

Understanding the Soft Budget Constraint

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1. *Introduction*

The term “soft budget constraint” (SBC),² introduced by Kornai (1979, 1980 and 1986), has become a familiar part of the economics lexicon. Originally formulated by Kornai to illuminate economic behavior in socialist economies marked by shortage, the concept of SBC is now regularly invoked in the literature on economic transition from socialism to capitalism. Indeed, SBC problems currently constitute a central policy issue in transition economies. But the concept is increasingly acknowledged to be pertinent well beyond the realm of socialist and transition economies. A host of capitalist phenomena, such as the collapse of the banking sector of East Asian economies in the 1990’s, can be usefully thought of in SBC terms.

A large formal literature on soft budget constraints has developed, much of it evolving from Dewatripont and Maskin (1995). Several partial surveys of this literature have been produced (Maskin, 1996; Dewatripont, Maskin and Roland, 2000; Berglöf and Roland, 1998; Maskin, 1999; Maskin and Xu, 2001; Mitchell, 1998, 2000; Roland, 2000). There is also a significant body of work that employs models quite different from the Dewatripont-Maskin variety.

We have two main objectives in this paper. The first is conceptual clarification. Although the intuitive meaning of SBC was reasonably clear from the outset, there is still no consensus on a precise definition. Of course, such ambiguity about a central concept is not uncommon in the social sciences. Interpretations change and develop over time, as experience in applying the concept accumulates. Herein we do not intend to adjudicate the differences of opinion and declare which definition is “correct.” Our intention is rather to report on our own current thinking about SBC. Even so, we believe that the interpretation presented here is comprehensive enough to embrace most research on the subject.

² HBC correspondingly stands for “hard budget constraint”.

The concept of SBC has been invoked by two distinct groups of economists. First, it has been a workhorse for those involved in studying and formulating policy for post-socialist economies. There has hardly been a report on transition—by the World Bank, the EBRD, or other agencies—in the last decade in which the expressions “soft” and “hard budget constraint” have not appeared prominently (see, for instance, World Bank, 1997, 1999; EBRD, 1998, 1999, 2000, 2001). Second, there is a sizable group of theorists who have attempted to model the SBC phenomenon formally. In this paper, we attempt to lay out a conceptual apparatus acceptable in both genres and therefore useful for integrating research programs. In addition to interpreting the SBC concept, we suggest ways that “softness” might in fact be measured. Conceptual clarification and discussion of measurement are taken up primarily in section 2, although section 3 touches on these issues too.

Our other purpose in this paper is to survey the formal theoretical literature on SBC. Rather than being exhaustive, the review in section 3 presents the models that we have found most instructive; we acknowledge that the selection is somewhat arbitrary and reflects our own tastes. In any case, space constraints preclude discussion of much other work that is worthy of note.³

We conclude, in section 4, with a discussion of some problems that remain to be clarified and some tasks that face those participating in the SBC research program.

³ It should be pointed out that in spite of frequent references to empirical observations, we do not aim to provide a compendium of the rich and instructive empirical literature on SBC. Such surveys, however, have been undertaken in other papers. Kornai (2001) reviews the empirical and economic-policy writings on the SBC phenomenon in the postsocialist transition. World Bank (2002) summarizes the experience to date with hardening budget constraints during this transition.

2. Clarification of Concepts: The SBC Syndrome

The expression “soft budget constraint” syndrome is borrowed from the budget-constraint terminology of microeconomics. It applies figuratively to a specific, comprehensive social *syndrome* found in economic reality. A syndrome customarily denotes a characteristic configuration of manifestations generated by a particular constellation of circumstances. To describe the SBC syndrome involves reviewing both the manifestations (the symptoms) and the set of circumstances giving rise to them.

János Kornai, one of the authors of this article, first observed the SBC phenomenon in the Hungarian economy of the 1970's, a socialist economy experimenting with the introduction of market reforms (Kornai 1979, 1980). Although state-owned enterprises were vested with a moral and financial interest in maximizing their profits, the chronic loss-makers among them were not allowed to fail. They were always bailed out with financial subsidies or other instruments. Firms could count on surviving even after chronic losses, and this expectation left its mark on their behavior. Since Kornai's first observations, the contention that softness of the budget constraint was one of the main causes of the low efficiency of socialist economies has gained wide acceptance. From the outset, analysis suggested that although the SBC phenomenon is especially pervasive in socialist economies, particularly those intent on “reform” (through heavier reliance on the market mechanism), it can also appear in other economic environments, even in settings based entirely on private ownership (Kornai 1980, 1986).

Let us begin with a stylized description of the phenomenon.

2.1 BC-Organizations and S-Organizations

In our depiction, one organization (e.g., a state-owned enterprise) has a budget constraint (let us call this a *BC-organization*). That is, it must cover its expenditures out of its initial endowment and revenue. If it fails to do so and a deficit arises, it cannot

survive without intervention. Some sort of constraint—on liquidity, solvency, or debt—sets the upper limit on the sustainability of the financial deficit. A BC-organization faces an HBC as long as it does not receive outside support to cover its deficit and is obliged to reduce or cease its activity if the deficit persists.

The SBC phenomenon occurs if one or more *supporting organizations* (S-organizations) are ready to cover all or part of the deficit. In the case of state-owned enterprises, the supporting role is played by one or more organs of the state. This pair of actors—a BC-organization in financial difficulty and a supporting S-organization—is found in every instance of the SBC phenomenon.⁴ We treat the terms “support”, “rescue” and “bailout” as synonymous actions to avert financial failure.

A great many kinds of “BC-organization–S-organization” pairs are found in practice.

(i) Most SBC research has dealt with the *corporate sphere*. Furthermore, the majority of researchers, especially in the early literature, have examined enterprises under *state* ownership.⁵ However, it is not rare for firms in *private* ownership to be rescued from financial straits. This has been particularly evident in post-socialist transition; privatization has by no means ended the practice of bailouts. Indeed, a wide range of methods has been used to ensure the survival of firms that have continued to make losses after passing into private hands. SBC phenomena have also arisen in many capitalist economies through such institutions as state subsidies to agriculture and assistance to “rustbelt” industries.

(ii) The SBC syndrome also clearly applies to banks and other *financial intermediaries* (although the academic finance literature and the media do not usually apply SBC

⁴ The long-term relationship between an individual on welfare and the agency that dispenses payments may appear to fall under this description. But conventional usage of the term “SBC syndrome” is limited to the case where both parties in the relationship are *organizations*.

⁵ Indeed, most studies mentioned in this paper concentrate on this sphere.

terminology to the financial sector). It is quite rare these days for a large bank in severe financial trouble to go out of business; normally, it is allowed to continue operating, perhaps after being acquired by another bank. The role of an S-organization here is played by the government or other financial institutions (Aghion, Bolton and Fries, 1999, Berglöf and Roland, 1998, Mitchell, 1998 and 2000, and Tornell, 1999).⁶

(iii) Bailouts are common among various *non-profit organizations*, such as hospitals, schools and universities that spend more than their revenues (on hospitals, see for instance Duggan 2000). Particularly in transition economies, social-insurance institutions covering large numbers of people have not been permitted to go bankrupt. Instead, their deficits have been covered out of the state budget (Kornai and Eggleston, 2001).

(iv) Indebted or insolvent *local government authorities* (cities, municipalities, districts etc.) frequently can rely on rescue by central government (Moesen and van Cauwenberge, 2000, Wildasin, 1997).

(v) The SBC syndrome often appears at an international level. *National economies* that have become insolvent and face financial crisis apply for rescue and usually obtain assistance from international financial agencies or the international financial community (Fischer, 1999).

2.2 *The Motives*

The motives of the BC-organization asking for rescue and support do not require much explanation; they are self-evident in the case of profit-motivated organizations. Of course, the list above includes many organizations that do not have a profit motive. But in those cases, a survival motive will often work just as effectively. Indeed, it is a well-

⁶ Notorious examples of financial SBC's in the United States have included the state bail-outs of the Saving and Loan Associations in the 1980's and 1990's and the privately financed rescue of the Long Term Capital Management investment

known social psychological principle that the leaders of an organization come to see the work of their institution as essential. Furthermore, their positions typically provide them not only with a financial livelihood, but with privileges, prestige and power. Hence, the heads of most organizations can be expected to fight tenaciously for their survival.

The motives of the S-organization, by contrast, are often less transparent. Much of the literature on the SBC concentrates precisely on this issue. Our position is that there is no single, universal motivation. Here we offer a classification of a multiplicity of possibilities.

The first criterion by which we can classify motives is according to whether the S-organization undertakes the act of rescue voluntarily or by necessity. To understand how rescue may be forced on S-organization, imagine that a BC-organization can survive if it avoids its taxes, does not repay its bank loans, or neglects its suppliers' bills. In those instances, of course, the BC-organization has breached its constraints and failed to fulfil its civil or contractual obligations. Suppose, however, that the means of enforcing the tax obligation or private contract are prohibitively costly to the tax authority, bank, or supplier. Then the S-organization has little option but to tolerate the noncompliance, at least temporarily. Thus, the ability to enforce tax obligations and private contracts is an essential condition for ensuring a hard budget constraint.⁷

In other cases, however, the tax authority may deliberately overlook mounting tax arrears or the bank may willingly tolerate non-performing debt, because it actually wishes to assist the BC-organization.

corporation.

⁷ The experience of the post-socialist transition confirms that establishing the requisite legal infrastructure is important for hardening the budget constraint. The EBRD has devised several indices to measure progress in legal transformation, including enactment and enforcement of commercial, financial and bankruptcy legislation in conformity with a market economy. It is also attempting to measure the extensiveness and effectiveness of these measures. (See EBRD *Transition Reports*, 1998 and 1999).

What might motivate such voluntary acts on the part of the S-organization?

Let us consider first the most thoroughly studied case, that of a state-owned enterprise in a socialist economy (as Hungary, Poland or Yugoslavia used to be) in which market-oriented reforms are taking place (implying, in particular, that an enterprise's profit is a meaningful concept). On the one hand, the state wishes the enterprise to earn a profit, because this enhances efficiency and provides a source of state revenue. On the other hand, the state is concerned that allowing a loss-making enterprise to fail will cause many workers to be made redundant, thereby contributing to social dissatisfaction and political tension. This inconsistency in objectives can induce a sort of schizophrenia, causing the state to vacillate and issue conflicting orders. Often a division of labor develops, in which one state agency acts tough—demanding that the enterprise be profitable— while another stands ready to come to the rescue should the enterprise falter. In other cases, inconsistent behavior occurs sequentially: first, threats and promises of severity and then, bailouts.

We have mentioned fear of unemployment and political unrest as motives for softness. There are, however, many other possible motivations. Here are some of the most typical:

1. The S-organization (e.g., a bank or an investor) may be induced by its *own best business interests* to extend more credit or invest more capital in a troubled BC-organization. It is led to do so because of previous investments or loans that it would lose were operations to discontinue.

The idea of investing in an enterprise in order to recoup past investment is central to Dewatripont and Maskin (1995) and a succession of related models that are reviewed in section 3. This motivation for bailouts merits special attention because there is a sense in which it is the most logically parsimonious explanation for the SBC syndrome: it requires no appeal to outside economic and political factors or to corrupt

influence. Partly for that reason, it has played an especially important role in the theoretical SBC literature.

2. *Paternalism* may motivate the S-organization to bail out an ailing enterprise. Particularly if the enterprise is owned by the state, state officials may feel protective and responsible for it. In his early writings on the SBC syndrome (e.g., Kornai (1980)), Kornai gave particular prominence to this motive.⁸

A similar mentality can be found in large corporate organizations consisting of many business units (big American conglomerates, Japanese *keiretsu* and *zaibatsu*, and Korean *jaebol* organizations). If one of the separate accounting units makes a loss, earnings from the profitable units are often reallocated to help out the loss-makers. That is, cross-subsidization serves as insurance against failure.

3. When there is multi-level hierarchical control, leaders may have *reputational* incentives to prevent financial failure. In particular, a spectacular collapse on the part of a lower-level unit might suggest that higher-ups had failed to exercise proper control. Rescuing the troubled unit would help avoid the charge of managerial laxity (Bai and Wang, 1996).⁹

4. Sometimes rescuing a *BC*-organization represents an effort by an S-organization to avoid *economic spillover effects*. If a big enterprise goes under, its unpaid bills may force its suppliers down too, starting a chain reaction of bankruptcies. These failures could cause mass redundancies and a fall in aggregate demand, possibly leading

⁸ This paper reflects the three authors' current shared conception of the SBC syndrome, in which a multiplicity of motives for bail out must figure for a comprehensive understanding. Thus we see no value in, say, pitting the views in Kornai (1980) against those in Dewatripont and Maskin (1995). To the contrary, we believe a synthesis accommodating both views to be the most worthwhile approach.

