

The Role of Banking Sector Policies in Financial Development: The Case of Iran

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Abstract

The paper aims to investigate empirically the effects of several types of financial restraints on financial development for the case of the Iran. Two hypotheses addressed and discussed in the context of the McKinnon/Shaw and the monopoly bank model. A conditional co-integration model has been employed to carry out the empirical investigations. The long and short-run analysis show that financial restraints in general as well as ceilings on lending rates have had a negative effect on financial depth in Iran, supporting that the financial restraints policy has hindered rather than helped financial deepening.

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Therefore, in the context of the financial system imperfections (the monopoly bank model) which is the case in Iran, the finding could be interpreted that the authorities have used a severe financial repression policy which has caused a negative effect on financial development rather than developing financial intermediation. In addition, our findings show that the per capita output is not weakly exogenous with respect to financial development, stating that financial development may bring economic growth in the long-run. Thus, policies that affect financial development are also likely to influence economic growth.

The main implication of this paper is that if the government continues to tighten financial restraints in the banking sector, this policy does not develop financial sector; therefore, it may damage the economic growth which is the main aim in the FYDPs.

Keywords: Bank, Financial restraint, Financial development, Conditional co-integration.

JEL: G18; G21; E44; E58

Introduction

The role of banking sector policies in the process of financial development has received considerable attention in the literature as they have important implications for economic development. McKinnon (1973) and Shaw (1973) argue that financial repression, including government intervention in the pricing and allocation of loan able funds impedes financial deepening mainly by depressing real interest rates. In view of this, they suggest that the financial system should be liberalized. The same line of argument was followed by Fry (1997) where he recommended the liberalization of the financial system to increase the quantity and the productivity of investment. On the other hand, the recent growing literature emphasizes financial market imperfections. For example, Stiglitz (1994) argues that imperfect information between lenders and borrowers increase adverse selection and moral hazard in credit markets. He justifies some government intervention in the financial markets to address the agency cost. Furthermore, Courakis (1984) and Demetriades and Luitel (2001) focus on the structure of credit market that influence the way in which banking policies affect financial deepening. They argue that the structure of banking system in many developing countries is not competitive and show that under a monopoly bank model, a ceiling on the lending rate may lead to greater financial deepening in the presence of good governance in the financial system. Consequently, the effects of these restrictions on the process of financial deepening are different at the empirical level across countries (Arestis et al., 2002).

The aim of this paper is to empirically examine the effects of banking sector policies on financial deepening for the case of Iran. I am interested in studying the case of Iran because first of all, the Iranian authorities have used repression policy for a long period; although they have started to partially relax the policy of financial repression during the early 2000's. Second, to the best of my knowledge there is no similar previous study in

this area for the case of Iran. To fill the gap, this paper aims to analyse how banking sector policies have affected on financial deepening in Iran. In so doing, first of all, I have identified several important types of banking sector policies which have been used in the Iranian economy: ceilings on interest rates, liquidity and reserve requirements on bank deposits, and directed credits. Second, using the principal components method, I construct a summary measure of financial restraints¹ (repression) by collecting information on these three policy variables and finally, I analyze the direct effect of these policies on financial deepening independently of its influence via the level of the real interest rate.

To examine the effect of the above policies on financial development, I construct a model and then address different hypotheses in the context of the McKinnon/Shaw model as well as a monopoly bank model. The first hypothesis says any financial restraint hinders financial development while the latter states a mild financial restraint on the lending rate may develop financial deepening. The above hypotheses have been tested using the Iranian data spanning over 1960-2005 by employing the conditional co-integration approach, developed by Pesaran et al. (2000) and Harbo et al. (1998). I also construct conditional error correction models to analyze the above hypotheses in the short-run.

The rest of this paper is structured as follows: section one reviews the banking sector policies implemented by the Iranian government; Section two provides a brief overview of the related literature as well as summarizes the existing empirical literature; Section three contains a brief discussion of model specification and econometric methodology; Section

¹-There is a difference between the term “financial restraint” and “financial repression”. An important difference is that with financial restraint, interest rate controls are used to improve the efficiency of private financial markets; while with financial repression interest rates are typically a mechanism for the government to extract rents from the private sector (Hellmann et al, 2000). However, in practice it is difficult to distinguish between these policies, although financial repression is a severe type of financial restraint policy where the real interest rate is negative in financial repression.

four explains the construction of the measurement of financial restraints and outlines the data sources; Section five presents the main empirical results. Some concluding remarks are provided in the final section.

1. Banking sector policies in Iran

The banking system constitutes the central part of financial sector in Iran and plays a critical role in transmitting monetary policy effects to the entire economic system. Each year after the approval of government's annual budget by the parliament, the central bank presents the detailed monetary and credit policies to the Money and Credit Council (MCC) for approval. In practice, the major policy issues like the interest rate of deposits and loans, directed credits and reserve requirement ratios were determined by the MCC.

Interest rate of deposits and loans are determined administratively by the MCC in Iran¹. Ceilings on interest rates were continued after the nationalization of banks in 1979. However, since 1990 the central bank has reconsidered the previous policy and has designed the policy to reconcile the rates with the inflationary situation in the economy. As a result, average loan rates increased from 4-12 percent in 1989 to 6-19 percent in 1990. Furthermore, the central bank has started to partially relax control on interest rates.

Consequently, the ceiling on loans interest rates was removed in 1991 only for the domestic commerce and services sectors; but the minimum rate has been determined administratively and banks can determine the rate above the minimum rate according to the market factors. However, for other sectors the ceilings have still remained. Until 2004, as always,

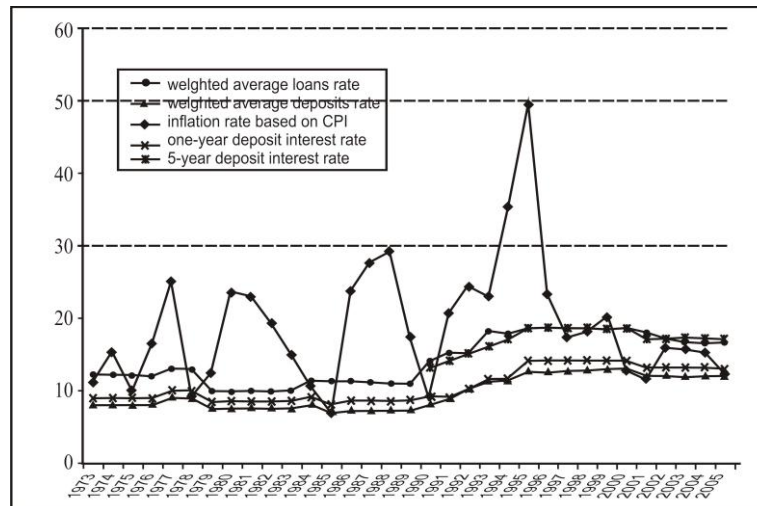
¹- The private commercial banks are not subject to controls on rates of interest. However, it was highly recommended by the MCC to set the rates at the maximum of 2-3 percent above the rates approved by the MCC for the public banks. As a result, their costs of funds, including deposit rates are higher, which tends to be reflected in higher lending rates compared with those of state-owned banks.

