



ELSEVIER

Japan and the World Economy 8 (1996) 125–133

Japan and the  
WORLD  
ECONOMY

## Theories of the soft budget-constraint

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Received 15 March 1994; accepted 15 December 1994

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### Abstract

A soft budget-constraint arises whenever a funding source finds it impossible to keep an enterprise to a fixed budget, i.e., whenever the enterprise can extract ex post a bigger subsidy or loan than would have been considered efficient ex ante. We review several recent theoretical models that attempt to predict the sorts of economies in which soft budget-constraints are likely to be present.

*Keywords:* Soft budget constraints; Credit allocation; Production; Ownership rights

*JEL classification:* E60; H7; L30

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### 1. Introduction

The *soft budget-constraint* syndrome, a concept formulated by Kornai (1979), pertains wherever a funding source – e.g., a bank or government – finds it impossible to keep an enterprise to a fixed budget, i.e., whenever the enterprise can extract ex post a bigger subsidy or loan than would have been considered efficient ex ante. As Kornai forcefully demonstrated, the centralized economies of Eastern Europe were rife with soft budget-constraints. By contrast, the more decentralized economies of the West have seemed far less prone to the syndrome, although they are by no means immune.

The existence of soft budget-constraints is clear. What may not be so obvious is why the softness of the budget-constraint should depend on the degree of centralization. One possible reason is ideology. The socialist countries of Eastern Europe were in principle committed to a fully employed, egalitarian

society, and this philosophy may have constrained the state to prop up failing enterprises for the sake of employment and the income distribution. But, as Marx contended, ideology is only the reflection of the underlying economic structure. Thus, ultimately, we would like an explanation that turns only on the economic and not the ideologic differences between the East and West.

Recently, there have been several attempts to build theoretical models capable of predicting when soft budget-constraints are and are not likely to be present, and, in the former case, what economic consequences they lead to. Roughly speaking, these fall into three categories: (i) theories that turn on the way *credit allocation* organized (e.g., Dewatripont and Maskin, 1995; Qian, 1994; Qian and Xu, 1991); (ii) those that emphasize the organization of *production* (e.g., Segal, 1993), and (iii) those that stress the distribution of *ownership rights* (e.g., Li, 1992; Boycko et al., 1993; Shleifer and Vishny, 1994). In this paper I will review, compare, and assess these three approaches.

## 2. Credit

I will begin with a stripped-down version of a model in Dewatripont and Maskin (1995). Imagine that there are two kinds of (potential) projects, fast and slow. Each project absorbs one unit of capital per period, and slow projects require two periods to complete, whereas quick projects can be completed in one. We shall assume that it is *ex ante* profitable for fast but not slow projects to be undertaken (I will express this more precisely below). Each project is associated with an entrepreneur, who knows its quality (i.e., its speed). However, entrepreneurs have no capital and so must get their funding from banks. Banks have capital, but cannot initially distinguish between fast and slow projects. (Let us assume that they can make the distinction only after they have already made a loan.)

For simplicity, suppose that banks have all the bargaining power in negotiating financing. That is, they can make take-it-or-leave offers, and so extract the entire (observable) return  $R_f$  or  $R_s$  for the project (where *f* and *s* are mnemonics for “fast” and “slow”). All that is left to the entrepreneur is his private return, e.g., what he can divert from the project into his own pocket or the extent to which he can enhance his reputation. Let this return be  $E_f$  if the project is left incomplete and  $E_c$  if completed, where  $E_f < 0 < E_c$ .

To model centralized credit, let us suppose that there is a single bank with all the capital, which, for our purposes, means at least two units of capital. If an entrepreneur shows up asking for a loan, the bank makes a proposal, where the repayment terms depend on the project's return, when it is realized, and whether or not there is refinancing. If the bank actually extends credit, it might as well loan only one unit of capital in the first period: there is no need to loan more if the project turns out to be fast, and the bank – if it chooses – can later

lend another unit for the second period assuming the project is slow. Now, if the bank finances the entrepreneur and the project turns out to be fast, then the bank will extract the observable return  $R_f$ . Thus in this case the bank's and entrepreneur's net payoffs are, respectively,

$$R_f - 1 \text{ and } E_c. \quad (1)$$

Moreover, because we are assuming that fast projects are profitable – i.e.,  $R_f - 1 > 0$  – it is worthwhile for banks to finance such projects. Suppose instead that the project turns out to be slow. (The bank will discover this only after it has made the loan.) If the project is not refinanced, then the bank recoups nothing on its investment, and so its and the entrepreneur's payoffs are, respectively,

