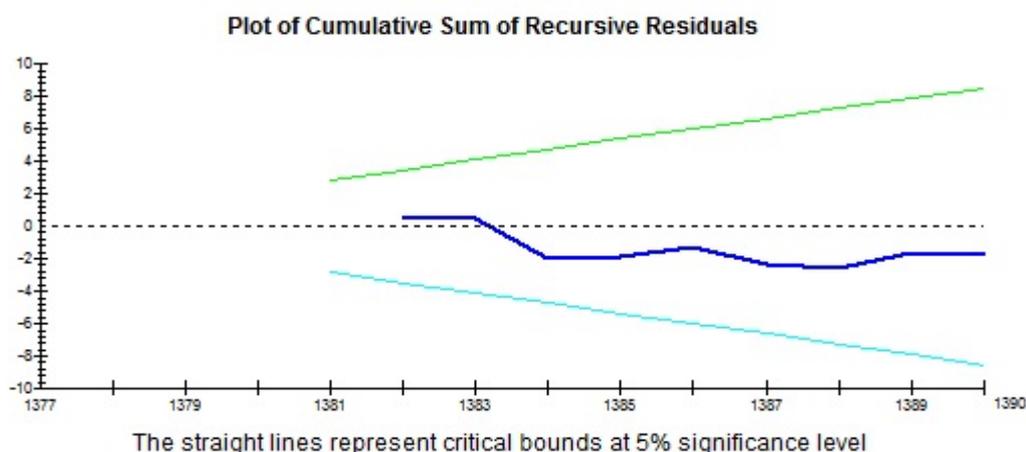
Fig. 1.   Results of CUSUM test for the Dynamic Model

As can be seen in the above graph, the CUSUM curve is located at the area between two critical lines at the level of 5%. This shows that the short-term model consistency.

5   CONCLUSION

Based on the findings of the present study, the main research hypothesis concerning the effectiveness of credits granted by specialized banks on the economic growth is confirmed. Accordingly, there is a positive relationship between credits granted by specialized banks and the economic growth. However, given the nature of ARDL models, it is possible to explore the effectiveness of credits granted by specialized banks on the economic growth in both short and long terms. Accordingly, our findings suggested that the credits granted by specialized banks had a positive significant impact on the growth of the Iranian economy in both short and long terms. In addition, it was noted that the effectiveness of credits granted by specialized banks on the economic growth is higher in the long term than in the short term as the variable coefficient of credits is greater for the long term. Based on these findings, the following recommendations are offered:

1- Given the direct impact of credits granted by specialized banks on the economic growth, managers, policy-makers, and planners are recommended to use banking credits optimally as a significant policy tool to accelerate the economic growth and to control its fluctuations.

2- In addition, as the long-term elasticity of the economic growth relative to credits granted by the specialized banks is almost two times greater than the corresponding short-term elasticity, policy-makers are advised to pay attention more to the long-term horizon when using banking credits to accelerate the economic growth.

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