Iranian Economic Review, Vol.6, No.6, 2002

Administrative rationing and multiple equilibria

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ABSTRACT

In this paper, we introduce non-interest profit/loss sharing (PLS) banks into a three-period overlapping generations model. Two types, (low- and high quality) investments are assumed and capital accumulation and level of output in the steady state is considered. Then, administrative rationing is introduced to the model. It is shown that the level of capital accumulation and output in equilibrium are lower compared to the market solution.

1. Introduction

There is a fairly large body of literature on growth and financial development indicating that the extent of financial intermediation in an economy is a significant determinant of its real growth rate (Levine, 2000). The purpose of this paper is to construct a model in which the behavior of competitive intermediaries (i.e. banks) affects resource allocation, and influences the steady-state capital intensity and per capita output. This paper will provide a general equilibrium approach to show that economies with competitive intermediaries will grow faster than the economies in which the government intervenes in the market and allocates credits through an ad.hoc. (i.e. non-market) rules. This negative consequense is indicated to come from the negative impact of saving mobilization by the intermediaries due to the government intervention. We postulate a cooperative intermediaries with a direct relationship between providers of funds and users of funds. Intermediaries in this model are assumed to accomplish two major functions: a) introducing the two parties to each other; b) provision of

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the advantages of the law of large numbers to savers.

The remainder of this article is divided into four sections. section two sets up the basic model and section 3 studies the effect of introducing administrative rationing into the model. Section 4 extends the model for a life time expected utility framework and section 5 provides summary and conclusion.

2. A simple model of overlapping-generations with financial intermediaries

A. Assumptions

The economy consists of three-period-lived overlapping-generations so that each individual lives for three periods. The population composition is subject to change: new individuals are continually born and old individuals are continually dying. Time is discrete so that the variables of the model are defined for $t=1,2,...$

L_t individuals are born in period t. Young generations are identical and each contains a continuum of identical agents. Each individual supplies one unit of labor when he is young. c_i denotes age i consumption. We assume that all young period income is saved. Thus the utility of an individual born at t, denoted U_t, depends on c_{t+1} and c_{t+2}. We assume constant-relative-risk aversion utility:

$$u(c_1, c_2, c_3) = \ln(c_2, \phi c_3) \tag{1}$$

Where ϕ is an individual-specific random variable realized at the beginning of age 2. ϕ has the following probability distribution

$$\phi = \begin{cases} 0 \text{ with probability } 1-\pi \\ 1 \text{ with Probability } \pi \end{cases} \tag{2}$$

Where $\pi \in (0.1)$. This formulation of preferences follows that of Diamond and Dybvig (1983) and Bencivenga and Smith (1991, 1992). Finally, it is assumed that only agents with $\phi=1$ can operate firms; (a fraction π of old agents are entrepreneurs.

B. Production

Production is described by the following assumptions. A non-storable consumption good is produced using capital and labor. As in OG models, all capital is owned by a subset of old agents called "firms". There are many firms, each with a constant returns to scale production function $y_t = K_t^{\theta} L_t^{1-\theta}$; $\theta \in (0,1)$ y_t has constant return to scale. Markets are competitive thus labor and capital receive their marginal products and firms earn zero profits. The real interest rate and the wage per unit of effective labor are

$$r_t = f'[k_t] \tag{3}$$

$$w_t = f[k_t] - k_t f'[k_t] \tag{4}$$

Capital is equally owned by all old individuals. Thus, in period zero, the capital owned by the old and labor supplied by the young are combined to produce output. Production takes place at the end of the period t+2. The old agents consume their capital income. They then die and exit the model.

C. Labor market

At each date, each age 3 whit $\phi=1$ operates a firm (Bencivenga and Smith, 1991). These firms have the same amount of capital; k_t. Taking this capital stock and the wage rate w_t as given, each firm chooses an employment level L_t to maximize $K_t^{\theta} L_t^{1-\theta} - w_t L_t$ which yields the profit maximization choice of L as below

$$L_t = k_t \left[(1-\theta)/w_t\right]^{\frac{1}{\theta}} \tag{5}$$

Equation (5) gives per firm labor demand. The firm owner gets a (θy_t) amount of the value of production. Substituting (5) into the production function gives the return to capital at t:

$$\theta y_t = \theta k_t \left[(1-\theta)/w_t\right]^{(1-\theta)/\theta} \tag{6}$$

Per firm labor supply is $1/\pi$[1]. Equating Lt from (4) with $1/\pi$ gives the labor market equilibrium condition.

$$w_t = (1-\theta)\,\pi^{\theta} k_t^{\theta} \tag{7}$$

1- Only a fraction of old agents are entrepreneurs, each of whom hires L_t units of labor. For example, when $\pi=0.25$, it says that each firm can hire $1/\pi=100/25$ of labor.

D. Portfolio decision

Young agents allocate their saving among money, capital (direct investment), and bank deposit. We assume no information cost and no information assymetry. If an individual places one unit of his saving in money, he will get P_t/P_{t+1} after one period. Where P_t and P_{t+1} are the price level at periods t and t+1, respectively. Therefore, P_t/P_{t+1} is the present value of one unit of money in period t+1. We assume $P_t/P_{t+1} \leq 1$.
All holding of money will be liquidated after one period.

Banks Promise that for each unit of income deposited in period t, r_1 will be paid if money is withdrawan after one period. If this occurs after two periods, r_2 will be paid per unit of income deposited. Using equation (6), individuals who withdraw after two periods earn the return $r_2\theta k_t\left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta}$ per unit of money deposited.

It is assumed that there are two kinds of projects that entrepreneurs can undertake. When credit is not administratively rationed, entrepreneurs will invest in normal-return projects with R^n. But when administrative rationing is imposed, a fraction of the banks' loan will go to the favored projects with low return, R^l, and a fraction $(1-\alpha)$ of the loan will go to the projects with normal return; R^n. In the absence of operating costs and with a competitive banking system, r_2 will be equal to the rate of return offered on deposits; $r_2 = \left[\alpha R^l + (1-\alpha)R^n\right]$. These payments are shown in table 1. At time t, each young agent has a real income w_t all of which is saved. Let λ_t be the fraction of young period saving placed in bank deposit, λ_2 be the fraction held in money and $\lambda_3 = 1-\lambda_1-\lambda_2$ be the fraction held in the form of capital $(\lambda_i \in [0,1]$.

Table 1. Payments

	Saving at t	Returns at t+1	Returns at t+2
λ_1:Deposit	**1**	**r_1,0**	$0, r_2\theta w_t\left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta}$
λ_2: Money	**1**	**P_t/P_{t+1}**	**0**
λ_3:Capital	**1**	**0**	$\left[\alpha R^l+(1-\alpha)R^n\right]\theta w_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta}$

When an individual holds one unit of saving in bank deposit there is a probability of π that he will not withdraw it until the end of period t+2 and receive θy_t. He also may need the money meanwhile and withdraw the deposit after one period with the probability of 1-π and receive r_1.

