Reducing Default Rate in Rural Credit: How effective is Enhanced Supervision Approach for Formal Financial Institutions?

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Abstract

Formal financial institutions viz. commercial banks are gradually shifting their priorities from rural credit due to many practical reasons. High default rate and non-viability of rural credit, and increasing pressure on these formal financial institutions, to be more profitable, are few of the basic reasons. This paper focuses on one probable approach of default mitigation, that is, enhanced supervision, which is one of the potential reasons for high default rate in rural sector. The paper models a specific type of interaction between the regulatory and the institution and concludes that in a regulated competitive environment the institutions will not tend to increase supervision for higher recovery of delivered credit unless the regulatory intervenes and directs the institutions to do so. Even after such intervention from the regulatory, the institutions will find it optimal to invest less in additional supervision in rural sector if rate of return is higher or the default rate is lower in alternative sectors of investment.

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1.Introduction

The rural sector is still the largest employer in Indian economy with more than two third of the population depending on agriculture, while the contribution of agriculture and allied services to national GDP is around 25% (1999-2000). These facts underline the importance of the rural economy in India. Despite having enough room for development in the rural sector, it has been largely ignored in the recent years of economic growth. I would like to discuss in this paper one particular aspect of the rural economy and institutions, rural credit, in the context of Govt./Central Bank regulations. The objective in this paper is to analyze some strategies for rural credit institutions, which primarily aim to reduce default and thus increase the viability of credit, for extending credit delivery in an efficient manner. The issues addressed here are quite specific, in the definitional sense (deliberately so). I categorize defaults into two main types:

- That owed by those who are unable to pay, irrespective of their willingness.
- That owed by those who are able but unwilling to pay, either due to
    1) Inappropriate monitoring/supervision
    2) Attitudinal problems.

I am deliberately omitting an analysis of type I defaulters, since the problem and its solution, are outside the domain of what, I consider, purely economic analysis, since the solutions require many policy prescriptions, which are subject to value judgment.

2.Rural Financial Institutions & characteristics of Rural Credit

Rural credit is significantly different from other categories of credit. The basic characteristics of rural credit are uncertainty in production and high transaction costs, which

often lead to a high rate of delinquencies. Uncertainty in production, however, (being one of the prime reasons for differential treatment of rural credit) cannot be overcome by economic and policy measures by Rural Financial Institutions (henceforth referred as institutions). It is important to note that the rural sector, consisting agriculture as its main occupation, also has many non-farm occupations, which are equally vulnerable as agriculture to most of the external shocks. The existence of these uncertainties in the rural sector decreases the viability of institutional credit operations and makes it more risky, which in turn could be an explanation for the lack of interest in rural credit by some credit providing institutions (e.g. Commercial Banks).

Growth rates of rural population, rural bank offices, rural and agricultural credit for scheduled commercial banks, India, 1973 to 1999 (in percent per annum)

Period	*Rural population*	*Rural bank offices*	*Credit from rural offices*	*Rural + semi-urban branches*	*Credit from rural + semi-urban branches*	*Credit to agriculture*
1973- 1981	*1.78*	*15.54*	*23.46*	*12.32*	*16.72*	*18.76*
1981- 1991	*1.84*	*7.15*	*9.97*	*5.95*	*7.91*	*6.64*
1991-1999	*1.66*	*-0.86*	*2.51*	*0.13*	*2.88*	*2.16*

Source: Chavan (2001) cited in Ramchandran & Swaminathan, 2001

The high default rate in rural credit is one of the factors primarily responsible for this lack of interest. High default rate (ranging from 30 to 95%) is observed (see Braverman & Guasch, 1989) in the studies around developing world (with exception of East Asia). For rural financial institutions to be self-sustainable and rural credit, *more* viable, one has to look for

ways to reduce the default rate as well as to increase the credit base, in consonance with the process of financial reform.

Given the inevitability of the financial reform process, and the pressure there from on the banks to be competitive and productive, institutions must explore some new approaches consistent with the changing scenario, such as:

- Group lending
- Saving mobilization
- Enhanced supervision
- Support service facilitation.

