A POSITIVE THEORY OF PRIVATIZATION

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This paper presents a theory that explains the prevalence of different models of privatization across countries and across industries. First, it establishes the analytical framework for determining the impact of privatization on the value of a privatized firm, on aggregate social welfare, and on the relevant interest groups: taxpayers, consumers, employees, and private investors. Merging both the income distribution and the production efficiency aspects of the process, it identifies the government's principal decision variables, and presents the political tradeoffs faced by the government when carrying out privatization. Based on this framework, the paper offers an outline for testing the hypothesis that privatization introduces a Pareto-dominating mode of operation. Two fundamental laws of privatization define necessary and sufficient conditions for Pareto-dominance. Based on four economically sensible principal assumptions, the paper analyzes the government's behavior under alternative objective functions: maximization of taxpayer welfare, maximization of aggregate social welfare, and maximization of political support. The main result reveals that a vote-maximizing government sets the optimal value of its decision variables, depending on the characteristics of the political market. This result is illustrated through a cross-country and a cross-industry comparison.

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I. Introduction

A considerable share of the literature on public enterprises and regulation theory has addressed the question: "What is the most efficient mode of operation?" Recent studies have shown that, on average, state enterprises are less profitable and less efficient than private corporations. Boardman and Vining (1989) present an international comparison of the performance of the 500 largest enterprises outside the US operating in a competitive environment. Ehrlich et al. (1994) analyze productivity growth in the context of the airline industry. Megginson et al. (1994) analyze the financial operating performance of 64 newly privatized firms. Avishur (1995) estimates the impact of privatization in British Telecom on productive efficiency.

The theoretical ground for those studies relies primarily on the property rights model. Rowley and Yarrow (1981) argue that "the possibility of bankruptcy in the private sector, but not in the public sector, could encourage more efficient private production by inducing a greater supply of managerial effort." Moreover, the essence of this model is summarized by De Allesi (1980):¹

"The crucial difference between private and political (publicly owned) firms is that ownership in the latter effectively is nontransferable. Since this rules out specialization in their ownership, it inhibits the capitalization of future consequences into current transfer prices and reduces owners' incentives to monitor managerial behavior." (pp. 27-28)

These studies, however, ignore the issue of income distribution brought into present the paper at the Privatization and Regulation sessions of the European Public Choice Society and the Eastern Economic Association 1996 meetings, and at the XIIth World Congress of the International Economic Association, 1999. Clearly, all errors are my responsibility.

¹ For further elaboration on the theoretical rationale for the property rights model and details of the empirical results, see Alchian (1965), De Allesi (1980), and Boardman and Vining (1989).
effect by the competing ownership structures. This issue is addressed in the
literature on public choice, and particularly in studies that present and/or test
positive models of regulation (see, for example, Stigler 1971, Peltzman 1976,
and Becker 1983). Since the evaluation of privatization is concerned with two
aspects, i.e., efficiency and income distribution, they have been integrated in
this paper into a comprehensive analytical framework.

Once the deficiencies of state-owned enterprises are well recognized,
privatization as a sound concept becomes less controversial. Nevertheless,
important questions are left open concerning the characteristics of the process.
Of primary interest is the question whether privatization is an "all or nothing"
type of decision. Pirie (1988) offers a qualitative answer to this question in a
description of 21 methods for implementing privatization. Thus, one goal of this
paper is to provide a quantitative analysis which explores whether, from an
economic perspective, there is more than one way to implement privatization.

Specifically, the current study extends the Peltzman (1976) approach to the
issue of privatization to predict changes in four primal choice variables (the issue
price, the proportion of divestment, and the post-privatization price and wage
rate) according to the political importance of worker, consumer, taxpayer, and
investor interests. The analysis is based on four distinctive assumptions, alluding
to potential economic dynamics associated with the process of privatization.
These are: the property rights model, diminishing returns to price lifting, self-
sustainability, and a noncooperative political equilibrium. The paper then provides
a framework to see how the political system determines the size of the primal
choice variables, on which one might otherwise not be able to predict anything a
priori.

The next section sets the basic structure for determining how privatization
affects the value of the privatized firm, the welfare of the relevant interest groups,
and aggregate social welfare. In addition, it presents the political tradeoffs faced
by the government when carrying out privatization. Section III elaborates on the
interaction between productivity and Pareto-efficiency by introducing two
fundamental laws of privatization which specify the necessary and sufficient
conditions for privatization to generate a Pareto-dominating allocation. Section IV
analyzes the behavior of the government in the context of alternative objective functions: maximization of taxpayer welfare (the no-agency case), maximization of aggregate social welfare (the normative model), and maximization of political support (the positive model). Lastly, utilizing positive theory, Section V provides some comments on the motivation to privatize, and attempts to explain the prevalence of different privatization models across industries and countries. Section VI summarizes with a few concluding remarks.

II. A One Period Model

A. The Basic Structure

The discussion begins by introducing a simplified one-period, zero-corporate tax rate, and a single good version of the model. The analysis refers to the industry level, which, for simplicity’s sake, maintains constant returns to scale with a unit cost of size $c$. All of the quantities appearing in this paper are to be interpreted as expected values. Thus, issues concerning uncertainty and allocation of risk are avoided by assuming risk neutrality of all agents involved, or, alternatively, that private ownership stochastically dominates public ownership. As generally accepted in economic theory, demand is negatively related to price.2

2 It can be shown that our results remain consistent under a more realistic set of assumptions.

3 The framework best describes situations in which a single public provider, protected by legal barriers to entry, operates in the industry before privatization occurs. These circumstances are most common in public utilities, i.e., telecommunications, electricity, water, gas, etc. However, the framework also applies to other state-owned enterprises operating in such industries as airlines, coal-mining, public transportation, or even steel and car-manufacturing.

4 Demand shifters such as consumers’ income and wealth, tastes, and product quality, which derive from microeconomic foundations, are suppressed here. While privatization of a single venture is assumed to have a negligible impact on consumers’ income, and while tastes are assumed to be stable, one might trace potential quality effects of privatization. In order to simplify the analysis, we assume that these effects are reflected in price. That is to say, price is defined here as the price of a unit of good of a given quality.
That is,

\[ Q = Q(P) \quad \text{with} \quad Q'(P) < 0 \quad (1) \]

We start with a dichotomous world in which two modes of operation are admitted: state and private ownership. Accordingly, the variable \( m \), denoting the possible modes of operation, can obtain two values: \( m_1 \) for public ownership, and \( m_2 \) for private ownership. Private ownership is defined as any distribution of shareholding in which more than 50 percent of the voting power, and consequently the control over the decision process, is held by the private sector.