$$-1 \text{ and } E_i \quad (2)$$

Let us suppose that, even if the project is ultimately completed, the bank must play a supervisory role in the first period to ensure that the funds it has invested are used properly by the entrepreneur.<sup>1</sup> However, assume that such monitoring is costly. Specifically, suppose that the return  $R_s$  is random – either 0 or  $\bar{R}_s (> 0)$  are possible realizations – and that, to ensure probability  $p$  of the high outcome  $\bar{R}_s$ , the bank must incur a cost of  $\psi(p)$  (where the function increasing and convex). Then it will choose  $p = p^*$  to satisfy

$$\bar{R}_s = \psi'(p^*).^2 \quad (3)$$

Thus the bank's net return from financing and then refinancing a slow project to completion is

$$\pi_s^* = p^* \bar{R}_s - \psi(p^*) - 2,$$

whereas the entrepreneur's payoff is  $E_c$ . We conclude that, provided that

$$\pi_s^* > -1, \quad (4)$$

the bank will choose to refinance the project if slow.

We see that, when (4) holds, a slow project is subject to a soft budget-constraint in a centralized economy. Even though such a project is, by assumption, ex ante unprofitable ( $\pi_s^* < 0$ ), it will nevertheless be refinanced once it is started.

Let us compare what happens under centralized credit to that under decentralization. To capture (rather crudely) the idea of decentralized credit, let us suppose that, instead of one bank, there are two, each with one unit of capital.

<sup>1</sup>For simplicity, we have assumed that the bank does not need to monitor fast projects; such a complication, however, would not affect the qualitative conclusions.

<sup>2</sup>We are implicitly assuming here that the monitoring decision is taken after the bank has discovered the project's type.

Notice that if the project turns out to be fast, nothing is changed from before; the project is financed and completed in one period. Suppose, however, that the project is slow. In this case, the bank that initially provides the financing *cannot* refinance because it does not have the capital. (In a less extreme version of the model, the bank might technically be able to refinance but find this disadvantageous because too high a proportion of its assets would be tied up in one project.) Therefore, if the project is to be completed, the entrepreneur must go to the other bank. Suppose that this second bank cannot observe the first bank's monitoring intensity, i.e., the level at which  $p$  was set. Thus, if it extends credit for the second period, the amount it is repaid must be some fixed fraction of  $R_s$  (when  $R_s = \bar{R}_s$ ); the repayment terms cannot depend on  $p$ . But, since the second bank must get some fixed cut, the first bank's marginal gross profit from an additional unit of monitoring will be strictly less than  $\bar{R}_s$  (the marginal gross profit from monitoring when credit is centralized). Therefore, the first bank's incentive to monitor is blunted relative to the framework with centralized credit. It will, therefore, monitor less than  $p^*$ , and this may render refinancing unprofitable for the second bank. If this is the case, the budget constraint will be *hard*. Furthermore, since an entrepreneur's payoff is negative when he does not complete his project ( $E_i < 0$ ), he will not even *attempt*, in this hard budget-constraint case, to obtain financing if his project is slow. Hence, in equilibrium, only fast projects – the profitable ones – are financed.

To summarize, when credit is centralized, slow as well as fast projects are financed in equilibrium because entrepreneurs with slow projects forecast that they will be able to obtain refinancing to see their projects through to completion, earning them a return of  $E_c > 0$ . This is an inefficient outcome because such projects are *ex ante* unprofitable. By contrast, the decentralization of credit can act as a commitment device to prevent slow projects from being refinanced and therefore may serve to keep these projects from being undertaken at all.<sup>3</sup>

This sort of mechanism can be appealed to explain a large variety of differences between centralized and decentralized economies. For example, Qian (1994) showed how one can understand the pervasive shortages in Soviet bloc economies in this light. Also Qian and Xu (1991) argued that the relatively poor performance of the Soviet Union in developing new technology is another implication of this kind of soft budget-constraint.

Because this analysis of soft budget-constraints depends so crucially on the failure of commitment, it would be desirable to understand more fully why

<sup>3</sup>The model, as I have presented it, is too simplistic, because it takes the size and number of banks as given. It also does not allow for the possibility that some long-term (i.e., two-period) projects may be *ex ante* profitable. See Dewatripont and Maskin (1990) for more satisfactory models.

commitment is so difficult. For example, a reputation for “toughness” in refinancing on the part of the centralized bank might be enough to keep entrepreneurs with slow projects away. But, in the current models, the failure of reputation as well as that of other potential commitment devices is simply assumed, rather than explained.