This paper concentrates on one of the above approach, enhanced supervision, which is mainly concerned with decreasing intentional default in repayment. In this context, for understanding some major categorizations of the reasons of default, it would be worthwhile to refer the results of a comprehensive survey, one of the few of its kind, undertaken by Central Bank of Ceylon in Sri Lanka. This survey was undertaken in 1971 for inquiring into the reasons for default in agricultural loans disbursed during 1967 to 1970 (Padmanabhan 1988, Sanderatne 1974). By referring the result of the survey, I want to emphasize on the identification of the potential reasons for default among borrowers; the significance of various reasons might well be different in the other cases.

The major categories of default as observed in the survey were

- Defects in farm production
- Variability in incomes

- Defects in credit organization
- Attitudinal conditions
- Misallocation
- Miscellaneous

The first two reasons for default viz. defects in farm production and variability of incomes are cases where the farmers are willing to pay but are unable to, due to either poor production condition or to some external shock (seasonal or market fluctuations, etc.). These are the same as the uncertainty factor discussed in the earlier section. The lending institution has little or no control over these factors. Misallocation of the credit by the borrower to some other uses, which is illiquid or unproductive, is another reason of default. In World Bank categorization it is termed as failure of farmers to use borrowed fund for production.

Whereas the third reason for default (Defects in credit organization) is purely institutional, occurring due to poor supervision and lack of interest on the part of the employees of the institution in recovery efforts. In the result of the above survey, the reason attributed by the borrowers was that the officers did not particularly insist on repayment of the loan and were indifferent to loan recovery. In Indian studies too (Kher & Jha 1979, NABARD (a) 1990), lack of proper supervision and follow up was found and regular check and supervision was suggested for proper utilization of credit. Therefore it is reasonable to assume that enhanced monitoring and supervision may completely convert this proportion of default into recovery. Regarding the fourth reason, that is, unwillingness of the borrowers to repay their loans, one can infer that this type of default can be converted into repayment, at least up to some extent by providing proper incentive to farmers to repay. The requirement of incentives can also be

understood with help of "triadic interaction" argument (Basu 1994). In this regard one approach would be that banks or institutions should work as support service facilitators to the rural people. (Refer to studies by Dhawan & Kalhan 1997, also see Padmanabhan 1988, p. 115 & NABARD (b) 1990, Sukumaran 2000) Here the basic argument is that the borrower would like to reap the benefit of the support services available with the institution, and in this way find an incentive to repay. The quantum of cost incurred to provide such services can be decided on the basis of probable conversion of default into recovery. The nature of support services may be providing technical know-how, marketing facilities and information thereof, warehousing facility, access to cheaper inputs, etc.

3.Model

The model addresses the issue of inadequate monitoring and efforts for recovery of delivered credit, which specifically arises due to a two-stage principal-agent type problem, where the Govt., in the first period, determines a minimum amount of credit to be delivered in the rural sector as a target for the institutions and, in second stage, emphasizes on profit maximization and therefore instructs the institutions to increase recovery of delivered credit. The institution, in the first stage, does not foresee the Govt.'s second stage objective, and disburses the targeted minimum amount of credit, which also leads to default associated to it[1]. In the second period, the institution tries to increase recovery, and therefore, tries to reduce default by addressing some of its probable reasons, which are under their control (viz institutional defects). In practice, this type of situation can be observed in a democratic environment. The paper considers the first period as given and models the second period

[1] The issues of the credit contract between the institution and borrower as well as the screening mechanism are not been addressed and considered as given, which makes default rate exogenous to the model.

decision analysis for the institution. The model, with some common assumptions regarding rural sector (like low & regulated interest rate and comparatively high default rate), leads to an interesting conclusion that institutions will not be keen to go for enhanced supervision despite the fact that it increases recovery.

Assumptions: We consider a single-period framework for loan disbursement, which could be understood as very short-term loan disbursement scenario. We assume that a proportion of default, which occurs due to institutional defects (the reason of default recognized by the institutions as low recovery efforts), could be converted into repayment by employing more efforts on supervision and monitoring. This additional effort will increase cost, which will in turn increase the cost of fund. The implicit assumption, here, is that the institution is already working at a least-cost level and, therefore cost cutting is not a feasible alternative[2]. The relationship between the additional cost incurred and conversion of default into repayment is taken to be monotonically non-decreasing and concave[3].