When $\phi=1$, direct investment is possible, because this is the only case that a firm can be operated. If $\phi=1$, one unit of saving placed in the normal-return (low-return) investment project will give R^n (R^l) of capital at t+2. Using (6), the value of this capital is:

$$\alpha R^l \theta k_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta} + (1-\alpha) R^n \theta k_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta} \tag{8}$$

The return of direct investment in period t+1 is assumed to be zero(1). The utility maximization problem of young individuals is:

$$u_t = \left[1-\pi)\ln(c_2) + \pi\ln(c_3\right] \tag{9}$$

$$c_2 = \lambda_1 r_1 w_t + \lambda_2 \frac{P_t}{P_{t+1}} w_t$$

$$c_3 = \lambda_1 \theta y_{t+2} + \lambda_2 \frac{P_t}{P_{t+1}} w_t + \lambda_3 \theta y_{t+2}$$

Substituting c_2 and c_3 in (9) yields

$$u = (1-\pi)\ln\left[\lambda_1 r_1 w_t + \lambda_2 \frac{P_t}{P_{t+1}} w_t\right] + \pi\ln\left[\lambda_1 \theta y_{t+2} + \lambda_2 \frac{P_t}{P_{t+1}} w_t + \lambda_3 \theta y_{t+2}\right] \tag{10}$$

θy_{t+2} is the share of firm owner from the output at t+2 and θy_{t+2} can be obtained as function of rate of return and w_{t+2}. Using equation (6) yields.

$$\theta y_t = \theta k_t^{\theta} L_t^{1-\theta} \tag{6}$$

Substituting (5) in (6) yields,

$$\theta y_t = \theta k_t \left[1-\theta)/w_t\right]^{\gamma}$$

1- The production process takes two periods. If a firm liquidates the investment project after one period, it will receive the scrap value of the investment which is assumed to be zero here.

The share of firm owner from the output at t+2 is:

$$\theta y_{t+2} = \theta k_{t+2} \left[(1-\theta)/w_{t+2}\right]^{\gamma} \tag{11}$$

Where k_{t+2}=rw_t. Thus, we can rewrite (11) as

$$\theta y_{t+2} = \theta k_{t+2} \left[(1-\theta)/w_{t+2}\right]^{\gamma} \tag{11'}$$

Substituting (11') in (10), we have the following utility maximization problem

$$u_t = (1-\pi)\ln\left[\lambda_1 r_1 w_t + \lambda_2 \frac{P_t}{P_{t+1}} w_t\right] + \pi \ln\left[\lambda_1 r_2 \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma} w_t\right.$$
$$\left. + \lambda_2 \frac{P_t}{P_{t+1}} w_t + [1-\lambda_1-\lambda_2]\, R^n \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma} w_t\right] \tag{12}$$

Or,

$$u_t = \ln(w_t) + (1-\pi)\ln\left[\lambda_1 r_1 + \lambda_2 \frac{P_t}{P_{t+1}}\right] + \pi \ln\left[\lambda_1 r_2 \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma}\right.$$
$$\left. + \lambda_2 \frac{P_t}{P_{t+1}} + [1-\lambda_1-\lambda_2]\, R^n \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma}\right] \tag{13}$$

Where $\gamma = (1-\theta)\theta$. Assuming $r_2 \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma} > r_1$ and $(P_t/P_{t+1}) \le 1$ and $(P_t/P_{t+1}) \le r_1$ then $\lambda_2 = 0$. In this case, bank deposits dominate real cash balances as the asset of choice for young savers. In this section, we assume that the financial market is competitive and there is no administrative rationing, then α=0. Therefore, the utility function (12) can be written as follows:

$$u = \ln w_t + (1-\pi)\ln \lambda_1 r_1 \tag{14}$$
$$+ \pi \ln\left\{\lambda_1 r_2 \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma} + [1-\lambda_1]\, R^n \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma}\right\}$$

The solution to (14) sets:

$$\lambda_1 = \frac{\left[(1-\pi)R^n\right]}{R^n - r_2} \tag{15}$$

According to table 1, in a competitive credit market, one unit of direct investment yields $R^n \theta k_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta}$ but the return of one unit of bank deposit is $r_1 + r_2 \theta k_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta}$ Since banks are corporative entities of funds owned by young individuals, projects to the depositors in the second period. So, we can conclude that $r_1 + r_2 \theta k_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta} > R^n \theta k_t \left[(1-\theta)/w_{t+2}\right]^{(1-\theta)/\theta}$. Therefore,

young agents hold all their savings as bank deposits. This means $(\lambda=1)$. This is equal to the condition $\pi R^n = r_2$.

E. Intermediary behavior

In the context of an OLG model, intermediaries' behavior can be described as follows. Intermediaries accept deposits from young savers at t and use them to lend to the firms or keep a fraction of the deposits in money balances. Bank investment takes the form of lending to the firms. We assume a competitive profit loss sharing banking system, instances of which are Islamic and cooperative banks. The bank is viewed as a cooperative entity (like a coalition formed by young agents at t=1) which maximizes the expected utility of a representative depositor evaluated at time t=1[1]. The model of cooperative intermediaries provides a direct relationship between providers of funds and users of funds. Intermediaries in this model introduce two parties to each other and provide the advantages of the law of large numbers to savers.

Since Islam prohibits interest and allows profit, the model of Islamic banking and financial institutions have been built on profit/loss sharing principle. The Islamic instruments for productive cooperation between entrepreneurs and providers of capital are the various financial contracts which provide proportionately sharing of profit and loss (PLS scheme) such as Musharakah and Mudarabah. As far as banks and financial institutions are concerned, the scope for provision of Qard-al-Hassane (i.e. interest free loan) is limited. Thus, the major emphasis has to be on Musharakah and

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1- For more details see Bencivenga, Valerie R. and Bruce Snith, Financial Intermediation and Endogenous Growth, Review of Economic Studies, 58(1991), PP. 195-209.

mudarabah financing modes.

In Musharakah contract, all partners participate in profit according to the ratios that they agreed in advance. These ratios may or may not be in proportion to their capital contributions. However, if there is a loss, it is shared by the partners strictly in proportion to the capital contributions.

Mudarabah is basically a partnership between two parties: one party, called Rab-al-Mal, provides the finance and the other party called Mudarib, works or manages the business. This is the conventional Mudarabah.

It is also possible to set up a two-tier Mudarabah. In this case, Mudarib may mobilize funds from one Rab-al-Mal or more and he may use them to provide finance to other entrepreneurs on the basis of Musharakah or Mudarabah or any other financing modes permissible in Shariah as may be agreed between the provider and the user of finance.

The two-tier Mudarabah is considered to be the ideal model for setting up Islamic banks and other financial institutions whose main function is financial intermediation. They mobilize deposit from the public on the basis of Mudarabah and provide finance to entrepreneurs (Elgari,1997). However, Islamic banks may also accept current account deposits. In this regard, the relationship between depositor and the bank is that of lender and borrower. These deposits are in the nature of Qard-al-Hassane. The principal amount is to be returned to the depositors in full and on demand. In our model of financial intermediation and growth, the amount of deposit withdrawn after one period is considered to be demand deposit.

In the case of investment deposits (deposits which stay in bank for two periods), based on Mudarabah or Musharakah, the PLS principle applies. Since the bank acts as a Mudarib under this arrangement, the loss (if only) will have to be borne by the depositors. However, the possibility of a net loss in the case of banks and other financial intermediaries is weak. Because, there will be diversified financing operations in such institutions. On the average, there will be no net loss.

The difference between cooperative banks and conventional commercial banks is that the latter separate providers of funds from users of funds. Savers lend their money to the banks. They do not bear the risk of the profit because the return is fixed. Depositors do not need to know the type of borrowers to whom banks lend money. All they need is the general information about banks' portfolio quality. Banking laws assure depositors that banks are well supervised and thus minimize the amount of information to be produced by a single saver.

Separation of savers from producers is never an Islamic idea (Elgari,, 1997). The concept of PLS on which most of the Islamic modes of finance are based is dissimilar to the concept of conventional banking. Islamic/cooperative model of inter mediation provides a direct relationship between providers of funds and the users of funds. Hence, depositors now bear the risk of profit. The model puts the bank in the position of manager and depositors bear the risk of the production directly. The model of cooperative intermediaries provides a direct relationship between providers of funds and users of funds. Intermediaries in this model introduce parties to each other and provide the advantages of the law of large numbers to savers.