Changing the mode of operation can affect both price and costs. The potential effect on costs is twofold: (1) it may affect efficiency in production, and (2) it may affect the price of inputs--primarily wages. This can be expressed formally as follows:

\[ P = P(m) \quad (2) \]

and

\[ c = c(m, w(m)) \quad (3) \]

where \( w \) denotes wage.\(^5\) While it is easily understood that the government sets prices consistent with its policy goals under state ownership, it is important to emphasize that the government possesses effective means of price control under private ownership as well (see Beesley and Littlechild, 1983).

The economic rationale behind equation 3 is that privatization is expected to improve production efficiency and reduce the component of workers' rent in wages. Under private ownership, property rights are properly assigned, thereby enhancing specialization in ownership. This, in turn, leads to a reduction in the

\(^5\) The effect of changing the mode of operation on the price of other inputs, possibly reflecting improved bargaining practices, is illustrated by the first argument in equation 3.
agency costs resulting from separation of ownership and control over the decision-making process, relative to public ownership. Formally, application of the property rights model to the dichotomic setup presented above gives rise to the following assumption:

\[ A1: \quad c(m_p, w(m_p)) < c(m_p, w(m_i)) \]  \hspace{1cm} (3a)

B. How Does Privatization Affect the Value of the Privatized Firm?

The aggregate value of the firms in the privatized industry (henceforth the aggregate firm) can be modeled as a function of the mode of operation by

\[ V(m) = Q(P(m))[P(m) - c(m, w(m))] \]  \hspace{1cm} (4)

The first order effect of privatization on the value of the aggregate firm can be expressed as the total differential of \( V \) with respect to \( m \), evaluated at \( m_i \). That is,

\[ dV|_{m_i} = \frac{\partial Q}{\partial P} dP[P - c] + Q[dP - (dc|_{w(m_i)} + \frac{\partial c}{\partial w} dw)] \]  \hspace{1cm} (5)

where \( dx \) denotes the effect of privatization on argument \( x \). By applying the idea of Shepard’s Lemma to the partially passive cost function and rearranging, three effects are distinguished, for which changing the mode of operation can affect the value of the aggregate firm:

\[ dV = \{dQ[P - c] + dP \cdot Q\} \cdot \{-dc|_{w(m_i)} \cdot Q\} \cdot \{-L \cdot dw\} \]  \hspace{1cm} (6)

\[ ^6 \text{It should be emphasized that we allow wages and labor inputs to be determined by political means, through negotiations between the union and the government in the restructuring stage. However, given } L \text{ and } w, \text{ the firm is rational in its use of inputs. Put differently, it uses the (conditional) cost minimizing bundle of inputs to produce a given level of output.} \]
where $L$ denotes labor inputs.

The first element on the right hand side (r.h.s.) of equation 6 is the *price effect*. This element describes the effect of privatization on the value of the aggregate firm resulting from its effect on price. As it contains a positive component and a negative component for any given change in price, its sign cannot be unambiguously determined unless additional considerations are introduced. The second element is the *productivity effect*. This element describes the effect of improvement in productivity deriving from a more efficient use of resources on the value of the aggregate firm, given that there is no change in the average wage rate. If the property rights model is correct, the sign of the productivity effect is positive. The third element on the r.h.s. of equation 6 is the *wage effect*. This element describes the effect of a change in the average wage rate on the value of the aggregate firm. Ceteris paribus, an increase in the wage rate would reduce the firm's profits, and hence the value of the firm, and vice-versa. These effects are illustrated in Figure 1 while assuming, for the sake of presentation, that $dP < 0$, and $dw > 0$.

C. How Does Privatization Affect the Welfare of the Relevant Interest Groups?

Measuring the impact of privatization on the various interest groups requires the entertainment of an additional notation. Let

\[
Z = \text{issue price of the firm's shares;}
\]

\[
X = \text{market value of the firm's shares;}
\]

\[
N = \text{number of outstanding shares; and}
\]

\[
y = \text{proportion of divestment.}
\]

By definition, the market value of the firm's shares represents the value of

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7 See Subsection II.E "The Political Tradeoffs of Privatization" where we explain, using positive economic theory, why the price effect should be positive for an increase in price and negative for a price decline.
the aggregate firm under private ownership less the value of the business lost to potential entrants, denoted as \( BL \). This gives

\[
NX = V(m_2) - BL = \delta V(m_2)
\]  

(7)

\( \delta < 1 \). \( \delta \) is the proportion of demand supplied by the descendants of the public firm.\(^8\) This proportion is presumed to be negatively related to price, since increased

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\(^8\) For the sake of simplicity, we assume that all firms in the privatized industry employ the same technology, and, thus, produce at the same cost, namely, \( c(m_i, w(m_i)) \).
competition, or simply lower prices, discourages entrance. Thus, it can be assumed that the scope of this effect increases with price. That is to say, it is assumed that returns to price lifting diminish at some point. In formal terms, this is expressed as follows:

\[ A2: \frac{\partial \delta}{\partial P(m_2)} < 0 ; \frac{\partial^2 \delta}{\partial P(m_2)^2} < 0 \]  

(8)

C.1. Impact on Taxpayers' Welfare

Critical to the analysis of the impact of privatization on taxpayers' welfare is the assumption that privatization proceeds are used to reduce taxes, as they are broadly defined. Furthermore, the assumption of zero-corporate tax rate and the existence of taxpayers in the model may seem contradictory. However, taxpayers are regarded here as the initial owners of a firm being transferred, at a price, to a different group of owners. Thus, the first order effect on taxpayers, denoted \(dT\), is equal to the difference in the proceeds from the firm that result from the act of privatization. This amounts to

\[ dT = [y N Z + (1 - y) N X - RST] - V(m_1) \]  

(9)

where \(RST\) represents the financial consequences of restructuring the enterprise, sales costs, small shareholder incentive schemes, and compensation to laid-off labor. Rearrangement and substitution of equation 7 for \(NX\) gives

\[ dT = \{ V(m_2) - V(m_1) \} \{ -yN(X - Z) \} \{ -RST' \} \]  

(10)

where \(RST' = RST + BL\). In equation 10, the impact on taxpayers is expressed as the sum of three components: (a) change in the value of the aggregate firm;

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9 Rents are possible, since the government may regulate entry even after privatization.
(b) loss (gain) from an underpriced (overpriced) sale; and (c) the modified version of restructuring costs.

