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Röller, Lars-Hendrik; Zhang, Zhentang

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Lars-Hendrik Röller
Zhentang Zhang

ABSTRACT

Provision of Social Goods and Soft Budget Constraints[*]

by Lars-Hendrik Röller and Zhentang Zhang

Firms in socialist and transitional economies are often obliged to provide a social good in addition to a private good, which makes it difficult for a government to commit not to bail out the firm once it is in financial trouble. This creates a soft budget constraint syndrome which causes the firm to underinvest ex ante in order to extract state subsidy and thereby reduces dynamic efficiency. In this paper, we show that separating the provision of social goods from private goods can harden budget constraints, while introducing competition into the private market may not.

Keywords: Dynamic Efficiency, Transitional Economy, Soft Budget Constraint, Social Goods, Subsidy

JEL Classification: L13, L30

ZUSAMMENFASSUNG

Bereitstellung sozialer Leistungen und geringere Budgeteinschränkungen

Unternehmen in sozialistischen und Übergangsländern sind oft verpflichtet, neben privatwirtschaftlichen auch soziale Aufgaben zu übernehmen. Ob soziale Aufgaben von privaten Unternehmen oder von staatlichen Einrichtungen finanziert werden sollten, ist Gegenstand dieses Beitrags. Es wird gezeigt, daß die Verquickung von privatwirtschaftlichem Interesse mit öffentlichen Aufgaben durch gehörige Anreizprobleme gekennzeichnet ist. So entsteht etwa ein erhöhter Druck auf die Politik die Unternehmen zu subventionieren, wenn diese in finanzielle Schwierigkeiten geraten. Aufgrund dieser glaubwürdigen Absicherung seitens des Staates schwindet der Anreiz wettbewerbsfähige Strukturen in den Unternehmen umzusetzen, was in der Literatur unter dem Stichwort „soft budget constraint" diskutiert wird. In der vorliegenden Untersuchung wird gezeigt, daß eine saubere Trennungen von sozialen und privaten Aufgaben für eine Entstehung von wettbewerbsfähigen Strukturen notwendig ist. Die bloße Einführung von mehr Wettbewerbsdruck, ohne strukturelle Separierung, führt zu keinen marktwirtschaftlich sinnvollen Lösungen.

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1 Introduction

Enterprises in socialist and transitional economies are often mandated by their governments to provide some social goods in addition to producing a private good.[1] These social goods include retraining redundant workers, providing housing, kindergartens, pensions and medical benefits to workers, etc. For example, SOEs (state owned enterprises) in China, have been mandated to provide so-called LIW (labor insurance and welfare) benefits to their active and retired workers which cover pensions, medical care and other benefits (see Table 1). In 1993, the LIW cost Chinese enterprises an estimated US$17 billion, which accounted for 34% of their total wage bill. Before the recent economic reforms, the social good obligation did not impose any extra burden on the SOEs because the state covered all the SOE expenditures. However, as part of the economic reform, SOEs have become responsible for payment of wages, medical care and pensions of their active and retired workers. Facing competition from enterprises which provide little or no social goods, the obligation to provide social goods has become a huge burden for Chinese SOEs and considerably undermined their ability to stay viable. It is estimated that over 50% of all Chinese SOEs were losing money in 1993. As a consequence of these developments, these loss-making SOEs attempt to bargain with the government for subsidies on the grounds that they were unable to meet their LIW obligations. Indeed it was concern about possible SOEs failure to maintain redundant workers and provide medical care and pensions that has prompted the government to grant subsidies to financially distressed SOEs (Hu 1997). In 1993, subsidies for loss-making SOEs amounted to some US$5 billion, which adds up to an incredible 9% of total government expenditure. These subsidies, in theory, should only cover the SOE losses from the social obligations. However, due to the information-asymmetry problem, it is very difficult for the state to distinguish between these losses from the operational losses and consequently, the state in practice has to be responsible for all the SOE losses and the budget constraints of SOE's become soft (Lin, Cai and Li 1998).