Mutual Fund is an example of investment based more or less on the principle of PLS. They mobilize funds from the public by issuing certificates, without guaranteeing any return. In this case, if there is a profit on the investment projects, the mutual fund will receive its share according to the percentage agreed in advance and the rest will be distributed among the holders of certificates. When there is a loss, it will be borne entirely by the certificate holders. The loss borne by the Mutual Fund would be in the terms of the efforts put in the project and went completely un-awarded.

The funds mobilized by the mutual fund are utilized namely for equity type financing. However, they may have interest-based assets in their portfolios. If these interest-based assets are replaced by equity type financing and the other requirements of Shariah are met, the operations of Mutual Funds can be accepted in Islam.

Now, let β_t denote the fraction of deposits held as capital and $1-\beta_t$ denote the fraction of deposit held in money to prevent bank runs. So, banks choose β_t to maximize the utility function of a representative depositor evaluated at date t. The relevant resource constraints are:

$$(1-\pi)r_1 = (1-\beta_t)\frac{P_t}{P_{t+1}} \tag{16}$$

$$\pi r_2 = R^n \beta_t \tag{17}$$

The left-hand side of (16) indicates that a fraction $(1-\pi)$ of depositors will withdraw after one period and receive r_1. On the other hand, the bank will keep $1-\beta_t$ of deposits in money with the return of P_t/P_{t+1} Similarly, the left-hand side of (17) says that a fraction π of depositor will withdraw their deposits after two periods and receive r_2 per unit deposited. As shown by the right-hand side of (17), the bank will put a β_t fraction of deposits in capital and gets R^n per unit invested. So, intermediary should solve the following utility maximization problem with respect to β_t:

$$u = \ln(w_t) + (1-\pi)\ln\left[\frac{(1-\beta_t)P_t/P_{t+1}}{(1-\pi)}\right] + \pi\ln\left[\frac{R^n\beta_t}{\pi}\theta\left[(1-\theta)/w_{t+2}\right]^\gamma\right] \tag{18}$$

The solution to (18) sets:

$$\beta = \pi \tag{19}$$

F. Capital accumulation[1]

We can aggregate representative individuals' behavior to characterize the dynamics of the economy. In a closed economy, summation of individual's assets cancels debt and claims, and hence yields the aggregate capital stock. The capital stock in period t+2 is the amount saved by young individuals in period t. Thus,

$$K_{t+2} = \lambda_1\pi\, r_2\, s(r_1, r_2)\, L_t w_t \tag{20}$$

Dividing both sides of (20) by L_t gives us capital per unit of labor:

$$K_{t+2} = \lambda_1\pi\, r_2\, s(r_1, r_2)\, w_t$$

Here, we have $\lambda_1 = s = 1$.

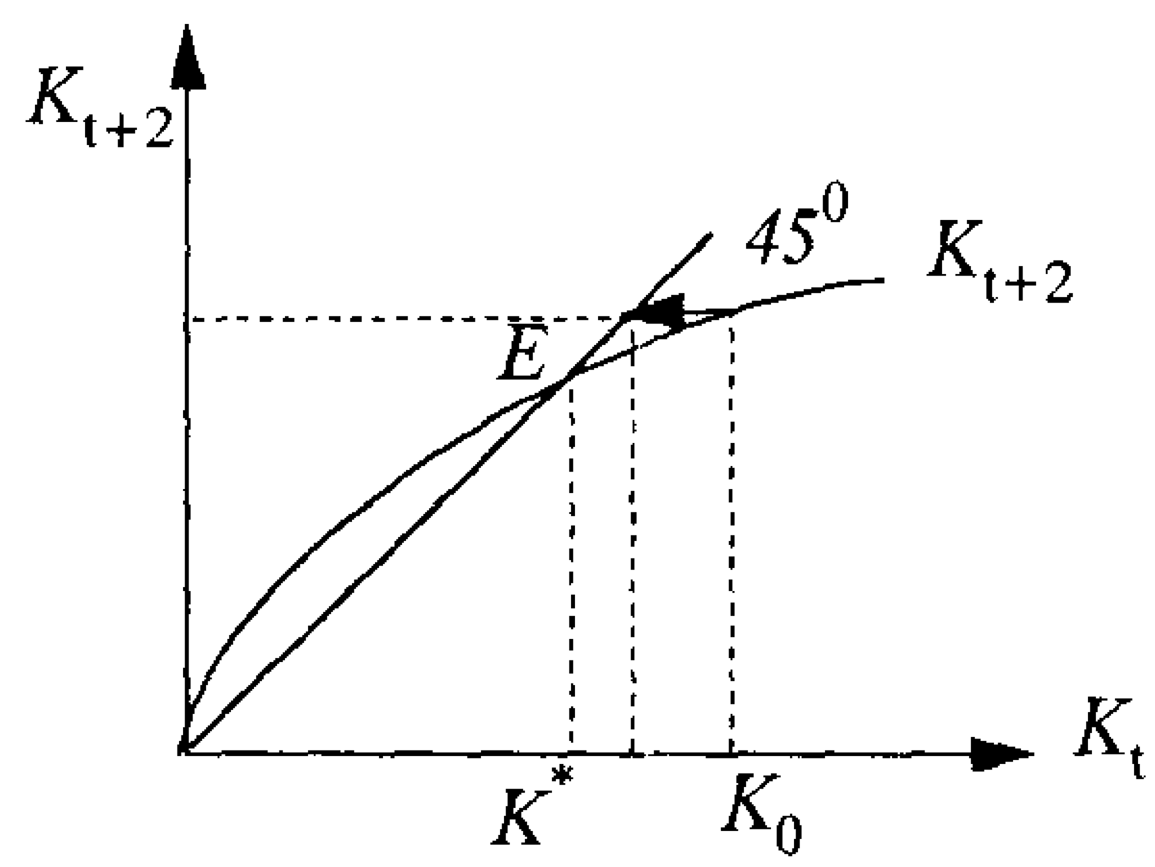
$$K_{t+2} = \pi\, r_2\left[f(k_t) - k_t f'(k_t)\right] \tag{21}$$

Assuming that production function is Cobb-Douglas, $f(k) = k_t^\theta$ and $w_t = (1-\theta)\, k_t^\theta$. Therefore, equation (20) becomes:

$$k_{t+2} = \pi R^n (1-\theta)\, k_t^\theta \tag{22}$$

1- *For more details see Romer, David, Advanced macroeconomics, McGrow-Hill, 1996; and Azariadis, Costas and Bruce Smith, financial intermediation and regime swiching in business cycles, American Economic Review, 1998, Vol.88, No.3, PP. 516-536.*

Figure 1: Law of Motion for K_t in market solution



Equation (22) is the equation of motion for k_t. Figure (1) shows k_{t+1} as a function of k_t. The fixed point of the system is shown at E corresponding to the steady-state value of capital intensity. At the steady-state, the above economy has a constant saving rate, constant output per worker, and constant capital-output ratio.

3. The model with administrative rationing

In this section, we introduce the administrative rationing to the model and consider how it may impinge the average efficiency of the loan portfolio of the bank. The representative bank has to tackle two issues: deposit mobilization and portfolio optimization.

The economy is the same as in previous section and we introduce administrative rationing to the model. When administrative rationing exists, the pattern of capital formation will reflect the fact that a favored group of firms have more access to credit even if the rate of return on its investments are lower than the normal firms(1). More specifically, we assume that a fraction α of the bank deposit is channeled to low-return investment projects and $(1-\alpha)$ of the banks' loan goes to finance normal-return projects. α is the degree of administrative rationing so that $0 \leq \alpha \leq 1$. When $\alpha=0$, there is no administrative rationing. On the other extreme, when $\alpha=1$, there is a perfect administrative rationing and all credits are channeled to the low-return projects. Presumably, we introduce government into the model. It will impose tax for current expenditure and allocate a fraction α (of credits.