C.2. Impact on Consumers' Welfare

The impact on consumers' welfare would be the effect of privatization, via change in price equivalents,\(^\text{10}\) on their consumer surplus, namely,

\[
dCS = \int_{P(m_2)}^{P(m_1)} Q(P) dP
\]

Figure 1 illustrates the impact on consumers' welfare by the area \(P_1AFP_2\).

C.3. Impact on Managers' and Employees' Income

The impact of privatization on an individual manager or employee is indeed the present value of the difference in the time path of their compensation.\(^\text{11}\) Yet, when privatization is followed by a release of some of the employees, the difference in the path of aggregate employee and managerial compensation understates the impact on remaining workers and ignores the loss of income that laid-off employees may incur. Standard efficiency analysis implicitly presumes that a reduction in production costs represents the market value of the released production factors and, therefore, reflects true savings of resources. As potential deviations from allocative efficiency in the labor market have been taken into account here, as far as a political firm is concerned, and since we are interested in the Pareto-dominance aspects of changes in allocation resulting from privatization,

\(^{10}\) See supra note 4.

\(^{11}\) The structure of employee compensation, in particular whether managerial remuneration has become more performance-related due to privatization, is an important issue to be dealt with separately.
compensation for decline in income among released employees is included in the restructuring costs component. Maintaining this form of welfare accounting, the following analysis will refer to the remaining group of workers: \( L(m_2) \). The impact of privatization on their income, denoted \( dE \), would therefore be \( \text{13} \)

\[
dE = dw \ L(m_2) = [w(m_2) - w(m_1)] \ L(m_2)
\]  \( \text{(12)} \)

The total effect on the remaining employees in equation 12 consists of three distinct components: (a) the effect of privatization on workers' productivity; (b) the 'pure rent' effect; and (c) the price effect. Putting this formally, the wage effect, \( dw \), can be broken down into \( \text{13} \)

\[
dw = \{P(m_1)[MP_L(m_2) - MP_L(m_1)]\}
\]  \( \text{(13)} \)

\[
+ \{[w(m_2) - P(m_2)MP_L(m_2)] - [w(m_1) - P(m_1)MP_L(m_1)]\}
\]

\[
+ \{[P(m_2) - P(m_1)]MP_L(m_2)\}
\]

where \( MP_L \) denotes the marginal product of the representative employee. While the first component is considered 'legitimate' for pricing labor under conventional economics, the second component is an illustration of possible deviations from competitive equilibrium in the labor market, as discussed above. The third

\( \text{12} \) In line with supra note 8, the total amount of labor in the industry would be \( L(m_2)/\delta, \) 
\( (1-\delta)/\delta L(m_2), \) regarding who will be employed by new entrants.

\( \text{13} \) Legally, only the descendant firms can be committed to a pre-contracted post-privatization wage rate. However, it can be assumed that, in the long run, the same wage rate paid to quality augmented labor will prevail in the entire industry.

\( \text{14} \) Whereas the existence of labor rents under public ownership is common and perceived as the consequence of the ambiguity in the government-worker relationship, under private ownership it is viewed as a "bribe" given to employees in order to win their support for privatization.
component is the price effect. This describes the effect of changes in the prices of goods and services produced by the privatized firm on the value of the marginal product of labor. According to the property rights model, it is expected that the productivity effect will be positive and the rent effect will be negative. In other words, the model predicts that the proportions between the rent component and the productivity component will change in favor of the latter as a result of privatization.

C.4. Impact on Private Investors' Wealth

Gains to investors are possible to the extent that there is a gap between the issue price of a share and its market value. Another source of benefits to investors refers to discounts given to small-shareholders for promotion of a wider share-ownership in the community, when such a policy is pursued. Thus, the total effect on investors would amount to

\[ dI = yN(X-Z) + SSIS \]  \hspace{1cm} (14)

where SSIS denotes the present value of the small shareholder incentive schemes.

D. How Does Privatization Affect Aggregate Social Welfare?

Consistent with the prediction of the theory, increase in aggregate social welfare is closely related to reduced production costs resulting from privatization. However, the distinction between the two is important for quantifying the effects of privatization on the various interest groups. In the following discussion, the term aggregate social welfare will correspond to the sum of all utilities (see Harberger, 1971). Thus, the change in social welfare resulting from privatization should account for all of the changes in the welfare of the relevant interest groups. That is,

\[ dS = dT + dCS + dE + dl + [BL + \Delta w \frac{(1-\delta)}{\delta} L(m_2)] \]  \hspace{1cm} (15)
where $dS$ denotes the aggregate change in social welfare, and $\Delta w$ denotes the impact on the wage rate of labor employed by new entrants.

Substituting equations 7, 10, 11, 12, and 14 into equation 15 yields

$$dS = [V(m_2) - V(m_1)] + \int_{P(m_2)}^{P(m_1)} Q(P)dP + (dw + \Delta w \frac{1-\delta}{\delta})L(m_2) - RST$$  \hspace{1cm} (16)

Equation 16 presents the effect on aggregate social welfare as the change in the value of the aggregate firm due to privatization, plus the effect on consumer surplus and employee compensation, minus restructuring costs. Using equation 6 to substitute for $dV$, and canceling out reciprocal terms gives

$$dS = \{-dc \big|_{w(m_1)} Q \big\} + \{dQ \ [P-c] + dP \ Q + \int_{P(m_2)}^{P(m_1)} Q(P)dP \big\} - \{RST''\}$$  \hspace{1cm} (17)

where $RST'' = RST-(\Delta w-dw)L(m_2)(1-\delta)/\delta$. Equation 17 draws a direct positive link between the effect of privatization on aggregate social welfare and increased production efficiency. At the same time, it shows that the effect of privatization on social welfare also depends on other factors, such as the change in price and the size of the restructuring costs. It also serves as a consistency equation, since it proves the fundamental identity between the sum of privatization effects on the different interest groups ('sum of all utilities') and the net increase in producer and consumer surplus. To illustrate, equation 17 may be written in terms of the areas appearing in Figure 1:

$$dS = EBNM + IFKN - P_1AIP_2 + P_1AFP_2 - RST''$$  \hspace{1cm} (17a)

$$= AFKMEB - RST''$$

The area AFKMEB describes the total surplus added to society as a result of privatization, in a zero transaction cost world, i.e., before subtracting restructuring costs.
E. Political Tradeoffs of Privatization

Given the aggregate change in social welfare, presented in equation 17, the government can determine its allocation across the relevant interest groups. In this subsection, we demonstrate the political tradeoffs faced by the government with respect to its choice variables. These choices may be represented by four primal variables: the issue price, $Z$, the proportion of privatization, $y$, and the post-privatization price and wage rate--$P(m_2)$, and $w(m_2)$, respectively. The following analysis will provide an answer to the question: "Ceteris paribus, how are different interest groups affected by a marginal change in a single choice variable?"