This kind of mandatory bundling of social goods with private goods is not

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[1] Social good is defined as a good with a positive externality which must be provided or subsidized by government if it is to be produced by a profit-maximizing firm. Universal service, kindergardens, unemployment benefits, pension and medical cares are some of the examples.

immune to market economies. Firms in network industries have been obligated to provide so-called *universal service* in addition to other services.[2] In fact, universal service obligation and natural monopoly arguments were commonly used to justify public and/or monopolistic control of certain network industries. Before the recent liberalization of many European network industries, there was less competition and firms might be able to cover their losses from universal service obligation by cross-subsidizing. However, as liberalization introduced more competition, the ability of firms to cross-subsidize is undermined.

The introduction of competition in the private goods market puts government into a difficult situation. In principle, there are two possible alternatives: either firms are required to continue the provision of the social good coupled with a subsidy to keep firms viable, or a separation of the provision of social and private good is undertaken. This paper studies this trade-off. As we will show, the first scenario will give rise to a soft budget constraint syndrome, which dilutes the firms incentive to invest and thereby reduces dynamic efficiency.

Imagine an economy consisting of a politician and two firms. The politician is a self-interested economic agent who derives political benefit out of the provision of the social good. Firms are competing in the private good market. One of the firms (so-called multiproduct firm) is required by the politician to provide a social good in addition to the private good. The provision of the social good involves loss making. In addition to their production decisions, firms can invest into becoming more efficient. To make the problem interesting we assume that the firm who produces both the social good and the private good can stay in business only if it undertakes some investment to reduce its cost.[3] Whenever the firm underinvests (and is consequently in financial trouble), it bargains with the politician for a subsidy. The politician concern about the provision of the social good and thereby concerns about the firm's via-

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[2]The objective of universal service obligations is to make sure that everyone, including uneconomic customers in uneconomic areas, have access to certain essential services of high quality at prices they can afford (European Commision 1998).

[3]If the firm is viable without investing there would be no soft-budget constrain problem and the firm would always have an incentive to become efficient. In effect that would be the situation whenever the monopoly rents are large enought to cover the loss from the provision of the social good, i.e. this can be thought of as the situation before competition is introduced.

bility, allow the firm to extract a subsidy by credible threaten to shut down. The firm, therefore, deliberately underinvests ex-ante, giving rise to the SBC problem. When this happens, dynamic efficiency is undermined, consumers are worse off due to the higher price from both the underinvestment and softer competition in the private good market. However, the politician is better off.

Given the existence of a SBC syndrome for multiproduct firm, we next study how to harden the budget constraint. One way is to separate the provision of social good from private good, in other words the social goods is provided by a firm or government agency who specializes in supplying social goods. When the provision of social good is detached from the provision of private good, the multiproduct firm can no longer use its shutdown as a credible threat and the SBC problem is eliminated. Facing competition in the private good market, the firm will now have an incentive to become efficient in the provision of the private good. This finding suggests that the efficiency of firms in the private sector crucially depends on the separation of social and private provision. Note that this result does not depend on any exogenous cost inefficiency that a multiproduct firm might have. Rather we show that there are *endogenous diseconomies of scope* due to an incentive problem of a multiproduct firm.

Another possibility for hardening the SBC might be to increase competition. As we mention above, the SBC problem only emerges when the cross-subsidization does not cover the loss from the provision of social goods. Moreover, as we show in this paper, increasing competition in the private good market may even worsen the SBC problem. Increasing competition in the private good market reduces the multiproduct firm's profit, which makes it more likely to use shutdown as a credible threat and to receive a subsidy, further softening its budget constraint.

Our analysis suggests that social obligations, especially those involved loss-making, should be detached from the enterprises. As long as the social obligations remain, the politician always has incentive to subsidize the firm, and the SBC problem will persist. This not only weakens the enterprises' incentive to become efficient and undermine their ability to restructure, but also impose losses on consumers.

The rest of the paper is organized as follows: in section 2, we give related

literature. In Section 3, we provide a basic set-up. In Section 4, we investigate how the provision of social good induces the SBC syndrome, and the impact of an increase in competition. In Section 5, we study means to harden budget constraints and analyze the economic consequences from the SBC syndrome. Section 6 gives conclusion and comments.