Notations: Let an institution has lend a unit amount of credit, at the rate of interest *r*. The cost of fund (rate at which the institution gets the fund) is measured in per unit of credit per annum and normalized to zero. Rate of default is fraction q of total credit out of which the proportion due to institutional defect is α^{0}. ω is the cost of additional supervision[4] required

[2] However, we can relax this assumption without harming much the further discussion. In that case we have to consider the additional cost of enhanced supervision as net increase in cost of fund due to enhanced supervision and cost cutting measures, which will require measuring the decrease (due to cost cutting measures) in cost as per unit of credit per year (period).

[3] In above context it explains that any increase in cost due to enhanced supervision will, at least, result in same level of recovery. The concavity of the function explains the diminishing marginal recovery with additional supervision cost.

[4] The additional cost ω is expressed as cost per unit of credit per annum, therefore it could be added to cost of fund.

to decrease the default rate by the fraction α; $\{\alpha \in [0, \alpha^0]\}$. Thus, enhanced supervision will change the default rate to $(1-\alpha)q$.

Also, $\frac{\partial \alpha}{\partial \omega} \geq 0$; $\frac{\partial^2 \alpha}{\partial \omega^2} < 0$

Π is the gain to institution from adopting enhanced supervision. We assume $\Pi \geq 0$ at least for some value of ω[5]. Let $\tilde{r}$ and $\tilde{q}$ be the rate of interest and the default rate respectively, prevailing in alternative sectors with $\tilde{r} = r + \Delta r$ and $\tilde{q} = q - \Delta q$.

Assume a) $\Delta r, \Delta q > 0$ b) $\tilde{r} \geq \tilde{q}/(1-\tilde{q})$ ------- (a.1)

Proposition 1 (a): *In a regulated competitive environment with two institutions, even though adopting the enhanced supervision approach will increase the profit to both the institutions irrespective of the time sequence of adopting, they will end up with not adopting the approach unless any external directive exists, given free riding is not optimal.*

(b): *In case an institutions adopts the approach, given assumption (a.1) and that increase in supervision leads to positive gain to the institution at least at some value, the optimal additional supervision cost for rural sector will be lower if*

I) The rate of return in alternative sector is higher than that in rural sector, or

II) The default rate in alternative sector is lower than that in rural sector.

In usual case, return to the institution will be

$R_1 = (1-q)(1+r) - 1$

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[5] This assumption simply provides initial incentive to the institutions so that they can consider enhanced supervision as an alternative strategy.

If the institution increases the supervision to convert the default, occurring due to institutional defects, into repayment and therefore, incurs an additional cost ω, the return to the institution will be:

$R_2 = (1-(1-\alpha)q)(1+r) - (1+\omega)$

The gain to the institution by enhanced supervision (Π) is the difference of R_2 and R_1. It is also worthwhile to consider the alternative use of amount ω (the additional supervision cost). The institution may instead lend ω to some borrower at the rate of interest $\tilde{r}$ and default rate $\tilde{q}$, if the expected return from this would be higher then ω, i.e. $(1+\tilde{r})(1-\tilde{q})\omega > \omega$ (we implicitly assume that timeframe is short enough to ignore the time value of money). In this case, instead of ω its opportunity cost is to be considered. Thus:

$\Pi = \alpha q (1+r) - (1+\tilde{r})(1-\tilde{q})\,\omega$ if $\tilde{r} \geq \left(\frac{\tilde{q}}{1-\tilde{q}}\right)$

$\Pi = \alpha q (1+r) - \omega$ otherwise

To undertake the approach, the additional recovery should be greater than additional supervision cost, at least at some value of ω. i.e. $\exists\ \omega$ such that $\Pi \geq 0$. Given this holds, the institution tries to maximize its gain, Π, with respect to the additional supervision cost ω. The simple maximization exercise[6] yields the optimal value $\hat{\omega}$:

$$\hat{\omega} = \left[\alpha^{-1}\left(\frac{(1+\tilde{r})(1-\tilde{q})}{(1+r)q}\right)\right]' = \Phi\left(\frac{(1+\tilde{r})(1-\tilde{q})}{(1+r)q}\right) \quad \text{if} \quad \tilde{r} \geq \left(\frac{\tilde{q}}{1-\tilde{q}}\right)$$

$$\hat{\omega} = \left[\alpha^{-1}\left(\frac{1}{(1+r)q}\right)\right]' = \Phi\left(\frac{1}{(1+r)q}\right) \quad \text{otherwise.}$$

or, $\hat{\omega} = \Phi(r,q)$; where $\Phi(.) \equiv \left[\alpha^{-1}(.)\right]'$ --------[1]

[6] For detail see Appendix A.