Differentiation of equations 9 and 14 with respect to $Z$ yields

$$\frac{\partial (dL)}{\partial Z} = \frac{\partial (dT)}{\partial Z} = yN$$

Equation 18 implies that an increase of one penny in the issue price will result in a transfer of $yN$ pence from private investors to taxpayers. Similarly,

$$\frac{\partial (dL)}{\partial y} = \frac{\partial (dT)}{\partial y} = N(X-Z)$$

that is, on the condition that the issue price is lower than the market price (i.e., $Z<X$), an increase of one percent in the proportion of divestiture will shift resources amounting to $N(X-Z)/100$ from taxpayers to private investors.

The consequences of a marginal increase in the post-privatization price depend on the value of the price elasticity of demand, $\eta$. First let us show that, contrary to the outcome of changes in the value of other choice variables, changing the time path of price is not a zero-sum game when $\eta < 0$. Differentiation of equation 16 with respect to $P(m_2)$ yields

$$\frac{\partial (dS)}{\partial P(m_2)} = \frac{\partial V(m_2)}{\partial P(m_2)} + \frac{\partial (dCS)}{\partial P(m_2)}$$
Application of the same procedure to equations 4 and 11 yields

$$\frac{\partial V(m_2)}{\partial P(m_2)} = \frac{\partial Q(P(m_2))}{\partial P(m_2)} [P(m_2) - c(m_2)] + Q(P(m_2))$$  \hspace{1cm} (21)

and

$$\frac{\partial (dCS)}{\partial P(m_2)} = -Q(P(m_2)) < 0$$  \hspace{1cm} (22)

Substitution of equations 21 and 22 into equation 20 proves the desired result, namely,\(^{15}\)

$$\frac{\partial (dS)}{\partial P(m_2)} = \frac{\partial Q(P(m_2))}{\partial P(m_2)} [P(m_2) - c(m_2)] < 0$$  \hspace{1cm} (23)

The complete picture of the political tradeoffs vis-à-vis price can be obtained by differentiating equations 9 and 14 with respect to \(P(m_2)\), after utilizing the identity of equation 7. That is,

$$\frac{\partial (dT)}{\partial P(m_2)} = (1 - y)[\delta \frac{\partial V(m_2)}{\partial P(m_2)} + V(m_2) \frac{\partial \delta}{\partial P(m_2)}]$$  \hspace{1cm} (24)

and

$$\frac{\partial (dI)}{\partial P(m_2)} = y[\delta \frac{\partial V(m_2)}{\partial P(m_2)} + V(m_2) \frac{\partial \delta}{\partial P(m_2)}]$$  \hspace{1cm} (25)

While equation 22 clearly indicates that raising price adversely affects consumers, the sign of its effect on taxpayers and private investors cannot be determined unambiguously without involving arguments from positive economic theory. Specifically, it would be irrational for a government attempting to maximize political support to choose a price that harms all relevant interest groups.

\(^{15}\) The other requirement necessary for obtaining this result is that the firm is making money. This is a plausible condition, at least in the expectation sense, for a private firm operating under conditions different than perfect competition.
Therefore, it can be assumed that the government would choose a point where a marginal increase in price hurts consumers but benefits private investors and taxpayers.\(^{16}\)

As for employee compensation, a change in its post-privatization rate would affect taxpayers and private investors, via \(V(m_2)\), in addition to workers. Differentiation of equation 4 with respect to \(w(m_2)\) yields

\[
\frac{\partial V(m_2)}{\partial w(m_2)} = \frac{\partial [Q(P(m_2))c(m_2,w(m_2))]}{\partial w(m_2)} = -\frac{L(m_2)}{\delta} < 0
\]

(26)

Applying the same procedure to equations 9, 12, and 14 generates the following results:

\[
\frac{\partial (dT)}{\partial w(m_2)} = (1-y)\delta \frac{\partial V(m_2)}{\partial w(m_2)} = -(1-y)L(m_2) < 0
\]

(27)

\[
\frac{\partial (dI)}{\partial w(m_2)} = y\delta \frac{\partial V(m_2)}{\partial w(m_2)} = -yL(m_2) < 0
\]

(28)

and

\[
\frac{\partial (dE)}{\partial w(m_2)} = L(m_2) > 0
\]

(29)

Due to lower profitability, a marginal increase in the post-privatization wage rate transfers income from investors, taxpayers, and new entrants, to employees. The total effect will be borne in proportion to their holdings in the aggregate firm.

### III. Fundamental Laws of Privatization

In Subsection II.D a direct positive relationship has been found between the effect of privatization on productivity and its effect on aggregate social welfare

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\(^{16}\) The upper bound for the price-cost ratio is outlined in inequality 58.
(see equation 17). The current section examines the conditions under which privatization can bring about a Pareto-dominating allocation. As we shall see, the framework of this piece allows us to derive some conclusive results, which will be formulated as fundamental laws that hold for every case of privatization.

**Proposition 1:** Assume the allocation under public ownership is Pareto-efficient. Then greater efficiency in production is a necessary condition for privatization to generate a Pareto-dominating allocation.

**Proof.** Suppose that privatization did not bring about any change in productivity but generated a Pareto-dominating allocation. The assumption that $Z < X$ (see equation 19) insures that $dI > 0$. Hence, Pareto-dominance requires $dP \leq 0$, $dw \geq 0$, and $dT \geq 0$. Since $\{-yN(X-Z)\}$ and $\{-RST'\}$ in equation 10 are negative, $\{V(m_2) - V(m_1)\}$ must be positive to ensure $dT \geq 0$. Absence of increase in productivity means that $dc_{\text{wim1}} = 0$. Hence equation 6 becomes

$$V(m_2) - V(m_1) = \{dQ[P-c] + dPQ\} \{-Ldw\}$$

Equations 21 and 26, and the argument following equations 24 and 25, indicate that all possible combinations of $dP$ and $dw$ which guarantee Pareto-dominance imply

$$V(m_2) - V(m_1) \leq 0$$

Inequality 31 suggests that $dT < 0$ which generates a contradiction.