the priority sectors like agriculture had the lowest loan rates and those for domestic commerce and services had the highest rates. Finally, in 2005 all rates unified and determined at 16% for all sectors. Recently, the rate has decreased to 12% in state banks.

Furthermore, the central bank has relaxed slightly its control on the interest rates on deposits for longer term since 2001; therefore, since then public banks have been authorized to determine the rate of interest on 2-4 year investment deposits within the range of 13-17 percent per annum.

On the basis of the MCC approval, the average rate of interest on term investment deposits and rate of interest on banks loans extended by the public banks are plotted in figure (1).

Figure (1) Inflation rate and the average nominal interest rates of deposits and loans in the Iranian state-owned banks, 1973-2005.



As it is shown from the Graph, the interest rates of deposits as well as loans were constant until 1989 (except few years in the late 1970s). However, after that the rates were increased annually by the end of 1995 due to inflationary situation in the economy so as to raise financial savings as well as increase the lending capacity of the banking system. This policy was initially successful in increasing non-sight deposits and

“term investment” deposits in the banking system. However, fiscal/monetary policies were inconsistent with the interest rate policies. With a big surge in the rate of inflation in the early to mid 1990s the real interest rate on five-year deposits (longest maturity deposit in Iran) began to decline quite substantially. The real interest rate on 5-year deposits has become positive since 2000; however, the short-term deposits have not enjoyed a positive real interest rate for decades reflecting a substantial degree of "repression" in the financial sector.

In sum, a significant characteristic of interest rate in the Iranian economy during the period under consideration is that the real interest rate was negative in most years. This way of administratively determining interest rates more likely causes households and investors even with low productivity apply for the loan as borrowing from the banking system emerges as one of the most lucrative economic activities; thereby, rationing of credit among potential investors become widespread and the government plays a key role in its allocation; this policy may distort allocation of resources and may damage potentially economic growth.

Apart from ceilings on interest rate other financial restraint policies such as credit ceiling, directed credits and liquidity and reserve requirements have been used by the authorities. This was partly because of the fact that there were no enough indirect instruments¹. However, since 1991 credit ceiling control on banks loans was removed in 1991. Also, in the framework of the 3rd FYDP (2000-2004), directed credits have been decided to decrease. The recent policy has caused banks to have more fundable resources to allocate freely.

Structure of banking system in Iran:

Following the 1979 Revolution, the new constitution stipulated that banks be government-owned entities. All commercial banks then were nationalized. However, in the context of the 3rd FYDP (2000-2004)

¹- The current main instruments of monetary control available to the central bank are reserve requirements; central bank participation papers; penalties for overdrafts by commercial banks from their agreed credit lines with the central bank; restriction on interest rates.

structural reforms in the banking system started. Therefore, the private non-bank credit institutions and private banks were licensed. As a result, since 2000 private banks have been given permission by the central bank to begin operations. They have started to exert competitive pressure on state-owned banks, though they still are small¹. According to the Iranian central bank report, the ratio of private banks credits to private sectors constructed 1.3, 3.3 and 6.9 percent of total credits expanded by banks during the years 2002-04, respectively.

Table (1) shows the concentration ratio index for the banking system in Iran over the period 2001-04. The concentration ratio is a way of measuring the concentration of market share held by particular suppliers in a market. In our case, bank concentration is defined the ratio of each bank's assets in total banking system assets. According to the computed index, for example, the two large banks, National and Export banks hold around a quarter of total assets in the banking sector. Furthermore, the three and four largest banks cover 31.8 and 36.6 percent of the Iranian banking market. These figures to some extent indicate the existence of monopoly situation in the banking system in Iran.

Table (1) Concentration ratio of banks in Iran (%)

Year	1st Largest bank	The 2 largest banks	The 3 Largest banks	The 4 largest banks
2001	15.2	24	33.5	39
2002	13.4	23.8	30.6	35.5
23003	14.4	24	30.9	36
2004	14.2	22.8	30.3	35.8
Average	14.3	23.6	31.8	36.6

Source: author calculation based on the balance sheet of corresponding banks and banking system.

¹- Currently, the banking system consists of six state-owned commercial banks, four state-owned specialized Banks, a state-owned Postal Bank (licensed in 2004) and six recently established private banks and some small private non bank credit institutions.

2. Financial policy and financial development: theory and evidence

Financial repression as a set of policies, regulations, implicit taxes, distortions, qualitative and quantitative restrictions and controls imposed by governments which do not allow financial intermediaries to operate at their full technological potential (McKinnon, 1973).

McKinnon (1973) and Shaw (1973) argue that the policies of financial repression affect financial development through different channels: first, financial repression policies affect the equilibrium quantity of saving and investment through its effect on the real net return to saving. Second, financial repression policy affects how efficiently savings are allocated to investment purposes. The efficiency with which savings are allocated to investment purpose depends on the degree of financial development in the economy: the more developed (or the less repressed) the financial sector, the more efficiently saving will be allocated to investment projects. Because a more developed financial sector can reduce the costs associated with intermediation between savers and investors through economies of scale, risk diversification, and maturity transformation. It also helps to collect and screen information (see: Gibson and Tsakalotos, 1994). Furthermore, in repressed financial sectors, competition is limited and oligopoly conditions will lead to high cost of intermediation.

The McKinnon and Shaw model implicitly assumes that banking institutions operate under perfect competition, perfect information (McKinnon, 1981; Fry, 1980). However, this model is not without its critics. Beside the well known neo-structuralist critique, emphasizing the importance of curb markets (Van Wijnbergen, 1983), there are other areas of criticisms. The first broad set of criticisms emphasizes more on microeconomic failure that are prevalent in financial markets (see: Gibson and Tsakalotos, 1994).