2 Related Literature

Soft budget constraint (SBC hereafter) is a term coined by Kornai (1979) as a phenomenon that a funding source can not commit to keep an enterprise to a fixed budget, i.e., the enterprise finds its budget constraint "softened" by the infusion of additional subsidy or credit when it is in financial trouble. According to Kornai (1998), there are exogenous and endogenous explanations for the SBC phenomenon. The exogenous explanation ascribes the SBC mainly to political factors such as the politicians' aim to gain political support, the paternalism and the egalitarianism of the state, etc. The other explanation views the SBC arising endogenously from a time inconsistency problem.[4] Dewatripont and Maskin (1995) show that the SBC can arise from the creditor's inability to commit not to refinance the bad project ex ante since marginal benefit of refinancing the bad project exceeds marginal cost of abandoning it. This time inconsistency problem lies at the heart of many other theoretical investigations (see for example, Qian and Roland (1998), Qian and Xu (1998), Schaffer (1989)).

The exogenous political factors and the time inconsistency problem often act together to induce the SBC problem. Segal (1998) shows the SBC phenomenon may arise from a benevolent government's decision to subsidize a unprofitable monopoly since the social damage of shutting down the firm exceeds the social cost of bailout. Schmidt (1996) demonstrates that the public ownership may cause a benevolent government to subsidize a failing firm and gives rise to the SBC problem. These two papers, however, impose a strong assumption on the role of the government. Namely, the government is a benevolent, fully rational social-welfare maximizer. In particular, there

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[4]A different explanation is offered by Lin and Tan (1998). They attribute the SBC to the state's accountability problem.

are no self-interested politicians. In contrast to Segal (1998) and Schmidt (1996), our government is modeled as a self-interested politician who seeks political gain. In both socialist and capitalist regimes, anecdotal evidence suggests that politicians often use their political power to force firms to produce services and goods which are beneficial to them (Shleifer 1998). In a totalitarian political system, the politicians' main concern is social stability. Keeping redundant workers off the street or supplying medical and pension benefits to active and retired workers certainly helps to reduce the chance of social unrest. On the other hand, in a democratic political system, the politicians' goal is to remain in office. Transferring wealth to certain groups of society through social goods such as universal service may gain political support for politicians and increase their chance to be elected.[5] For this reason we model the politician as someone who cares about the provision of the social good.

A malnevolent politician has been modeled by Shleifer and Vishny (1994), in which the relationship between a self-interested politician and a firm is governed by incomplete contracts and the control right of the firm decides the direction of bribe flows between the politician and the firm. By contrast, we model the relationship between the politician and the firm through the social good obligation and focus on the firms ability to make its shut-down threat credible through underinvesting ex ante, in order to extract a subsidy. In addition to the other papers mentioned above, we investigate ways in which the SBC problem is eliminated within the a multiproduct context.

3 Model

In this section, we develop a model characterizing the game between a politician and two firms. The politician is a self-interested economic agent aiming to maximize his utility. One of the firms (the multiproduct firm) is obliged to provide a social good in addition to a private good. The multiproduct firm

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[5]The univeral serivce obligation may be the outcome of a political process or result from regulatory capture by some pressure groups and they are not necessarily motivate by social welfare considerations (European Commision 1998).

is competing with the other firm in the private good market. Firms can undertake some investment to reduce their costs. The structure of the game is as follow: at the first stage, the politician sets the amount of social good. At stage 2, firms choose their cost-reduction investments noncooperatively. At stage 3, the firms and the politician bargain over the magnitude of subsidy. At stage 4, producing firms compete in the private good market.

The politician derives political benefit from the firm's provision of social good. In a totalitarian political regime, providing social protections to workers and keeping redundant workers off the street help to reduce the chance of social unrest, benefiting the politician. In a democratic political regime, universal service may be used by the politician to transfer wealth to certain groups of society and gain political support. Let q_O (subscript O for social good) denote the quantity of social good and $R(q_O)$ denote the politician's benefit from the provision of q_O. The firm uses its social good obligation to bargain for subsidy when it is in financial trouble. The cost to the politician to provide subsidy s is given by $N(s)$. This cost can be interpreted as the political cost of rasing taxes to finance the subsidy. The politician's utility function is thus given by

$$R(q_O) - N(s); \text{ where } R(0) = N(0) = 0, R'(\cdot) > 0, N'(\cdot) > 0, R''(\cdot) < 0,$$
$N''(\cdot) > 0.$

There are two firms: firm 1 and firm 2. Firm 2 is obliged to produce a social good in addition to a private good. Firm 1 is assumed to produce only the private good. These two firms compete in the private good market.

Cost function of firm 1 is given by $c_1 q_1$, where c_1 is constant.