**Q.E.D.**

**Proposition 2:** Assume that restructuring costs are zero. Then greater efficiency in production is a sufficient condition for privatization to generate a Pareto-dominating allocation.

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17 As in Coase (1960), by 'zero' we mean economically negligible.
Proof. Suppose that $dP = dw = 0$. This condition guarantees that consumers and employees are not worse off due to privatization. Also, given that $Z < X$, $dI$ is always positive. Application of the assumption of no change in price or wage rate to equation 6 yields

$$dV = -dc_{w(m_1)} Q > 0$$

Thus, the impact on taxpayers in equation 10 becomes

$$dT = -dc_{w(m_1)} Q - yN(X-Z)$$

Since $Z$ is a choice variable, the government can set $Z$ such that $-dc_{w(m_1)} Q > yN(X-Z)$, which insures that $dT > 0$. Thus privatization has generated a Pareto-dominating allocation.

Q.E.D.

This result can be easily generalized to a stronger case of Pareto-dominance (greater utility of all interest groups) by the continuity property of the utility function. That is to say, we can set $P(m_2) = P(m_1) - \varepsilon$, and $w(m_2) = w(m_1) + \varepsilon$, and choose $\varepsilon > 0$ small enough so that $dI$ and $dT$ are still positive.

IV. Alternative Government Objective Functions and the Selection of Decision Variables

Different government ambitions are suggested in the literature, depending on the writer's interpretation of the political process. The debate over the government's objective function can be illustrated through the optimal choice of the variables at its discretion during the privatization process. In this connection, three specific cases are considered: (a) maximization of taxpayer welfare (the no-agency case); (b) maximization of social welfare (the normative model); and (c) maximization of political support (the positive model). The analysis seeks to
determine what the optimal value of the decision variables set by the government would be, given alternative objective functions.

**A. Maximization of Taxpayer Welfare**

Equation 19 concluded that, given \( Z < X \), an increase in the proportion of privatization unambiguously redistributes income away from taxpayers. Therefore, if the government maximizes taxpayer welfare, it should restrict the proportion of flotation to 51%. This result is somewhat counter-intuitive. It could be criticized on the grounds that when the property rights model holds, productivity improvements are positively related to private sector ownership, since the greater \( y \) is the greater the incentive to specialize in ownership and reduce consumption on the job. Empirical support for this argument is found in Ehrlich et al. (1994). In their study, they use the percent of equity owned by the state as a continuous measure, which varies across airlines and within some of them over time.

The analysis of this subsection focuses on results derived from the continuity of the property rights model. In order to accommodate this element, slight modification of the dichotomic model introduced in Section II is required. The effect of privatization on cost reduction, presented in equation 3a, can be reformulated as a continuous function of \( y \). Formally, \( AI' \) is replaced by the following assumption:

\[
AI': \quad c = c(y, w(m)) \quad \text{where} \quad 0.5 < y \leq 1
\]  

(34)

and with

\[
\frac{\partial c(y, w(m_2))}{\partial y} < 0 \quad ; \quad \frac{\partial^2 c(y, w(m_2))}{\partial y^2} > 0
\]  

(35)

Inequality 35 presumes that productivity improves with the proportion of privatization at a diminishing rate. Consequently, increasing private sector holdings in the aggregate firm would raise its value. Analytically, this result is obtained by differentiating equation 4 with respect to \( y \), which yields
\[
\frac{\partial V(y,m_2)}{\partial y} = -Q(P(m_2)) \frac{\partial c(y,w(m_2))}{\partial y} = -TC(y,w(m_2)) \frac{\partial \log[c(y,w(m_2))]}{\partial y} > 0
\]  

where TC denotes total costs. According to equation 36, increase in the value of privatized industry is proportional to the marginal rate of cost decline resulting from a one percent increase in the proportion of privatization.

Essential to the inquiry of the current subsection is the assumption that some underpricing of the privatized firm is determined exogenously. It is presumed, however, that the issue price will be positively related to the post-privatization value of the firm’s stock. In order to entertain this link, it is assumed that the government maintains a constant, preassigned, proportion between the issue and market prices of the firm’s shares, denoted as \( k \) (i.e., \( Z/X = k \forall y \)). In Subsection IV.C.1 below \( k \), rather than \( Z \), is analyzed as a choice variable. Thus, in principle, this constitutes a mere change in notation aimed at enhancing the clarity of analysis.

If equation 9 is differentiated with respect to \( y \) after incorporating these modifications into the model, the loss to taxpayers from increasing \( y \) is offset by a positive term reflecting the gains in productivity. That is,

\[
\frac{\partial (dT)}{\partial y} = -(1-k)\delta V(y,m_2) + [1-y(1-k)]\delta \frac{\partial V(y,m_2)}{\partial y}
\]  

Equation 37 can be expressed in a more familiar format by substituting \( NX \) for \( \delta V(y,m_2) \) and \( Z/X \) for \( k \). Further, the result of equation 36 can be used to draw a direct link between the improvement in productivity and the welfare of taxpayers. Putting these considerations together we get

\[
\frac{\partial (dT)}{\partial y} = -N(X-Z) - [1-y(1-k)]\delta Q(P(m_2)) \frac{\partial c(y,w(m_2))}{\partial y}
\]  

The first term on the r.h.s. of equation 38 is negative and, as in equation 19, it describes the loss to taxpayers from underpricing of the initial public offering.
Equation 36 indicates that this effect increases, in absolute terms, with \( y \). However, the second term on the r.h.s. of equation 38 is positive. It is proportional to the expected increase in the value of the privatized firm, resulting from a higher proportion of private sector ownership. Therefore, it reflects the expected gain to taxpayers generated by a greater volume of initial public offering. Given the assumptions of inequality 35, this effect declines with \( y \).

Barring agency problems, if the government were to maximize taxpayer welfare by assigning the appropriate value of \( y \), it would base its decision on the intuition of equations 37 and 38. Specifically, the first order condition for an internal solution to \( y \) would be achieved by equating the r.h.s. of equation 37 with zero and solving for \( y \).\(^{18}\) However, since the decision to privatize restricts the permissible domain for \( y \) to the open interval (.5,1], the global solution to the maximization problem would be

\[
y = \max\{0.5 + \varepsilon, \min[1, \frac{V(y,m_2)}{TC(y,w(m_2)) + \frac{\partial \log [c(y,w(m_2))]}{\partial y}} + \frac{1}{1-k}]\}
\]

where the algebraic expression on the r.h.s. of equation 40 represents the internal solution, and \( \varepsilon > 0 \) is in the neighborhood of zero. Evidently, this solution is subject to the terminal condition of a positive effect on the welfare of taxpayers, that is, \( dT > 0 \).

