WHY DID TRANSITION ECONOMIES
CHOOSE MASS PRIVATIZATION?

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Abstract
In many transition countries privatization has taken the form of distribution of states assets at a zero price (mass privatization), and the state has retained some ownership in many companies. We provide a rationale for these policies in terms of a political feasibility constraint, preventing sale at a negative price. The government may choose to retain some ownership in order to make the constraint bite, in effect raising its bargaining power. As a result, mass privatization may actually have been revenue-maximizing; that is, may have been rational in an economic sense, as well as in the political sense previously claimed. (JEL: L33, P21)

1. Introduction
Tens of thousands of firms have been privatized in Central and Eastern Europe and the former Soviet Union, with many countries employing some form of “mass privatization” (the distribution of state assets at a zero or nominal price). Moreover, the state has retained some ownership in many companies. In this paper, we show that mass privatization can be a rational policy, even for a revenue maximizing government, but that it is complementary with retention by the state of some shares. These policies enable the government to take advantage of a political feasibility constraint that in effect increases its bargaining power when privatizing.

Mass privatization was the “primary” method of privatization in 11 out of 25 transition economies, and a secondary method in a further 8 countries (EBRD 1998). Sale at a positive price, which we refer to as “full privatization,” was the primary or secondary method in the remaining countries. State retention of shares after privatization is a rarely noted fact, but, for example, in a survey of 23 economies undertaken for the 1999 EBRD Transition Report it was found that...
the state retained shares in around 20% of privatized firms, with a more than a
20% shareholding in about 12% of the firms. This may appear hard to understand,
especially since an aim of privatization programmes was to sever the links with
the state.

Section 2 models the process of privatization, while in Section 3 we examine
the choice between full and mass privatization. Concluding comments are made
in Section 4, while an appendix provides proofs of the propositions.

2. The Model

Our analysis focuses on a firm that was state owned under communism but is
to be privatized by sale to an outside agent. The government sells the ownership
share \( s \in (\bar{s}, 1] \) to the new owner, where \( \bar{s} \in (0, 1] \) is the minimum stake required
for transfer of control. We assume that the alternative to privatization would be
for the firm to continue as a state-owned enterprise, and we only examine the
case in which a sale can be arranged that yields positive net payoffs to both the
government and the buyer.

Privatization is formulated as a three-stage game with the following timing.

*Policy Stage*: The government chooses the ownership share \( s \in (\bar{s}, 1] \) to
sell. We assume that the government’s objective is to maximize its expected
net revenue. Note that revenue maximization is the assumption apparently
least consistent with mass privatization.

*Sale Stage*: The share \( s \) is sold to an outside buyer for the price \( P \). We
model \( P \) as determined by a generalized Nash bargain, though we go on to
add the constraint \( P \geq 0 \).

*Restructuring Stage*: The new private owner sets employment at its profit-
maximizing level, sales revenue is received and profit is distributed.

We now work backwards through these stages, going into more detail.

2.1. The Restructuring Stage

At this stage the share \( s \in (\bar{s}, 1] \) has already been bought by the new owner.
When privatization takes place there are \( L \) employees in the firm and the owner
must choose the size of workforce \( l \) to retain. Since a key problem of planning
was overemployment (see e.g., Blanchard 1997) we assume \( l < L \). Each of the \( l \)
employees is assumed to supply a number of efficiency units \( e(s) \) that is non-
decreasing in \( s \), where \( e(\bar{s}) \geq 1 \). This reflects the incentive for greater monitoring
associated with a larger $s$. The firm’s output $q$ is given by the production function

$$q = Q[e(s)l, k]; \quad Q_1, Q_2 > 0; \quad Q_{11}, Q_{22} \leq 0; \quad \forall s \in (\bar{s}, 1],$$

where $k$ is its capital stock.

The inverse demand function for the firm’s output is $p(q)$, where $p$ is unit price and $p'(q) \leq 0$.