Cost function of firm 2 is given by $c_2 q_2 + c_O q_O$, where c_2 and c_O are constant.

That is, the production cost of firm 2 consists of two parts: the cost of producing private good, $c_2 q_2$, and the cost of producing social good, $c_O q_O$.

There are two markets, A (private good market) and O (social good market).

Demand in market A is given by

$$p_A(Q^A), Q^A = q_1 + q_2 \text{ is the total output of the private good.}$$

Demand in market O is given by

$$p_O(q_O), \text{ where } q_O \text{ is the quantity of social good.}$$

In addition, each firm can undertake some investment x_i to reduce its marginal cost of producing the private good. The cost of investment is given by

$$I(x_i), \text{ where } 0 \leq x_i \leq X_i , i = 1, 2. \quad I(0) = 0, \ I'(\cdot) > 0, \ I''(\cdot) > 0,$$
reflecting diminishing return to the investment.

Firm 1's profit function is then,

$$\pi_1(x_1, x_2, q_1, q_2) = (p_A - c_1 + x_1)q_1 - I(x_1).$$

Firm 2's profit function (net of subsidy) is given by

$$\pi_2(x_1, x_2, q_1, q_2, q_O) = (p_A - c_2 + x_2)q_2 - I(x_2) + (p_O - c_O)q_O.$$

Firm 1 aims to maximize $\pi_1(\cdot)$. Firm 2 maximizes $(\pi_2(\cdot) + s)$. The politician chooses the amount of social good q_O to maximize $(R(q_O) - N(s))$, where $0 \leq q_O \leq \overline{q}_O$ and $p_O(\overline{q}_O) = 0$. That is, as long as the multiproduct firm is producing the private good, it is obliged to provide social good.

The politician and firm 2 bargain over the amount of subsidy. The bargaining game between them is characterized by the Nash bargaining solution, which is given by

$$\arg\max_{s \in \Omega} \left(R(q_O) - N(s) \right) \left(\pi_2 + s \right);$$

where $\Omega = \{(R(q_O) - N(s), \pi_2 + s) \mid 0 \leq s \leq \overline{s} , \overline{s} = N^{-1}(R(\overline{q}_O))\}$ is the feasible agreement set, which is compact and convex.

Before proceeding with the analysis, we make the following assumptions:

Assumption 1: $p'_A < 0$ and $p''_A Q^A + 2p'_A < 0$. In addition, $p'_O < 0$.

This assumption is simply to ensure the existence and stability of a unique solution to firms' maximization problems.

Assumption 2: The production of social good is loss-making. That is,

$(p_O - c_O)q_O \leq 0.$

Assumption 3: $\pi_2(X_1, 0, \overline{q}_O) < 0$ *but* $\pi_2(X_1, X_2, \overline{q}_O) > 0$, *where*

$p_O(\overline{q}_O) = 0.$

This assumption says that the multiproduct firm is making a loss without investment but can stay viable if it undertakes full investment, given that the rival firm invests in the full amount.

Assumption 4: $\frac{\partial \pi_i(\cdot)}{\partial x_i} > 0$ *and* $\frac{\partial \pi_j(\cdot)}{\partial x_j} < 0$ *for* $i \neq j$, $i, j = 1, 2$.

This assumption says that a firm's investment raises its profit but reduces its rival's profits.

4 The SBC phenomenon

4.1 The Provision of Social Goods and the SBC syndrome

In contrast to Schmidt (1996) and Segal (1996), we model the SBC syndrome arising from a time inconsistency problem of a self-interested politician instead of a benevolent government. The introduction of competition in the private goods market puts government into a difficult situation. In principle, there are two alternatives: either the firm continues to provide the social good and receives subsidies from the government, or a separation of the provision of social good from private good is undertaken. In this section, we investigates the effect of the first scenario. The game between the politician and the firms can be described as follows:

Game 1.

Stage 1. The politician sets the amount of social good.

Stage 2. Firm 1 and firm 2 make their cost-reduction investment decisions non-cooperatively.

Stage 3. The firms bargain with the politician over the size of subsidy. If firms receive the subsidy, they produce. Otherwise, they decide to produce or not.

Stage 4. Producing firms compete in private good market via Cournot.

We solve for a subgame perfect equilibrium.

The following Lemma 1 describe the equilibrium behavior of firms at stage 4.