⁹ Motives 2 and 3 presume that the S-organization is hierarchically *superior* to the supported BC-organization. The other motives do not entail any particular hierarchal relationship.

recession. This motivation for rescue is sometimes captured by the phrase, “Too big to fail.” It seems particularly important for the case of banks and other financial institutions on the brink of insolvency. Indeed, there have been occasions in economic history, including the great depression of the 1930’s, when spectacular bank failures seem to have been instrumental in precipitating panic and recessions. The financial collapse of social insurance institutions can also have grave economic consequences.

5. Finally, there may be *dishonest influences* at work in the S-organization: “crony” relationships with the organization to be rescued, political pressure or plain bribery.

Notice that we do not include insurance companies among S-organizations. In a commercial insurance transaction, the client *buys* a “service” (through paying a premium) in which the insurer agrees to provide compensation in case of loss. But a BC-organization in a SBC relationship does not purchase rescue from the S-organization.¹⁰ Indeed, the crux of the SBC problem is precisely that an S-organization would *not* wish to commit itself contractually to provide support; its incentive to bail the BC-organization out arises only *ex post*.

2.3 *The Duration and Means of Support*

The terms “support” and “rescue” have been used up to now without specifying any temporal context. A rescue in everyday language is a *single act*, e.g. throwing a life belt to a drowning man. That is often the case in economic practice as well: an organization that has previously been viable finds itself in grave financial trouble and is kept alive by a single intervention. The SBC syndrome, however, is not limited to once-off rescues. It

¹⁰ Of course, there may be cases where a BC-organization seems to “buy” rescue by bribing the appropriate agent of the S-organization. But this is clearly not an insurance transaction. The bribe cannot be viewed as a premium; it typically will fall far short of compensating the S-organization for the cost of the rescue effort (in any case, it typically goes straight into the bribed official’s pocket rather than into the S-organization’s coffers).

also includes *prolonged* support of organizations suffering from persistent financial problems. Another analogy may be more appropriate here: a patient near death, hooked up to life-support machines and breathing apparatus, fed through tubes, with the heart-beat electrically regulated. Long-term interventions of this kind are unquestionably part of the SBC syndrome.

The means of rescue and sustenance fall into two main groups. The first consists of *fiscal means*, in the form of subsidies from the state budget or of tax concessions (remission, reduction, or postponement of tax obligations).

The second group involves some form of *credit*. For example, loans may be offered to financially troubled firms that would not be eligible for credit were standard conservative lending criteria applied. Alternatively, firms that have already borrowed may have the servicing and repayment terms in their loan contracts relaxed. Of course, credit *per se* is consistent with an HBC. But under the SBC syndrome *too much* credit is extended from the standpoint of economic efficiency.

Trade credit is normal practice in both HBC and SBC settings: buyers are often not expected to pay sellers straightaway. However, in the SBC world, a buyer can often get away with postponing payment beyond the agreed upon deadline.

Actions that soften the budget constraint are often observable events, whose frequency and relative weight in financial affairs can be measured. Some indicators of softness are published in standard economic statistics. Observing and measuring other indicators is more complex and calls for special data collection. (See indicators 1– 4, forming the first block in Table 1.)

INSERT TABLE 1

Softening can often be disguised by being undertaken in parallel with measures that appear to go the other way. For instance, a government may sharply reduce the subsidies recorded in the state budget—such a change is obvious and welcome to the IMF and international observers— but concurrently relax fiscal discipline, and, in this way, provide financial support for loss-making firms. Similarly, when fiscal means of

softening are restricted, credit methods may come to the fore, say, in the form of soft loans (Bonin and Schaffer, 1995, Kornai 2001). Just as a drastic operation to remove a cancer in one organ may be followed by secondary tumors in other organs, so the symptoms of the SBC syndrome can move from one sphere to another. Such metastases have occurred repeatedly during the post-socialist transition, hence the need for caution when measuring the strength of the SBC syndrome via the means of softening. Simply observing one or two such measures can easily generate misleading conclusions.

2.4 Expectations and the SBC Mentality

If a bailout is entirely unanticipated there is little point in ascribing the event to an SBC. We normally say that the syndrome is truly at work only if organizations can *expect* to be rescued from trouble, and those expectations in turn affect their behavior. Such expectations have much to do with collective experience. The more frequently financial problems elicit support in some part of the economy, the more organizations in that part of the economy will count on getting support themselves.

From time to time, S-organizations may announce that henceforth they will break with past practice and refrain from making bailouts. But, of course, such announcements normally have little effect unless combined with some institutional change that lends credibility to the promises. If BC-organizations can see that an S-organization has done nothing to modify its *vested interest* in lending support, they will simply ignore such vows.

Naturally, it is not possible to observe expectations and states-of-mind directly, but an appropriate questionnaire may garner useful information about these. For instance, the head of a BC-organization could be asked what sort of financial trouble would force it to cease trading, or what chance he/she would see of a rescue (for these possibilities of measurement, see indicator 5, the second block in Table 1).

To summarize, the SBC *mentality* is a basic feature of the SBC syndrome. The syndrome embraces not just a characteristic sequence of events and financial

transactions, but the states-of-mind of organization managers that give rise to those events.

2.5 Primary Consequences: Survival and Exit

The SBC syndrome exerts considerable influence over the life and death of organizations and thus over economic natural selection. Let us ignore categories (iv) and (v), from subsection 2.1: financial difficulties do not normally lead municipalities, towns and districts, let alone countries, to exit. Within categories (i)–(iii), however, exit is a normal event. If an organization, particularly one in category (i) or (ii), makes persistent losses, an HBC environment will not permit its survival.

A key measure of the SBC syndrome is the degree to which organizations are permitted to fail. As a first approximation, one can examine the overall frequency of bankruptcies and liquidations. More accurate conclusions can be drawn by limiting the exit proportion calculations to the organizations in serious financial difficulty—those likely to exit under an HBC (for these measurement possibilities, see indicators 6–8 in the third block in Table 1).

The SBC idea complements Schumpeter’s (1911) theory of *creative destruction*. Schumpeter’s main concern was to explain the *birth* of organizations, and the role played by entrepreneurs in generating entry; he tacitly assumed that the market takes care of *death*. Indeed, even in good times, most market economies experience a significant rate of exit. Theories of the SBC syndrome help illuminate the role of the S-organizations in producing deviations from normal exit rates, by weakening or even eliminating the “destructive” aspect of the Schumpeterian process.

2.6 Behavioral Effects of the Syndrome

When BC-organizations anticipate being rescued should they get into trouble, their behavior is usually distorted. Let us examine some characteristic distortions.

Perhaps the most important is the attenuation of managerial effort to maximize profits, or, when there is no profit motive, to reduce costs. There is also a weakening of the drive to innovate and develop new technologies and products. Rather than wooing customers, sellers concentrate more on winning the favor of potential S-organizations¹¹ efforts from production or service provision to wooing organizations that may give assistance. All these effects reduce the efficiency of organizations affected by the SBC.

The SBC syndrome dulls the price responsiveness of BC-organizations and thereby the effect of price signals. There is less need to attend to relative prices on the output or input side if the difference between revenue and expenditure is no longer critical.

BC-organizations' ability to buy inputs without footing the bill—costs are borne by S-organizations—can dramatically augment their demand for these inputs. This in turn can lead to serious shortages. The SBC syndrome may also give an inordinate boost to the propensity to invest, by reducing the risk to the investor, who can anticipate assistance from the S-organization should the investment turn out poorly. Both phenomena—runaway demand and overinvestment in risky ventures—may lead to excessive economic expansion.¹²

To sum up, the SBC syndrome is a complex phenomenon that substantially alters the selection processes operating in society and the economy, compared with their operation in a market framework. It is driven by a characteristic set of motives, works through a characteristic set of means, and has characteristic effects on the expectations

¹¹ This ambition resembles the managerial attitude customarily termed “rent-seeking” (Krueger, 1974).

¹² On the occasion of the Asian crisis, Krugman (1998) writes that “over guaranteed and under-regulated intermediaries can lead to excessive investment by the economy as a whole.” He offers a simple model of the effect of implicit guarantees to financial intermediaries, but does not set these ideas within the framework of the SBC-syndrome. Going farther, Huang and Xu (1999a) argue that the 1997/1998 crisis can indeed be traced to such a syndrome.

and behavior of actors. All these features are empirically observable and measurable. That is, the extent to which an economy or sub-economy is subject to the SBC syndrome is a question that is in principle answerable.

3. *Theories of the SBC Syndrome*

Before beginning our theoretical review, we must make several preliminary remarks. First we must stress that no available model analyzing the SBC captures all the characteristic features delineated in section 2. In this sense, there does not exist a formal model that can be designated *the* theory of the SBC. The use of the plural, rather than the singular in the section title is meant to emphasize this.

Each theory, even the most comprehensive, at best does what theoretical analyses of other complex social phenomena do, which is to pick out particular relationships; study them using rigorously defined concepts and precisely expressed assumptions; and arrive at certain logical conclusions. All this is done by abstracting away other relationships, explanatory factors, and consequences.

Understanding the SBC syndrome entails bearing in mind a complex chain of causality, which has been depicted in a schematic form in Figure 1. Block (1) represents the political, social and economic environment that generates the motives behind the formation of the SBC syndrome, for instance the classical, pre-reform socialist system, or the post-socialist transition, or some variant of the capitalist system. Block (2) represents the motives that create the SBC syndrome. Finally Block (3) represents the effects that the SBC syndrome brings about. All three blocks have been discussed in section 2.

INSERT FIGURE 1

The formal theories below focus on Blocks (2) and (3), and the effects of Block (2) on Block (3). The implication (1) \rightarrow (2) is usually touched on in these works, but not always with a detailed analysis. Some modelers have been inspired by a particular

political-social-economic formation under Block (1), such as reform experiments within socialism or the post-socialist transition. In most cases, they have framed their papers and placed their models in this environment. Our survey follows this approach. We make no attempt to extend the models by generalizing them beyond the particular environments in which they are set. In section 4 we return to the interaction (1) \rightarrow (2) when discussing the remaining research agenda.

There is a fair amount of work that simply posits the existence of the SBC syndrome and concentrates on the effect (2) \rightarrow (3). These papers do not address the question of why the budget constraint is soft. Rather they clarify how the softness of the budget constraint – exogenously given—influences the working of the economy, e.g., how it modifies the form of the demand function (e.g. Kornai and Weibull, 1983; Goldfeld and Quandt, 1988, 1990, 1993; Magee and Quandt, 1994, etc.). We think this approach has been useful, but do not deal with it in section 3.

3.1 *The SBC as a Dynamic Commitment Problem*

As suggested in section 2, an important potential explanation for SBCs is the inability of the supporting organization (*S-organization*) to commit itself not to extend further credit to a budget-constrained organization (*BC-organization*) after providing initial financing. The *S-organization* would like to induce the *BC-organization* to avoid making a loss. So it declares that it will refuse to bail the firm out. However, it fails to abide by this declaration.

Thinking of the problem as one of dynamic commitment leads one to consider the *ex ante* and *ex post* decisions of the *S-organization*. The very term “soft budget constraint” suggests that the *S-organization* becomes willing to extend more money *ex post* to the *BC-organization* than it was prepared to provide *ex ante*. This indicates that the *ex post* bailout money would be seen as wasteful beforehand. We will show below that a wide spectrum of interpretations of the SBC syndrome can be understood and classified using this *ex ante/ex post* distinction.

The first formal model to make the link between SBCs and dynamic commitment was that of Schaffer (1989). The model works as follows¹³. An enterprise manager chooses either to exert effort (costing him e) on producing output or to withhold effort. If he expends the effort, output is Y and he receives a bonus B for high output (so that his net payoff is $B - e > 0$). If he does not expend effort, output is zero unless the center then undertakes to bail the enterprise out. A bailout ensures that output is Y but costs the center R , where $R < Y$. Suppose that the center is interested in maximizing output net of bailout costs. Then, if the manager withholds effort, the center will opt for a bailout, since $Y - R > 0$ and output otherwise would be 0. Anticipating this bailout, the manager will refrain from exertion, because, without effort, he still expects to collect his bonus but avoids the expenditure e . In equilibrium, therefore, the manager will expend no effort, and the center will step in to create an SBC in the form of a bailout.