The firm’s total revenue is

$$R[e(s)l, k] = p(q)q; \quad R_1 \geq 0, R_{11} < 0.$$

Its profit is

$$\pi \equiv R[e(s)l, k] - k - wl,$$

where $w$ is the private-sector wage rate, and the price of capital is normalized at unity. $l$ is chosen to maximize $s\pi$, the first-order condition for an internal solution being

$$e(s)R[1][e(s)l, k] = w.$$

We assume that at this solution $\pi \geq 0$. Since $R_{11} < 0$, the second-order condition is satisfied. To economize on notation, when we refer to $l$, $R$, and $\pi$ we shall henceforth mean their equilibrium values when equation (4) is satisfied.

Denote $(dl/ds)s/l$, the elasticity of $l$ with respect to $s$, by $\eta(s)$. From equations (1) and (4),

$$\eta(s) = \frac{e(s)R[1][e(s)l, k]}{[\gamma(s) - 1]},$$

where $\epsilon(s) \equiv s e'(s)/e(s)$ is the elasticity of the efficiency parameter $e(s)$ with respect to $s$, and $\gamma(s) \equiv -e(s)R_{11}/R_1$ is minus the elasticity of marginal revenue $e(s)R[1][e(s)l, k]$ with respect to $l$ ($\gamma(s) > 0$ for $l \geq 0$). If $\epsilon(s) = 0$, then $\eta(s) = 0$, in which case arg max $s\pi(l)$ is independent of the value of $s$. If, however, $\epsilon(s) > 0$, then $\eta(s) \geq 0$ as $\gamma(s) \geq 1$.

Let $TB$ denote the payoff that the buyer would get from using her expertise in an alternative activity, and let $\Pi_B(s)$ denote her net gain, at the restructuring stage, from buying the firm. Then

$$\Pi_B(s) = s\pi - TB.$$

We assume that in the solution $\pi > TB > 0$. Let $TB/\pi = s^m$, the minimum private ownership share for which $\Pi_B(s) \geq 0$. 
Of the $L - l$ employees that are sacked, the proportion $\xi$ obtain alternative private sector employment, and the proportion $1 - \xi$ receive state unemployment benefit $b$ per person. Given that the government retains the ownership share $1 - s$, its net revenue at the restructuring stage is

$$\Gamma_G(s) \equiv (1 - s)\pi - (1 - \xi)(L - l)b. \quad (7)$$

If the firm is not sold, it remains a state-owned enterprise (SOE), paying wage rate $\bar{w}$, where $b < \bar{w} \leq w$. In this case each employee supplies a number of efficiency units that we normalize as unity. Following Blanchard (1997), we assume that an SOE in a transition economy maximizes employment subject to a nonnegative profit constraint. In our model the constraint binds, so profit is zero. Since $w \geq \bar{w}$, each worker prefers private to state sector employment, and so, if the firm operates as an SOE, the proportion $\xi$ of the $L$ workers obtain jobs in the private sector. The supply of workers wishing to remain with the firm is therefore $(1 - \xi)L$. However, the firm will choose to employ $l^s$ workers (by assumption, $l^s < (1 - \xi)L$), where $l^s$ is the larger solution of

$$R(l^s, k) - l^s\bar{w} - k = 0. \quad (8)$$

Note that $l^s > l$: if the firm remains an SOE, its employment will be greater than if it is privatized.

The government’s net revenue if the firm remains an SOE is minus its total benefit payments in this case:

$$T_G = -[(1 - \xi)L - l^s]b. \quad (9)$$

Thus we obtain the government’s net gain from privatization:

$$\Pi_G(s) \equiv \Gamma_G(s) - T_G = (1 - s)\pi + [(1 - \xi)l - l^s]b. \quad (10)$$

The terms $\{T_B, T_G\}$ are the respective threat points for the buyer and the government in the Nash bargain for the sale of the firm.