Lemma 1: For any given (x_1, x_2), there exists a unique equilibrium at Stage 4, $q_1^*(x_1, x_2) > 0$ and $q_2^*(x_1, x_2) > 0$, where

$$q_1^*(x_1, x_2, q_2^*(q_1)) = \arg\max_{q_1} \pi_1(x_1, x_2) \text{ and}$$

$$q_2^*(x_1, x_2, q_1^*(q_2)) = \arg\max_{q_2} \pi_2(x_1, x_2, q_O).$$

Proof: By Assumption 3, any firm who did not produce would be better off by investing at full amount X and producing. The rest of proof follows from Assumption 1.

We now turn to the investment incentive of firm 1.

Lemma 2: At the subgame perfect equilibrium, firm 1 always undertakes full investment regardless of firm 2's investment decision. In addition, firm 1 gets no subsidy.

Proof: Since firm 1 does not provide the social good, it can not use its shutdown as a credible threat in order to extract subsidy. Anticipating this, facing the competition from firm 2 in private good market, it will invest in full amount by Assumption 4.

Denote x_2^0 as firm 2's break even level of investment when providing the maximum amount of social good. That is, $\pi_2(X_1, x_2^0, \overline{q}_O) = 0$. From assumption 3, we know that $0 < x_2^0 < X_2$. Additionally, denote $s^* = s^*(\overline{q}_O)$ as the equilibrium amount of subsidy when SBC syndrome occurs.

Now we are ready to investigate how firm 2's obligation to supply the social good together with the time inconsistency problem create the SBC syndrome.

Proposition 1: The subgame perfect equilibrium outcome of Game 1 is as follows:

a. If $\pi_2(X_1, X_2, \overline{q}_O) < s^*(\overline{q}_O)$, then firm 2 invests x_2^0 ($x_2^0 < X_2$), receives subsidy s^*, provide $\overline{q}_O$ of social good and produces $q_2^*(X_1, x_2^0)$ of private good. Firm 1 invests X_1, receives no subsidy and produces $q_1^*(X_1, x_2^0)$ of private good.

b. If $\pi_2(X_1, X_2, \overline{q}_O) > s^*(\overline{q}_O)$, then firm 2 invests X_2, receives no subsidy, provide $\overline{q}_o$ of social good and produces $q_2^*(X_1, X_2)$ of private good. Firm 1 invests X_1, receives no subsidy and produces $q_1^*(X_1, X_2)$ of private good.

c. If $\pi_2(X_1, X_2, \overline{q}_O) = s^*(\overline{q}_O)$, then both a and b forms equilibrium outcome.

Proof: See Appendix.

Proposition 1 says that when $\pi_2(X_1, X_2, \overline{q}_O) < s^*(\overline{q}_O)$, i.e. when the multiproduct firm's profit under full investment is lower than the subsidy it receives when it underinvests, it will choose to underinvest and thereby create the SBC problem. The intuition behind this proposition 1 is straightforward. The social good obligation makes firm's threat not to produce become credible since its shutdown means that the social good is not provided, to the harm of the politician. The firm thereby deliberately underinvests ex ante to become unprofitable in order to extract subsidy. This softens the firm's budget constraint and gives rise to the SBC syndrome.

The following corollary describes the impact of increasing competition on the likelihood that SBC syndrome occurs.

Corollary 1: The higher degree of competition in the private good market, the more likely the SBC phenomenon arises.

Increasing competition in the private good market reduces price and lowers the multiproduct firm's profit, which raises the chance of firm 2 using its shut-down as a credible threat, further softening the budget constraint.

Moreover, the correlation between the size of the social good and the likelihood that the SBC occurs can also be drawn from Proposition 1. From the Nash bargaining solution between the politician and firm 2, we can derive that $\frac{ds^*}{dq_O^*} = \frac{R'}{2N'+N''s^*} > 0$. This is illustrated in Corollary 2.

Corollary 2: The bigger size the social good has, the more like the SBC syndrome occurs.

This may explain why the SBC syndrome is much more widespread and prevalent in socialist economies than in market economies . Enterprises in socialist economies were obliged to provide a much wider range of social goods than enterprises in market economies.

4.2   Harden Budget Constraint

In this section, we investigate means to eliminate the SBC syndrome. We propose to separate the provision of social good from private good. After the separation, firm 2 only produces the private good and can no longer use its shutdown as a credible threat so as to extract subsidy.