Stiglitz (1994) argues that various types of market failure in the financial system provide scope for government intervention. He argues

that markets that are information incentive- as is normally the case in the financial markets- are likely to be imperfectly competitive. Therefore, asymmetric information is an important source of imperfectly competitive behavior in the banking system which leads to credit rationing even in liberalized markets. Thus, under conditions of imperfect information some mild forms of financial restraints including mild interest rate ceilings may contribute to reduce agency cost. In contrast, the high real interest rates which are associated with financial liberalization in monopoly market may make the financial system vulnerable to crises by worsening the problem of adverse selection and moral hazard (Arestis and Demetriades, 1997). Adverse selection problem happens as rise in interest rate may decrease the average quality of the loan applicant pool because only high risk projects continue to apply. Moral hazard happens as higher interest rate encourages firms to redirect funds to higher risk activities (Hellmann et al., 1997).

Courakis (1984) argues that under monopoly banking¹, a ceiling on the lending rate can raise the volume of deposits while this result opposes sharply with the McKinnon/Shaw school stating that any form of control reduces the volume of deposits and loans.

Figures 2a and 2b, explains the effect of financial restraints on financial development under a monopoly bank and compares with the competition banks (the McKinnon and Shaw model). I assume that the banks face with a downward sloping demand schedule for loans (L_d) with respect to the loan rate from the banking system by deficit agents and an upward sloping supply of deposits (D_s) with respect to the deposit rate to the banking system by surplus agents. Following Demetriades and Luintel (2001), I also assume that a monopoly bank is able to increase the supply of deposits by non-interest rate activities such as increasing the number of bank branches and/or marketing which are subject to diminishing return technology. Therefore, a monopoly bank with flexible deposit rate

¹- The monopoly case is certainly closer to the oligopoly situations that describe reality in LDCs.

minimizes the cost of collecting an extra pound of loan able funds either by increasing the interest rate of deposits or by non-interest activities where the marginal cost of raising an extra deposit by increasing the interest rate of deposits should equal that of non-interest activities. As a result, deposit collection technology will be an upward sloping marginal cost schedule (MC) for collecting loan able funds.

In the absence of the loan rate ceiling in a competitive setting, equilibrium is defined by $D_s=L_d$ (see: Figure 2a). Thus, at the competitive equilibrium the volume of loan is Q_c and the loan and deposit rate is equal at r_{cl} . Under a monopoly bank, on the other hand, equilibrium is defined by the intersection of marginal cost (MC) and marginal revenue (MR); and hence at equilibrium the volume of loan is Q_m , the rate charged on loans being r_{ml} (see: Figure 2b).

Assume now that authorities impose a lending rate ceiling. In a competitive setting, any lending rate restriction below equilibrium rate, say r , reduces the volume of loans and deposits. However, with monopoly banking a mild compulsory ceiling on the loan rate, by altering the nature of the effective marginal revenue curve, can result in higher interest rate of deposit and the volume of deposits and loans. With deposit and loan volume maximization as the objective and a loan rate as the only instrument available for the policy makers, the optimal ceiling on the loan rate will be at rate r^*_{ml} where marginal cost intersects demand curve. Note, importantly, that any restraint on loan rate ceiling at the level $r_{ml} < r < r_{ml}^*$ market clears and it does not lead to credit rationing. However, ceilings bellow r_{ml}^* , result in some credit rationing as it is no longer possible for banks to satisfy the loan demanded without the marginal cost of loan greater than the marginal revenue (Demetriades and Luintel, 2001). If the ceiling on loan rate is determined below point A (MC=MR), this policy will decrease financial intermediation even below the case where there is no ceiling on the loan rate. Therefore, only mild repression

of loan rates may raise the loan and deposit volumes while the severe restraint will essentially decrease them. In summary, the effect of ceiling on loan rate on the financial intermediation depends on the market structure as well as the severity of the repression of loan rates. However, even if there is market failure, government policies designed to address such problem may make matters worse.

Figure (2a) free market and ‘ceiling on loan rate constrained’ equilibrium under competition banks

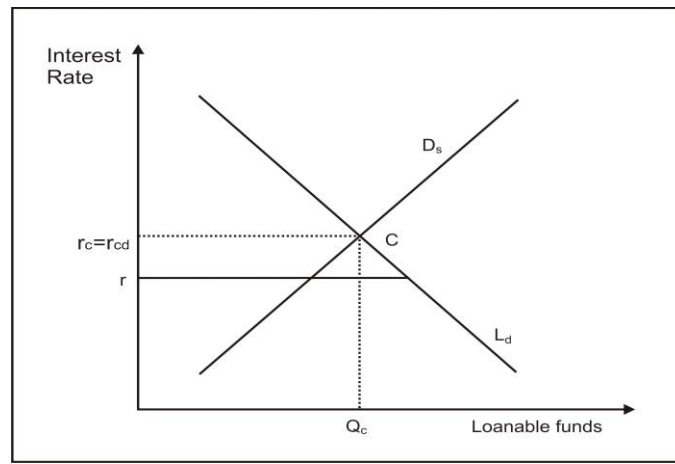
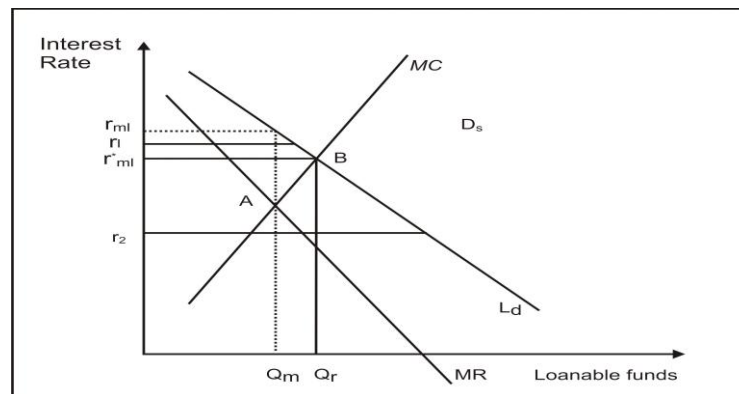


Figure (2b) Free market and ‘ceiling on loan rate constrained’ equilibrium under a monopoly bank



Ceilings on loan rates are not the only constraint used by the government in many countries. They impose reserve and liquidity requirements on the bank deposits. Also, direct credits program for preferred sectors is another instrument that typically applies to the preferred sector with the rate below market rate. Directed credits are not a necessary component of financial restraint policy, they are, however, a prevalent feature of financial policies of developing countries. In this policy the allocation of resources to preferred sectors is not determined by the marginal productivity of capital because political priorities are, in general, not determined by marginal productivity of different types of capital. Thus, they may distort the allocation of credit. This policy of government intervention may be justified under circumstances where there is divergence between private and social returns due to externalities and market failures (Hellmann et al., 1997). Directed credits to preferred sectors with high social return can be justified provided that the intervention does not create inefficiencies that exceed the gains from the intervention.