### 2.2. The Sale Stage

At the sale stage the government has already fixed the value of $s$, and agents understand that at the restructuring stage $l$ will be chosen to satisfy equation (4). We assume initially that the sale price $P$ of the firm is determined by a generalized Nash bargain in which $P$ is unrestricted in sign. The owner of the firm and the government each wishes to maximize its expected net payoff for the sale and restructuring stages taken together. The expected net payoffs are $\Pi_B(s) - P$ and $\Pi_G(s) + P$, respectively, and so $P$ is chosen to maximize

$$\Psi \equiv [\Pi_G(s) + P]^{1-\alpha}[\Pi_B(s) - P]^\alpha, \quad 0 < \alpha < 1, \quad (11)$$
where $1 - \alpha$ represents the government’s bargaining power and $\alpha$ that of the buyer.\footnote{It might be objected that $1 - \alpha$ is related to the government’s threat point $T_G$. However, the value of $T_G$ in the model follows strictly from considerations of expected net revenue.}

Differentiating equation (11) with respect to $P$, and using equations (6) and (10),

$$P^*(s) = (1 - \alpha)\Pi_B(s) - \alpha\Pi_G(s) = (s - \alpha)\pi - \alpha[(1 - \xi)l - l^{\xi}]b - (1 - \alpha)T_B,$$

(12)

which exists if

$$N(s) \equiv \Pi_B(s) + \Pi_G(s) = \pi + [(1 - \xi)l - l^{\xi}]b - T_B \geq 0,$$

(13)

i.e., if the “net surplus” $N(s)$ from privatization is nonnegative. $N(s)$ is the net amount received from sources outside the bargain.\footnote{Once privatized, the firm earns profit $\pi$, while $[(1 - \xi)l - l^{\xi}]b$ is the net difference in total unemployment benefit payments paid out when the firm is privatized rather than remaining an SOE.}

Note that if $s < s^m$ then $l = 0$ and $\pi < 0$, so that $N(s) < 0$. Hence, we focus on $s \geq s^m$. We define $\Omega$ to be the set of $s$-values for which privatization is feasible here, i.e., $s \in [\max(s, s^m), 1]$. Using equations (2)–(5), we obtain

$$\frac{dN(s)}{ds} = \frac{1}{s} [\epsilon(s)w + \eta(s)(1 - \xi)b] \quad \text{for} \quad s \in \Omega.$$

(14)

It is then found that $dN(s)/ds > 0$ if $\epsilon(s) > 0$, but is zero if $\epsilon(s) = 0$.\footnote{From equation (5), if $\epsilon(s) = 0$, then $\eta(s) = 0$, and so $dN(s)/ds = 0$. If $\epsilon(s) > 0$, there are three possibilities in equation (5): (i) if $\gamma(s) < 1$, then $\eta(s) > 0$; (ii) if $\gamma(s) = 1$, then $\eta(s) = 0$; (iii) if $\gamma(s) > 1$ then $\eta(s) < 0$, but $\epsilon(s) \geq -\eta(s)$. Taking into account that $w > (1 - \xi)b$, it follows from equation (14) that if $\epsilon(s) > 0$, then, for each of these three possibilities, $dN(s)/ds > 0$.}

In this formulation $P^*(s)$ may be negative. As shown in equation (12), the sign of $P^*(s)$ is determined by the relative net payoffs $\Pi_B(s)$ and $\Pi_G(s)$, weighted by $1 - \alpha$ and $\alpha$, respectively. For example, if the firm has poor profitability, even after restructuring, or if the government’s bargaining weight is low enough, the equilibrium price at which the firm can be sold is negative. However, this is not an outcome that can be viewed as politically feasible. Even if a negative price would generate the greatest feasible expected net revenue for the government, it would be unacceptable to political opponents and to international agencies, who would see opportunities being created for corruption. We therefore explore the implications of a political feasibility constraint preventing price from being negative. Incorporating this “nonnegative price constraint” (NNPC) into the bargain, price becomes

$$\hat{P}(s) \equiv \max\{P^*(s), 0\}.$$

(15)
If, given, $s$, the unconstrained price $P^*(s)$ is negative, the sale price will be raised to zero.