1- *For more details see Bencivenga, Valerie R. and Bruce Smit, Some Consequences of Credit Rationing in an Endogenous Model, Journal of Economic Dynamics and Control 17 (1993) 97-122; and Mckinnon, R.I. and Mathesion, D.J., How to Manage a Repressed Economy, Essays in International Finance, Princeton University, 1981.*

A. Portfolio decision

In the context of the model of previous section, young agents save their after-tax wage income and can allocate their saving between money, bank deposits, and direct investment. If an individual places one unit of his saving in money, he will receive $(P_t/P_{t+1}) \leq 1$.

If a young agent places one unit of income in demand deposits, he will be paid $r_1 \geq (P_t/P_{t+1})$ if he withdraws it after one period. If he places one unit of income in deposits and waits for two periods, he will receive $\bar{r}_2$. The return to the term deposits comes from the real sector return through firms' investment in both kinds of projects. Since low-return projects cannot compete in a free financial market to get the desired amount of credit, the government channels the credit to them by administrative clecre. We assume that the return of these firms per unit of capital is less than the normal per capita return in previous section; $R^l < R^n$

When an individual holds one unit of saving in bank deposit, there is a probability of π that he will not withdraw it until the end of period t+2 and get $\bar{r}_2$; where $\bar{r}_2 = \alpha R^l + (1-\alpha) R^n$. He also may need the money meanwhile and withdraw the deposit in the next period with the probability of $1-\pi$ and get r_1. Hence, a representative agent will consume at t+2:

$$c_{t+2} = \left\{ \alpha R^l \theta k_{t+2} \left[(1-\theta)/w_{t+2} \right]^{\gamma} + (1-\alpha) R^n \theta k_{t+2} \left[(1-\theta)/w_{t+2} \right]^{\gamma} \right\} (1-\tau) w_t \tag{23}$$

Where τ is the tax rate and it is assumed to be a fixed proportion of wage income and thus $(1-\tau)w_t$ is disposable income of a representative agent(1). Now, a representative young agent should decide how to divide his saving among bank deposit, money balances, and direct investment. We can write the utility maximization problem of young agents as follows:

$$u = \ln \left[(1-\tau) w_t \right] + (1-\pi) \ln \left[\lambda_1 r_1 + \lambda_2 \frac{P_t}{P_{t+1}} \right] + \pi \ln \left[\lambda_1 \bar{r}_2 \theta \left[(1-\theta)/w_{t+2} \right]^{\gamma} + \lambda_2 \frac{P_t}{P_{t+1}} + \left[1 - \lambda_1 - \lambda_2 \right] R^n \theta \left[(1-\theta)/w_{t+2} \right]^{\gamma} \right] \tag{24}$$

1- Since the tax rate, as shown later, does not influence consumption decision, we assume that it does not alter labor supply behavior.

Here, we have the same assumption of the last section about the relations among r_1 , r_2, R^n and P_t/P_{t+1} so that $r_2\theta\left[(1-\theta)/w_{t+2}\right]^{\gamma} > r_1$ and $(P_t/P_{t+1}) \leq 1$ and $(P_t/P_{t+1}) \leq r_1$. Then, it is easy to see that $\lambda=0$. So, we have the following utility maximization problem:

$$u = \ln(w_t) + (1-\pi)\ln(\lambda_1 r_1) + \pi\ln\left[\lambda_1 \bar{r}_2\theta\left[(1-\theta)/w_{t+2}\right]^{\gamma}\right.$$
$$\left. + \left[1-\lambda_1\right] R^n\theta\left[(1-\theta)/w_{t+2}\right]^{\gamma}\right] \tag{25}$$

The solution to (25) sets:

$$\lambda_1 = \frac{(1-\pi)R^n}{R^n - \bar{r}_2} \tag{26}$$

λ_1 will be less that unity if $\pi R^n > \bar{r}_2$.

In section 2, we conclude that $\lambda_1=1$ is equal to $\pi R^n = r_2$. Here, we know that $\bar{r}_2 < r_2$ because a credit-channeling program decreases the expected return paid to deposits held for two periods and prevents deposits from being too attractive relative to direct investment. and then it results $\pi R^n > \bar{r}_2$. Therefore, we conclude that

$$\lambda_1 = \frac{(1-\pi)R^n}{R^n - \bar{r}_2} < 1 \tag{27}$$

Equation (27) means that when administrative rationing is introduced to the model, young agents will not hold all their savings in bank deposit. As the rate of rationing increases, the share of savings placed in bank deposit will decrease and the share of direct investment will increase. This can be shown clearly by derivative of (26) with respect to α.

$$\lambda_1 = \frac{(1-\pi)R^n}{R^n - \alpha R^l - (1-\alpha)R^n}$$

$$\frac{\partial\lambda_1}{\partial\alpha} = \frac{-\left[R^n - R^l\right]}{\left[R^n - \alpha R^l - (1-\alpha)R^n\right]^2} < 0 \tag{28}$$

B. Intermediary behavior

Intermediaries have the same behavior as in the last section (laissez-faire). They accept deposits from young savers at t and use them to lend firms or keep them in money balances. Let β_t denote the fraction of deposits held as capital and $(1-\beta_t)$ the fraction of deposit held in money to prevent bank running. So, banks choose β_t to maximize the utility of a representative depositor evaluated at date t. Relevant resource constraints are the same as (16) and (17) and we rewrite them here:

$$(1-\pi)r_1 = (1-\beta_t)\frac{P_t}{P_{t+1}} \tag{29}$$

$$\pi\bar{r}_2 = \tilde{R}\beta_t \tag{30}$$

Where $\tilde{R} = \alpha R^l + (1-\alpha)R^n$. Intermediary should solve the following utility maximization problem with respect to β_t[1]:

$$u = \ln w_t + (1-\pi)\ln\lambda_1 r_1 + \pi\ln\left[\lambda_1 r_2\theta\left[(1-\theta)/w_{t+2}\right]^\gamma + [1-\lambda_1]\,R^n\theta\left[(1-\theta)/w_{t+2}\right]^\gamma\right] \tag{31}$$

Since we can not obtain a solution for the optimum value for β_t by solving the utility maximization of the representative agents, we proceed to find β_t by profit maximization of a representative firm.

B.1. Profit maximization

Total profit of a bank is total income minus total cost and can be written by the following function:

$$\text{Profit} = \left[(1-\tau)w_t\right]\lambda_1(1-\beta)\frac{P_t}{P_{t+1}} + \left[\lambda_1\beta\,\bar{r}_2\theta\left[(1-\theta)/w_{t+2}\right]^\gamma + \lambda_1(1-\pi)r_1 - \lambda_1\beta\,\bar{r}_2\theta\left[(1-\theta)/w_{t+2}\right]^\gamma\right] = 0 \tag{32}$$

Assuming constant returns to scale production function and that factors of production are paid their marginal products, the profit for a reppresentative intermediary will be zero. Equation (32) gives the optimum