Now, we extend this model to a framework, where two institutions are operating in the same area in above stated framework with similar govt. regulations on the total amount of credit disbursement and the rate of interest. Now assuming, the previous discussion as common knowledge to both the institutions, the decision variable for them is to whether to adopt the enhanced supervision approach or not.

Assumption: If one institution adopts the approach then it has to invest in additional supervision cost so as to achieve the optimal recovery (the recovery at $\omega = \hat{\omega}$).

Assumption: The additional supervision cost incurred by one institution has positive impact on recovery of other institution. Calling it "diffusion effect" and represent it (observed by i^{th} institution) as $\lambda\omega_j$; where λ is the diffusion co-efficient and ω_j is the additional supervision cost incurred by j^{th} institution.

Therefore, effective additional supervision cost for i^{th} institution will be:

$$\tilde{\omega}_i = \omega_i + \lambda\omega_j \qquad \lambda \in (0,1)$$

If the i^{th} institution adopts the approach, then, given its knowledge about ω_j it will determine the ω_i, such that $\tilde{\omega}_i = \hat{\omega}$ and will try to get maximum gain (Π_i). Thus the gain to i^{th} institution will be $\Pi_i = R - \omega_i\Omega$

where, $R = \alpha(\hat{\omega})q[1+r]$

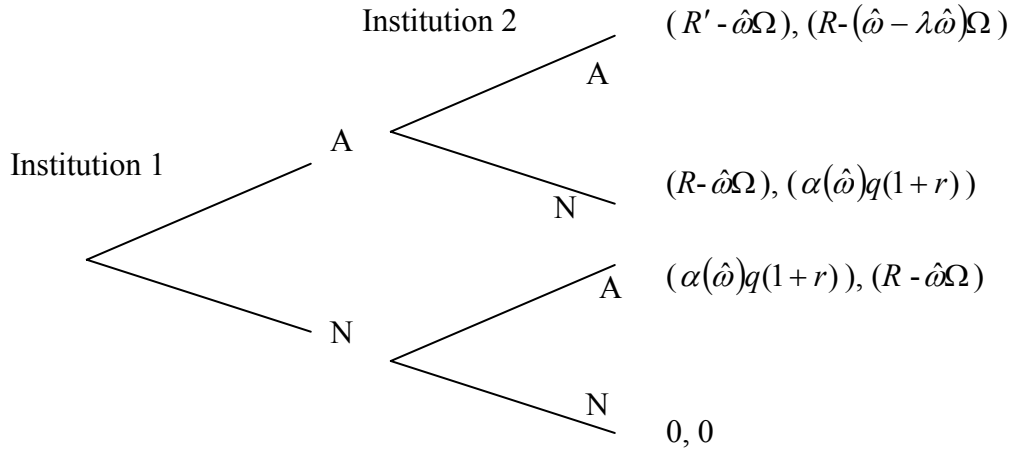
$$\Omega = (1+\tilde{r})(1-\tilde{q}) \qquad \text{if} \qquad \tilde{r} \geq \left(\frac{\tilde{q}}{1-\tilde{q}}\right)$$

$= 1$ otherwise.

Also $R' = \alpha(\hat{\omega} + \lambda\hat{\omega})q[1+r]$

Clearly, higher the ω_j in the knowledge of i[th] institution, higher the diffusion effect and lower the required ω_i, therefore higher the Π_i.