This outcome can be viewed as a failure of commitment. If the center could somehow tie its hands and commit itself not to undertake a bailout, it would fare better: the manager would now choose to exert effort (since $B - e$ is bigger than 0), and the center would therefore enjoy output Y without expenditure R . But notice that the center cannot simply announce in advance that there will be no bailout. Such an announcement would not be believed, since the manager knows that the center prefers a payoff of $Y - R$ to 0. To induce the manager to expend effort, therefore, the manager must do something at the outset to make bailouts impossible or at least prohibitively costly.

Although Schaffer (1989) connects SBCs to the issue of dynamic commitment, the paper leaves many questions unanswered. One obviously important question is why the center has to play this game at all. Since its intervention serves no useful purpose, one might ask why it cannot simply erect an insuperable bureaucratic barrier that

¹³ Schaffer's model was developed to address a variety of issues. We present a simplified version that focuses on just the soft budget constraint.

prevents its playing any economic role in the enterprise. Within the context of the model, this would completely solve the SBC problem.

Another major unaddressed issue is why socialist and transitional economies seem to have been more vulnerable to SBCs than full-fledged market economics. Put another way, why don't the S-organizations of capitalism bail out capitalist firms in the same way that the center in the Schaffer model does?

Dewatripont and Maskin (1995) (henceforth DM) and the literature that developed from it attempt to answer these questions. The simplest version of the Dewatripont-Maskin model comprises two periods, a center that serves as a source of financing, and a set of enterprises, each headed by a manager, that require funding to undertake projects. At the beginning of period 1 each enterprise manager selects a "project" and decides whether or not to submit it for funding. Projects are of two possible types: good (with probability α) and poor (with probability $1 - \alpha$). Once a project is selected, its type is learned by the manager but not the center. Thus there is asymmetric information.

When a project is submitted, the center must decide in period 1 whether or not to fund it. Set-up funding costs 1. If funded, a good project yields a verifiable gross monetary return $R_g (> 0)$ and a private benefit $B_g (> 0)$ for the enterprise (the private benefit might include such things as managerial perquisites and reputation enhancement) by the beginning of period 2. By contrast, a funded poor project yields a zero monetary return by the beginning of period 2. Faced with a poor project, the center could liquidate the enterprise's assets, in which case it obtains a liquidation value $L (\geq 0)$ and the enterprise gets a net private benefit $B_L (< 0)$ (representing, say the manager's loss of reputation after liquidation). The center alternatively could refinance the project by injecting additional capital of 1. In this case, the gross return is $R_p (> 0)$ and the manager's benefit $B_p (> 0)$ at the end of period 2. The decision to liquidate or refinance need not be a pure strategy; the center may choose to refinance

with probability σ and to liquidate with probability $1 - \sigma$. The timing and structure of the model are depicted in Figure 2.

INSERT FIGURE 2.

We will say that an enterprise with a poor project has a *hard* budget constraint if the center decides to liquidate it ($\sigma = 0$). The enterprise's budget constraint is *soft*, however, if the center opts for refinancing ($\sigma = 1$). More generally, when σ is strictly between 0 and 1, it measures the *degree* to which the budget constraint is soft.

The degree of softness in the enterprise's budget constraint will influence the manager's behavior, in particular his decision whether or not to submit a poor project. If we assume that all monetary returns go to the center (so that the manager's payoff equals his private benefit), then the manager will submit a poor project if and only if $\sigma B_p + (1 - \sigma)B_L \geq 0$, i.e. as long as

$$\sigma \geq \frac{-B_L}{B_p - B_L} \equiv \underline{\sigma}.$$

Thus, there is a minimum degree of softness $\underline{\sigma}$ above which managers will submit poor projects. Notice that $\underline{\sigma}$ decreases with B_p and increases with $-B_L$.

Up to this point we have assumed nothing about the center's objectives and the conditions under which it will choose to finance projects *ex ante* and either liquidate or refinance poor projects *ex post*. Because the SBC syndrome was originally identified by Kornai (1980) for socialist economies, let us begin by adopting assumptions appropriate for this case. Accordingly, assume that the center is the state and that the state maximizes *the overall social welfare* from a project, which we will take to be the project's net monetary return, plus the private benefit to enterprises, plus the external effect E of the project on the rest of the economy. The last term might include such things as the political benefit of keeping project workers employed. As already noted, enterprise managers are assumed to be interested solely in their net private benefits.

Notice that if we have

$$R_p + B_p + E_p - 1 > L + B_L \quad (1)$$

(where E_p denotes the external effect of a poor project), the state will prefer to refinance a poor project and so will take $\sigma = 1$. We should emphasize that if inequality (1) holds, it does not follow that the project is efficient nor that the state would have chosen to go ahead with financing *ex ante* had it known the project was poor. Indeed, a poor project is efficient only if its benefits (amounting to $R_p + B_p + E_p$) outweigh its costs (amounting to 2). And the project is inefficient if

$$1 > R_p + B_p + E_p - 1. \quad (2)$$

Observe that if (1) and (2) both hold, the center will choose to refinance a poor project, even though that project is inefficient and would not have been financed in the first place had its type been known. The discrepancy arises because (2) represents an *ex ante* criterion; by contrast, (1) is an *ex post* criterion, one that arises after an investment of 1 has already been sunk in the project. Even though (*ex ante*) efficiency is the relevant criterion in deciding whether or not a project should be undertaken, it is no longer pertinent when the state decides whether to refinance or liquidate.

The inconsistency between these *ex ante* and *ex post* criteria is at the heart of the SBC syndrome viewed as a dynamic commitment problem. If the state could credibly commit not to bail out poor projects, it would improve efficiency—a manager of an enterprise with a poor project would refrain from even submitting it for financing, since liquidation would earn him a negative payoff ($B_p < 0$). But without such commitment, the state will end up refinancing poor projects, and so they will indeed be submitted *ex ante*.

Notice that the discrepancy between criteria (1) and (2) boils down essentially to a project's *initial funding*. Specifically, this financing enters the center's *ex ante* but not *ex post* calculations, since, once extended, it becomes a sunk cost for the center. Hence, the SBC problem is not due to the socialist objective function that we have assumed for

the center. Indeed, we will see below why SBCs are confined neither to socialist economies nor to government-firm relationships. Indeed, the interesting question in the end is not why we observe the SBC syndrome in socialist economies, but rather why such constraints are not more prevalent in capitalist economies.

We must stress the importance of *ex ante* uncertainty in this model. If the center could identify a poor project *ex ante*, it would decline to fund it. However, because *ex ante* it cannot distinguish between good and poor projects, it will either finance all projects or none of them. Projects will be financed if

$$\alpha(R_g + B_g + E_g - 1) + (1 - \alpha)(R_p + B_p + E_p - 2) > 0,$$

i.e., if

$$\alpha > \frac{2 - R_p - B_p - E_p}{R_g + B_g + E_g - R_p - B_p - E_p + 1} \equiv \alpha^s.$$

Thus, if $L + B_L < 1$ and $\alpha > \alpha^s$, the only equilibrium of this model is one in which managers submit poor projects, all projects are funded, and all poor projects are refinanced ($\sigma = 1$), even though poor projects are *ex ante* inefficient. We call this a *soft budget constraint equilibrium*. Its opposite, a hard budget constraint equilibrium (which would prevail if inequality (1) were reversed) would entail that all poor projects be liquidated *ex post*. Thus they would not be submitted by managers *ex ante*.

From the standpoint of the DM model, “hardening” the budget constraint means creating conditions in which the center can credibly commit not to refinance an enterprise. Note that the hardness of the budget constraint is not a matter of *direct* policy choice, but rather the indirect result of putting institutions in place that discourage or interfere with refinancing.

As we indicated in section 2, the original analysis of soft budget constraints in Kornai (1980) was not mainly concerned with the causes of the SBC syndrome but rather with its consequences, especially the emergence of pervasive shortages. To the extent that it dwelt on causes, it concentrated particularly on political considerations,

e.g., the desire of a “paternalistic” state to avoid socially and politically costly layoffs. Our above rendition of the DM model is entirely consistent with this point of view—as we have demonstrated, a paternalistic center (a center that maximizes “over-all” welfare) in that model may indeed give rise to an SBC. Indeed, as we will see below, SBCs may be particularly likely when the center is paternalistic. Logically, however, the model shows that paternalism is neither a necessary nor sufficient condition for SBCs. The crux of the story is lack of dynamic commitment, which *could* arise with paternalism but also with many other possible motivations on the part of the center.

We will now review some of the ways the Dewatripont-Maskin model in subsection 3.1 has been extended and adapted to shed light on a variety of SBC phenomena.

3.2 *The SBC in Socialist Economies*

3.2.1 *Shortage*

Kornai (1980) cited the phenomenon of widespread shortages as one of the most important consequences of the SBC syndrome in socialist economies. Building on the model of subsection 3.1, Qian (1994) proposes a mechanism for how shortages might come about. In effect, Qian suggests that a shortage may be a device—albeit a very costly one—to reduce the benefits of refinancing poor projects and thereby eradicate, or at least to mitigate, soft budget constraints.

Consider the model of subsection 3.1 but assume now that in period 2, enterprises with poor projects, if refinanced, use this additional funding to purchase an input that is also in demand by consumers (the conclusions of the analysis would not be altered if enterprises with good projects also bought this input). Assume that this input is inelastic supply \bar{x} . Without SBC and thus no refinancing of poor projects, consumers will pay a market-clearing price $p = v(\bar{x})$, where $v(\cdot)$ is the inverse demand function. When poor projects are refinanced, however, consumer demand can be crowded out.

Assume that one unit of input is needed to complete a poor project. The market-clearing price will then be $p^* = v(\bar{x} - n(1 - \alpha))$, where n is the total number of projects (we are invoking the law of large numbers to express the number of poor projects as $n(1 - \alpha)$). Thus the cost of refinancing will be p^* which is larger than p . But, as long as $R_p + B_p + E_p - p^* > L + B_L$, the SBC syndrome will persist.

In this model SBCs impose a double burden on society: the usual loss from propping up an inefficient project plus higher prices for consumers. Qian shows, however, that placing a cap on the input price—thereby creating a shortage and the need for rationing (which Qian assumes is implemented probabilistically)—may serve to help mitigate these ill effects. Suppose that the cap is set so that, if refinancing is not sought for any other poor project, an enterprise with a poor project receives the input with probability q and does not receive it (i.e., the enterprise is rationed) with probability $1 - q$, in which case the project is liquidated. Then the expected payoff for the enterprise's manager is $qB_p + (1 - q)B_L$, which is negative for q sufficiently small. Hence for a sufficiently low price cap (implying a low q), the manager will be deterred from submitting a poor project, and the SBC will thus vanish. Of course, consumers too now face rationing—which itself is inefficient—but, for a large range of parameter values, this will be preferable to their being crowded out by inefficient projects.

3.2.2 Innovation

The failure to innovate—to develop new technology at a sufficient pace—was a major reason for the ultimate collapse of central planning in the former Soviet Union and other socialist economies. Qian and Xu (1998) argue that this failure was directly related to the SBC syndrome. Because of soft budget constraints, centrally planned economies lack the capacity to screen out poor R&D projects *ex post*, i.e., after these projects' prospects are known (by contrast with market economies, which—for reasons we will discuss in later subsections—have harder budget constraints and therefore *can*

screen *ex post*). Therefore, they have to rely on *ex ante* screening, which is less effective.

Following Qian and Xu (1998), we can formalize the argument as follows. Suppose, as before, that the center does not know at the outset whether an R&D project is good or poor. Assume, however, that perhaps by consulting experts, the center can acquire a signal about the project's type (pre-screening). Prescreening is imperfect: it labels poor projects correctly but may mistakenly mislabel a good project as poor (to simplify the argument, we assume that only type II errors are possible). Nevertheless, if SBCs are a problem, the center may well avail itself of prescreening, which eliminates poor projects but also reduces the number of good projects, and hence induces a lower rate of innovation than in an economy with HBCs.

Prescreening of R&D projects—which was intensely employed in the former Soviet Union—will of course, work better if the number of mislabeled good projects is low. This is more likely to be the case when prior technological knowledge is good (as was the case in the Soviet aerospace industry in the period 1950-1980), and less likely when the relevant science is in its infancy (as was the case in the computer industry at that time). Thus, the model predicts—and experience bears out—that the innovation “gap” between economies with soft and hard budget constraints should be greater for technologies where the corresponding science is newer.