Theoretical investigation associated with the role of financial policies in the process of financial development has motivated empirical studies in this area. For example, Demetriades and Luintel (2001) study the effect of various types of financial restraints measures in the South Korea. They find a positive association between financial deepening and the degree of state control over the banking system combined with mild repression of lending rates¹. These results confirm the neo-Keynesian and neo-structuralist view that government intervention in the financial sector can enhance economic growth by positively affecting financial development. However, their results oppose the assertion of the McKinnon-Shaw

¹- The same line of research was studied by Arestis and Demetriades (1997) for the case of South Korea. They found that financial repression index has a positive effect on financial development.

hypothesis that interest rate ceilings and other financial restraints are harmful to economic growth. While their empirical results for 1961-91 in India predict that severe financial repression negatively affects financial deepening (Demetriades and Luintel, 1996a, 1997). Furthermore, for the case of Nepal they found that all interest rate controls seem to have a positive effect on financial deepening whilst non interest rate controls seem to have a negative effect (Demetriades and Luintel, 1996b).

Arestis et al. (2002) examine the effect of a number of financial restraints, including restrictions on deposit and lending interest rates and reserve and liquidity requirements on financial development in a sample of six developing countries: Greece, Thailand, Philippines, Korea, India and Egypt. They find that the effects of financial policies vary considerably across our sample of countries. In Philippines interest rate restraints have a negative and significant effect on financial development while in all the other countries the effect is insignificant (in Egypt it appears with a positive but insignificant). The Reserve and Liquidity Requirements variable enters negatively in the co-integrating vector for Egypt, and significant. In the case of India it enters significantly with a positive coefficient. In contrast, financial policies do not have a significant long-run effect on financial development in Korea, Thailand and Greece. These results indicate that institutional factors, which vary considerably across the countries, may be playing a critical role in determining how financial policies affect the process of financial development. Their findings demonstrate that financial liberalization is a much more complex process than has been assumed by earlier literature and its effects on financial development are ambiguous.

The same line of studies has been done by Hachicha (2005) for Tunisia over the period 1961–2000, and Ang and Mc-Kibbin (2007) for Malaysia. The main empirical finding of both papers suggests that financial repression has had significant and negative effects on financial development.

3. Model specification and econometric issues

3.1. Model specification

In order to examine the role of banking sector policies on financial development, following Demetriades and Luintel (2001), I specify a financial development equation including measure of financial restraints as well as some other control variables such as the real interest rate of deposits and the real income as follows:

$$FD_t = \gamma_1 + \gamma_2 Ly_t + \gamma_3 RI_t + \gamma_4 FR_t + u_t \quad (1)$$

In Eq (1), FD is an indicator of financial development¹(depth) measured by the ratio of bank deposits to GDP, Ly is the logarithm of per capita real output, and RI is the real interest rate of deposits.

FR is an indicator of financial restraints which stand for a summary measure of financial policies consisting of three policy variables: the ceiling on interest rate, the reserve requirement ratio on bank deposits, and directed credits. Although each of these policy variables affects on financial deepening through different channels and it is tempting to use them individually in the financial depth equation to estimate their individual effects. However, using them in this way may result in omitted variables since the Iranian authorities simultaneously impose all these controls on the banking system. Thus, I construct a summary measure of financial restraints utilizing the method of principal components based on these three policy variables mentioned above. Although in terms of magnitude these policy variables have different effects, but all have same direction effect on financial depth. Therefore, the overall computed index is a reasonable measure for the total effect of financial repression.

¹- Financial development and financial deepening are used interchangeably throughout this paper, although the first refers to a host of instruments including the innovation of financial products, an increase in various financial savings mechanisms and in bank branches, institutional changes, and interest deregulation.

In Equation (1), it is expected output to have a positive effect on financial deepening ($\gamma_2 > 0$) stating the demand-following hypothesis. That is, when the real side of the economy develops, it demands new financial services. Consequently, financial sector develops in response to the demand of financial services.

The real deposit rate (γ_3) under competitive market condition (the McKinnon/Shaw model) has positive effect but in a monopoly bank model with the presence of interest rate restriction on loan, change in the administrated real rate of interest is not as an important determinant of financial depth as in the competitive model because in the presence of ceiling on lending rate, variations in the administrated deposit rate are less likely to raise demand for loan able funds by the banking system (Demetriades and Luintel, 2001).

In the McKinnon/Shaw model, $\gamma_4 < 0$. In the context of a monopoly bank model, when a severe repression is implemented, financial restraint expected to have a negative effect $\gamma_4 < 0$ while a mild repression of lending rate could have a positive effect $\gamma_4 < 0$.

3.2. Econometric issues

Following Arestis et al. (2002) and Hachicha (2005), I use conditional co-integration approach which was developed by Pesaran et al. (2000) and Harbo et al. (1998) to estimate Equation (1) as long run relations.

Pesaran et al. (2000) and Harbo et al. (1998) essentially consider a sub-system approach in which a subset of random variables integrated of order one $I(1)$ is regarded as structurally exogenous; that is, any co-integrating vectors present do not appear in the sub-system vector error correction model for these exogenous variables.

Consider an $n \cdot 1$ vector X_t in a VAR form as follows:

$$X_t = \sum_{j=1}^p \phi_j X_{t-j} + \Phi D_t + \varepsilon_t \quad t = 1, 2, \dots, T \quad (2)$$

Where vector X_t includes all I(1) variables in Equation (1), that is, $X_t = (FD_t, Ly_t, FR_t, RI_t)'$ and D_t is a shift qualitative variable and other I(0) variables.