2.3. The Policy Stage

Here the government chooses $s$ to maximize $\Pi_G(s) + \hat{P}(s)$, taking into account the effect on behavior in the ensuing stages. The formula for its maximand depends on whether the NNPC binds, that is, on whether $\hat{P}(s) = P^*(s)$ or $\hat{P} = 0$. Using equation (12), the maximand is

$$\Pi_G(s) + \hat{P}(s) = \begin{cases} 
(1 - \alpha)[\Pi_B(s) + \Pi_G(s)] = (1 - \alpha)N(s) & \text{if } \hat{P}(s) = P^*(s), \\
\Pi_G(s) & \text{if } \hat{P}(s) = 0.
\end{cases} \quad (16)$$

3. Full Privatization versus Mass Privatization

We now consider the factors determining the choice of privatization method. For our first proposition we include negative value of $P^*(s)$ in our analysis.

**Proposition 1.** When price $P$ is unrestricted in sign, (i) if $\epsilon(s) = 0 \forall s \in \Omega$, the government is indifferent over all $s \in \Omega$; (ii) if $\epsilon(s) > 0 \forall s \in \Omega$, the optimum private ownership share is $\hat{s} = 1$.

Given that privatization occurs, the government’s expected net revenue for the sale and restructuring stages taken together is $(1 - \alpha)N(s)$. If $\epsilon(s) = 0$, then $N(s)$ is independent of $s$ and so the government is indifferent as to the value of $s$ for $s \in \Omega$. If, however, $\epsilon(s) > 0$, then, as $s$ is raised, the net surplus $N(s)$ increases. By setting $s = 1$, the government maximizes $N(s)$ and therefore its expected net revenue over $s \in \Omega$. In both cases (i) and (ii), the optimum value of $s$ is independent of the bargaining power parameter $\alpha$.

In the above solution $P^*(1) \leq 0$. We now consider, however, the implications of introducing a NNPC. We partition the set of $s$-values $\Omega$ into subsets $\Omega^c$ and $\Omega^u$, the sets of $s$-values for which the NNPC binds and does not bind, respectively. Denote the value of $s$ that maximizes $\Pi_G(s)$ over $\Omega^c$ by $s^c$, i.e., using equation (16)

$$s^c = \arg \max_{s \in \Omega^c} \Pi_G(s). \quad (17)$$

If the NNPC binds, the government gets a zero price for the share of the firm sold. Its only payoff is $\Pi_G(s)$, which it would maximize by setting $s = s^c$. 

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The introduction of the NNPC can lead to a substantially different solution, the most extreme case of which obtains when $\epsilon(s) = 0$.

**PROPOSITION 2.** In the presence of a NNPC, if $\epsilon(s) = 0 \forall s \in \Omega$, the optimum private ownership share is $\hat{s} = s^c = \max(\bar{s}, s^m) < 1$ and the firm is sold at a zero price.

To explain this proposition intuitively, we assume for simplicity that $\alpha = 0.5$ and $s^m \geq \bar{s}$. Since $\epsilon(s) = 0$, the surplus $N(s)$ is independent of $s$; we write $N(s) = \bar{N}$. If we disregard the NNPC temporarily, then, for any $s \in [s^m, 1]$, the government’s net payoff (for the sale and restructuring stages combined) is $0.5\bar{N}$. This outcome is achieved by an appropriate side-payment $P^*(s)$. From (6) and (10), using (3)-(5),

$$\frac{d}{ds} \Pi_B(s) = \pi = -\frac{d}{ds} \Pi_G(s),$$

where $\pi$ is constant. Thus, as $s$ is reduced, $\Pi_B(s)$ falls while $\Pi_G(s)$ rises, and so $P^*(s)$ falls. When $s$ is reduced as far as $s = s_0$, say, then, from (12), $\Pi_G(s_0) = \Pi_B(s_0)$, so that $P^*(s_0) = 0$. Thus, for $s < s_0$, $P^*(s) < 0$; that is, for $s < s_0$, the government achieves the net payoff $0.5\bar{N}$ by paying the buyer to take over the firm (and note that $0.5\bar{N} < \Pi_G(s)$).