3.2.3 *The Ratchet Effect*

The term “ratchet effect” was coined by Berliner (1952) in his analysis of management behavior in Soviet-style firms. In such firms, managers were given what appeared to be strong incentives to fulfill their production plans. Indeed, they had inducements to *over-fulfill* the plans: each percentage point over the target was rewarded by additional bonuses. Nevertheless, managers tended to pass up the opportunity for these bonuses and instead were conservative in their plan over-fulfillment, rarely exceeding 2% over target. Berliner's explanation for this conservatism was that managers feared that next year's target would be “ratcheted

up”—made more demanding—if they exceeded this year’s goal. By producing at 110% instead of 102%, their bonus would be higher today, but so would their target tomorrow. Models of the “ratchet effect” in Soviet planning include Weitzman (1980), Keren et al. (1983), Bain et al. (1987), and Roland and Szafarz (1990).

Like the SBC syndrome, the ratchet effect is not confined to socialist economies. Other manifestations include a corporate division scrambling to spend money to prevent its budget from being cut, and workers on the assembly line slowing down their pace to forestall getting higher workloads tomorrow. Treatments of the ratchet effect as a more general dynamic commitment problem include Freixas et al. (1985), Laffont and Tirole (1988, 1993) and Litwack (1993).

The ratchet effect and the SBC syndrome are clearly conceptually related. They also have the potential for reinforcing each other. To see this, let us follow Dewatripont and Roland (1997) and modify the model of section 3.1 so that good projects, as well as poor, generate a return in period 2 if refinanced. Assume furthermore that second-period financing derives entirely from first-period returns. Finally, suppose that by exerting effort, a manager with a good project can increase the second-period gross return and externality by the amount

$$\hat{R}_g + \hat{E}_g - (R_g + E_g) > 0 \quad (3)$$

and increase the private benefit by the amount $\hat{B}_g - B_g$, where

$$\hat{B}_g - B_g > e. \quad (4)$$

Formulas (3) and (4) imply that the manager’s exertions are socially desirable. Assume, however, that

$$R_p + B_p + E_p > \hat{R}_g + \hat{B}_g + \hat{E}_g. \quad (5)$$

Formula (5) implies that, given a choice, the center will give higher priority to refinancing poor projects than refinancing good projects, and so good projects may be crowded out. Specifically, if there is an SBC, the gross return from the first period is

αR_g per project (as opposed to R_g under an HBC). Hence, only $\alpha R_g - (1 - \alpha)$ is available for good projects (whereas there is ample capital to refinance all good projects under an HBC). Thus, if $\alpha < \frac{1}{R_g}$, there is only a probability $\frac{\alpha R_g - (1 - \alpha)}{\alpha} < 1$ that a good project will be refinanced. If managers are risk neutral and

$$\left(\frac{\alpha R_g - (1 - \alpha)}{\alpha} \right) (\hat{B}_g - B_g) < e,$$

they will be discouraged from exerting effort. This sort of deleterious cross-subsidization—in which proceeds from good projects refinance poor projects, thereby attenuating the good projects' returns—is conceptually similar to the ratchet effect. It also proved to be an intractable problem for the former Soviet Union.

3.2.4 Enterprise Autonomy

A hallmark of the attempted reforms of socialism undertaken in Yugoslavia, Hungary, Poland and Russia was greater enterprise autonomy. The rationale was that by delegating decision-making authority, the center would promote better decisions, since enterprise managers are likely to have the best information about local conditions. It became apparent in retrospect, however, that increased enterprise autonomy led to a softening of budget constraints.

Within the framework of the model presented in subsection 3.1, it is not difficult to see how this softening may have come about. Specifically, following Wang (1991), assume that the center monitors enterprises *ex ante* and can detect with probability p whether or not a project is poor. This means that a proportion $(1-p)(1-\alpha)$ of projects will be subject to bailout. Increased autonomy may well entail a more limited ability of the center to monitor and hence a reduction in p . But lower p means that more poor projects get refinanced, i.e., SBCs are more pronounced.

Still, we ought not conclude that weakening the center's ability to monitor unambiguously softens enterprises' budget constraints, as Debande and Friebel (1995)

emphasize. Suppose, for example, that a poor project's gross return R_p is *random*. Then only for those realizations of the project's return for which (1) holds will refinancing occur. Now, with greater enterprise autonomy, the center may no longer be able to discern the exact realization of R_p but only its mean. But although it is quite possible that (1) may hold for many realizations of R_p , it may well fail to hold for the mean—in which case SBCs will vanish.

3.3 *The SBC in Transitional Economies*

A recurrent theme in discussions about transforming an economy from a socialist to a market mode of operation is the need to harden budget constraints of both enterprises and banks. Ironically, the transition experience suggests that constraints have only become softer amongst the economies of Eastern Europe in the initial phases of their transition. Nevertheless, theory suggests that there are some steps that might be taken to help root out the SBC syndrome.

3.3.1 *Devolution*

Qian and Roland (1998) investigate devolution of government as a method for hardening budget constraints. The inspiration for this study was the Chinese experience. For obvious political reasons, privatization was not an acceptable option in China at the beginning of the transition process. Nevertheless, there was a significant reorganization of government, in particular a decentralization of fiscal authority from Beijing to regional governments. Qian and Roland argue that competition among regional governments to attract foreign capital led to harder budget constraints. The following is a rendition of their analysis.

As in the model of subsection 3.1, assume that there are enterprises—in this case, state-owned enterprises (SOEs)—that draw good projects with probability α and poor projects with probability $1 - \alpha$. There are also foreign firms, which make capital investments K_i in each region $i = 1, \dots, N$. Region i 's output is given by $f(K_i, I_i)$, where

I_i is public infrastructure in region i financed by government. The production function f satisfies standard assumptions:

$$\frac{\partial f}{\partial K_i} > 0 \quad \frac{\partial f}{\partial I_i} > 0 \quad \frac{\partial^2 f}{\partial K_i \partial I_i} > 0.$$

Government and foreign firms are, in effect, partners in a joint venture and divide output accordingly. Let β be the share accruing to government. Suppose that the total amount of foreign capital, K , is fixed.

Government's revenue comes from taxing the SOEs. Revenue is spent for three purposes: to bail out SOEs (in the case of SBCs), to invest in infrastructure, and to provide public goods. If these expenditures are all determined by the central government (and foreign firms choose their K_i 's as optimal responses to the I_i 's), they will be chosen to maximize

$$\sum_{i=1}^N \beta f(K_i, I_i) + (R_p + B_p + E_p - L - B_L - 1) \sum_{i=1}^N y_i + \sum u(z_i) \quad (6)$$

such that

$$\sum_{i=1}^N K_i = K \quad (7)$$

$$\frac{\partial f}{\partial K_i}(K_i, I_i) = \frac{\partial f}{\partial K_j}(K_j, I_j) \text{ for all } i, j \quad (8)$$

and

$$\sum I_i + \sum y_i + \sum z_i \leq \sum T_i, \quad (9)$$

where, for all i , y_i is expenditure on bailing out SOEs in region i , z_i is expenditure on public goods in region i , and T_i is tax revenue available from SOEs in region i (in this program, we treat the K_i 's as if they are choice variables for the government because we

also impose (7) and (8), which ensure that, at the optimum, the K_i 's will have the same values as though chosen by the foreign firms). Observe that there will be SBCs (i.e., $y_i > 0$) provided that, in the solution to this program, we have

$$R_p + B_p + E_p - L - B_L - 1 > \beta \frac{\partial f}{\partial I_i}(K_i, I_i) = u'(z_i), \quad (10)$$

i.e., if the marginal benefit from refinancing poor projects, $R_p + B_p + E_p - L - B_L - 1$, exceeds that from investing in infrastructure, $\beta \frac{\partial f}{\partial I_i}(K_i, I_i)$, which, at the optimum, must equal the marginal benefit from public goods $u'(z_i)$.

If, however, the expenditure decisions are devolved to the regional government, then, for all $i = 1, \dots, N$, the optimization problem becomes that of maximizing

$$\beta f(K_i(I_i), I_i) + (R_p + B_p - L - B_L - 1)y_i + u(z_i) \quad (11)$$

such that

$$I_i + y_i + z_i \leq T_i, \quad (12)$$

where we have written K_i as a function of I_i in (11) to reflect the fact that foreign investment in region i will adjust to I_i so as to satisfy

$$\frac{\partial f}{\partial K_i}(K_i(I_i), I_i) = \frac{\partial f}{\partial K_j}(K_j, I_j) \text{ for all } j \neq i. \quad (13)$$

In this case, the condition needed for an SBC becomes

$$R_p + B_p + E_p - L - B_L - 1 > \beta \left(\frac{\partial f}{\partial K_i} \frac{dK_i}{dI_i} + \frac{\partial f}{\partial I_i} \right) = u'(z_i). \quad (14)$$

But notice that (14) is more stringent than (10) because

$$\frac{\partial f}{\partial K_i} \frac{dK_i}{dI_i} > 0.$$

That is, the marginal value of infrastructure investment is higher for a regional government than for a central government because additional infrastructure in region i lures foreign investors away from other regions, a consideration that is pertinent to the regional but not the central government. As competition amongst regional governments raises the marginal value of investment, the relative attractiveness of bailing out failing SOEs declines and so hardens the budget constraint. This hardening, however, comes at a cost: competition induces excessive infrastructure investment. This cost must be taken into account when assessing the implications of devolution.

It is worth emphasizing that the above argument concerns the hardening of *enterprises'* budget constraints through devolution. Decentralization of government does not, however, necessarily harden the budget constraints of *regional governments*. Indeed, just the opposite may occur: giving regional governments discretion over expenditure allows them to distort the composition of this expenditure in the hope of attracting funding from the central government (see Qian and Roland (1998) for further details).

3.3.2 Privatizing Banks

The foregoing models amply illustrate the proposition that hardening budget constraints is not a matter of direct policy choice but rather the indirect outcome of institutional changes in the relationship between funding sources and enterprises. So far we have supposed that enterprises are financed and refinanced by a government that cares not only about the financial return (R) on its investment but “overall social welfare” (as modeled by $R + B + E$).

Let us now examine the implication of having firms financed by a *private* bank. Such a bank would presumably be in the business of maximizing profit rather than social welfare. In that case, the condition for refinancing is transformed from (1) to

$$R_p - 1 > L. \tag{15}$$

Notice that if

$$B_p + E_p - B_L > 0, \tag{16}$$

then condition (15) is more demanding than (1), in which case privatization serves to harden budget constraints. Furthermore, $B_p \geq 0$ and $B_L \leq 0$, and so unless E_p is highly negative, the budget constraint will indeed be harder with a private bank, a point made by Li (1992) and Schmidt and Schnitzer (1993). This is an illustration of the well-known idea that *ex ante* efficiency can sometimes be improved if the threat of *ex post* inefficiency is introduced. In this case, the potential inefficiency results from the fact that the bank maximizes its own profit rather than social welfare.

Note, however, that even though SBCs may be jeopardized by privatization, they need not be eliminated altogether—(15) may still hold. Indeed, there is at least one reason why (15) may be particularly likely to hold in transitional economics: the liquidation value L may be low owing to limited private wealth and poorly functioning markets for liquidated assets.

Besides having higher liquidation values, full-fledged market economies have two other features that serve to limit SBCs more effectively than in socialist or transitional economies: competition and decentralization. In subsection 3.4 we explore this theme.

3.3.3 *Arrears and Redeployment*

We now introduce interactions between enterprises to explore the issue of trade arrears and their relationship to SBCs. Trade debt has been an important phenomenon since the early days of transition. After price liberalization, many firms became insolvent and could not pay their suppliers, so that payment arrears began to accumulate. In effect, clients were borrowing from their suppliers, which were themselves brought into financial difficulty as a result. So many firms were affected that banks felt constrained to bail large numbers of them out to avoid generalized insolvency.