Suppose the social good is now supplied by a government agency who only specializes in the provision of a social good.

The profit functions of firms are given as follows, respectively:

Firm 1's profit function is:

$$\pi_1(x_1, x_2) = (p_A - c_1 + x_1)q_1 - I(x_1).$$

Firm 2's profit function is:

$$\pi_2(x_1, x_2) = (p_A - c_2 + x_2)q_2 - I(x_2).$$

The government agency's profit function (net of subsidy) is:

$$\pi_G(q_O) = (p_O - c_O)q_O.$$

The politician chooses the amount of social good q_O ($0 \leq q_O \leq \overline{q}_O$) to maximize $(R(q_O) - N(s))$.

The bargaining problem between the politician and the government agency is characterized by the Nash bargaining solution, which is given by

$$\arg \max_{s \in \Omega} \left(R(q_o) - N(s) \right) \left(\pi_G + s \right)$$

Where $\Omega = \{(R(q_o) - N(s), \pi_G + s) \mid 0 \leq s \leq \overline{s}, \overline{s} = N^{-1}(R(\overline{q}_O))\}$ is the feasible agreement set, which is compact and convex.

After the provision of social good is separated from the provision of private good, firm 2 does not provide the social good and can not use its shutdown as a credible threat. Facing the competition from each other in private good market, they will invest in full amount by Assumption 4.

The game between the politician and the government agency is as follows:

Game 2.

Stage 1. The politician sets the size of social good.

Stage 2. Firm 1 and firm 2 make their cost-reduction investment decisions non-cooperatively.

Stage 3. The government agency bargains with the politician for the subsidy. If the government agency receives the subsidy, it provides the social good. Otherwise, it decides to produce or not.

Stage 4. Firm 1 and 2 compete in private good market and the government agency produces the social good.

Denote $q_1^*(x_1, x_2)$ and $q_2^*(x_1, x_2)$ as the equilibrium output of firm 1 and 2 at stage 4, the following proposition says that separating the provision of social good from private good will eliminates the SBC problem.

Proposition 2: The subgame perfect equilibrium of Game 2 is given as follow:[6]

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[6]If the government agency is a non-profit organization, then $s_G^* = -\pi_G$, and q_{OG}^* satisfies that $R'(q_O) + N'(s) \frac{d\pi_G}{dq_O} = 0$.

The government agency produces q_{OG}^* of social good and receives subsidy s_G^*, where $0 < q_{OG}^* < \overline{q}_O$.

Firm 1 and 2 receive no subsidies, invest full amount X, and produce $q_1^*(X, X)$ and $q_2^*(X, X)$ of private good, respectively.

Proof: See Appendix.

That is, the government agency gets the subsidy and provides the social good. On the other hand, the firms who produce in the private good market invest the full amount and consequently the SBC problem is eliminated.

5 The economic consequences of the SBC Problem

From the above analysis, we know that bundling the provision of social good with private good may prevent the multiproduct firm from becoming efficient and reduce the dynamic efficiency. The other economic consequences caused by the SBC syndrome are discussed in this section.

Proposition 3: The politician is better off from bundling the provision of social and private good.

Proof: See Appendix.

That is to say, the politician benefits from forcing the firm to provide the social good in addition to the private good. This is because when the social good is supplied by the multiproduct firm, the loss in the provision of social good is partially cross-subsidized by the firm's profit in the private good market, which increases the amount of social good provided, i.e. $q_{OG}^* < \overline{q}_O$. Therefore, it is always in the politician's interest not to separate the provision of social good from private good.

Corollary 3 : Consumers in the private good market are worse off while the recipients of social good are better off from bundling the provision of social and private good.

When the SBC syndrome occurs, the multiproduct firm underinvests in order to extract the subsidy. This reduces the competition and raises the price of private good, harming the consumers. However, the recipients of social good gain from the higher amount of social good provided.

Corollary 4. Firm 1 benefits when the SBC syndrome arises. Firm 2 (the multiproduct firm) is worse off unless the size of the social good is sufficiently large.