1- *For more details see Bencivenga and Smith (1992).*

fraction of deposit held in capital as follows:

$$\beta_t = \pi \tag{33}$$

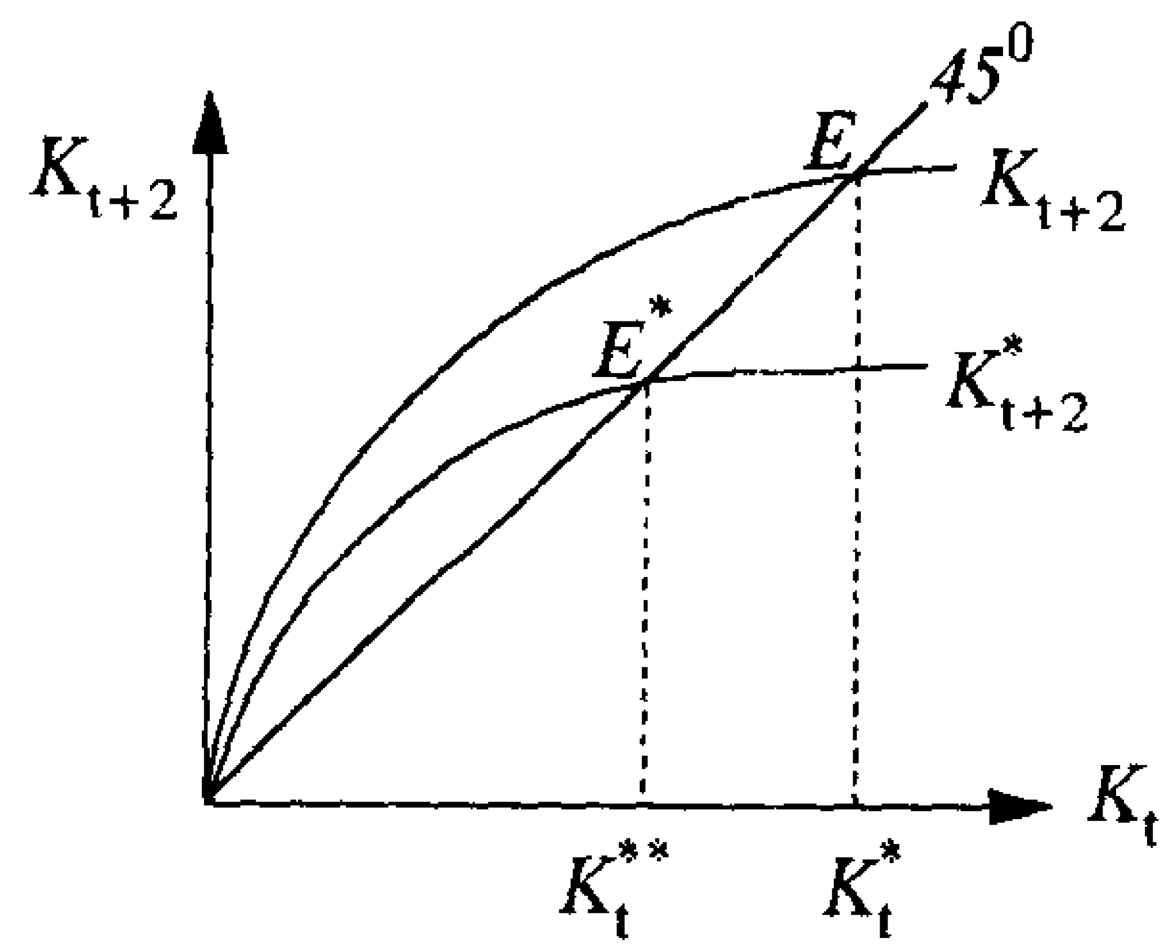
Equation (33) is the same as (19); a fraction of the deposit that bank holds in capital is the same in both cases of market solution presence of administrative rationing.

C. Capital accumulation

We can aggregate individuals' behavior to characterize the dynamics of the economy and then compare it with that of the market solution. The capital stock in period t+2 is the amount saved by young individuals in period t. Thus,

$$k^*_{t+2} = \lambda_1 \pi \bar{r}_2 \left[f(k_t) - k_t f'(k_t) \right] \tag{34}$$

Figure 2: Comparing law of motion for k_t in administrative rationing and in market solution:



$$k^*_{t+2} = \lambda_1 \pi \frac{\tilde{R}\beta}{\pi} \left[f(k_t) - k_t f'(k_t) \right] \tag{35}$$

Assuming that production function is Cobb-Douglas, $f(k) = k^\theta$ and

$$w_t = (1-\theta)\, k^\theta$$

Therefore, equation (35) becomes:

$$k^*_{t+2} = \lambda_1 \pi \tilde{R}\, (1-\theta)\, k_t^\theta \tag{36}$$

Equation (36) is the equation of motion for k_t. Figure (2) shows k^*_{t+2} as a function of k_t. A point where the k^*_{t+2} curve intersects the 45 degree line is a point where $k^*_{t+2} = k_t$. There is a unique equilibrium level of k at point E^*, denoted by k^*_{t+2}. k^*_{t+2} is stable: wherever k starts, it converges to k^*_{t+2}.

It is easy to see that $\pi R^n(1-\theta) > \lambda_1 \tilde{R}(1-\theta)$ This induces a downward shift of the equation of motion curve in Figure 2. Therefore, introducing administrative rationing to the model will decrease the equilibrium level of capital and output. As the rate of administrative credit rationing decrease, λ_1 will increase and the equilibrium gradually transit to point E.

4. Lifetime expected utility maximization

A. Market solution

In this subsection, we consider the role of financial intermediation in mobilizing the savings when government does not intervene in credit market. Suppose that the preferences over life time consumption of a young individual is represented by the following utility function:

$$u = \ln w_t + (1-\pi)\ln(\lambda_1 r_1) + \pi E \ln\left\{\lambda_1 \tilde{r}_2 \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma} + \left[1-\lambda_1\right] \tilde{R}^n_i \theta \left[(1-\theta)/w_{t+2}\right]^{\gamma}\right\} \tag{37}$$

Equation (37) is basically the same as (14) unless we introduce the operating cost of bank for each unit deposited, c, so that $\tilde{r}_2 = \tilde{R}^n - c$. We also assume that the rate of return to normal investment project is a random variable which varies between a lower bound, ω, and an upper bound, b. E is the expectation operator. The first order condition to (37) with respect to λ_1 sets:

$$\frac{1-\pi}{\lambda_1} + c\pi E\left[\frac{1}{\tilde{R}^n - \lambda_1 c}\right] = 0 \tag{38}$$

To find λ_1, we need to figure out the expected value of the second term in the right-hand side of (38). Assuming the interval (b-ω) being continuous, we can write the expected term in the following form of integral:

$$I_1 = \int_{\omega}^{b} \frac{1}{\tilde{R}^n - \lambda_1 c} f\left[\tilde{R}^n\right] d\tilde{R}^n \tag{39}$$

where $f\left[\tilde{R}^n\right]$ is the distribution function of $\tilde{R}^n$. Assuming a uniform distribution function for $\tilde{R}^n$, we can figure out the integral (39) as follows:

$$I_1 = \frac{1}{b-\omega} \log\left[\frac{b-\lambda_1 c}{\omega-\lambda_1 c}\right] \tag{40}$$

Substituting (40) in (38), we have

$$\frac{1-\pi}{\lambda_1} = \frac{c\pi}{b-\omega} \log\left[\frac{b-\lambda_1 c}{\omega-\lambda_1 c}\right] \tag{41}$$

The logarithmic term in (41) can be extended in the following form:

$$\log\left[\frac{b-\lambda_1 c}{\omega-\lambda_1 c}\right] = \log\left[1+\frac{b-\omega}{\omega-\lambda_1 c}\right] = \frac{b-\omega}{\omega-\lambda_1 c} - \frac{(b-\omega)^2}{2(\omega-\lambda_1 c)^2} + \frac{(b-\omega)^3}{3(\omega-\lambda_1 c)^3} - \ldots \tag{42}$$

Taking the first term of the extension in (42) as an approximation for the logarithm term and substituting it in (41), we have

$$\lambda_1 = \min\left[\frac{(1-\pi)\omega}{c}, 1\right] \tag{43}$$

It is clear from (43) that $(1-\pi)\omega/c>1$ and λ_1 will not be less than unity. Using more sentences of (42) to figure out λ_1 will not change the result but it will only impose a laborious computation. Therefore, when government does not intervene in credit market, young agents will hold all their savings in bank deposits.

