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Centralization of Credit and Long-Term Investment

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Any discussion of market socialism should address the central issues of how capital is allocated to investment projects and how such projects are terminated or refinanced.

Since Kornai (1979, 1980), it has been recognized that a major flaw in socialist economies is the prevalence of "soft budget constraints," which arise when a lender finds it difficult to hold a project he is financing to a fixed budget. The lender makes a capital investment (a loan), but if the project is not complete when this capital is exhausted, there is a tendency to expand the budget—to lend more—thus allowing the project to continue.

At the opposite extreme, certain capitalist countries—the United States and the United Kingdom, in particular—seem to have suffered from an overly "hard" budget constraint, wherein lenders have required project loans to be repaid inefficiently quickly. Thus, projects have been conceived with an excessive emphasis on short-term returns (see *Business Week*, 1992; *The Economist*, 1992; and Dertouzos, Lester, and Solow, 1989).

This chapter simultaneously considers the organization of credit markets, soft budget constraints, and the incentives for long-term investment. At the heart of the soft budget constraint problem, we argue, is the principle that even a poor project (one that is ex ante unprofitable) may be worth refinancing once major fixed costs have already been incurred. Because lenders may have trouble at the outset in distinguishing between poor and good projects, they must rely on entrepreneurs not to propose the former. One way to induce an entrepreneur not to propose a poor project is to threaten not to refinance it once it is underway and becomes demonstrably a loser. But, as the above principle makes clear, such a threat may not be credible.

We contend that decentralization of credit is a way to create credibility. If credit is sufficiently diffuse, a given lender may not have the funds to refinance a project that is slow to generate returns. Thus, if the project is to continue, another creditor must be brought in. Suppose, however, that creditors must monitor projects to ensure that they remain viable. If the initial creditor anticipates that he will have to share the return on his monitoring with a new lender, he will not be inclined to monitor as intensely as when he captures the full return himself. Indeed, his monitoring may be so lax that refinancing is not worthwhile at all.

Thus, decentralization of credit serves to harden the budget constraint and therefore to deter poor projects.[1] This may be a mixed blessing, however, since the same hard budget constraint also deters *profitable* projects that require refinancing. That is, decentralization may induce too short an investment horizon. We now explore these points more formally.

The Model

We begin with a simple model[2] that illustrates how the degree of credit centralization affects refinancing and the investment horizon. There are two periods, one entrepreneur, and a set of investors endowed with capital. An individual investor does not have enough capital to finance the entrepreneur by himself. However, investors can joint forces by depositing their capital in a bank that makes loans on their behalf. For simplicity, we assume there are no agency problems between the bank and the investors.

Contracting between the entrepreneur and a bank occurs before period 1 and the entrepreneur's project is carried out in periods 1 and (possibly) 2. If the project is incomplete at the end of period 1, the entrepreneur and bank can renegotiate the terms of the contract to their mutual advantage.

The entrepreneur can be either poor (p) or good (g). A poor entrepreneur is endowed with a poor project, which requires two periods to complete, absorbs one unit of capital per period, and yields a gross monetary return less than two (all costs and benefits are measured in the same units). At the outset, a good entrepreneur chooses between *two* projects, either quick (q) or slow (s). A quick project requires one unit of capital in period 1 and generates a gross monetary return greater than one at the end of this period. A slow project is the same as a poor one, except that it generates a gross monetary return greater than two. Assume that all monetary returns are observable and verifiable.

The entrepreneur has no endowment of capital and so must obtain financing from banks. Banks have capital but do not learn a project's type until the period in which it is completed. Thus, only in period 1 does a bank discover whether a project is quick or not. And only in period 2 does it learn whether a project is slow or poor. Let α and $1 - \alpha$ be the prior probabilities that the entrepreneur is good or poor, respectively. All parties are risk-neutral, that is, they maximize expected profits.

We also assume that, in addition to any contractual benefit, the entrepreneur derives a private (and nonappropriable) return from her project. This may be thought of as the prequisites she can command, the enhancement of her human capital or reputation, or whatever she can divert from the project into her own pocket.

Let E_q by the private return from a quick project, and E_t the private return from a (poor or slow) project that is incomplete but terminated after one period. Let E_p and E_s be the private returns from poor and slow projects if they are completed. We assume $E_s \geqslant E_p \geqslant E_t$, but only the second inequality—the fact that the entrepreneur prefers not to be terminated—really matters.

This second inequality makes sense if the entrepreneur can extract more from a project the longer it continues.[3] But, in any case, it is the natural assumption given our preoccupation with refinancing, since, if it fails, the budget constraint is hard. The entrepreneur's private return is net of all private costs she might incur, such as the effort to set the project up. Thus, it might be negative.[4]

We now investigate the equilibrium outcome of the model starting at the end of period 1, conditional on the entrepreneur's choice of project and the size of the bank with which she has contracted.