The error correction form of (2) (VAR-ECM) is obtained:

$$\Delta X_t = \alpha \beta' X_{t-1} + \sum_{j=1}^{p-1} A_j \Delta X_{t-j} + \Phi D_t + \varepsilon_t \quad t=1,2,\dots,T \quad (3)$$

Suppose that X_t is decomposed into Y_t of dimension g and Z_t of dimension k : $X_t = (Y_t', Z_t)'$. Then we can define the g -dimensional conditional error correction model for ΔY_t as:

$$\Delta Y_t = \Psi_0 \Delta Z_t + \alpha_1 \beta' X_{t-1} + \sum_{j=1}^{p-1} A_{1,j} \Delta X_{t-j} + \Phi D_t + \varepsilon_{1t} \quad t=1,2,\dots,T \quad (4)$$

and the marginal error correction model consists of the last k equation of (3) as:

$$\Delta Z_t = \alpha_2 \beta' X_{t-1} + \sum_{j=1}^{p-1} A_{2,j} \Delta X_{t-j} + \Phi D_t + \varepsilon_{2t} \quad t=1,2,\dots,T \quad (5)$$

Without further restrictions, the marginal model (5) clearly has information about the co-integrating vector β (Harbo et al., 1998). Then, conducting inference on β from the conditional model (4) alone is inefficient. However, if Z_t is weakly exogenous¹ for β , then the parameters in the conditional and marginal models are variation free and there is no information about β in the marginal model.

Johansen (1992) shows that $\alpha_2 = 0$, is a necessary and sufficient condition for Z_t to be weakly exogenous for α and β . In this case then the conditional models contains all information on α and β . Therefore, efficient inference on α and β can be conducted by analyzing the conditional model only (Boswijk, 1995).

In this paper I employ the conditional approach of co-integration because financial restraints index, as an I(1) variable, is considered as

¹- Weak exogeneity means that the second set of equations has no error correction term or that the variables z_t do not react to disequilibrium.

weakly exogenous variable¹, i.e. $Z=FR_t$. However, the possible endogeneity of the policy variable is checked by using Johansen's (1992, Theorem 1) approach. In fact, conditional VAR approaches means that providing weak exogeneity is valid then we do not need to assume Z_t is generated by linear time series model which may be a benefit when Z_t is a policy variable captures better characteristic.

Therefore, the conditional co-integration approach is used to estimate the long-run relations which are specified in Equation (1). Furthermore, to demonstrate the short-run behavior of variables (financial depth and GDP per capita), I construct and estimate conditional error correction models which appear to relate naturally to economic theory.

4. Measurement and data sources

4.1. Financial restraints

In this study I construct a summary measure for banking sector policies by collecting information pertaining to interest rate controls, reserve requirement ratios on deposits and direct and concessionary lending program from annual reports of the central bank of Iran.

The government uses different types of interest rate controls: a fixed deposit rate and a fixed lending rate, a floor as well as a ceiling on the lending rate. A dummy has been used to measure the intensity of these controls which take the value of 1 if the controls are severe, 0.75 if partially relaxed, and 0 if freely determined by banking institutions.

¹- However, it is worth noting that weak exogeneity does not mean there is no feedback effect from financial development to financial policy in the literature various factors have been mentioned motivating the policy of financial reforms. Amongst which we may refer to regional diffusion effects, banking crises, balance of payment crises, the openness of a country to international capital and the ideology of new government in power (Abiad and Mody, 2005; Simmons and Elkins, 2004). Abiad and Mody (2005) and Simmons and Elkins (2004) find that countries within a region possess similar characteristics, are likely to be motivated by similar objectives, including competition for the same pool of international capital.

Dummies are also constructed to indicate the intensity of directed credit programs. The dummy on directed credit program is set to 0 when there is no evidence of a directed credit program and to 0.5, 1 and 2 when the directed credit program respectively covers up to 5%, 5-15% and over 15% of total banks lending. I collect data on reserve requirement ratio on all deposits where for financially repressed economy this ratio expected to be high.

The policy variables can be used individually in the financial depth equation to quantify the effect of each policy. However, these policies are implemented simultaneously in the Iranian economy, then the coefficient estimated from such an approach can be biased due to the problem of omitted variables. The possibility of multi co linearity can also be happened if all of the variables entered into the equation due to the high correlation among these controls. Therefore, to solve this problem I construct a summary measure of the banking sector controls by employing the principal components method which basically involves the linear transformation of a large number of possibly correlated variables X_1, \dots, X_k into a new set of variables P_1, \dots, P_k . The new variables have two important properties. First, they are pair wise uncorrelated. Second, they are ordered in terms of variance, i.e., P_1 has the maximum possible variance; P_2 has the maximum variance amongst those uncorrelated with the first and so on.

Therefore, only a small number of the principal components are needed to account for variation in the original variables¹.

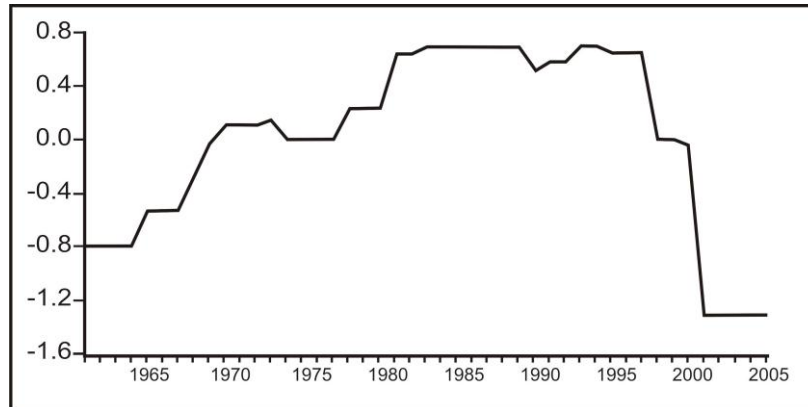
A summary measure of financial restraints using the principal components method based on policy variables such as interest rate controls, required reserve and directed credits is computed. The computed overall index for financial restraints based on the first principal

¹- For a good explanation see Theil (1971).

component¹ is shown in Figure (3) and appears to reveal quite well many of the policy shifts that occurred during the sample period. According to the figure, during the 1960s and in the early 1970s, the index shows a gradual increase in the level of financial restraints. This behavior coincides with the increase of reserve requirement ratio on deposits. However, in 1974 the reserve requirement ratio decreased which seems to be explained by the rise in Iran's external receipt due to the oil shock. With the nationalization of banks in 1979 the level of financial restraints index, however, rose which allowed the government to intensify its directed credit program and also to impose more controls on the interest rates as well as to impose a high reserve and liquidity requirements. This policy remained unchanged over the period 1983-97, except in the early 1990s when the government increases the level of directed credits. In the following years, however, the index dropped significantly which coincides with a partial deregulation of interest rate, decreasing the reserve and liquidity requirements, abolishing the ceiling on total credits and declining the direct credits.