B. Administrative rationing

Now, we consider the role of financial intermediaries in mobilizing public savings when government allocates a fraction of deposit to favored investment projects. We assume that they have a lower grade and can not take loan in a competitive situation. Usually, socially powerful groups undertake these projects and they claim that these projects have a larger social return than the private return. But, in fact, the social returrn of these projects are often equal to the private return.

The economy is the same as in section 3 Here, we assume that the rates of return to investment projects, $\tilde{R}^n$ and $\tilde{R}^l$, are random variables so that $e \le \tilde{R}^l \le f$ and $\omega \le \tilde{R}^n \le b$. The co-variance between $\tilde{R}^n$ and $\tilde{R}^l$ is zero. Since a fraction α of the banks deposit is channeled to the low-return projects and (1-α) of the banks' loan goes to finance normal return projects, the weighted average of the return to the deposit is $\left[\alpha \tilde{R}^l + (1-\alpha)\tilde{R}^n - c\right]\theta y$. Therefore, consumption in periods two and three are:

$$C_3 = \lambda_1 \theta y_{t+2} + (1-\lambda_1)\theta y_{t+2}$$

Now, a representative young agent should maximize the following utility function

$$u = \ln w_t + (1-\pi)\ln\lambda_1 r_1 + \pi E \ln\left\{\lambda_1 \left[\alpha\tilde{R}^l + (1-\alpha)\tilde{R}^n - c\right]\theta\left[(1-\theta)/w_{t+2}\right]^\gamma + [1-\lambda_1]\,\tilde{R}^n_i\,\theta\left[(1-\theta)/w_{t+2}\right]^\gamma\right\} \tag{44}$$

Here, we assume that those who put their savings in direct investment will get zero if they want to liquidate their investment after one period. In the next sub-section, we will remove this assumption for some purpose. The first order condition to (44) with respect to λ_1 sets.

$$1 - \pi E\left[\frac{\tilde{R}^n}{\lambda_1 \alpha\left[\tilde{R}^l - \tilde{R}^n\right] + \tilde{R}^n - c\lambda_1}\right] = 0 \tag{45}$$

We can write the expected term in the following form of integral:

$$I_2 = \tilde{R}^n \int_e^f \frac{1}{\lambda_1 \alpha \tilde{R}^l + \lambda_1 \alpha \tilde{R}^n - \tilde{R}^n + c\lambda_1} \frac{1}{f-e} d\tilde{R}^l$$

$$I_2 = \frac{\tilde{R}^n}{\alpha (f-e)\lambda_1} \log \left[\frac{\lambda_1 \alpha f + \lambda_1 \alpha \tilde{R}^n - \tilde{R}^n + c\lambda_1}{\lambda_1 \alpha e + \lambda_1 \alpha \tilde{R}^n - \tilde{R}^n + c\lambda_1} \right]$$

$$I_2 = \frac{1}{\alpha (f-e)\lambda_1} \int_\omega^b \tilde{R}^n \log \left[\frac{\lambda_1 \alpha f + \lambda_1 \alpha \tilde{R}^n - \tilde{R}^n + c\lambda_1}{\lambda_1 \alpha e + \lambda_1 \alpha \tilde{R}^n - \tilde{R}^n + c\lambda_1} \right] d\tilde{R}^n$$

$$I_2 = \frac{1}{\alpha (f-e)\lambda_1} \left\{ \int_\omega^b \tilde{R}^n \log \left[\lambda_1 \alpha f + \tilde{R}^n (\lambda_1 \alpha - 1) + c\lambda_1 \right] d\tilde{R}^n \right.$$

$$\left. - \int_\omega^b \tilde{R}^n \log \left[\lambda_1 \alpha e + \tilde{R}^n (\lambda_1 \alpha - 1) + c\lambda_1 \right] d\tilde{R}^n \right\} \qquad (46)$$

After a very long process of handling (46) and substituting the result in (45), we have:

$$\lambda_1^3 \left[\frac{1}{2}\alpha^3 (f^2 + ef + e^2)(b-\omega) + \frac{3}{2}\alpha^2 c(e+f)(b-\omega) + \frac{5}{4}\alpha c(b-\omega) \right.$$

$$\left. + \frac{1}{4}\alpha^2 c(b^2 - \omega^2) - \frac{1}{4}\alpha^3 (b^3 - \omega^3) \right] + \lambda_1^2 \left[-\frac{1}{2}\alpha^2 (f^2 + ef + e^2)(b-\omega) \right.$$

$$- (e+f)(\alpha^2 + \frac{3}{2}\alpha^2 c)(b-\omega) + (\frac{1}{4}c^2 - 2\alpha c)(b-\omega) - \frac{1}{2}\alpha c(b^2 - \omega^2)$$

$$\left. + \frac{3}{4}\alpha^3 (b^3 - \omega^3) - \frac{\alpha^2}{\pi} \right] + \lambda_1 \left[\alpha (f^2 + ef + e^2)(b-\omega) + e(e+f)(b-\omega) \right.$$

$$\left. + (\frac{3}{2}\alpha c + 2c)(b-\omega) + \frac{1}{4}(b^2 - \omega^2) - \frac{3}{4}\alpha (b^3 - \omega^3) + \frac{2\alpha}{\pi} \right]$$

$$+ \frac{1}{4}(b^3 - \omega^3) - \frac{3}{2}(b-\omega) - \frac{1}{\pi} = 0 \qquad (47)$$

Table 2:

α	λ_1	α	λ_1	α	λ_1	α	λ_1
.50	4.27	.30	.85	.55	.47	.80	.32
.10	2.37	.35	.73	.60	.43	.85	.31
.15	1.64	.40	.65	.65	.40	.90	.29
.20	1.25	.45	.57	.70	.37	.95	.27
.25	1.02	.50	.52	.75	.35	1.00	.26

The solution to (47) in parameters is meaningless or even impossible. So, by introducing hypothetical numbers for parameters, we can solve (47) for λ_1. Assuming π=.3 , c=.02, ω=1.02 , b=1.20 , e=.95 , f=1.05 , and $0 \le \alpha \le 1$, we have the following result in table (2). Thus, considering expected utility, we also conclude that when we introduce administrative rationing to the model, young agents put less of their savings in banks as rationing increases. But we see in table 2 that when α=1 then λ_1=0.26 This implies that when government allocates all deposits to favored projects, young their savings in agents will still hold. 26 of their saving in bank deposit. How can we explain this phenomenon? This is primarily explained the by scrap value of the direct investment. Here, we assumed that the scrap value of direct investment liquidated after one period was zero. This makes deposit in banks be very desirable. In the next section, this assumption will be relaxed and a different result will be obtained.