### 3. Monopoly

Let me now turn from centralization of credit to centralization of production as a source of soft budget-constraints. I shall consider a potted version of a model due to Segal (1993), in which a monopolistic producer has the option of making an investment to reduce its marginal cost. Imagine that if it undertakes the investment (which we might as well assume to be costless), its resulting (net) profit  $\pi_m^*$  positive, whereas if it fails to do so, its profit  $\pi_m^{**}$  from continuing to operate is negative. Even so, the monopolist may find it optimal not to make the investment. The reason is that although  $\pi_m^{**} < 0$ , the corresponding social surplus  $S^{**}$  may be positive. In that case, a government that wishes to maximize social surplus will attempt to induce the monopolist to produce. But, since production leads to negative profit, the government will need to provide a subsidy. And this subsidy could well exceed the profit that the monopolist forgoes by not investing. More specifically, the government is in principle willing to pay a subsidy up to  $S^{**}$ , and if, in the negotiation between the two parties, the monopolist can command a fraction of  $\lambda$  of this figure, then, provided that

$$\pi_m^{**} + \lambda S^{**} > \pi_m^*,$$

the monopolist is better off not making the investment. That is, it profits from deliberately putting itself in a position of weakness in order to exploit the government.

In this model, the softness of budget-constraint – the willingness of the government to bail out an unprofitable monopoly – leads to two possible kinds of inefficiency. First, there is the allocative loss due to the failure of the monopolist to invest. Second, if the subsidy is financed by distortionary taxation or inflation, an additional dead weight loss is sustained.

As in the previous model, the softness of the budget constraint reflects an absence of commitment ability. If the government could somehow bind itself in advance not to pay the subsidy, the problem would evaporate.

Another way to dispel the soft budget-constraint is to demonopolize the industry. Suppose that instead of a monopoly there are  $N$  firms in the industry, each of which can make a cost-saving investment. (Assume, as before, that profit from production is negative if this investment is not made.) Let  $N^*$  be the socially optimal number of operating firms (assuming that each of these

firms makes the investment), where  $N^* \ll N$ . Suppose, furthermore, that if no more than  $N^*$  firms invest, each makes a profit of least  $\hat{\pi}$ , where  $\hat{\pi} > 0$ . In this case, the government clearly will not pay a subsidy if  $N^*$  or more firms choose to invest. But there cannot be an equilibrium in which fewer than  $N^*$  firms invest. To see this, note that any firm that refrains from investing does so because it expects to be subsidized. But such a firm could earn profit  $\hat{\pi}$  for certain by investing, and, if in equilibrium at least  $N - N^*$  firms do not invest, its probability of receiving a subsidy is at best  $1/(N - N^*)$ . Thus, for  $N$  large, it would be better off opting for the sure thing, a contradiction. Of course, the fact that  $N$  is large itself introduces an allocative inefficiency, which must be traded off against the elimination of the soft budget-constraint.

The two models we have discussed so far are mutually complementary. Taken together they suggest that economic reform in centralized economies may have to be quite thorough in order to solve the soft budget-constraint problem.

#### 4. Ownership rights

Li (1992) has made the point that one reason why socialist economies may be more prone than their capitalist counterparts to soft-budget constraints is because socialism entails public ownership of capital (in contrast to private ownership under capitalism). To formalize this idea, he examines a framework similar to the centralized-bank model of Section 2. Notice that the capital in Section 2 model is “owned” by the centralized bank, in the sense that the question of whether or not credit is extended for a second period is entirely up to the bank. From this point of view, therefore, the model corresponds to a *capitalist* economy, despite the centralization of credit. Now, Section 2 model assumed that, once a slow project is begun, a centralized bank will choose to see it through to completion. This assumption is embodied in formula (4). Let us now suppose that instead a slow project is *not* profitable for a centralized bank to refinance, i.e.,

$$\pi_s^* < -1. \quad (5)$$

For the analysis of Section 2, adopting (5) rather than (4) leads to there being no difference between centralized and decentralized economies; in either case, slow projects are not refinanced, and so are not undertaken. Hence, for the purpose of that section, (5) is not an interesting case.

However, Li’s (1992) contrast is not between centralization and decentralized economies, but rather between capitalism and socialism. Indeed, from his perspective, capitalism and socialism are each consistent with both centralization and decentralization. I have already noted that the capitalism is identified with a model in which the bank can unilaterally decide whether

refinancing occurs. Suppose that we define socialism to be the case in which the bank and the enterprise *jointly* decide whether refinancing occurs, i.e., there is joint ownership of capital. Specifically, let us assume – following Li – that refinancing occurs as long as *either* the bank or the entrepreneur is in favor of it. Under this assumption, refinancing gets the greenlight provided that

$$E_c + \pi_s^* - 1 > E_i. \quad (6)$$

(Because  $E_c > E_i$ , the entrepreneur must be “bribed” by the bank if he is to refrain from voting for refinancing; formula (6) says that such a bribe is not worthwhile for the bank to make.) Observe, moreover, that, despite (5), it is entirely possible that (6) may hold, in which case slow as well as fast projects are undertaken in equilibrium. Thus, by extending ownership rights too far – in this case, to entrepreneurs – socialism leads to a softer budget-constraint than capitalism.