Firm 1 is better off from the reduced competition in the private good market due to firm 2's underinvestment. This finding is rather surprising at the first glance. During the liberalization of network industries, it is often argued that granting subsidy to the multiproduct firm (often the incumbent firm) to ensure the provision of social good creates disadvantages to the competing firm (often the entrant). However, from a dynamic point of view, anticipating to be bailed out when it is in financial trouble causes the incumbent to underinvest in order to exact subsidy and consequently, it becomes a "softer" competitor, to the benefit of the entrant.

On the other hand, if the size of the social good is small, the amount of subsidy received by firm 2 is low. And firm 2 is worse off from bundling the provision of social and private good.

The policy implication can be drawn from the above analysis is that detaching the provision of social good from private good is important to help the enterprises in transitional economies become efficient. As long as the enterprises continue to provide the social good, the SBC syndrome will persist. This not only weakens the enterprises' incentive to become efficient and undermine their ability to restructure, but also imposes losses on consumers. Increasing competition may deteriorate the SBC syndrome and magnify its negative economic consequences if the separation of social good from the private good is not undertaken. This suggests that universal service should be provided by a government agency or a firm who specializes in supplying it. Separating the provision of universal service from other services will eliminate the SBC problem and help to detain the benefits from the liberalization.

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6 Conclusions and Future research

In this paper, we have demonstrated that the politician's personal benefit from bundling the provision of social good and private good makes the firm be able to use its shutdown as a credible threat and extracts ex post a bigger subsidy than would have been considered efficient ex ante, giving rise to the SBC syndrome. Consequently, firm's dynamic efficiency is reduced and its competitiveness is undermined. Consumers in the private good market are worse off while the recipients of social good are better off.

Also, we have shown that increasing competition in the private good market may deteriorate the SBC problem and its negative economic consequences, unless the provision of social good and private good is separated. After the separation, the firm only produces the private good and its threat to shutdown is nullified Facing the competition from the other firm, it will invests in full amount to reduce its cost, hardening the budget constraint. This suggests that the efficiency of a multiproduct firm in the private sector crucially depends on the separation of social and private provision. The bundling provision of social and private good results in endogenous diseconomies of scope due to an incentive problem of the multiproduct firm.

Appendix

Proof of Proposition 1: We solve Game 1 by backward induction.

At stage 4, from Lemma 1, firm 1 and 2's quantity of the private good is given respectively, by

$q_1^*(x_1, x_2)$, $q_2^*(x_1, x_2)$.

At stage 3, the politician and the firms bargain over the size of subsidy. Firm 1 receives no subsidy from Lemma 2. For firm 2, there are two cases:

Case 1: Firm 2's threat not to produce is credible only if $\pi_2(X_1, x_2, q_O) \leq 0$, which is equivalent to $x_2 \leq x_2^0(q_O)$ since $\pi_2(X_1, x_2, q_O)$ is monotonically increasing in x_2. The optimal amount of subsidy received by firm 2, $s^* = s^*(X_1, x_2, q_O)$ satisfies that

$$-N'(\ s^*)\,(\pi_2 + s^*) + (R(q_O) - N(s^*)) = 0. \tag{1}$$

In this case, the payoff of firm 2 is $\pi_2(X_1, x_2, q_O) + s^*(X_1, x_2, q_O)$.

Case 2: Firm 2's threat to shut-down is not credible if $\pi_2(X_1, x_2, q_O) \geq 0$, which is equivalent to $x_2 \geq x_2^0(q_O)$. In this case, the politician simply optimally chooses $s^* = 0$ since $-N'(s) < 0$. The payoff of firm 2 is $\pi_2(X_1, x_2, q_O)$.

At stage 2, firms choose their cost-reduction investments non-cooperatively. From Lemma 2, firm 1 will optimally choose $x_1 = X_1$. For firm 2, there are two cases:

Case 1: since $(\pi_2(X_1, x_2, q_O) + s^*(X_1, x_2, q_O))$ is monotonically increasing in x_2, firm 2 will optimally invest $x_2 = x_2^0(q_O)$ and its payoff is simply s^*.[7]

Case 2: since $\pi_2(X_1, x_2, q_O)$ is monotonically increasing in x_2, firm 2 will optimally invest $x_2 = X_2$ and gets $\pi_2(X_1, X_2, q_O)$.