The SBCs that arise when enterprises are linked together is an issue studied by Perotti (1993) and Coricelli and Miles-Ferretti (1993). Suppose that enterprises with poor projects have the option of restructuring (i.e., making their projects “good”), which requires effort on the part of managers, but no outside investment (see Grosfeld and Roland, (1997), for more on restructuring). Let θ be the proportion of enterprises exercising this option. Of poor projects that are not restructured, let λ be the proportion that are liquidated. Then, a proportion $(1 - \alpha)(1 - \theta)\lambda$ of all projects are liquidated. To capture the possibility of interaction among projects, assume that healthy enterprises—those with good or restructured projects—have supplier-customer relationships with those with poor projects. Specifically, suppose that the return on their projects decreases in proportion w to the proportion of liquidated projects in the total number of good and restructured projects. Then the return to the good and restructured projects is

$$\left(R_g - \frac{w(1-\alpha)(1-\theta)\lambda}{\alpha + (1-\alpha)\theta} \right).$$

This interaction creates a problem for the bank: a tough liquidation policy will spill over to healthy firms, causing their financial situation to deteriorate and therefore worsening the bank’s own situation. The bank’s expected profit as a function of θ and λ is given by

$$\Pi(\lambda, \theta) = (\alpha + (1 - \alpha)\theta)R_g + (1 - \alpha)(1 - \theta)[\lambda(L - w) + (1 - \lambda)(R_p - 1)] - 1.$$

The negative spillover of liquidation has the effect of reducing the liquidation value of a loan from L to $L - w$. Hence, budget constraints will be softened: the criterion for refinancing a poor project becomes

$$R_p - 1 > L - w.$$

That is, the stronger the trade links between firms with different projects, the softer the bank will be. By bailing out poor projects, the bank makes it possible for suppliers with

healthy projects to be paid. But, of course, this softness also lowers an enterprise's incentive to restructure.

3.4 *The SBC in a Competitive Environment*

We now turn to the issue of SBCs in market economies. Most of the models that follow are drawn from papers that leave the overall political and economic environment unspecified. The simplest interpretation is that both the BC-organizations and the S-organizations are operating in the competitive environment of a market economy, and this interpretation is reflected in the title of the subsection. However, the possibility that the situations portrayed in these models may also occur under other circumstances—e.g., in a reform-socialist or a transitional economy—is not excluded.

3.4.1. *Competition Across Enterprises.*

As Segal (1998) argues, demonopolization of an industry may itself help harden budget constraints. To see how this may happen, let us modify the basic Dewatripont-Maskin model by supposing that an enterprise can be broken up into pieces that compete with one another. In line with traditional industrial organization, assume furthermore that competition reduces the return on investment to individual enterprises.

Hence, $\frac{dR_p(n)}{dn} < 0$, where n is the number of enterprises in the industry and $R_p(n)$ is

the return on capital to a poor project if there are n enterprises (hence, $R_p(1) = R_p > 1$).

If enterprises are financed and refinanced by a private bank, then the number of enterprises being bailed out n^s satisfies $R_p(n^s) = 1$. Thus if there are N enterprises that

are identical *ex ante*, an enterprise with a poor project has a probability $\frac{n^s}{1 - \alpha N}$ of being

bailed out. But if N is big enough so that

$$\frac{n^s}{(1 - \alpha)N} B_p + \left(1 - \frac{n^s}{(1 - \alpha)N}\right) B_L \leq 0$$

(the absolute values of B_p and B_L may be affected by N , but we assume that the ratio B_p/B_L is unaffected), then enterprises drawing poor projects will choose not to submit them—the expected payoff from doing so would be negative. Notice that making N larger induces hardening of the budget constraint not because the bank’s incentive to bail out has changed—indeed, this incentive remains the same—but rather because N credibly limits the fraction of enterprises that will be bailed out.

The Segal (1998) model points to a general trade-off between excess capacity and HBCs. It has long been a tenet of the industrial organization literature that, if setup is costly, there will be too many enterprises—i.e., more than the efficient number—in a free-entry equilibrium (see, for example, Mankiw and Whinston (1986)). As we have observed, however, a potentially important compensatory effect of those “excessive” numbers is a hardening of the budget constraint.

3.4.2 *Entry of New Projects*

Following Berglöf and Roland (1998), we next study what happens when new projects can enter and compete for funding with old projects. This entails adding an additional period—period 0—before period 1.

Suppose that a (private) bank finances projects at the beginning of period 0. Managers with poor projects must decide whether or not to submit them, taking into account the prospect of future bailouts. At the beginning of period 1, there is an influx of new projects. Hence, the bank must decide how to use the proceeds from period 0 investment—to finance new projects or to refinance poor projects (assume that there are more new projects than funds to finance them). Like their counterparts in period 0, managers with poor projects in period 1 must choose whether or not to submit them. In period 2, the bank must decide whether or not to refinance the poor projects from period 1 (using revenue generated from good projects in period 1). If projects are refinanced, they realize their returns at the end of period 2.

Given that $R_p > 1$, the bank has the incentive to refinance poor projects in period 2. Anticipating this, managers with poor projects will indeed submit them for funding

in period 1. The expected net return to the bank from a new project financed in period 1 is therefore

$$\beta(R_g - 1) + (1 - \beta)(R_p - 2), \quad (17)$$

where β is the proportion of new projects that are good (β need not equal α).

Consider the bank's financing decision in period 1. If the bank opts to refinance existing projects before making new loans, managers with poor projects will submit them in period 0. Hence the bank's return from that refinancing is

$$R_p - 1. \quad (18)$$

But if (17) exceeds (18), i.e.,

$$\beta > \hat{\beta} \equiv \frac{1}{R_g - R_p + 1}, \quad (19)$$

the bank will prefer new projects, and so old projects will not be refinanced after all. That is, an HBC applies to the period 0 projects if and only if (19) holds. We conclude that the higher the average quality of the new cohort of projects, the harder the budget constraint for old projects.

This result may shed additional light on why SBCs have been a more persistent problem in transitional economies than in advanced industrialized economies (we already discussed this question in subsection 3.3.2). In the transitional economies of Eastern Europe, the average quality of new enterprise projects has been low, by comparison with that in advanced economies. Thus, banks may have preferred refinancing old projects, thereby perpetuating SBCs. Conversely, entry helps explain why the SBC phenomenon is not more widespread in advanced industrialized economies: vigorous entry by firms with high expected returns may make it less attractive for banks to refinance old loans rather than to invest in these very profitable projects, thereby hardening budget constraints for existing firms.

An immediate corollary of the analysis is that fewer new projects will be financed in period 1 if period 0 enterprises have SBCs. This result is notable because findings by Dittus (1994) and others that, early in the transition process, banks had drastically cut the allocation of credit to enterprises led some observers to argue that budget constraints had been hardened. The Berglöf-Roland model reveals that, to the contrary, the credit crunch may have been induced by a softening of budget constraints.

3.4.3 Decentralized Banks

Dewatripont and Maskin (1995) argue that decentralization of credit serves as a mechanism for hardening budget constraints. Specifically, they show that if credit is dispersed, so that refinancing an enterprise requires funds from an outside bank, inefficiencies in bargaining between banks may make refinancing unprofitable. The idea is that the bank that makes the initial loan may not have the funds to refinance a poor project. Thus, at least one additional creditor is required. However, the initial bank is likely to have an informational advantage over the new creditor. This asymmetry creates an inefficiency, reducing the return from refinancing and making liquidation more attractive.

More formally, suppose that the ultimate return from a poor project depends on the (unobservable) effort level a exerted by the initial bank (this effort can be interpreted as the resources that the bank devotes to monitoring). Specifically, assume that the financial return of a refinanced poor project is \bar{R}_p with probability a and 0 with probability $1 - a$. Let the bank's cost of a be $\Psi(a)$, where $\Psi(\cdot)$ is increasing and convex.

In this setting, centralized credit means that if a poor project is refinanced, the initial bank will do it. Thus, the bank will fully internalize the benefit of monitoring in choosing its effort level:

$$R_p^C = \max_a \{a\bar{R}_p - \Psi(a)\}, \quad (20)$$

with first order condition

$$\bar{R}_p = \Psi'(a^C). \quad (21)$$

Provided that

$$R_p^C > 1, \quad (22)$$

therefore, the bank will indeed refinance the poor project.

If the initial bank is liquidity constrained—as might be the case if credit is sufficiently dispersed—a new creditor may have to be brought in for a project to be refinanced. The new creditor cannot observe the effort level that the initial bank exerted, and so must form a conjecture \hat{a} . If there is competition among potential refinanciers (so that they just break even), the new creditor will thus demand repayment of $\frac{1}{\hat{a}}$ (for its loan of 1) if the poor project is successful (if the poor project is not successful, there is no money for repayment). That is, the creditor anticipates a return of $\hat{a} \cdot \frac{1}{\hat{a}} = 1$. Thus, the initial bank solves the problem

$$\max_a \left\{ a \left(\bar{R}_p - \frac{1}{\hat{a}} \right) - \Psi(a) \right\}.$$

Because, in equilibrium, the conjectured \hat{a} must equal the actual effort level, the equilibrium effort level a^D under decentralization satisfies the first-order condition

$$\bar{R}_p - \frac{1}{a^D} = \Psi'(a^D). \quad (23)$$

Hence,

$$R_p^D = a^D \bar{R}_p - 1 - \Psi(a^D). \quad (24)$$

Comparing (21) and (23), we see that $R_p^C > R_p^D$, and so even if (22) holds, we may well have

$$R_p^D < 1, \tag{25}$$

in which case the project will not be refinanced¹⁴.

In view of (22) and (25), we conclude that decentralization of credit may serve to harden enterprises' budget constraints. The mechanism at work in the particular model presented is a *liquidity constraint*; the initial bank cannot refinance the poor project out of its own funds. Alternatively, risk aversion on the part of the bank will deliver the same conclusion. That is, if decentralization leads banks to adopt undiversified portfolios (and, as we will note in a moment, there is reason to think that this may happen), then banks will be risk averse (relative to a centralized creditor with less highly correlated risks). This means that a bank that has already lent money to a poor project may find refinancing too risky to undertake—in which case the same logic we saw above would come into play. Thus, sufficient risk aversion can serve as a credible commitment against refinancing, and a bank may deliberately choose an undiversified portfolio to ensure that it attains this risk aversion.

Both liquidity constraints and risk aversion are most plausible when projects are large relative to the initial bank's total holdings. But other papers, including Povel (1995) and Huang and Xu (1998), explore how decentralization may produce HBCs when projects need not be big.

¹⁴ Note that if instead $R_p^D > 1$, decentralization of credit appears to be worse than centralization, since poor projects will now be refinanced but not monitored with sufficient effort. However, this poor performance of decentralization compared with centralized credit is an artifact of the assumption that the former entails that the bank's liquidity constraint be binding. If instead, following Dewatripont and Maskin (1995), we allowed liquidity to be determined endogenously in a decentralized credit market, we would conclude that if $R_p^D > 1$, there is no difference in performance between centralization and decentralization.

Povel (1995) examines a model in which a project is financed from the outset by two banks. In effect, an HBC arises through a war of attrition between the investors. Suppose that an agreement on a restructuring plan is necessary to refinance a poor project and that each bank's assessment of the continuation value of the project is private information. The asymmetric information between banks can give rise to a delay in their negotiating an acceptable restructuring plan. However, if the value of the project declines over time, this delay may render refinancing unprofitable.

Huang and Xu (1998) study a related model in which two banks (investors) agree to lend jointly to a project precisely because they have conflicting interests concerning how the project should be organized should it be refinanced. Specifically, assume that each investor i , $i = 1, 2$, observes a private real-valued signal s_i about reorganization. Suppose that, in case of refinancing, the project could be completed either according to plan A or plan B. However, which plan will actually succeed depends on the investors' signals: if $s_1 > s_2$ then plan A is the right choice, whereas B is indicated if $s_1 < s_2$. Suppose that the investors have arranged matters so that the difference between investor 1's gross payoffs (i.e., the payoffs before any *ex post* transfer) from plans B and A is increasing in s_1 , while the difference between investor 2's gross payoffs from plans A and B is increasing in s_2 . Then it is easy to show that there is *no* mechanism that ensures the correct choice between A and B. To see this intuitively, note that there is an inherent conflict between investors' incentives and making the right choice: as s_1 rises, plan A grows more likely to be the right option, but investor 1's preference for plan B strengthens. Thus, eliciting the signal value from investor 1 becomes more difficult. By purposely ensuring that they have different information, the banks may be able to commit themselves not to refinance a project that they have jointly invested in¹⁵.

¹⁵ This logic is reminiscent of the literature on using contracts as a barrier to entry (see Aghion and Bolton (1987)).