• Positive scrap value for direct investment

Now, we assume that the scrap value of direct investment liquidated after on period, x, is positive and can vary in a interval $0 \le x \le r_1 = 1$. For x=0, we had the results of table 2. For $0 < x \le 1$, a representative young agent should maximize the following utility function.

$$u = \ln w_t + (1-\pi)\ln\left[\lambda_1 r_1 + (1+\lambda_1)x\right] \pi E\ln\left\{\lambda_1\left[\alpha\tilde{R}^l + (1-\alpha)\tilde{R}^n - c\right]\right.$$

$$\left.\theta\left[(1-\theta)/w_{t+2}\right]^{\gamma} + \left[1-\lambda_1\right]\tilde{R}_i^n\,\theta\left[(1-\theta)/w_{t+2}\right]^{\gamma}\right\} \quad (48)$$

where $c_2 = \left[\lambda_1 r_1 + (1-\lambda_1)x\right]$. This term indicates that when a young agent holds one unit of his saving in bank or it is placed in a direct investment, he may withdraw/liquidate that sum after one period with the probability of $(1-\pi)$ If he puts his saving in bank, he will get r_1 in the next period. If he puts his saving in direct investment and he has to liquidate it after one period, he will get x.

The first order condition to (48) with respect to the share of the individual saving placed in the bank deposit λ_1 is given below

$$\frac{(1-\pi)(r_1-x)}{\lambda_1 r_1+(1-\lambda_1)x}\ \pi E\left[\frac{\alpha\left[\tilde{R}^l-\tilde{R}^n\right]-c}{\lambda_1\alpha\left[\tilde{R}^l-\tilde{R}^n\right]+\tilde{R}^n-\lambda_1 c}\right]=0 \qquad (49)$$

The expected value of (49) is given by (50).

$$\frac{1}{(\lambda_1\alpha-1)^2}\left[\begin{array}{l}\lambda_1^3\left[\frac{1}{2}\alpha^3(f^2+ef+e^2)(b-\omega)+\frac{3}{2}\alpha^2c(e+f)(b-\omega)+\frac{5}{4}\alpha c^2(b-\omega)+\right.\\ \left.+\frac{1}{4}\alpha^2c(b^2-\omega^2)-\frac{1}{4}\alpha^3(b^3-\omega^3)\right]\\ +\lambda_1^2\left[-\frac{1}{2}\alpha^2(f^2+ef+e^2)(b-\omega)-(e+f)(\alpha^2+\frac{3}{2}\alpha c)(b-\omega)\right.\\ \left.+(\frac{1}{4}c^2-2\alpha c)(b-\omega)\quad-\frac{1}{2}\alpha c(b^2-\omega^2)+\frac{3}{4}\alpha^2(b^3-\omega^3)\right]\\ +\lambda_1\left[\alpha(f^2+ef+e^2(b-\omega)+\alpha(e+f)(b-\omega)+(\frac{3}{2}\alpha+2c)(b-\omega)\right.\\ \left.+\frac{1}{4}c(b^2-\omega^2)\quad-\frac{3}{4}\alpha(b^3-\omega^3)\right]+\frac{1}{4}(b^3-\omega^3)-\frac{3}{2}(b-\omega)\end{array}\right]$$

Table 3:

	λ_{1i}										$\bar{\lambda}_1$
a	x=1	x=2	x=3	x=4	x=5	x=6	x=7	x=8	x=9	x=1	
.05	2.34	2.83	2.75	3.36	3.24	3.79	3.91	3.30	4.24	3.84	3.35
.10	1.32	1.80	1.60	1.72	1.53	1.91	2.11	1.25	2.81	3.45	1.95
.15	.92	1.00	1.10	1.13	1.30	1.86	1.34	1.57	1.60	1.71	1.35
.20	.63	.66	.64	.72	.93	1.04	1.09	1.14	1.25	1030	1.04
.25	.51	.61	.93	.93	.93	1.25	.66	.78	.93	.93	.84
.30	.62	.47	.46	.32	.78	1.25	1.25	1.25	1.25	1.24	.88
.35	.35	.67	.62	.31	.31	.31	.31	.93	1.25	1.24	.63
.40	.62	.62	.31	.31	.31	.31	.31	.31	.31	.31	.37
.45	.25	.46	.46	.46	.35	.33	.33	.32	.32	.31	.35
.50	.23	.20	.46	.46	.46	.46	.46	.46	.46	.46	.41
.55	.25	.20	.20	.20	.62	.46	.46	.46	.46	.46	.37
.60	.35	.20	.20	.20	.20	.20	.20	.62	.46	.46	.30
.65	.21	.21	.20	.20	.20	.20	.20	.20	..20	.20	.20
.70	.23	.23	.23	.23	.23	.23	.23	.23	.23	.23	.23
.75	.17	.17	.17	.17	.17	.17	.23	.23	.23	.23	.19
.80	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15	.15
.85	.23	.23	.23	.23	.23	.23	.23	.23	.23	.23	.23
.90	.11	.23	.23	.23	.23	.23	.23	.23	.23	.23	.21
.95	.11	.11	.31	.31	.23	.23	.23	.23	.23	.23	.22
1.00	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11

Substituting (50) in (49), we have

$$\lambda_1^3\left[\frac{1}{2}\alpha^3(f^2+ef+e^2)(b-\omega)+\frac{3}{2}\alpha^2c(e+f)(b-\omega)+\frac{5}{4}\alpha c(b-\omega)+\frac{1}{4}\alpha^2c(b^2-\omega^2)\right.$$
$$\left.-\frac{1}{4}\alpha^3(b^3-\omega^3)\right]+\lambda_1^2\left[-\frac{1}{2}\alpha^2(f^2+ef+e^2)(b-\omega)-(e+f)(\alpha^2+\frac{3}{2}\alpha c)(b-\omega)\right.$$
$$\left.+(\frac{1}{4}c^2-2\alpha c)(b-\omega)\quad-\frac{1}{2}\alpha c(b^2-\omega^2)+\frac{3}{4}\alpha^2(b^3-\omega^3)-\frac{\alpha^2}{\pi}\right]$$
$$+\lambda_1\left[\alpha(f^2+ef+e^2)(b-\omega)+\alpha(e+f)(b-\omega)+(\frac{3}{2}\alpha+2c)(b-\omega)+\frac{1}{4}(b^2-\omega^2)\right.$$
$$\left.-\frac{3}{4}\alpha(b^3-\omega^3)+\frac{2\alpha}{\pi}\right]+\frac{1}{4}(b^3-\omega^3)-\frac{3}{2}(b-\omega)-\frac{1}{\pi}$$
$$-\frac{\lambda_1^3\alpha^2(1-\pi)r_1x-2\lambda_1^2\alpha(1-\pi)r_1x+\lambda_1(1-\pi)r_1x}{\lambda_1\pi(r_1-x)+\pi x}-\lambda_1^2\alpha^2+2\lambda_1\alpha-1=0$$

Using numerical values, we have the results shown in table 3 for $0<x\leq 1$. So, there is a long-term negative relationship between λ_1 and α. Once again, we conclude that as the rate of administrative rationing increases, the share of savings placed in bank deposit will decrease. In table 3, we see that when $\alpha=1$ then $\lambda_1=.11$. Table 3 enables us to make a comparison between the hypothetical values assigned for α, and the corresponding values computed for λ_1. As it is shown in the table 3, a gradual increase in the value of α form.05 to 1.00) is concurrant with a gradually declining trend in corresponding values computed for λ_1 gradually decreasing from 3.35 down to 0.11.

5. Conclusions

We used a three-period overlapping generations model of cooperative financial intermediaries and economic growth. Intermediaries operate on the basis of profit/loss sharinng. Two types of (low- and high quality) investment projects were assumed.

We solved the model for the steady-state level of capital and output per worker under two distinct case: First, when the financial intermediaries operate in a free and competitive market; and second, when administrative rationing exists. The equilibrium level of capital and output per worker is unambiguously higher when administrative rationing is absent. As the degree of administrative rationing increases, the equilibrium level of bank deposits and the level of output at steady-state falls.

In section four, we solved a similar model with a probabilistic rates of returns assuming an expected utility function. Once again, we concluded a nagative relationship between the rate of administrative rationing and the level of output at steady- state decreases.