Suppose first that credit is sufficiently centralized so that the bank will be able to do any refinancing itself; thus it must have had at least two units of capital initially. At the end of period 1, we assume that the bank has all the bargaining power, that is, it can make a take-it-or-leave-it offer to the entrepreneur.

If the project is quick, there is, of course, no refinancing. Let R_q (>1) be the gross monetary return in this case. The social return is then $R_q + E_q$, which we assume exceeds 1. When the project is not quick, we assume that it must be monitored in period 1 (after the bank learns that it is not quick) in order to generate a return in period 2. A terminated project yields a gross monetary return of zero.

If refinanced, a poor project generates a random gross monetary public return R_p, where $R_p \in \{\underline{R}_p, \overline{R}_p\}$ and $\underline{R}_p < \overline{R}_p$. We interpret R_p as the liquidation or resale value of the completed project. We suppose that the bank can influence the distribution of R_p through its first-period monitoring effort.[5] Let e be the probability of $\overline{R}_p$. The bank can ensure probability e by incurring cost of effort $\psi(e)$, where $\psi' \geqslant 0$, $\psi'' > 0$. Furthermore, $\psi(0) = \psi'(0) = 0$ and $\psi(1) = \infty$. These assumptions ensure an optimal e* that equates marginal cost and benefit: $[\overline{R}_p - \underline{R}_p = \psi'(e^*)]$, and the expected monetary return net of the cost of effort (but gross of the cost of capital) is $\Pi_p^* = \underline{R}_p + e^*(\overline{R}_p - \underline{R}_p) - \psi(e^*)$.

For simplicity, we assume that the gross monetary return of a slow project R_s is the same as that of a poor project plus a positive constant S: $R_s \in \{S + \underline{R}_p, S + \overline{R}_p\}$, so that the same e* is optimal and $\Pi_s^* = S + \Pi_p^*$. We assume $\Pi_p^* < 2 < \Pi_s^*$, so that the bank can recoup its investment only if the project is not poor. We also assume $\Pi_p^* + E_p < 2 < \Pi_s^* + E_s$. Table 9.1 summarizes the private and monetary returns net of the costs of effort and capital for the various projects.

If credit is sufficiently diffuse (i.e., all banks have less than 1 unit of capital), the initial bank cannot refinance a slow or poor project itself. We assume that

Table 9.1 Private and Monetary Returns with Centralized Credit

	Private Return	Net Monetary Return
Quick project	E_q	$R_q - 1$
Slow project without refinancing	E_t	-1
Slow project with refinancing	E_s	$\Pi_s^* - 2$
Poor project without refinancing	E_t	-1
Poor project with refinancing	E_p	$\Pi_p^* - 2$

competition among the other banks is sufficiently intense to drive the net return from refinancing to zero. Does this mean that the initial bank has adequate incentive to monitor? The answer is "no" if the monitoring is unobservable to other banks and if $S + \underline{R}_p < 1$. This inequality implies that, if the project is poor or slow, the refinancing banks can be repaid only when the outcome is favorable. Therefore, because its effort is unobservable the initial bank can reduce its average repayment by doing less monitoring. This externality means that monitoring effort is less than e* when credit is decentralized. Specifically, let $\hat{e}(\beta)$ be the monitoring level, chosen when β is the probability that the project is slow.[6] Then, for all β, we have $\hat{e}(\beta) < e^*$.

In equilibrium, $\hat{e}(\beta)$ is correctly calculated by the new bank. The monetary return (net of effort but gross of capital) is then $\hat{\Pi}_p(\beta) = \underline{R}_p + \hat{e}(\beta)(\overline{R}_p - \underline{R}_p) - \psi[\hat{e}(\beta)]$ for a poor project, and $\hat{\Pi}_s(\beta) = \hat{\Pi}_p(\beta) + S$ for a slow project. At the time of refinancing, therefore, the original bank's expected monetary return is $\hat{\Pi}_p(\beta) + \beta S$ (since the refinancing bank's expected return is zero). Note that the monitoring externality implies $\hat{\Pi}_p(\beta) < \Pi_p^*$ and $\hat{\Pi}_s(\beta) < \Pi_s^*$.

Now $\hat{e}(\beta)$ is the effort level *conditional* on refinancing. But the externality may be so severe that it is impossible for the new bank to recoup its investment. This is the case if $\hat{\Pi}_p(\beta) + \beta S < 1$. In such a case, no refinancing occurs (and the initial bank chooses zero monitoring effort).