Figure (3) Financial repression (or restraints) index in Iran.

¹- Two aggregate methods were explored: a simple average and the principal component method. Both methods produced overall measures that were highly comparable. The correlation between the two computed measures was above 97 percent.



4.2. Financial depth and other data

Financial depth is measured by the ratio of bank deposits to nominal GDP, where bank deposits are equivalents to the sum of demand deposits plus quasi-money (time and saving deposits). This is a fairly standard measure and it prefers to the ratio of broad money (M2) to nominal GDP which measures the extent of monetization rather than financial depth. The monetization of transaction can be increased without financial development occurring. This is particularly relevant in an economy like Iran because In Iran part of M2 is increased externally due to converting the revenue of the oil export to Rial (domestic currency). Therefore, M2 may increase relative to GDP due to the monetization process rather than increased financial intermediation.

The per capita series for real GDP is calculated by dividing the real GDP by population. The real rate of interest is measured by subtracting the current rate of inflation from the current average deposits rates.

The interest rates and information about banking sector policies were obtained from the Economic Report and Balance Sheet of the Iranian central bank (various issues). The time series of all other data were obtained from the bulletin of the central bank of Iran which can be found on bank's website www.cbi.ir.

The data frequency is annual and covers the period 1960-2005. The choice of the period is based on the availability of time series data for all variables.

5. Estimation results

5.1. Unit root tests

In this paper I use Augmented Dickey Fuller (ADF) test to determine the order of integrated of each variable. The results of ADF test for the variables using annual data over the period 1960-2005 are reported in Tables (2). The results show that all variables, except the real interest rate are non-stationary, denoted as I(1), but become stationary after taking the first difference.

Table (2) The ADF unit root tests of variables using annual data (1960-2005)

Variables	Mnemonic	ADF		Conclusion at the 5% level
		Levels	difference	
Log of real GDP per capita	Ly	-2.39	-3.52	I(1)
Ratio of total banks deposits to GDP	FD	-1.89	-3.94	I(1)
Overall banking sector restraints index	FR	-0.64	-6.06	I(1)
Real interest rate of deposits	RI	-3.16	-	I(0)

5.2. Long-run estimation results

In order to estimate the long –run association between variables using the conditional co-integration approach, first it is necessary to check the weak exogeneity of variables in the model. The upper part of Table 2.3 shows that the null hypothesis that financial restraints index (FR) is

exogenous could not be rejected because the corresponding loading factor is not significant ($p=0.65$). Therefore, error correction model conditioned with financial restraints index is an appropriate model to conduct co-integration analysis¹.

Since the co-integration test may be sensitive to the lag length used, I conduct a series of diagnostic tests on residuals of VARs to determine the optimal lag length (p) prior to employing co-integration tests. Given the sample size and frequency of data, I have considered a maximum lag of four. Then I used the sequential approach to choose the optimal lag length which is found to be three. The Lagrange Multiplier test is used to check autocorrelation in the estimated VAR residuals. In the chosen lags the result shows there is no autocorrelation [$X^2(9) = 13.1(p=0.15)$].

In Table (3) both the results of trace and maximum eigen value test unanimously point to the same conclusion that there is one co-integrated vector between variables in the model. The co-integrated vector as long-run relations are estimated by maximum likelihood approach. In order to interpret economically, vector β is identified by using exact identification approach where we impose $r = 1$ just identifying restrictions including one normalization restriction on each equation (Johansen and Juselius, 1994)². By normalizing the coefficient of FD to one, the long-run relationship between financial depth, real GDP per capita and financial restraints index

¹- I also estimate co-integration relations using Johansen approach, but do not report. Given that the results are similar, I elect to report the conditional approach which is consistent with our data where we cannot reject that the financial repression index FR is exogenous.

²-There is another identification approach so called over-identification where we impose more than r restrictions on each equation and the validity of restrictions can be tested by a likelihood ratio test. Furthermore, in any case these restrictions imposed can be checked by the rank order condition as set out in Theorem 1 in Johansen and Juselius (1994, p.15).

is obtained. All variables entered with the expected sign and the estimated coefficients are reasonable in terms of magnitude. The likelihood ratio tests show that all coefficients are statistically significant. Therefore, the estimated equation shows that financial restraints (repression) index in Iran has had a long-run negative effect on financial depth, suggesting the importance of relaxing financial restraints in the banking system so as to deepen the financial system. The empirical results in this paper are consistent with those in Ang and McKibbin (2007) and Hachicha (2005) for the Malaysia and Tunisian experience, respectively. Moreover, the long-run financial deepening is positively affected by the level of real per capita GDP which is consistent with the theoretical prediction of the finance and growth literature.

Table (3) Co-integration tests based on the conditional VECM

VAR(3) ; (FD, LY,FR) ; LM test: $X^2(9)$ 13.1($p= 0.15$)				
Weak Exogeneity Tests				
	FD	Ly	FR	
Loading (α)	-0.080	0.104	0.194	
p-value	0.001	0.06	0.63	
Conditional Co-integration Tests				
	Maximal eigenvalue test		Trace test	
Null hypothesis	$r = 0$	$r \leq 1$	$r = 0$	$r \leq 1$
Alternative hypothesis	$r = 1$	$r = 2$	$r \leq 1$	$r \leq 2$
Statistic values	29.5	5.7*	35.2	5.7*
Critical values at 95% level	18.0	11.4	23.3	11.4
Critical values at 90% level	15.9	9.5	20.7	9.5
Maximum Likelihood Estimation Results				
	FD	Ly	FR	
Restricted eigenvector β	-1	0.986*	-0.170	
Standard error	n.a.	0.28	0.06	
Likelihood ratio statistic	n.a.	29.3	12.3	

Notes: Asterisk * shows that the Null cannot be rejected.

LR shows Likelihood Ratio test statistic.

+ Shows significant at the 1% level using LR statistic.

p -values are that of the likelihood ratio tests under the null the loading factor is zero.

The equations include one dummy which is 1 for 1984-88, 0 otherwise.

5.3. Short-run estimation results

In order to investigate the short-run behavior of variables, I now consider conditional error correction models by dealing with only two endogenous variable FD and Ly. Two econometric representations have been estimated which aims at investigating the effect of banking sector policies on financial deepening and real GDP per capita growth.