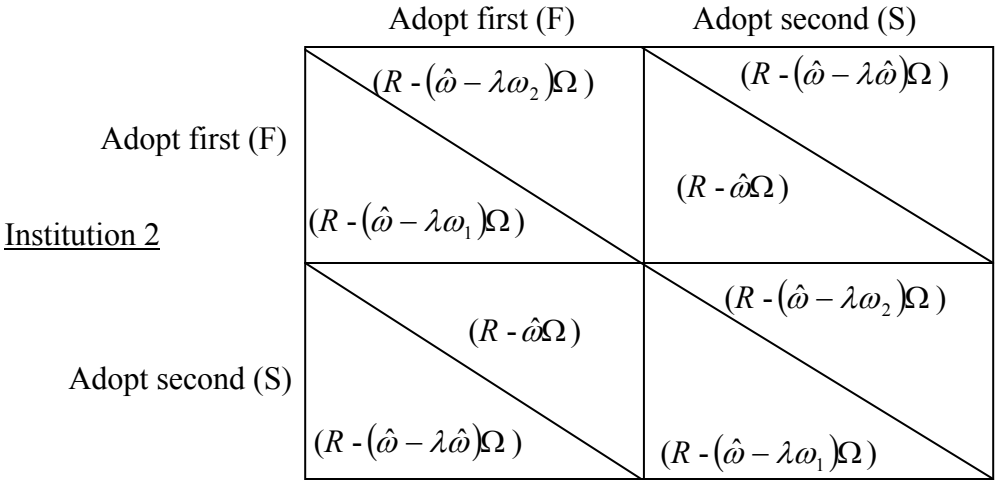
Now we create an extensive form game for two institutions, each with two alternatives, adopting (A) and not adopting (N) the approach. We assume that institutions design their strategies sequentially, that is, either of them decides first, whether to adopt or not, and the other frames his strategy accordingly.



We can see that one always has an incentive for not adopting the approach, given that the other is adopting. For discarding the free riding opportunity we assume that:

$$(\alpha(\hat{\omega})q(1+r)) < (R - (\hat{\omega} - \lambda\omega_1)\Omega)$$

The obvious solution of above game is A,A (both adopt the approach). But institutions would also know this solution. Considering the above solution as common knowledge, the question still unanswered is, who will adopt first? To get the answer let analyze the following normal form game.



We have, by symmetry $\omega_1 = \omega_2$. Here (F, F) and (S, S) both are simultaneous move strategies. But we can think of (F, F) as the solution where both the institutions adopt the approach immediately (as and when the game starts) whereas in (S, S) both will wait for being second mover and therefore no one will adopt the approach. We can see that (S, S) is the dominant strategy, therefore no institution will immediately adopt the approach, and will wait for being second to adopt, though adopting being the optimal strategy for both. We can also see the above situation as co-ordination game. Here both the institutions are worse-off with the Pareto-inefficient Nash-equilibrium solution. The Pareto-efficient solution is possible in case of coordination between the two institutions where both adopt the approach and incur the equal cost of additional supervision $\omega_1 = \omega_2 = \hat{\omega} \big/ (1 + \lambda)$. This establishes the first part of the proposition.

Now consider the case where due to some external directives (may be from Central Bank or from Govt.) the institutions adopt the approach and incur $\omega_i = \hat{\omega} \big/ (1+\lambda)$ as additional supervision cost**.** By considering result [1], it is easy to observe that:

$$\Phi'_r > 0, \qquad \Phi'_q > 0, \qquad \Phi'_{\Delta r} < 0, \qquad \Phi'_{\Delta q} < 0$$

The later two inequalities conclude that optimal additional supervision cost $\hat{\omega}$ is inversely related to Δr and Δq. Therefore higher is the rate of return or lower is the default rate in alternative sectors, lower is the optimal additional supervision cost and thus lower the ω_i. Thus established the second part of the proposition. This could also be one possible explanation for the institutions, in many of the developing nation, not giving due attention on lowering default in rural and agriculture sector by increasing supervision efforts.

4 Concluding remarks

It is to be borne in mind that the additional cost, ω, may be considered as the cost of providing what the banks already ought to have (in the first place). These costs may, thus, not to be considered *new*, rather, they are merely those components that have not been provided (probably) due to inability of the institutions in proper screening of the borrowers in first stage, lack of information (to the institutions) regarding the nature of the task to be undertaken by the institutions in the second stage, or due to perceived less profitability in rural sector.

If even after provisioning for these costs, the banks do not improve their profitability, it would indicate that they either have inefficient operations given their present institutional set-up, or their portfolio of loan is not ideal (with a major proportion of lending going to that

section not willing to repay their loans; this is because, other than those who do not pay due to the lack of supervision, the major category would be of those who are deliberate defaulters) or indeed a combination of both. In such a scenario banks may undertake institutional restructuring and may improve screening mechanism of the potential borrowers so as to enable them to reduce cost and yet be profitable.

I would like to conclude by pointing out that the present scenario of rural finance in India calls for innovative solutions, not merely working by rote, to ensure that credit is not denied those in dire need of it merely due to the inefficiency of the delivering institutions.