The broad range of possibilities encompassed by the mathematical solution of equation 40 is illustrated in Figure 2. The choice of the optimal proportion

\(^{18}\) It is easy to show that the second order condition for maximization is satisfied. Differentiation of equation 37 with respect to \( y \) gives

\[
\frac{\partial^2(dT)}{\partial y^2} = \delta[ -2(1-k) \frac{\partial V(y,m_2)}{\partial y} + (1-y(1-k)) \frac{\partial^2 V(y,m_2)}{\partial y^2} ] < 0
\]

The r.h.s. of equation 39 is negative by equation 36 and by inequality 35.
depends on the location of the intersection between the marginal loss curve, \((1-k)V(y,m_2)\) and the marginal benefit curve, \((1-y(1-k)) \partial V(y,m_2)/\partial y\). Ceteris paribus, the location of the intersection is positively related to two main factors: \(k\) - the ratio of issue price to market value of the privatized firm, and \(\partial \log[c(y,w(m_2))]/\partial y\) - the marginal rate of cost decline. The intuition is clear: a greater \(k\) means a smaller loss from underpricing the privatized enterprise, whereas a higher rate of cost decline raises the value of the privatized firm and thus shifts the benefit curve upwards.

The positive relationship found between the issue price and the proportion of flotation, at least in the taxpayer narrative, is fairly interesting. Contrary to the popular view that the decision on the issue price is of no consequence to resource allocation and that its only impact is in the dimension of income distribution, this result indicates that, in a positive setup, issue price may affect the extent of
privatization through the stake of taxpayers, and thereby impact productivity gains.

B. Maximization of Aggregate Social Welfare

As implied by the title of this paper, its ultimate goal is to analyze the behavior of a government that maximizes political support (see Subsection IV.C below). Nevertheless, the results become more evident when compared with the behavior of a government that acts normatively, i.e., a government that maximizes aggregate social welfare. Thus, the following section attempts to address this option as an alternative objective function for a government administering privatization.

To enhance the model, a second modification is introduced. It is assumed that the price of a unit of the final good is a function of the cost of producing it. Without loss of generality, the following linear functional form is employed:

\[ A3: \quad P(m_2) = \theta c(y, w(m_2)) \quad (41) \]

where \( \theta \geq 1 \) is some constant. \( \theta \) is greater than one implies self-sustainability. In this setup, an increase in the proportion of privatization does not necessarily raise the value of the aggregate firm. This can be shown by differentiating equation 4 with respect to \( y \) and rearranging it, which yields:

\[ \frac{\partial V(y, m_2)}{\partial y} = (\theta - 1) [Q(P(m_2)) \frac{\partial c(y, w(m_2))}{\partial y} + \]

\[ + Q'(P(m_2))\theta \frac{\partial c(y, w(m_2))}{\partial y} c(y, w(m_2))] = \]

\[ = V(y, m_2) \frac{\partial \log[c(y, w(m_2))]}{\partial y} [1 + \eta] \quad (42) \]

Equation 42 differs from equation 36 due to the fact that here we assume that the change in productivity also triggers a change in price, which affects the value
of the privatized firm directly and through the change in the quantity produced. The second part of equation 42 draws a link between the effect of changing \( y \) on the value of the aggregate firm and the elasticity of demand. Specifically, increasing \( y \) affects \( V(y, m_2) \) positively when demand is elastic (i.e., when \( |\eta| > 1 \)), and negatively when demand is inelastic.

Equation 41 also implies that changing the proportion of privatization affects aggregate social welfare through its effect on consumer surplus. This effect can be computed by differentiating equation 11 with respect to \( y \), which yields

\[
\frac{\partial (dCS)}{\partial y} = -Q(P(m_2)) \frac{\partial P(m_2)}{\partial y} = -TR \frac{\partial \log c(y, w(m_2))}{\partial y} > 0 \tag{43}
\]

where \( TR = P(m_2) Q(P(m_2)) \) denotes total revenue in the industry. According to equation 43, the effect of increasing flotation on consumer welfare is proportional to the marginal rate of cost decline, and is unambiguously positive.

Thus, the total effect of altering the percentage of divestiture on aggregate social welfare can be derived by differentiating equation 16 with respect to \( y \), which yields

\[
\frac{\partial (dS)}{\partial y} = \frac{\partial V(y, m_2)}{\partial y} + \frac{\partial (dCS)}{\partial y} \tag{44}
\]

Substitution of the results of equations 42 and 43 and rearrangement yields

\[
\frac{\partial (dS)}{\partial y} = \frac{\partial \log[c(y, w(m_2))]}{\partial y} - TC(y, m_2) + \eta V(y, m_2) > 0 \tag{45}
\]

Equation 45 reveals that the effect of increasing the extent of privatization on aggregate social welfare is proportional to the marginal rate of cost decline. Moreover, since this effect is invariably positive, privatization of the entire public enterprise is socially desirable. This conclusion is summarized by the following proposition:

**Proposition 3:** Assume that assumption AI' concerning the continuity of the
property rights model, and that assumption A3 concerning a price-cost ratio with self-sustainability hold. Then full privatization is the optimal solution for a government that maximizes the conditional aggregate social welfare.

Moreover, the stated result in Proposition 3 is independent of the link between price and cost illustrated in equation 41, as leaving this modification out reduces equation 44 to \( \frac{\partial dS}{\partial y} = \frac{\partial V(y, m_2)}{\partial y} \), which is positive according to equation 36. This conclusion gives rise to the next proposition.

**Proposition 4:** Assume that assumption A1' concerning the continuity of the property rights model holds, and that the post-privatization price, \( P(m_2) \), maintains self-sustainability but is not directly related to production costs, then full privatization is the optimal solution for a government that maximizes the conditional aggregate social welfare.