All the models so far are alike in the sense that the soft budget-constraint arises at least in part from a failure of commitment. The final model – a simplified version of that in Boycko et al. (1993) – is quite different: there is no dynamic element to the model at all, so that the question of commitment does not arise.

Consider a firm with profit function  $\pi(a)$ , where  $a$ , which is a specification of the firm’s action, has two possible values,  $a^*$  and  $a^{**}$ . Assume that

$$\pi(a^*) > \pi(a^{**}). \quad (7)$$

Suppose that the government has payoff function  $B(a) + \beta\pi(a) - t$ , where  $t$  represents a payment from the government to the firm’s manager and  $\beta$  corresponds to the fraction of the firm’s profit owned by the government (suppose that the remaining fraction  $1 - \beta$  is owned by the manager). The function  $B(\cdot)$  includes any objective besides profit that matters to the government, e.g., employment, output, or consumer surplus. Let us suppose that

$$B(a^{**}) > B(a^*) \quad \text{and} \quad B(a^{**}) + \pi(a^{**}) > B(a^*) + \pi(a^*). \quad (8)$$

The two inequalities imply that the government prefers  $a^{**}$  to  $a^*$ .

Let us distinguish among three cases. We call *pure centralization* case in which the government owns both the profit rights (i.e.,  $\beta = 1$ ) and the control rights to the firm (i.e., the government gets to choose  $a$ ). Then, under pure centralization, the government will choose  $a = a^{**}$ , given assumption (8). Although this choice may not be socially optimal (unless  $B$  is a good measure of consumer surplus) – and, in view of (7), is certainly not profit-maximizing – it entails no transfers and hence no soft budget-constraint.

The case of a *transitional economy* is the one in which  $\beta$  is big, but the manager has control. Now the government will have to “bribe” the manager in order to implement the action  $a = a^{**}$  (the manager has payoff function  $(1 - \beta)\pi(a) + b$ , where  $b$  is the size of the bribe it receives). Suppose that the

government makes a take-it-or-leave-it offer. It will be worthwhile doing so provided that

$$B(a^{**}) - B(a^*) + \beta(\pi(a^{**}) - \pi(a^*)) - C((1 - \beta)(\pi(a^*) - \pi(a^{**}))) > 0, \quad (9)$$

where  $C(x)$  is the cost (to the government) of making a bribe of size  $x$ .  $C(x)$  may well be substantially higher than  $x$ , e.g., because of the deadweight loss from raising the revenue to pay the bribe (if this is of concern to the government) or the difficulty of circumventing anti-bribery laws. However if  $\beta$  is high, then the manager requires a relatively low bribe and so, in view of (8), (9) is likely to hold. Thus, the equilibrium choice is  $a = a^{**}$ , the same as under pure centralization. The difference, of course, is that now a bribe is needed to sustain  $a^{**}$ , and this itself may create inefficiencies. Finally, consider the case of *pure decentralization*, in which  $\beta$  is low and the manager has control. Here, the cost of bribery may be very high (if  $C$  increases rapidly), and so (9) may well be negative, in which case the manager will choose  $a = a^*$  (the profit-maximizing action), and there is no bribe.

Notice that it is the assumption that  $C(x) \gg x$  that drives the profit-maximizing result in this last case. If  $C(x) = x$ , then in all three cases, the left-hand side of (7) reduces to

$$B(a^{**}) - B(a^*) + \pi(a^{**}) - \pi(a^*),$$

which, from (8), is positive. That is,  $a = a^{**}$  is optimal regardless of the distribution of ownership rights (this is just an example of the Coase theorem). Thus the profit-enhancing properties of decentralization are due to bribes being particularly costly in that case.

Observe that the very concept of decentralization is quite different here from what it was in the earlier models. Earlier the term meant diffuseness of power (either in credit or production), but now it means taking profit-ownership and control out of government hands.

A final difference across models turns on the concept of optimality. In the models of Sections 2 and 3, decentralization led to higher social surplus than centralization.<sup>4</sup> In this last model, such a result is not so clear: centralization leads to the maximization of  $B(a) + \pi(a)$ , whereas decentralization promotes the maximization of  $\pi(a)$ . Thus, only if we assume that the former objective is a worse approximation to social surplus than the latter does decentralization “win”. In particular, if  $B(a)$  corresponds to consumer surplus, then centralization would be more efficient. Thus a richer model, in which the government’s preferences are more fully specified, is called for.

<sup>4</sup>This is true in the first model as long as the entrepreneur’s private benefit from completion  $E_c$  is not too big.



## **Acknowledgements**

I thank the NSF for research support, the Japan–US Center for hosting the conference, and E. Somanathan and Hal Varian for helpful comments.

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