Appendix A

Gain to the institution by lending the amount ω at the interest rate $\tilde{r}$ *and with default rate* $\tilde{q}$ *is*

$$\Pi = (1+r)\alpha q - (1+\tilde{r})(1-\tilde{q})\omega \qquad \text{given } \tilde{r} \geq \left(\frac{\tilde{q}}{1-\tilde{q}}\right)$$

$$= (1+r)\alpha q - \omega \qquad \text{otherwise.}$$

Now the maximization exercise would be as:

$$\Pi = (1+r)\alpha q - (1+\tilde{r})(1-\tilde{q})\omega$$

$$\frac{\partial \Pi}{\partial \omega} = \frac{\partial}{\partial \omega}\left[(1+r)\alpha q - (1+\tilde{r})(1-\tilde{q})\omega\right]$$

$$\{F.O.C\} \qquad \Rightarrow \left[\alpha'(1+r)q - (1+\tilde{r})(1-\tilde{q})\right] = 0$$

$$\Rightarrow \hat{\omega} = \left[\alpha^{-1}\left(\frac{(1+\tilde{r})(1-\tilde{q})}{(1+r)q}\right)\right]' \qquad \text{if } \tilde{r} \geq \left(\frac{\tilde{q}}{1-\tilde{q}}\right)$$

The sufficient condition is as follows:

$$\frac{\partial^2 \Pi}{\partial \omega^2} = \left(\alpha''(1+r)q\right) < 0$$

If corresponding condition is not satisfied, then:

$$\Pi = (1+r)\alpha q - \omega$$

$$\{F.O.C\} \qquad \Rightarrow \left[\alpha'(1+r)q - 1\right] = 0$$

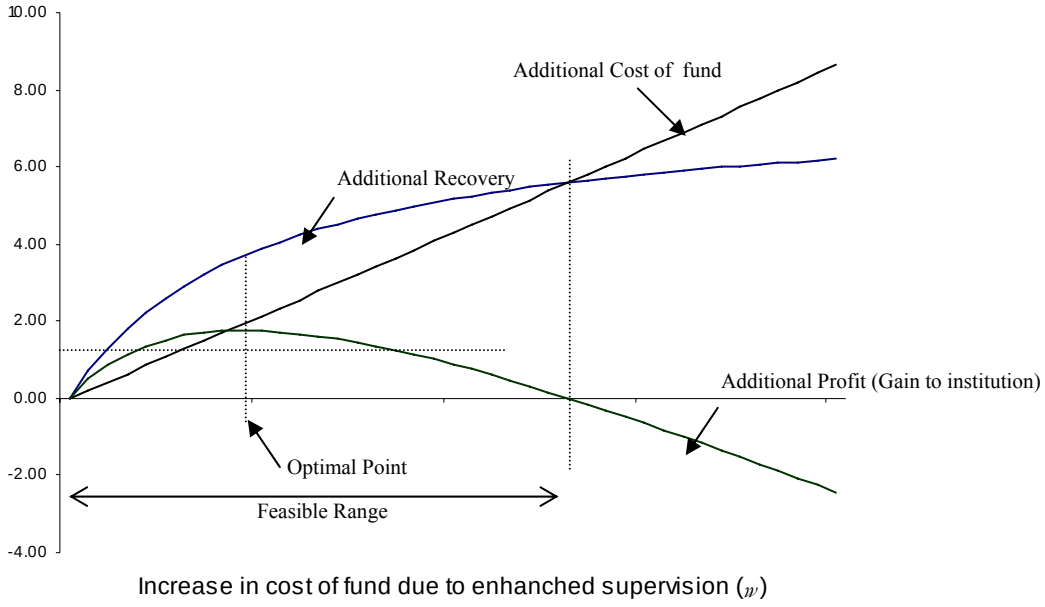
$$\Rightarrow \hat{\omega} = \left[\alpha^{-1}\left(\frac{1}{(1+r)q}\right)\right]'$$

Also,

$$\frac{\partial^2 \Pi}{\partial \omega^2} = \left(\alpha''(1+r)q\right) < 0$$

Appendix B

Graphical representation of optimality condition



Additional cost of fund (due to enhanced supervision)= ω

The additional recovery = (1+r)αq

Gain to institution (from additional supervision): $\Pi = \alpha q (1+r) - \omega$

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