C. Maximization of Political Support

This section presents an analysis in line with the positive tradition (see Downs 1957, Stigler 1971, Peltzman 1976, and Becker 1983 and 1985). These models apply the self-interest axiom to the behavior of actors, voters and governments, in the political arena. On election day, voters judge the party in power based on its past performance. In accordance with the framework described in previous sections, voters are grouped according to their interest in the process. Seeking reelection, the government attempts to maximize the number of votes in its favor. Concerning the behavior of the players in the political game, the following assumption is introduced into the model:

**A4:** Political equilibrium is accomplished where every interest group is assumed to act noncooperatively. That is to say, it is assumed that the formation of intergroup coalitions is either impractical or prohibitively expensive.
The approach presented by Peltzman (1976) was found to be more appropriate than the interest group approach, since privatization is generally initiated by the government in power, while the interest group approach ignores instances in which economic policy is initiated by the political sector upon recognition of potential for gaining additional political support. The government's objective function is defined over the impact of privatization on the wealth of the relevant interest groups.\footnote{The possibility of overlapping between the different interest groups was taken into consideration. However, for our problem it is sufficient to note that the stakes are distributed unequally among the different voters. That is to say, not all voters have the same stake in the different capacities.} To put this formally, the political support function of the government (or the would-be government), \( \phi \), is generated by

\[
\phi = \phi(dT, dI, dCS, dE) \tag{46}
\]

where \( \phi_i > 0 \) for all \( i \), but with no intergroup dependencies, so that \( \phi_{ij} = 0 \) for all \( i \neq j \). \( \phi_i \) represents the marginal vote gain from a marginal increase in the welfare of interest group \( i \), \( (i = 1, \ldots, 4) \). It is also assumed that political returns on wealth transfers diminish, that is, \( \phi_{ii} < 0 \ \forall i \).

The government chooses the proportion of flotation (\( y \)), the issue-to-market price ratio (\( k \)), the price-cost ratio (\( \theta \)), and the post-privatization wage rate (\( w(m_2) \)). Since the permissible range for all choice variables involves inequality constraints, the maximization problem ought to be solved simultaneously by applying Khun-Tucker programming. Equation 46 is to be maximized, subject to the following constraints: \( 0.5 < y \leq 1 \), \( 0 \leq k \leq 1 \), \( \theta \geq 1 \), and \( w(m_2) \geq w_c \), where \( w_c \) is the competitive wage rate; \( w(m_2) \) may be bounded from above by the self-sustainability constraint implying:

\[
w(m_2) \leq w_c + L(m_2)^{-1} \delta Q(P(m_2))[P(m_2)^{-1}c(y, w_c)]^= \tag{47}
\]

\[
= w_c + L(m_2)^{-1} \delta V(P(m_2), y, w_c)
\]
When this constraint is binding, it captures the interest that unions have in influencing government policy with respect to the organization of an industry, recognizing the potential for increasing their overall compensation. In the context of privatization, this may take the form of influencing the control variables that are relevant to privatization, other than the wage rate.

The measure of an interest group's relative effectiveness in influencing the privatization process in its favor is given by \( \phi_i \), which is determined by the characteristics of the political market. In the attempt to identify the parameters of the political market, researchers emphasize different aspects of positive theory. Peltzman (1976) identifies the number of potential votes and the per-capita stake in the would-be beneficiary group critical to the analysis of political equilibrium. Peltzman also illustrates how greater filtering of information induces the regulator to concentrate his favors on a few beneficiaries. While Peltzman refers to the cost structure of organization, Becker (1983, 1985) argue that political equilibrium depends on the relative efficiency of each interest group in producing political pressure and in controlling free riding.

Recognizing that the political game is negative-sum in taxes and subsidies, Becker emphasizes the per-capita deadweight cost aspect of taxes and subsidies. Peltzman mentions the rate of an industry's growth, elasticity of demand, and elasticity of scale as factors influencing the amount of deadweight costs. Other elements affecting the location of the political equilibrium consist of costs for negotiating mode of operation, extent of competition in the political sector, and legal environment.

Since the current paper focuses on the economic intuition of the solution, the following subsections calculate the internal solution for each decision variable, and subsequently analyze potential global solutions in a manner similar to Subsection IV.A. The first order conditions for maximization can be expressed as follows:

\[
\begin{align*}
\phi_1 & \frac{\partial(dT)}{\partial \alpha} + \phi_2 \frac{\partial(dI)}{\partial \alpha} + \phi_3 \frac{\partial(dCS)}{\partial \alpha} + \phi_4 \frac{\partial(dE)}{\partial \alpha} + \\
\lambda & \frac{\partial[L(m_2)w_c + \delta Q(P(m_2))[P(m_2) - c(y,w_c)] - L(m_2)w(m_2)]}{\partial \alpha} = 0
\end{align*}
\]
where \( \alpha = k, \theta, w(m_2), y. \lambda \) is the Lagrange multiplier, representing the shadow price of the self-sustainability constraint, in terms of votes gained from a higher post-privatization wage rate, in the Kuhn-Tucker maximization problem. Therefore, an internal solution for \( w(m_2) \) implies that \( \lambda = 0 \). However, when the self-sustainability constraint is binding, \( \lambda = \phi_4 \), where \( \phi_4 \) is the marginal political support of the workforce (see Subsection IV.C.2 below).

C.1 Selection of the Issue to Market Price Ratio (k)

Given the (optimal) value of the other choice variables, the government cannot influence the market price of the firm's shares through \( k \). Thus, selecting \( k \) is equivalent to selecting \( Z \). Moreover, an internal solution assumes capital market efficiency, since \( k \) cannot exceed unity, at least in terms of expected value. It is also plausible to impose the non-negativity constraint on \( k \), that is, \( k \geq 0 \).

As in Subsection II.E (equation 18), selection of \( k \) affects taxpayers and private investors. Thus, differentiation of equations 9 and 14 yields\(^{20}\)

\[
\frac{\partial (dI)}{\partial k} = \frac{\partial (dT)}{\partial k} = yNX
\]

(49)

Hence equation 48 becomes

\[
\phi_1 yNX - \phi_2 yNX = 0
\]

(50)

Since \( yNX \) is positive, \( \phi_1 = \phi_2 \). In general, this result is independent of assumptions \( A1 \) or \( A1' \), and \( A2 \); hence, it can be formulated as:

**Proposition 5:** Assume that assumptions \( A3 \) and \( A4 \), implying self-sustainability and a noncooperative political equilibrium, respectively, hold. If an internal solution exists, a vote-maximizing government will set the issue price, such that the marginal political support of taxpayers is equated with the marginal political support of private investors.