Huang and Xu apply this argument to illuminating the East Asian crisis of the late 1990's. They note that the Korean *jaebols* were subject to centralized financing and suffered from lack of financial discipline and SBCs. By contrast, Taiwan's economy was characterized by dispersed financial institutions and decentralized banking. In the event, Taiwan suffered much less from the crisis than Korea (even though it too was attacked by speculators). By embedding their SBC model in a framework that includes bank runs, Huang and Xu account for both the East Asian "miracle" and its crisis. The idea is that in an economy where innovation consists mainly of imitation, there will be high bank liquidity and high growth when the proportion of poor projects is sufficiently low, regardless of whether budget constraints are soft or hard. But when the proportion rises above a certain level, then the economy is vulnerable to bank runs unless budget constraints are hard. This is because SBCs promote poor projects, and a poor project increases the general cost of borrowing on the interbank lending market, which normally serves as a counterweight to bank runs. Therefore, an increase in SBCs promotes bank runs. Notice that this logic has little to do with the transparency or regulation of the interbank lending market, the issues that received most attention in the debate about the East Asian crisis.

We have been discussing models in which a multiplicity of creditors make refinancing more difficult. This is a theme, however that reaches well beyond the literature that invokes the term "soft budget constraints." Some of the papers outside that literature include Bolton and Scharfstein (1996), Berglöf and von Thadden (1994), Dewatripont and Tirole (1994), and Hart and Moore (1995).

Although an HBC has positive incentive effects, it can also induce "short-termism" among managers with good projects, as von Thadden (1995) and Dewatripont and Maskin (1995) argue. To see this, modify the model of subsection 3.1 so that managers with good projects can choose between a "quick" outcome yielding return R_g and private benefit B_g after one period or a "slow" outcome yielding 0 after one period but, with an additional infusion of capital, R_s and B_s by the second period, where $R_s - 2 > R_g - 1$ and $B_s > B_g$. Notice that the slow option is more profitable than the

quick one, but that, at the end of period 1, it cannot be distinguished from a poor project.

With an SBC, poor projects will be refinanced but so will slow (good) projects. By contrast, with an HBC, only quick projects will be refinanced. If the high profitability of the slow projects sufficiently outweighs the inefficiency of the poor projects, an SBC may therefore be desirable. In other words, by promoting only quick (i.e., short-term) projects, a hard budget constraint equilibrium sacrifices the potentially higher gains from long-term projects.

This reasoning bears on the contrast between the Anglo-Saxon and German/Japanese financial systems. In the 1980's, the idea was put forward that market-oriented corporate finance, as practiced in the U.K. and U.S., can be “short-termist” (Corbett, 1987), compared to the bank-based system of Germany and Japan, which provides more long-run finance and liquidity to firms (but also suffers from more poor projects). Thus, the U.K./U.S. system can be viewed as corresponding to HBCs; the German/Japanese system to SBCs.

The analysis changes somewhat if we allow for entry, as in the Berglöf and Roland (1998) model. Dewatripont and Roland (2000) show that, although the HBCs induced by decentralized credit may promote short-termism, they may also serve to mobilize financial resources quickly for financing new innovations. Assume, to simplify matters, that one unit of capital is exogenously available for financing at both period 0 and 1. Suppose that the new projects available in period 1 are homogenous with return R_n . Finally, assume that

$$(1 - \alpha)R_p^D < R_n - \alpha R_s < (1 - \alpha)R_p^C, \quad (26)$$

where R_p^D and R_p^C are the return to a poor project under decentralization and centralization as given by (24) and (20), respectively, and R_s is the return from a “slow” project. Notice that the second inequality in (26) implies that, under centralization, there will be no funds in period 1 to finance new projects: all money will be allocated to

refinancing slow and poor projects since the opportunity cost R_n of refinancing is lower than its benefit $\alpha R_s + (1 - \alpha)R_p^C$. However, if

$$\alpha R_s + (1 - \alpha)R_p^C - 1 < R_n \quad (27)$$

this allocation will be inefficient *ex ante*: the *ex ante* return from new projects is higher than that from period 0 projects. By contrast, the first inequality in (26) implies that poor and slow projects would *not* be refinanced if credit is decentralized. Hence, under decentralization, managers with good projects will elect the quick option, those with poor projects will not seek funding for them, and new projects will be financed.

The Dewatripont-Roland argument suggest that a decentralized financial system—as in the U.S.—may be better able to respond to rapid technological change than the more centralized bank-oriented systems of Germany and Japan, which emphasize long-run risk-taking.

3.4.4 *Ex ante Screening*

Although most of the literature emphasizes how the dispersion of capital hardens budget constraints, there are cases where larger banks can more easily commit to terminate projects. For example, in their (1998) model, Berglöf and Roland show that, if a bank is big enough, it can afford to invest in screening activities that allow it to reject some poor projects at the outset and also some of the new poor projects in period 1. The latter effect enhances the attractiveness of funding new projects and so hardens the budget constraint for those begun in period 0. A similar argument is made by Schnitzer (1999), who emphasizes that the screening benefits of bigness may be particularly important in transition economies.

If, however, there are complementarities between the activities of screening and monitoring (in the extreme case, if the same investment that permits screening also makes monitoring possible), then there will be a tension between enhanced screening (which improves the mix of funded projects) and enhanced monitoring (which makes refinancing more attractive and hence softens the budget constraint). If the second

effect is strong enough, banks may rationally choose to refrain from screening—and the potential advantage of larger banks vanishes. In a similar vein, Faure-Grimaud (1996) shows that when a regulated firm relies on the stock-market for financing, then the additional scrutiny provided by the market may raise the probability of a bailout and so weaken the firm manager's incentives—a syndrome often witnessed in transitional economies.

3.5 The SBC in Banks

The discussion so far has concerned models (or more precisely, institutional interpretations of models) in which the BC-organizations are enterprises and the rescuers (the S-organizations) a state and/or a bank. We now turn to another set of circumstances, in which the BC-organizations are banks and the role of S-organization is played by somebody else, such as a state or a central bank. Situations in which banks face SBCs are by no means confined to transitional economies. In recent years we have witnessed the 1980's S&L bailout in the U.S., the early 1990's bailout of the Swedish and Finnish banking system, and the late 90's bailout of banks in Asia.

3.5.1 Bank Passivity and Gambling for Resurrection

Mitchell (1998) analyzes the phenomenon of bank passivity, in which a bank fails to liquidate poor projects because it anticipates being bailed out by the government if it gets into difficulty. The bank can either refinance the loan to a poor project or liquidate it. The expected financial return from rolling over is negative, but the possibility of bailout serves as downside insurance. Thus the bank has the incentive to gamble on a project's "resurrection": the bank benefits from the upside of such a decision and does not suffer the consequences of the downside. To prevent such gambling, the government may try to monitor the bank.

Formally, take the model of subsection 3.1 and suppose that, if refinancing occurs, the return from a poor project is either \bar{R}_p (with probability q) or 0 (with

probability $1 - q$). Assume too that the government can become an active player by monitoring the bank (to determine whether the bank is liquidating poor projects or not). The government decides *ex ante* on a detection probability D at a cost $C(D)$. Detection occurs after the bank decides whether or not to refinance. If the bank is discovered to be passive, its manager is fired (we assume that the threat of firing is credible).

The timing of the model is as follows. In period 1, the government chooses D and the bank lends to a single project (it will simplify the analysis to limit attention to just one project). In period 2, returns are observed, and the bank decides whether or not to liquidate a poor project (let a be the probability of liquidation). Directly afterward, the government monitors and fires the manager if discovered to be passive. At the end of the period, the government recapitalizes the bank by injecting an amount of capital K (by assumption, a negative net position for the bank must be covered by the government).

The government's problem is to minimize the expected value of $C(D) + K$ subject to the bank's position being nonnegative at the end of period 2. The bank's payoff is $\max\{0, \Pi_i\} + \rho$, where Π_i is the net return from lending and ρ is a private benefit that is lost if the manager is fired. If Π_i turns out to be negative, the government must make up the difference. Thus $K = \{-\Pi_i, 0\}$.

The bank's problem is to choose a to maximize

$$a[\max\{-1 + \alpha R_g + (1 - \alpha)L, 0\} + \rho] + (1 - a)[\alpha(R_g - 1 + \rho) + (1 - \alpha)(1 - D)(q(\bar{R}_p - 2) + \rho)].$$

It follows immediately that there is a threshold value of D below which the bank will choose to be passive and above which it will set $a = 1$. Although D is costly, setting it too low means that with probability $(1 - a)(1 - \alpha)(1 - q)$ the bank loses money, in which case the government must bail it out. Hence, equilibrium will entail either the government choosing D sufficiently high so as to induce the bank to choose $a = 1$ or

choosing $D = 0$ because $C(D)$ is too high relative to the benefit of having the bank choose $a = 1$.

3.5.2 Rent-Seeking by Banks

In the previous subsection, a bank received a subsidy from the government to keep it solvent, but there are other reasons for bailouts. In this subsection, following Berglöf and Roland (1995), we explore the possibility that the government will subsidize a bank in order to induce it to refinance poor projects. This sort of effect—which is an important feature of transitional economies (see Anderson and Kegeles, 1997) and Perotti (1993)—derives from the likelihood that the government, unlike the bank, cares not only about verifiable revenue but also about such “external effects” as workers’ employment.

To explore this effect, assume now that $L > R_p - 1$, i.e., that the bank does not directly benefit from refinancing a poor projects. Suppose that in period 0 the government endows the bank with N units of capital. Assume that the cost of this capitalization is $(1 + \lambda)N$ (where λ represents the deadweight loss associated with raising the capital). A total of N projects could, in principle, be financed, but the bank may choose to finance only k (and keep reserves $N - k$). In period 1—when poor projects are subject to refinancing—the government may provide a subsidy S (at cost $S(1 + \lambda)$). The subsidy is paid after the bank commits to bailing out poor projects. By assumption, the government cannot recover the returns from refinancing; its only instrument is S . However, because the government maximizes total welfare, it is willing to pay the subsidy if the benefit it promotes exceeds the deadweight loss it creates, i.e. if

$$(1 - a)k(R_p + B_p + E_p - 1) > \lambda S.$$

If the bank’s liquidity position can be observed perfectly by the government, the subsidy will exactly cover the extra funds needed to bail out poor projects:

$$S = k[(1 - \alpha) - \alpha R_g] - (N - k). \quad (28)$$

For its part, the bank will accept the subsidy if S at least offsets the loss from refinancing:

$$S - (1 - \alpha)k(1 + L - R_p) \geq 0. \quad (29)$$

From (28) and (29), it is easy to verify that if $k = N$, the bank will accept the subsidy provided that

$$\alpha \leq \alpha^H \equiv \frac{R_p - L}{R_p - L + R_g}.$$

Hence, a necessary condition for SBCs is that the proportion of good projects be sufficiently low. Even though a fall in α increases the loss from refinancing, it increases the subsidy even more (provided that $R_p - L > 0$). One way to restore a HBC is for the bank to set aside reserves by financing fewer than N projects. Specifically, if it funds no more than k^H , where

$$k^H = \frac{N}{1 + R_p - L - \alpha(R_p + R_g - L)},$$

it will refuse any subsidy that the government is willing to offer.

If the government could identify the bad loans in the banks' portfolio, it could refinance them itself, e.g., by transferring them to a specialized government agency. Such "hospital" agencies have been set up in many transitional economies to clean up bank portfolios and to avoid subsidizing banks for refinancing poor projects. If *all* bad loans were transferred, the government's expenses would exceed those from subsidizing the bank, since the government would have to bear the full cost of refinancing. However, not all bad loans need be transferred to discourage the bank from rent-seeking and thus to harden enterprises' budget constraints. It suffices that $k \geq k^*$, where

$$k^* [(1 - \alpha) - \alpha R_g] - (N - k^*) - (1 - \alpha)k^*(1 + L - R_p) = 0.$$

To summarize, sufficient *ex ante* capitalization can reduce a bank's incentive to extract subsidies from the government to bail-out poor projects. Another way of achieving the same end is to create a hospital bank that siphons off sufficiently many bad loans to make rent-seeking unprofitable.

Transferring bad loans may be more difficult when the government does not know how many such loans a bank has in its portfolio. Mitchell (1995) shows that punitive measures directed against bank management may lead the bank to conceal or underestimate the extent of bad loans. By contrast, Aghion, Bolton, and Fries (1999) show that policies in which the bank is recapitalized in compensation for bad debts may give it the incentive to overstate its bad debt problem. One way to strike a proper balance between these two effects is through a scheme that combines partial recapitalization with the transfer of bad loans out of the bank's portfolio. Aghion, Bolton, and Fries (1999) work out the transfer "price" that the bank must receive for loans to ensure incentive compatibility.

Faure-Grimaud and Rochet (1998) study the consequences of different modes of privatization for SBCs, specifically, the question of whether it is better to put current or new management in charge of banks. They suppose that a current manager has a better knowledge of the loan portfolio than a newcomer. But as a result, the manager has an advantage in extracting surplus from enterprises if refinancing occurs. This superior surplus-extraction ability may exacerbate the SBC syndrome because it makes refinancing more likely. Thus, the authors conclude that it may be better to put newcomers in charge precisely because their information is worse.