The results of different estimation of the two equations are reported in Table (4). The findings indicate that the coefficients are acceptable at the economic and statistical level. The estimated models pass a number of diagnostic tests. The Breusch-Gudfery test indicates the absence of any autocorrelation problem. Moreover, there is no heteroskedasticity problem detected by the Whit test.

In financial deepening equations (Eq. 1 and 2), the overall index for the financial controls at current time (FR_t) has strongly a significant negative effect on financial depth. The result supports that the financial repression policy has hindered rather than helped financial deepening in Iran. Furthermore, Eq. 3 shows that ceilings on lending rate have had a negative effect on financial deepening in Iran. Therefore, in the context of imperfections in the financial system (the monopoly bank model) which is the case in Iran, the finding could be interpreted that authorities have used a severe financial repression policy which cause a negative effect on financial development rather than developing financial intermediation. In other words, it appears that the government has not managed properly the

financial restraints policy by playing a prudential role, limiting moral hazard behavior by banks, instead they employed severe financial restraints such that depositors have received negative real interest rates on their deposits in the banks, impacting negatively on the financial deepening. Therefore, it may conclude that the government intervention has not been successful in developing financial system.

The real interest rate does not have significant effect on savings. This result may be interpreted that in the case of severe restrictions on lending rate which is the case in the Iranian economy, variations in the administrated deposit interest rates are less likely to raise demand for loan able fund by the banks. Furthermore, during the period under consideration, depositors experienced negative real interest rate. In this environment, change in the nominal interest rate is less likely to make enough motivation for depositors to supply funds to the banks.

The estimated error correction term is significant which suggests the financial deepening adjusts towards its equilibrium level but the speed is not very high (-0.04) due to possibly distortions in policies and regulations in the financial sector.

The conditional ECM for the real GDP per capita Eq. (4) shows that coefficient of financial depth is insignificant. It may be interpreted that in a repressed financial system, the role of financial system in promoting economic growth may not as effective as that in a liberalized system. However, the coefficient of error correction term (-0.08) is strongly significant. This suggests that per capita GDP is not weakly exogenous with respect to financial development, implying that such development may bring economic growth in the long-run. Thus, policies that affect financial deepening in Iran are also likely to influence economic growth.

**Table (4) Conditional error correction models; OLS estimations:
1960-2005**

	Regressor Dependent variables			
	Eq1	Eq2	Eq3	Eq4
Intercept	-0.038(-2.04)	-0.037(-2.2)*	0.054(1.21)	-0.062(-1.6)
ΔFD_{t-1}	0.276(1.46)	0.267(1.7)**	0.176(1.07)	-0.361(-1.1)
ΔLy_{t-1}	0.011(0.13)	0.002(0.09)	0.020(0.34)	0.238(1.7)**
Dum ₇₉	0.097(3.03)*	0.096(3.3)*	0.095(3.58)*	-
Dum ₇₇₋₈₀	-	-	-	-0.158(-4.9)*
Dum ₉₀	-	-	-	0.114(-2.1)*
RI_{t-1}	-7.03 _{e-5} (-0.11)	-	-	
Financial restraints:				
<u>Overall index</u>				
Interest rate controls, required				
Reserve and directed credits				
FR_t	-0.016(-1.93)*	-0.016(-2.0)*	-	0.013(0.77)
FR_{t-1}	0.002(0.22)	0.001(0.23)	-	0.006(0.32)
Ceiling on the interest rates				
$DUMLR_t$	-	-	-0.082 (2.15)	
ECM_{t-1}	-0.040(-2.3)*	-0.040(-2.4)*	-0.031(-2.05)*	-0.086(-2.2)*
Diagnostics:				
Adjusted R ²	0.47	0.49	0.55	0.53
Serial correlation:	0.44(p=0.50)	0.61(p=0.43)	2.33(p=0.12)	1.6(p=0.20)
Breusch- Godfrey LM test	33.8 (p=0.20)	28.8(p=0.12)	18.51(p=0.18)	15.7(p=0.92)
While Heteroskedasticity test				

* shows significant at the 5% level

** shows significant at the 10% level

5. Conclusions

This paper assessed the effect of various banking sector policies including interest rate ceilings, reserve requirements and directed credits on financial development in Iran using multivariate time series approach. Conditional co-integration approach as described in Pesaran et al. (2000) is used to estimate the long-run relation between financial restrains and financial development.

The results show that financial repression (restraints) policy in Iran has had a long-run negative effect on financial depth, suggesting the importance of relaxing financial restraints in the banking system so as to deepen the financial system. The short-run analysis using conditional error correction models show that the overall financial restraints measure as well as ceilings on lending rates has had negative effect on financial depth, supporting that the financial repression policy has hindered rather than helped financial deepening in Iran. Therefore, in the context of imperfections in the financial system (the monopoly bank model) which is the case in Iran, the finding could be interpreted that authorities have used a severe financial repression policy which cause a negative effect on financial development rather than developing financial intermediation. In other words, it appears that the government has not managed properly the financial restraints, instead they employed sever financial restraints. Therefore, it may conclude that the government intervention has not been successful in developing financial system.

Furthermore, our findings show that per capita GDP is not weakly exogenous with respect to financial development, implying that financial development (deepening) may bring economic growth in the long-run. Thus, policies that affect financial development are also likely to influence economic growth in Iran. Therefore, these results indicate that if the Iranian government tightens financial restraints in the banking sector, this policy does not develop financial sector; thereby, it may damage the economic growth which is the main aim in the FYDPs.