At stage 1, the politician chooses the amount of social good to maximize its utility, $(R(q_O) - N(s^*))$. In both cases, the politician optimally chooses

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[7]From the Nash bargaining solution , it is trivial to derive that $\frac{\partial(\pi_2 + s^*)}{\partial x_2} = \frac{\partial \pi_2}{\partial x_2} * \frac{N''(s^*)*(\pi_2 + s^*) + N'(s^*)}{N''(s^*)*(\pi_2 + s^*) + 2N'(s^*)} > 0$ for any $x_2 \leq x_2^0(q_O)$.

the maximum amount of social good $q_O = \overline{q}_O$. This is because in Case 1, $R'(q_O^*) - N'(s^*)\frac{ds^*}{dq_O^*} > 0.$[8] And in Case 2, $R'(q_O) > 0$. Therefore, firm 2's payoff is $s_2^*(X_1, x_2^0, \overline{q}_O)$ in Case 1 and $\pi_2(X_1, X_2, \overline{q}_O)$ in Case 2.

The rest of the proof is straightforward by comparing firm 2's payoff in two cases.   Q.E.D.

Proof of Proposition 2:

At stage 4, firm 1 and 2's quantity of the private good is given, respectively, by

$q_1^{A*}(x_1, x_2)$, $q_2^{A*}(x_1, x_2)$.

At stage 3, the politician and the government agency bargain over the size of subsidy. Since the provision of social good always involves loss, i.e.

$\pi_G(q_O) \leq 0$, the government agency's threat to shut down is always credible. Therefore, The optimal amount of subsidy, $s_G^*(q_O), (R(q_O) - N(s))$ satisfies that

$$-N'(s_G^*)(\pi_G + s_G^*) + (R(q_O) - N(s_G^*)) = 0. \tag{2}$$

At stage 2, firm 1 and 2 choose full investment X_1 and X_2, respectively.

At stage 1, the politician selects the amount of social good to maximize $(R(q_O) - N(s_G^*))$.

That is, the politician optimally chooses the amount of social good $q_O = q_{OG}^*$, where q_{OG}^* satisfies that $R'(q_{OG}^*) - N'(s_G^*)\frac{ds_G^*}{dq_{OG}^*} = 0.$[9] That is,

$\frac{R'N''(\pi_G+s_G^*)+R'N'-(N')^2\frac{d\pi_G}{dq_O}}{2N'+N''(\pi_G+s_G^*)} = 0.$[10] The government agency's payoff is thereby given by $(\pi_G(q_{OG}^*) + s_G^*(q_{OG}^*)) \geq 0$.   Q.E.D.

Proof of Proposition 3: From the proof of Proposition 2, we have that

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[8]Totally differenticatong equation (1), we have that $\frac{ds^*}{dq_O} = \frac{R'}{2N'+N''s^*}$.

[9]Totally differenticatong equation (2), we have that $\frac{ds_G^*}{dq_O} = \frac{R'-N'\frac{d\pi_G}{dq_O}}{2N'+N''(\pi_G+s_G^*)}$.

[10]It is trivial that $0 < q_{OG}^* < \overline{q}_O$

$q_{OG}^* < \overline{q}_O$. Thus, $(R(\overline{q}_O) - N(s^*)) - (R(q_{OG}^*) - N(s_G^*)) > 0$ if $s^* < s_G^*$. In addition, from equation (1) and (2), we know that at the subgame perfect equilibrium

$(R(\overline{q}_O) - N(s^*)) - (R(q_{OG}^*) - N(s_G^*)) = N'(s^*)s^* - N'(s_G^*)(\pi_G + s_G^*)$, which is greater than zero if $s^* > s_G^*$. Therefore, $(R(\overline{q}_O) - N(s^*)) - (R(q_{OG}^*) - N(s_G^*)) > 0$. That is, the politician is always better off from bundling the provision of social good and private good.   Q.E.D.

Table 1: Labor Insurance and Welfare Expenditures by sector, 1978-93 (yuan billion, 1 US$=8 yuan)

Year	SOEs	Total
1978	6.7	7.8
1979	9.5	10.7
1980	11.9	13.6
1981	13.6	15.5
1982	15.7	18.1
1983	18.3	21.3
1984	21.3	25.8
1985	27.4	33.2
1986	34.4	42.0
1987	41.6	50.9
1988	53.8	65.3
1989	63.6	76.8
1990	77.7	93.8
1991	91.3	109.5
1992	109.6	131.0
1993	138.7	167.0

Source: HU (1997).

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