We are interested in comparing the outcomes under centralization and decentralization of credit. For this purpose, we henceforth assume $E_s \geqslant E_p > 0 > E_t$, that is, poor entrepreneurs are deterred only by the threat of termination.

The Costs and Benefits of Decentralization

The previous section leads to two conclusions about the effect of decentralized credit: (1) it creates an externality in monitoring that reduces the profitability of long-term projects, and (2) this externality may be so severe that it makes refinancing unprofitable.

The first conclusion implies that if refinancing occurs in any case, decentralized credit is inefficient. However, decentralization may reduce the probability of refinancing, which in turn has two consequences: (1) poor entrepreneurs may be deterred from starting projects, and (2) good entrepreneurs may be induced to choose quick projects. The first consequence is desirable from the standpoint of efficiency; the second can be good or bad (depending on whether $E_q + R_q - 1$ is more or less than $E_s + \Pi_s^* - 2$).

So far, we have been taking the size of the banks as given. But, in a market economy, the size of banks is itself determined endogenously. We must, therefore, allow small investors to choose their desired bank size.[7] We can think of this choice as taking place at the outset, when the entrepreneur selects project length. In equilibrium, banks will correctly guess the project length, as well as the strategy of the poor entrepreneur, that is, whether or not she asks for financing. These beliefs determine β if the project is not quick. Refinancing then occurs as described in the previous section.

We concentrate on the case where $\Pi_p^* > 1$, which means that a centralized (big) creditor will refinance a poor project once the first period is completed. Thus, a soft budget constraint obtains with centralization. We assume, moreover, that $\hat{\Pi}_p(0) < 1$, so that poor projects are not refinanced with decentralization; that is, we are considering the case where decentralization hardens the budget constraint. Whether big or small banks emerge in equilibrium will be driven by the banks' beliefs about the good entrepreneur's choice of project. If they believe that she chose a quick project, this implies that a project which is not completed after period 1 is poor ($\beta = 0$). Since $\hat{\Pi}_p(0) < 1 < \Pi_p^*$, small banks have an advantage over big ones: they alone can make the threat of termination credible. Indeed, they can drive big banks out of the market by promising a net return of $R_q - 1$ for quick projects, which allows them to break even on quick projects. Big banks cannot match such an offer; to break even, they would need strictly positive profit from quick projects to cross-subsidize losses they would suffer from poor projects. Thus, in equilibrium only small banks operate, and the good entrepreneur adopts a short investment horizon.

Although the preceding equilibrium always exists, it may be less efficient than the outcome where the good entrepreneur chooses the slow project and refinancing occurs. Of course, this scenario allows the poor entrepreneur to obtain financing too, but this cost may be worth bearing provided that slow projects are sufficiently profitable (i.e., provided that $\Pi_p^* + \alpha S - 2 > \alpha[R_q - 1)]$. In this case, big banks can promise good entrepreneurs with slow projects more than $R_q - 1$ and still break even on average, even though they will lose money on poor entrepreneurs. Of course, banks will offer such an entrepreneur a zero monetary payment, but this will not deter her from seeking financing since, by assumption $E_p > 0$. Hence, provided that slow projects are sufficiently profitable, there exists an equilibrium in which good entrepreneurs choose slow projects, poor entrepreneurs are financed, and banks are big.

We conclude that market equilibrium is guaranteed to be efficient only in the case where long-term projects are not socially worthwhile. When such projects *are* efficient, however, there exist two equilibria, including one in which projects have inefficiently short horizons.

A lending institution, such as a state bank, can eliminate the short-horizon equilibrium by guaranteeing that long-term projects are refinanced. Indeed, the mere fact that the institution is big is sufficient to make this guarantee believable. However, this solution runs the (opposite) risk of over-promoting long-term projects (i.e., of falling into the soft budget constraint trap). Whether or not the soft budget constraint overwhelms the efficiency of long-term projects turns on the proportion of good entrepreneurs. If α is big, centralization is favored; if α is small, the market outcome requires no interference.

Notes

1. Actually, it is not necessary for the initial lender to be literally incapable of refinancing the project for our argument to hold. For example, the lender might be one of several bond-holders, each of which has too small a financial stake to monitor adequately.

2. The model presented here is a simplified version of that in Dewatripont and Maskin (1990).

3. It also applies if we suppose that the entrepreneur's reputation is enhanced when the project is completed.

4. As we shall see, the case of main interest is where $E_t < 0$ and $E_p > 0$.

5. One could make similar assumptions about quick projects. We simplify the story by assuming a deterministic R_q. However, if it were random our findings would be unaffected.

6. One can show that $\hat{e}(\beta)$ is increasing in β.

7. We should also allow for competition among entrepreneurs (see Dewatripont and Maskin (1990).

References

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