References

- 1- Abiad, Abdul & Mody, Ashoka. (2005). Financial Reform: What Shakes It? What Shapes It? *The American Economic Review*, 95(1) 66-88.
- 2- Barnebeck, Andersen, T. & Trap, F. (2003). Financial Liberalization, Financial Development and Economic Growth in LDCs. *Journal of International Development*, 15, 189-209
- 3- Ang, James, B. & McKibbin, Warwick, J. (2007). Financial liberalization, Financial Sector Development and Growth: Evidence from Malaysia. *Journal of Development Economics*. 84, 215–233.
- 4- Arestis, P. & Demetriades, P. O. (1997). Financial Development and Economic Development: Assessing the Evidence. *The Economic Journal*, 107(442), 783-799.
- 5- Arestis, P. & Demetriades, P. O. (1999). Financial liberalisation: the Experience of Developing Countries. *Eastern Economic Journal*, 25 (4), 441–457.
- 6- Arestis, P. & Demetriades, P. O., Fattouh, B., & Mouratidis, K. (2002). The Impact of Financial Liberalization Policies on Financial Development: Evidence from Developing Economies. *International Journal of Finance and Economics*, 7, 109–121.
- 7- Auerback, Paul & Jalal Uddin, Siddiki. (2004). Financial Liberalization and Economic Development: an Assessment. *Journal of Economic Survey*, 18(3), 231-265.
- 8- Breitung, Jörg., Brüggemann, Ralf & Lütkepohl, Helmut. (2004). Structural Vector Autoregressive Modeling and Impulse Responses. *Applied Time Series Econometrics*, 8, 159-196.
- 9- Bidabad, Bijan. (2005). *Tehran: Country Report for Iran*. Tehran: Monetary and Banking Research Academy.

- 10-Boswijk, Peter, H. (1995). Efficient Inference on Cointegration Parameters in Structural Error Correction Models. *Journal of Econometrics*, 69 (1), 133–58.
- 11-Central Bank of Iran. *Economic Report and Balance Sheet*, Various Issues.
- 12-Courakis, Anthony, S. (1984). Constraint on Bank Choices and Financial Repression in Less Developed Countries. *Oxford Bulletin of Economics and Statistics*, 46(4), 341-370.
- 13-Demetriades, P.O. & Luintel, K. B. (1997). The Direct Cost of Financial Repression: Evidence from India. *The Review of Economics and Statistics*, 79 (2), 311-320.
- 14-Demetriades, Panicos, O., & Luintel, Kul, B. (1996a). Banking Sector Policies and Financial Development in Nepal. *Oxford Bulletin of Economics and Statistics*, 58(2), 355–72.
- 15-Demetriades, panicos, O. (1996b). Financial Development, Economic Growth and Banking Sector Controls: Evidence from India. *The Economic Journal*, 106, 359–74.
- 16-Demetriades, panicos, O. (1997). The Direct Costs of Financial Repression: Evidence from India. *Review of Economics and Statistics* , 79(2), 311–320.
- 17-Demetriades, panicos, O. (2001). Financial Restraints in the South Korean Miracle. *Journal of Development Economics*, 64(2), pp. 459–79.
- 18-Hendry, Engle, R., D. & Richard, J. (1983). Exogeneity. *Econometrica*, 51, 277-304.
- 19-Ericsson, Neil, R. (1995). Conditional and Structural Error Correction Models. *Journal of Econometrics*, 69(1), 159–71.

- 20-Maxiwell Fry, J. (1980). Saving, Investment, Growth and the Cost of Financial Repression. *World Development*, 8(4), 317-27.
- 21-Maxwell, Fry, J. (1997). In Favour of Financial Liberalization. *The Economic Journal*, 107 (5), 754-770.
- 22-Gibson, Heather, D. & Tsakalotos, Euclid. (1994). The Scope and Limits of Financial Liberalization in Developing Countries: A Critical Survey. *Journal of Development Studies*, 30(3), 578-628.
- 23-Hachicha, Nejib. (2005). Banking Sector Controls and Financial Deepening: A Structural Error Correction Model for Tunisia. *The Developing Economies*, XLIII (2), 265–84.
- 24-Hamilton, James, D. (1994). *Time series Analysis*. Princeton, N. J: Princeton University Press.
- 25-Harbo, Ingrid., Johansen, Søren, & Rahbek, Anders. (1998). Asymptotic Inference on Cointegrating Rank in Partial Systems. *Journal of Business & Economic Statistics*, 16 (4), 388-399.
- 26-Hellmann, Thomas., Murdock, Kevin & Stiglitz, Joseph. (1997). Financial Restraint: Towards a New Paradigm. In M. Aoki, H-K. Kim & M. Okuno-Fujiwara, (Eds). *The Role of Government in East Asian Economic Development Comparative Institutional Analysis*. (pp. 163-207). Oxford: Clarendon Press
- 27-Hellmann, Thomas, F., Murdock, Kevin, C., & Stiglitz, Joseph, E. (2000). Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough. *American Economic Review*, 90(1), 147–65.

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- 28-Johansen, Søren. (1992). Co-integration in Partial Systems and the Efficiency of Single- Equation Analysis. *Journal of Econometrics*, 52, 389-405.
- 29-Johansen Søren & Juselius, Katarina. (1994). Identification of Long-run and Short-run Structure: An Application to the ISLM Model. *Journal of Econometrics*, 63, 7-36.
- 30-Lütkepohl, Helmut. (2006). Vector Autoregressive Models. In Terence C. Mills and Kerry Patterson (Eds). *Handbook of Econometrics*, Vol. 1. New York: Palgrave Macmillan.
- 31-McKinnon, Ronald, I. (1981). Financial Repression and the Liberalization Problem in Less-Developed Countries. In Sven Grassman and Erik Lundberg (Eds). *The Past and Prospects of the World Economic Order*. New York: Macmillan.
- 32-Hashem; Pesaran, M. Shin, Yongcheol & Smith, Richard, J. (2000). Structural Analysis of Vector Error Correction Models with Exogenous I. *Journal of Econometrics*, 97(2), 293–343.
- 33-Salehi-Isfahani, Javad. (1989). The Political Economy of Credit Subsidy in Iran, 1973-1978. *International Journal of Middle East Studies*, 21(3), 359-379.
- 34-Sims, C. (1980). Macroeconomics and Reality. *Econometrica*. 48, 1-48.
- 35-Simmons, Beth, A. & Elkins, Zachary. (2004). The Globalization of Liberalization: Policy Diffusion in the International Political Economy. *American Political Science Review*, 98(1), 171–89.
- 36-Shaw, E. (1973). *Financial Deepening in Economic Development*. New York: Oxford University Press.
- 37-Stiglitz, Joseph, E. (1994). The Role of the State in Financial Markets. In Michael Bruno and Boris Pleskovic (Eds). *The World Bank Annual*

Conference on Development Economics Supplement to the World Bank Economic Review and the World Bank Research Observer. Washington, D. C.: World Bank.

38-Theil, Henri. (1971). *Principals of Econometrics*. New York: John Wiley and Sons, Inc.

39-Van Wijnbergen, S. (1983). Interest Rate Management in LDC's. *Journal of Monetary Economics*, 12, 433–452.