3.5.3 *Lenders of Last Resort*

When there is financial-market failure (e.g., a breakdown of the interbank lending market), it may be desirable for the government to step in and provide liquidity to prevent bank run contagion. Goodhart and Schoenmaker (1995) show that in recent

years a high percentage of failing banks have enjoyed government bailouts¹⁶. But bailing out illiquid banks is costly. The cost of bailout has been as high as 30% of GDP in Japan and 27% in Mexico (Freixas (1999)), bringing the central bank's role as lender of last resort (LOLR) into serious question¹⁷.

Having a central bank as LOLR was first proposed by Thornton (1802), with the details worked out by Bagehot (1873). The Bagehot rules emphasize that a central bank should lend only to solvent but illiquid institutions (i.e., those with good collateral). Clearly, this is intended to curb the SBCs of banks.

Following the Bagehot logic, non-interventionists argue that bailouts distort the incentives of bank managers and induce them to take excessive risk (Goodfriend and King (1988); T. Humphrey (1989); and Schwartz (1995)). To avoid the SBC problem, they suggest that the central bank should intervene only at the macroeconomic level through open market operations. Their critics retort that a bank's failure generates externalities, such as bank-run contagion; and so bailing banks out may be efficient after all (Mishkin (1995); Santomero and Hoffman (1998); Freixas (1999); Freixas, Parigi and Rochet (1998)). Moreover, the Bagehot rule of lending only to solvent banks is often not implementable because solvency is difficult to determine. Indeed, Goodhart (1995) contends that in most cases it is impossible to distinguish illiquidity from insolvency. Finally, it is debatable whether the central bank should confine its bailouts to solvent banks, since as Goodhart and Huang (1999) argue, letting even insolvent banks go under may trigger bank runs. Indeed, Goodhart and Schoenmaker (1993) make the case that it is really only insolvent banks that need lending of last resort anyway.

Goodhart and Huang (1999) suggest that one way to limit the SBC problem when the central bank acts as LOLR would be to restrict bailouts to very large banks.

¹⁶ In their sample of 104 failing banks, 73 were rescued and only 31 were liquidated.

¹⁷ Particularly, in the U.S. savings and loan crisis, the Mexican crisis of 1994, the failure of *Crédit Lyonnais*, and the collapse of Long Term Credit Bank of Japan.

That is, a too-large-to-fail policy may be optimal. Freixas (1999) argues instead for a “creative ambiguity” approach: bailing out banks randomly. Huang and Xu (1999) show that although the too-large-to-fail policy may be optimal when restricted to short-run and narrowly defined problems, it may lead in the long run to inefficient bank mergers, which could be harmful. Indeed, if all banks were large, they would all qualify to be bailed out, giving rise to an aggravated SBC problem. Thus, Huang and Xu (1999) argue, the optimal LOLR policy should not be separated from financial reforms such as decentralization of banking.

3.5.4 *Financial Crisis*

Various authors (e.g., Krugman (1998)) have argued informally that certain financial policies, such as bailing out firms and banks and providing government guarantees to private investment had much to do with the East Asian financial crisis that began in 1997. Such policies are, of course, intimately connected with SBCs.

Huang and Xu (1999) develop a formal theory to explain financial crises from the standpoint of the SBC syndrome. In their model, there are many banks, each of which receives deposits and invests in enterprises’ projects. Banks rely on the interbank lending market to ease liquidity shortage problems when they face liquidity shocks. There are numerous depositors who, as in Diamond and Dybvig (1983), are divided between early consumers (those who consume only at date 1) and late consumers (who consume only at date 2). *Ex ante* all depositors are identical in that they do not know their own types until date 1 and make their deposit decisions *ex ante*. There are many enterprises, which have to rely on banks to finance their projects. Projects are of two types, good and poor, as in the previous sections.

As in the models of subsection 3.4, enterprises’ budget constraints will be hard if projects are financed by multiple banks. In contrast, they will be soft if projects are financed by single banks (or by the government).

Whether there are hard or soft budget constraints, every bank stores the optimal amount of cash to meet expected early consumer withdrawals. The interbank lending

market is an instrument for banks to avoid bank runs when some of them face idiosyncratic liquidity shocks, i.e., excess early withdrawals. In a hard budget constraint economy, a bank liquidates any poor project that it has funded, and the liquidation is observable by other banks as well. Given this common information, a bank has no problem borrowing if it faces excess early withdrawals. And so bank runs do not occur. In an SBC economy, project types are not publicly known, because poor projects are not terminated. Thus when a bank faces liquidity shocks and needs to borrow, potential lenders assume that its portfolio is poor. This raises the cost of borrowing. Thus, when a liquidity shock is sufficiently severe, even banks with good projects may be forced into liquidation. Anticipating this, depositors may be induced to make larger than normal early withdrawals, possibly precipitating a bank run.

Rochet and Tirole (1996) study how interbank lending itself can create SBCs. Imagine that bank A is in distress and that, according to the interbank agreement, bank B is supposed to lend to it. Such a loan may leave the lender insolvent, requiring rescue by the central bank. But the prospect of this rescue will dull bank B's incentives to monitor A.

3.6 Other Conceptions of the SBC

In subsections 3.1 through 3.5, we have examined models that conceive of the SBC syndrome as a problem of dynamic commitment. In our view, this has been a fruitful approach for understanding the syndrome. At the same time, there have been several interesting alternative conceptions as well.

3.6.1 Extra Subsidies for Extra Employment

Boycko, Shleifer, and Vishny (1996) associate the SBC syndrome with subsidies paid to enterprises to induce them to retain excess labor. There is no dynamic element to their model and hence no problem of commitment.

Consider a firm with profit function $\Pi(a)$, where a , a measure of the firm's effort, can assume two values, a^* and a^{**} . Assume that

$$\Pi(a^*) > \Pi(a^{**}). \quad (30)$$

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 β 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 $B(\cdot)$ incorporates any objective besides profit that matters to the government, e.g., employment, output, or consumer surplus. Let us suppose that

$$B(a^{**}) > B(a^*) \text{ and } B(a^{**}) + \Pi(a^{**}) > B(a^*) + \Pi(a^*). \quad (31)$$

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

Let us distinguish among three cases. We call *pure centralization* the 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). Under pure centralization, the government will choose $a = a^{**}$, given assumption (31). Although this choice may not be socially optimal (unless perhaps $B(\cdot)$ is a good measure of consumer surplus)—and, in view of (30), is certainly not profit-maximizing—it entails no transfers and hence no SBC.

The case of a transitional economy is the one in which β 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 he receives). Suppose that the government must make a take-it-or-leave-it offer. It will be worthwhile doing so provided that

$$B(a^{**}) - B(a^*) + \beta(\Pi(a^{**}) - \Pi(a^*)) - C((1 - \beta)\Pi(a^*) - \Pi(a^{**})) > 0, \quad (32)$$

where $C(x)$ is the cost (to the government) of making a bribe of size x . $C(x)$ may well be substantially bigger 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 risks entailed in circumventing anti-bribery laws. However, if β is high, then the manager requires a relatively low bribe and so, in view of (31), (32) 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 β is low and the manager has control. Here, the cost of bribery may be very high (if $C(\cdot)$ increases rapidly), and so (32) 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 (32) reduces to

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

which, from (31), 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 from that in subsection 3.4. In that earlier section the term meant “diffuseness of power” (either financial or productive), but here it means taking profit-ownership and control out of the hands of government.

Another difference turns on the concept of optimality. In the models of subsection 3.4, decentralization led to a higher social surplus than centralization. In this last model, such a result is not so clear: centralization entails maximizing $B(a) + \Pi(a)$, whereas decentralization implies maximizing $\Pi(a)$. Thus, only if the former objective is a worse approximation to “social surplus” than the latter does decentralization dominate. In particular, if $B(a)$ corresponds to consumer surplus, centralization would dominate.

3.6.2 *The SBC as a Control Instrument*

Bai and Wang (1996) show that SBC may be deliberately introduced by a center in order to control an agent. Suppose that the center owns a large number of potential projects but must rely on an agent to assess each project's profitability and hence whether or not it should be launched. Suppose that a project, if launched, takes two periods to complete and requires a capital input costing c each period. The agent can exert (unobservable and costly) effort to pre-screen the expected gross returns of a fraction e of these projects *ex ante* (where e increases with effort). It then launches a number of the potential projects, including all projects that pre-screening indicates are profitable (i.e., the projects whose gross return exceeds $2c$), but possibly also some projects that have not been pre-screened. At the end of the first period, it learns the expected gross returns of all launched projects and can choose to terminate some of them, thereby saving the cost c of continuing them for a second period. Presumably, any project that is terminated would be one that is unprofitable to complete (i.e., one for which the expected gross return is less than c), but, as we will see, not all unprofitable contracts ought to be terminated.

The agent requires a fee from the center to induce it to exert effort. But because effort is unobservable, the fee must be made contingent on the variables that the center *can* observe: the total net return (which is assumed to be the sum of the expected gross returns of completed projects less the capital costs of all completed and terminated projects, plus noise), the number of projects launched, and the number of projects terminated after the first period. Assume that, on average, a project that is not pre-screened turns out to be unprofitable to complete. Bai and Wang show nevertheless that if the agent is risk-averse then the optimal fee schedule will have the proportions that the agent should (i) launch some project that it has not pre-screened and (ii) allow some unprofitable projects to be completed.

To see why this is so, suppose that there are just two possible effort levels: an optimal level and lower level. Then one would expect that, when confronted with the

optimal fee schedule, the agent will be left just indifferent between these two levels (i.e., his “incentive constraint” will be binding). Now suppose, contrary to the claim, that the agent launches no project that it has not pre-screened (i.e., the set of projects launched consists only of projects that pre-screening indicates are profitable). Suppose that the center now slightly increases the number of projects it requires to be launched. This will, in effect, force the agent to launch some projects that it has not pre-screened. Since this change will reduce the overall net return on average, it will lower the agent’s expected fee. Thus the agent’s expected utility will fall, whether he exerts the optimal or lower level of effort. But because his expected marginal utility of income is higher when effort is low (since his expected fee is lower), his expected utility will fall *more* in that case than when his effort is optimal. Hence, the agent’s incentive constraint will be relaxed, which, given that the fall in the agent’s utility when he exerts optimal effort is zero to the first order, means that the fee schedule could not have been optimal to begin with, and so property (i) is established. For exactly the same reason, if the center slightly decreases the number of projects it requires to be terminated after the first period (i.e., slightly increases the number of projects it requires to be completed), the agent’s expected utility will again fall more for low effort than for optimal effort, implying the same sort of incentive relaxation as before. This establishes property (ii).

4. Concluding Remarks

4.1 A Broad Range of Phenomena, a Common Framework of Analysis.

The SBC syndrome embraces a broad range of phenomena from economic life, and there are many different reasons why the budget constraint may be softened. Nevertheless, the syndrome gives rise to specific and predictable patterns of behavior among economic agents. We hope to have convinced the reader that models of dynamic commitment problems provide some analytic insight into these patterns and that the SBC concept is a useful unifying device. Most of the work discussed in this article

applies the terminology and conceptual apparatus of the literature on SBC and refers to its theoretical antecedents. However, some papers mentioned do not invoke these concepts or language. We do not wish to suggest that these are fatal omissions. Nevertheless, we feel that something of importance may thereby be lost.

Numerous examples in the history of the social sciences indicate that vividly descriptive concepts, metaphors, models, or analytical tools can have an inspirational effect (a classic instance is the enormous fruitfulness of the prisoner's dilemma game in economics and political science). They highlight the essence of complex situations and encourage researchers to seek similarities across apparently disparate phenomena. We believe that the notions, theories, and models of the SBC framework have played such an inspiring role and can continue to do so. Time and again, researchers who are steeped in the conceptual apparatus and analytical methods of the SBC syndrome have drawn and reinforced connections that have escaped others' attention.

4.2 Extensions Beyond Socialism and Post-Socialist Transition

We have mentioned repeatedly that the idea of the SBC was initially inspired by the study of socialism and that it has recently attracted a great deal of attention through its application to problems of post-socialist transition. However, we have noted that the SBC syndrome should not be thought of as wedded only to the socialist system or to transitional economies. It can arise in *any* economic system. All that is needed is the confluence of certain elements: a BC-organization and one or several S-organizations with the incentive to provide financial rescue. Unquestionably, these elements come together more frequently and in a wider set of cases under socialism and post-socialist transition than under systems where socialism has never arisen. However, the effects of the SBC syndrome are clearly perceptible in the traditionally capitalist part of the world as well.