Now introduce the NNPC. This binds for $s^m \leq s \leq s_0$. Because of the NNPC, for $s$ in this range the government cannot pay anything to the buyer, the government’s net payoff therefore being $\Pi_G(s)$. Thus, the government receives a net payoff that exceeds the amount $0.5\bar{N}$, the amount it would receive if it sets $s \in [s_0, 1]$, in which case the NNPC would not bind. Since $-d\Pi_G(s)/ds < 0$, the government will set $s$ at the lowest value in this range for which the NNPC binds: $s = s^m$. Selling at a zero price—mass privatization—is optimal in this case. We now examine how this conclusion changes when $\epsilon(s) \geq 0$.

**PROPOSITION 3.** With a NNPC, the optimum value of $s$ for the government is $\hat{s}$ where (i) if $\alpha \Pi_G(s) > (1 - \alpha) \Pi_B(s) \forall s \in \Omega$, then $\hat{s} = s^c$ and $\hat{P}(\hat{s}) = 0$; (ii) if $\alpha \Pi_G(s) \leq (1 - \alpha) \Pi_B(s) \forall s \in \Omega$, then $\hat{s} = 1$ and $\hat{P}(\hat{s}) = P^*(1) \geq 0$; (iii) if $\alpha \Pi_G(s) \leq (1 - \alpha) \Pi_B(s)$ for some but not all $s \in \Omega$, then $\hat{s} = s^c$ and $\hat{P}(\hat{s}) = 0$, or $\hat{s} = 1$ and $\hat{P}(\hat{s}) = P^*(1) \geq 0$.

Part (i) of the proposition related to the case in which the NNPC binds for all $s \in \Omega$, and so the solution is to set $s = s^c$; part (ii) is the case in which the NNPC never binds, and so the solution is to set $s = 1$; part (iii) relates to when the NNPC binds for some, but not all, $s \in \Omega$ (this encompasses Proposition 2 as a special case). With $\epsilon(s) > 0$, curvature is imparted to $\Pi_B(s)$, $\Pi_G(s)$ and $N(s)$. Although the same general principles are at work as in Proposition 2, there are two important differences. First, for $s \in \Omega^c$, the range of $s$ in which the NNPC binds, we cannot presume that $-d\Pi_G(s)/ds < 0$. Therefore, in this range, maximization of $\Pi_G(s)$ requires setting $s = s^c$, which is not necessarily
the lowest value of \( s \) in the range. Second, since \( N(s) \) is now increasing in \( s \), if \( s \) is set such that the NNPC does not bind, it should be set as high as possible; that is, \( s = 1 \). The choice for the government reduces to setting \( s = s^c \) or \( s = 1 \).

If \( \epsilon(s) \) is not too large, the gain from setting \( s = 1 \) (full privatization) will be outweighed by the gain from making the NNPC bind (mass privatization).

Hence, the government may gain from retaining some ownership and selling the rest at a zero price, even if it has the option of selling off the entire ownership for a positive price. The rationale for this result is that a binding NNPC has an effect similar to that of a rise in the government’s bargaining power. When a value of \( s \) is chosen at which the constraint bites, price is pushed up (to zero), benefitting the government. Given that sale at a zero price is associated with income for the government from its retained ownership stake, the net gains from making the NNPC bite can outweigh those of a full sell-off for a positive price.