References

1. *Alexander Gordon J., Jonathan D. Jones, and Peter J. Nigro (2001), Does Mutual Fund Disclusure at Banks Matter? Evidence from a Survey of Investors, The Quarterly Journal of Economics and Finance, Vol.41, PP. 387-403.*

2. *Amable, Bruno and Jean-Bernard Chatelian (2001), Can Financial Infrastructures Foster Economic Development?, Journal of Development Economics, Vol.64, 481-489.*

3. *Arstis, Philip and Panicos Demetriades (1997), Financial Development and Economic Growth: Assessing the Evidence, The Economic Journal, PP.783-799.*

4. *Azariadis, Costas and Bruce Smith (1998), Financial Intermediation and Regime Swiching in Business Cycles, American Economic Review, Vol.88, No.3, PP.516-536.*

5. *Bencivenga, Valerie R. and Bruce Smith (1991), Financial Intermediation and Endogenous Growth, Review of Economic Studies, PP.165-209.*

6. *Bencivenga, Valerie R. and Bruce Smith (1993), Some Consequences of Credit Rationing in an Endogenous Model, Journal of Economic Dynamics and Control 17, P. 97-122.*

7. *Bernanke, Ben S. (1995), Inside the Black Box: The Credit Channel of Monetary Policy Transmission, Journal of Economic Perspective Vol.9, No.4, PP. 27-48.*

8. *Brock, Philip L. (1989), Reserve Requirements and the Inflation Tax, Journal of Money, Credit, and Banking, Vol.21,No.1, PP. 105-121.*

9. *Calomiris, Charles W. and R. Glenn Hubbard (1990), Firm Heterogenity, Internal Finance, and Credit Rationing, Economic Journal, PP. 90-104.*

10. *Cesaratto, Sergio (1999), Saving and Economic Growth in Neocalassical Theory, Cambridge Journal of Economics, PP. 771-793.*

11. *Chirinko, Robert S. (1995), Why Does Liquidity Matter in Investment Equations?, Journal of Money , Credit, and Banking, Vol.27, No.2, PP. 527-548.*

12. *CHO, Yoon Je (1988), The Effect of Financial Liberalization on the Efficiency of Credit Allocation: Some Evidence from Korea, Journal of Development Economics, Vol.29, PP. 101-110.*

13. *Corton, Gray, and George Pennacchi (1990), Financial Intermediation and*

Liquidity Creation, The Journal of Finance, Vol. XIV, No.1, 49-71.

14. *Daniel, Betty C. and Hong-Bum kim (1992), An Alternative Rationale for Financial Dualism, Journal of Money, Credit, and Banking, Vol.24, No.4, PP. 570-577.*
15. *Dewatripont, M. and E. Maskin (1995), Credit and Efficiency in Centralized and Decentralized Economies, Review of economic Studies 62, PP. 541-555.*
16. *Diamond, Douglas W. (1984) ,Financial Intermediation and Deligated Monitoring, Review of Economic Studies, PP. 393-410.*
17. *Diamond, Douglas W. (1997), Liquidity, Banks, and Markets, Journal of Political Economy, Vol.105, No.5, PP. 928-956.*
18. *Diamond, Peter (1965), National Debt in a Neoclassical Growth Model, American Economic Review, PP. 1126-1150.*
19. *Diamond, D.W. and P.H. Dybvig (1983), Bank Runs, Depost Insurance, and Liquidity, Journal of Political Economy, Vol. 91, PP.401-419.*
20. *Dixon, Huw, (1997), Controversy: Finance and Development, The Economic Journal, PP. 752-753.*
21. *El Gari, Mohammad Ali (1997), Islamic Investment Funds as Means for Resources Mobilization, in "Islamic Financial Instruments for Public Sector Resource Mobilization", Edited by Ausaf Ahmad and Tariqullah Khan, Islamic Research and Training Institute, Jeddah.*
22. *FAMA, Eugene F.(1980), Banking in the Theory of Finance, Journal of monetary economics, 39-57.*
23. *Gelbard, A. and Sergio Pereira Leite (1999), Measuring Financial Development in Sub-Saharan Africa, IMF Working Paper.*
24. *Gelles, Gregory M., and Douglas W. Mitchel (1999), Ordering Utility Functions Based on Mean-Seeking Behavior, The Quarterly Review of Economics and Finance, Vol.39, PP. 317-328*
25. *Gregorio, Jose De, Pablo E Guidotti (1995), Financial Development and Economic Growth, World Development, Vol. 23, No.3, PP. 433-448.*
26. *Harris, John R., Fabio schiantarelli (1994), and Moranda G. Siregar, The Effect of Financial Liberalization on the Capital Structure and Investment Decisions of Indonesian Manufacturing Establishments, The World Bank Economic Review, Vol. 8, No.1, PP 17-47.*
27. *Holmstorm, Bengt and Jean Tirole, (1997) Financial Intermediation, Loanable Funds, and the Real Sector, Quarterly Journal of Economics, Vol. CXII, No,3, PP. 663-691.*
28. *Jung. Woo S. (1986), Financial Development and Economic Growth: International Evidence, Economic Dvelopment and Cultural Change, PP. 333-346.*
29. *Kaminsky, Craciela L., Richard K. Lyons, and Sergio L. Schmukler (2001), Mutual*

Fund Investment in Emerging Markets: An Overview, The World Bank Economic Review, Vol.15, No.2, PP. 315-340.

30. *Khan, Mohsin S. and Abdlhak S. Senhadji (2000), Financial Development and Eonomic Growth: An Overview, IMF Working Paper.*
31. *King, Robert G., and Ross Levine (1993b), Finance and Growth: Schumpeter Might Be Right, Quarterly Journal of Economics, PP. 717-737.*
32. *Lacker, Jeffrey M. (1989), Financial Intermediation, Optimality, and Efficiency, Canadian Journal of Economics, PP. 364-382.*
33. *Levine, Ross (1997), Financial Development and Economic Growth PP. Views and Agenda, Journal of Economic Literature, Vol. XXXV, PP. 688-720.*
34. *McCallum, Bennett T. (1983), The role of overlapping generation models in monetary economics, Carnegie-Rochester Conference series on Public Policy, PP. 9-44.*
35. *Mckinnon, R. I. and Mathesion, D. J. (1981), How to manage a repressed economy, Essays in International Finance, Princeton University.*
36. *Mino, Kazuo and Akihisa Shibata (1995), Monetary policy, overlapping generations, and patterns of growth, Economica, PP. 179-164.*
37. *Romer, David, (1994), Advanced macroeconomics, McGrow-Hill.*
38. *Rothschild, Michael and Joseph Stiglitz (1976), Equilibrium in competitive insurance markets an essay on the economics of imperfect information, Quarterly Journal of Economics, PP. 629-649.*
39. *Saint-Paul, Gilles, Technological choice, financial markets, and economic development, European Economic Review 36(1992) P.763-781.*
40. *Stiglitz, Joseph E. (1985), Credit Markets and the Control of Capital, Journal of Money, Credit, and Banking, Vol.17, No.2, PP. 133-152.*
41. *Stortz, Robert H. (1956), The empirical implications of a utility tree, Statististika Institutonen, University of Uppsala.*
42. *Tobin, James, (1965), Money and economic growth, Econometrica, Vol.33, No.4,PP. 671-685.*
43. *Tybout, James R.(1983) Credit rationing and investment behavior in a developing country, Review of Economics and Statistics, Vol.65 , PP. 598-607.*
44. *Tybout, James R. (1984), Interest controls and credit allocation in developing countries, Journal of Money, Credit, and Banking, Vol.16, No.4, PP. 474-487.*