There is, for instance, a large number of empirical studies demonstrating the existence and deleterious effect of the SBC syndrome in the public sectors of various

non-socialist countries. Here are a few illustrations, running the gamut from developing to advanced economies: Raiser (1994) 32 developing countries: enterprises; Skoog (2000) Tanzania: enterprises; Anderson (1995) Middle-East Arab countries: enterprises; Bartel and Harrison (1999) Indonesia: enterprises; Majumdar (1998) India: enterprises; Tornell (1999) Latin-America: enterprises and banks; De Macedo (1990), Portugal: enterprises; Bertero and Rondi (2000) Italy: enterprises; Nett (1992) Italy: medical service; Levaggi and Zanola (2000) Italy: national health system; Moesen and Van Cauwenberge (2000) 19 OECD countries: local governments; Dahlberg and Petterson-Lidblom (2002): Swedish local governments; Rodden et al. (2002): fiscal federalism; Duggan (2000) USA, hospitals.¹⁸

Huang and Xu (1998, 1999) have pioneered the study of capitalist financial crises from the standpoint of the SBC syndrome. In particular they provide micro-foundations for a macro-economic analysis of the East Asian crisis of the late 1990's (see the discussion in subsection 3.5.4). It would be desirable to carry out similar research into earlier crises (e.g. the early 1990's crisis in Mexico) and the current one in Argentina. In no case are we prepared to say that the SBC syndrome was the only cause. However, we believe that it was invariably one of the important contributing factors, with an influence that differs from country to country and crisis to crisis. In general, it seems a good way of understanding the accumulation of bad loans, the inflation of demand, and the creation of bubbles.

Many students of the SBC syndrome compare economies of similar political and economic disposition (e.g., they examine the similarities and differences between two transitional economies). Others contrast economies from opposite ends of the spectrum (e.g., they compare the SBC of socialist systems with the HBC of capitalist economies). But more general sorts of comparisons would probably require a more systematic methodological approach. Such an approach would entail a set of strictly comparable

¹⁸ The list contains only studies that use the conceptual apparatus of the SBC literature.

indicators, with uniform definitions and rules of observation and measurement. Indicators such as those listed in Table 1 could be observed and measured with a standardized methodology in many countries. Of course, the obvious candidates for initiating and organizing the introduction of a uniform methodology are international financial institutions, e.g., the World Bank and EBRD.

4.3 Softening and Hardening the Budget Constraint from a Secular Historical Perspective

Studying the softening and hardening of budget constraints over historical time poses a formidable intellectual challenge, requiring a synthetic approach to changes in politics, society, the economy and the law. Nevertheless, a few simple generalizations can be made. In the early days of capitalism, the budget constraint was for the most part hard. Think, for example, of debtors' prisons, of borrowers compelled to auction off their personal property, and of businessmen for whom the threat of bankruptcy led to suicide. Since that time the capitalist budget constraint has gradually softened. The introduction of the principle of limited liability in corporate finance, less draconian bankruptcy regulations, and modern forms of separation and interweaving of ownership and management have all served to protect managers from the adverse consequences of their actions. Indeed, the fact that the executives of a corporation can survive the financial ruin of the company they manage without losing their own property may have created a mentality similar to that under the SBC syndrome. A critical review of modern capitalism in the light of SBC phenomena would certainly seem extremely worthwhile.

The history of SBC's under the socialist system is interesting as well. In pre-reform socialism, SBC's permeated all organizations. The first market reforms attempted to impose the requirement that the budget constraint be hardened, but such attempts largely failed. To understand this failure calls for an interdisciplinary study, a demanding undertaking. But, in our view, the potential benefits clearly outweigh the costs.

4.4 Normative Implications

The work reviewed in this paper is, for the most part, *positive* in nature. The “meta-model” of the typical research pattern can be described as follows: An author singles out some aspect of the SBC phenomenon, devises a model that focuses on some of the causes and consequences, and abstracts away the others. Policy implications of the analysis are drawn with caution because of the acknowledged limitations of the model.

Of course, the need for normative caution is common to economic research far beyond that on the SBC syndrome. No single theoretical work can be expected to give a comprehensive analysis of the causes and effects of any complex phenomenon. Nevertheless, a responsible decision about whether, say, an indebted corporation should be rescued can be reached only after consideration of all direct and indirect consequences.

Such matters are rarely clear-cut. The SBC literature may give the impression that hardness is “good” and softness “bad.” But if this were literally true, it is hard to imagine that the SBC syndrome would be so widespread or recurrent.

The dilemma is especially agonizing when the rescue of an entire economic sector or nation is on the agenda. Almost always, preservation of national stability provides a strong argument for going through with such a bailout. Yet even in these cases, the logic is not completely one-sided, since rescue will presumably have unfortunate repercussions on expectations of future bailouts, contributing to the perpetuation of SBC phenomena.

A major shortcoming of the literature on the SBC is the absence of a systematic exploration of normative implications. No one expects to devise a simple formula that will determine, in any given situation, the breadth and magnitude of the bailout that is called for. Still, comprehensive normative evaluation seems a feasible scientific task. Potential short-term consequences of a bailout can be clearly enumerated. Theoretical and empirical examination of the tradeoffs between short-run benefits and long-run

costs is more difficult, since it must draw on political, sociological, and even ethical thinking, besides purely economic analysis. But it seems far from impossible.

Finally, we hope that the present survey of the rich literature on the SBC syndrome will contribute to a further expansion of this research program.

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TABLE 1
INDICATORS OF THE SOFTNESS/HARDNESS OF THE BUDGET CONSTRAINT OF THE FIRM

Phenomena represented by the measurement	Studies applying the measurement
<u>Instruments of softening</u>	
1. Subsidies or other contributions of the state	
– percentage of GDP or total budget	EBRD (1997) Gao and Schaffer (1998) Raiser (1994, 1996)
– percentage of firms reporting subsidies	Earle and Estrin (1998) EBRD (1999)
2. Soft taxation	
– tax arrears as a percentage of GDP or total budget	Djankov and Kreacic (1998) EBRD (1997) Frydman, Gray, Hessel and Rapaczynski (2000) Pinto, Drebenstov and Morozov (2000) Schaffer (1998) Sjöberg and Gang (1996)
– percentage of firms reporting tax arrears	EBRD (1999)
– survey: perception of the phenomenon	Tóth (1998)
3. Soft bank credit	
3a Preference for distressed firms in credit allocation	Brana, Maurel and Sgard (1999) Budina, Garretsen and de Jong (2000) Gao and Schaffer (1998) Schaffer (1998)
3b “Bad” loans (e.g. as a percentage of total outstanding loans)	Bonin and Schaffer (1995) EBRD (1997, 1998) Gao and Schaffer (1998)
3c Arrears of repayment of loans (e.g. as a percentage of total outstanding loans or bank credit and bank arrear correlation)	Cull and Xu (2000) Dobrinisky (1994) Frydman, Gray, Hessel and Rapaczynski (2000) Gao and Schaffer (1998) Perotti and Carare (1997)

3d Unusual debt/equity ratio or debt/asset ratio	Budina, Garretsen and de Jong (2000) Majumdar (1998) Gao and Schaffer (1998)
3e Unusual cash-flow/debt ratio	Pohl, Anderson, Claessens, Djankov and (1997)
3f Survey: subjective assessment	Tóth (1998)
4. Excess trade-credit	
– overdue trade credit as a percentage of GDP or total capital	Bonin and Schaffer (1995) EBRD (1997) Frydman, Gray, Hessel and Rapaczynski (2000) Gang and Sjöberg(1996) Pinto, Drebensov and Morozov (2000) Schaffer (1998)
– Survey: subjective assessment	Tóth (1998)
<u>Expectation of rescue</u>	
5. Survey data about subjective probabilities concerning the expectation of rescue	Anderson, Korsun and Murrell (2000)
<u>Characteristics of the exit process</u>	
6. Survival of organizations in financial trouble (chronic deficit, insolvency, accelerating growth of indebtness) (e.g. loss-makers as a percentage of all firms)	Claessens and Peters (1997) EBRD (1997) Gao and Schaffer (1998) Li and Liang (1998)
7. Frequency of bankruptcies and liquidations, filed and executed (e.g. as a percentage of total number of firms)	Bonin and Schaffer (1995) EBRD (1997) Mitchell (1998)
8. Frequency of bail-outs	Li and Liang (1998)

Note: The table refers only to subsidies which use in an explicit form the language of the SBC Theory, and apply the indicators mentioned in the left column for measuring the softness/hardness of the budget constraint.

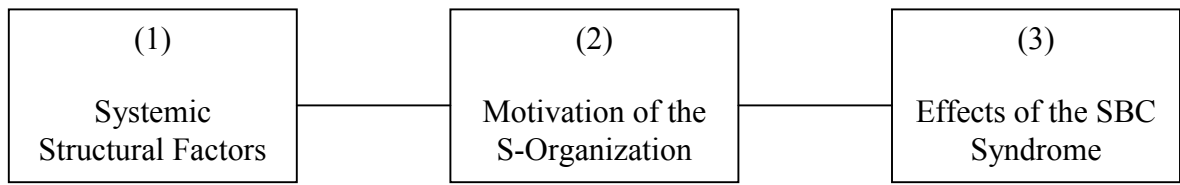


Figure 1. The SBC Syndrome: The Chain of Causality

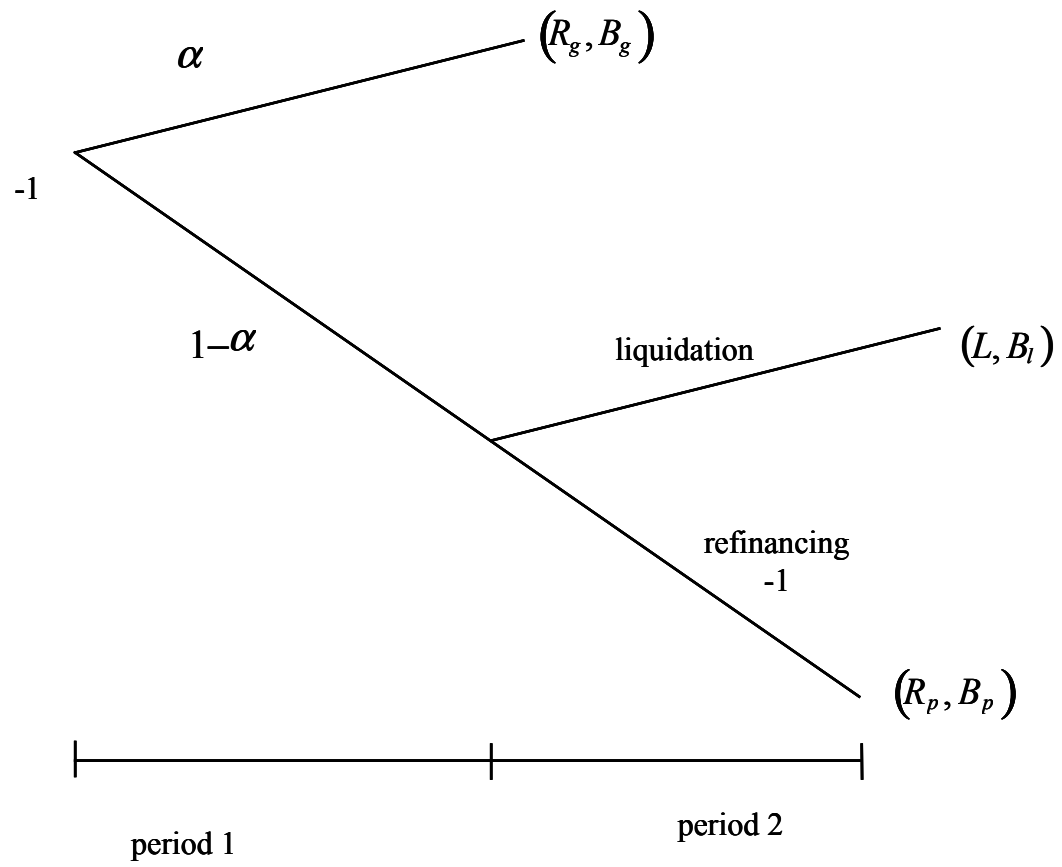


Figure 2. The Structure of the Dewatripont-Maskin Model