If the government’s bargaining power \( 1 - \alpha \) is smaller, its payoff from setting \( s = 1 \) and relying on the unconstrained Nash bargain, falls, but its payoff from setting \( s = s^c < 1 \) and selling at a zero price is unaffected. Other things being equal, a government with lower bargaining power is therefore more likely to sell for a zero price, while retaining partial ownership, and less likely to sell 100% of the ownership for a positive price.

4. Concluding Comments

We have sought to understand why a government might distribute shares in firms at a zero price, while retaining some state share ownership, as has occurred in many countries in transition. Our explanation rests on the existence of a political feasibility constraint, which prevents state assets from being sold at a negative price. The impact is not merely to raise an equilibrium price to zero when it would otherwise have been negative. There is also a more subtle effect by which, even if the entire assets of a firm could be sold at a positive price, the government may gain from retaining state ownership of a portion of the shares and giving the remaining portion away. This result is more likely to obtain if the government’s bargaining power is low.

Our model is a formalization of the political economy explanation of mass privatization, which focuses on the need to break links between the state and the private sector and to commit managers to reform (Boycko, Shleifer, and Vishny 1995). It shows that the political imperative to eliminate the widespread ownership of firms by the state in the early phase of the transition process was not necessarily attained at the cost of the government’s revenue objectives. The aim of rapidly reducing state ownership through mass privatization may have been rational in an economic as well as a political sense.
Appendix: Proofs

Proof of Proposition 1. From equation (16), the government maximizes $\Pi_G(s) + P^*(s) = (1 - \alpha)N(s)$. From (13), if $\epsilon(s) = 0 \forall s \in \Omega$, all $s \in \Omega$ yield the same value of $(1 - \alpha)N(s)$ (part (i) of proposition); if $\epsilon(s) > 0 \forall s \in \Omega$, $(1 - \alpha)N(s)$ is maximized by maximizing $s$ over $\Omega$ (part (ii)).

Proof of Proposition 2. Given that $\epsilon(s) = 0$, $l$ is constant over $\Omega$ (see equations (4) and (5)). Thus, $\pi$ is also constant. For $s \in \Omega'$ Proposition 1(i) applies, though over $\Omega'$ rather than $\Omega$. From equation (16), the government’s payoff for $s \in \Omega'$ is $(1 - \alpha)N(s) = (1 - \alpha)[\pi + (1 - \xi)l - l^\xi]b - TB \equiv x$. For $s \in \Omega''$, from equation (16), the government’s payoff is $\Pi_G(s)$, which, since $l$ and $\pi$ are constants, is decreasing in $s$. Therefore, the government’s payoff over $\Omega''$ is maximized by setting $s = s^m$, so that, from equation (10), the payoff is $(1 - s^m)\pi + [(1 - \xi)l - l^\xi]b \equiv z$. Hence, we obtain $z - x = \alpha[(1 - s^m)\pi + [(1 - \xi)l - l^\xi]b] = \alpha\Pi_G(s^m) > 0$. Taking into account that $s^m$ may be less than $\bar{s}$, the proposition follows.

Proof of Proposition 3. (i) $\Omega'$ is empty. $\alpha\Pi_G(s) > (1 - \alpha)\Pi_B(s) \forall s \in \Omega' \Rightarrow \hat{P}(s) = 0 \forall s \in \Omega'$. Therefore, $\Pi_G(s) + \hat{P}(s) = \Pi_G(s) \forall s \in \Omega'$, so that, from equation (17), $\hat{s} = s^c$. (ii) Since $\alpha\Pi_G(s) \leq (1 - \alpha)\Pi_B(s) \forall s \in \Omega, \Omega''$ is empty. Proposition 1 therefore holds (but over $\Omega'$, rather than $\Omega$), and so $\arg\max_{s \in \Omega'}[\Pi_G(s) + \hat{P}(s)] = 1$ and $P(s) = P^*(s)$. (iii) Neither $\Omega'$ nor $\Omega''$ is empty. The solution in either (i) or (ii) may apply.

References