\(^{20}\) The interpretation of equation 49 is identical to the interpretation of equation 18.
The mathematical solution implied by equation 50 is illustrated graphically in Figure 3. The optimal choice of \( k \) depends on the location of the intersection between the marginal political support curves, \( \phi_1 \) and \( \phi_2 \). Ceteris paribus, the location of the intersection is positively related to an upper \( \phi_1 \) curve (such as \( \phi_1' \)), and negatively related to an upper \( \phi_2 \) curve. Clearly, when \( \phi_1 \) is sufficiently high or \( \phi_2 \) is sufficiently low, a corner solution is optimal (i.e., \( k^* = 1 \)). Consequently, greater efficiency in lobbying on the part of private investors, relative to taxpayers, will result in lower \( k \), whereas \( k \) will be greater when taxpayers are better organized politically.

Figure 3. Maximization of Political Support. Selecting the Optimal Issue-to-Market Ratio

\[ \phi_1 = \text{Marginal Support Function of Taxpayers} \]
\[ \phi_2 = \text{Marginal Support Function of Private Investors} \]

Furthermore, the analysis presented in this section enhances understanding of the selection of an optimal \( k \) under alternative objective functions. When the government maximizes taxpayer welfare, it behaves as if its political support function is defined over one argument only, namely, \( dT \). The first derivative of this degenerated objective function w.r.t. \( k \) would be \( \phi_{ij}yNX \), which is positive for every \( k \) within the permissible range. Specifically, the government can raise the value of its objective function whenever it increases \( k \). Therefore, the optimal solution would be \( k = 1 \). As for the optimal solution from a normative perspective, equation 16 indicates that \( k \) has no direct relevance in influencing aggregate
social welfare as a first order effect. The following corollary summarizes the predictions with respect to the issue price.

**Corollary 1:** A vote-maximizing government will tend to set an issue price lower than the optimal rate selected by a government that maximizes taxpayer welfare.

### C.2 Selection of the Post-Privatization Wage Rate ($w(m_2)$)

It has been suggested earlier that there exists a causal relationship between the degree of unionization in the industry and the privatization process. In different countries, organized labor has managed to keep salaries higher than equilibrium level over a wide range of time, particularly in state-owned enterprises. Harberger (1987) mentions union pressure as one of the causes of the global trend toward nationalization following World War II. Hence, in many instances, union power can halt the privatization process. Alternatively, it can be translated into monetary compensation, i.e., higher wage rates.

The political influence of unions is enhanced by several factors. First, union members have more common interests than other groups. Second, organized activity is relatively inexpensive, and free riding is easily controlled. Third, unions are large enough to constitute an effective demand in the political market; they are able to offer politicians what they need most--votes and resources. Foreman-Peck (1991) describes the problem in a refined but accurate fashion:

"Whereas both private and state companies must take into account the costs of strikes in implementing reductions in manning levels or the introduction of new working methods, the state manager also might have to consider the labour force as one of the constituencies to be placated."

Therefore, in the British experience there has been a coherent approach toward dealing with the issue of industrial relations. Accordingly, the British government attempted to maximize support for the program on the one hand while weakening potential resistance on the other. Inherently, the program accelerated the
breakdown of centralized bargaining into local units, thereby reducing trade union power. Furthermore, the British government encouraged employee ownership, which has reinforced this process.\footnote{Almost every privatization involved a package granting employees free shares, allocating them additional shares at a discount, and a profit-sharing scheme.} As shareholders in their workplace, employees would not submit to union pressure to participate in industrial action that might jeopardize their future dividends. Finally, firm industrial policy complemented by proper legislative measures completed the set of actions required to guarantee a successful process.

The complexity of industrial relations is well recognized throughout the paper. In the formal model, the bargaining power of trade unions is expressed through their ability to affect the post-privatization wage rate. Therefore, the analysis proceeds with the calculation of the vote-maximizing value of $w(m_2)$. In Subsection II.E it is concluded that changing the value of this decision variable adversely affects taxpayers and private investors while it unquestionably benefits employees. The assumption of a constant price-cost ratio presented in equation 41 suggests a possible impact on consumers as well. The first order condition for an internal solution for $w(m_2)$ would, therefore, be

\[
\left\{ \phi_1 \frac{\partial (dT)}{\partial w(m_2)} + \phi_2 \frac{\partial (dI)}{\partial w(m_2)} + \phi_3 \frac{\partial (dCS)}{\partial w(m_2)} + \phi_4 \frac{\partial (dE)}{\partial w(m_2)} \right\} = 0 \quad (51)
\]

Based on the results that define the impact of privatization on the relevant interest groups (see equations 10, 11, 12, and 14), and applying assumptions A2 and A3 concerning diminishing returns to price lifting and the price-cost ratio, respectively (see equations 8 and 41), equation 51 can be reformulated as

\[
\left\{ \phi_1 (1-y(1-k)) + \phi_2 y(1-k) \right\} \delta V(m_2) \frac{\partial \log c(y, w(m_2))}{\partial w(m_2)} \left[ \epsilon_{\delta_p} + \eta + 1 \right] - \phi_3 TR \frac{\partial \log c(y, w(m_2))}{\partial w(m_2)} + \phi_4 L(m_2) = 0 \quad (52)
\]
where \( \varepsilon_{\delta p} \) is the price elasticity of the business loss function \( \delta \).

Equation 52 indicates that when the self-sustainability constraint is nonbinding, the optimal value of the post-privatization wage rate would depend on several economic parameters in addition to the relative marginal political support of the relevant interest groups. Taxpayers and private investors are harmed by wage increases, assuming \( |\eta| > 1 + \varepsilon_{\delta p} \).\(^{22}\) In this case, the government needs to balance taxpayer, private investor, and consumer interests against worker pursuits. Another important factor in determining \( w(m_2) \) is labor share in production costs as it affects the semi-elasticity of costs with respect to wage and, presumably, correlates with labor proportion relative to firm size. The latter is represented by \( V(m_2) \) and TR. A smaller labor share is advantageous to employees, since it is associated with lesser damage to the other interest groups. Nonetheless, if this diminishes electoral power, it could imply a reduced worker political influence.

The result of equation 52 is independent of assumptions \( A1 \) or \( A1' \). Hence, it can be summarized by the following proposition:

**Proposition 6:** Assume that assumptions \( A2, A3, \) and \( A4 \) hold. Also assume that the self-sustainability constraint is nonbinding, and let the price elasticity of demand satisfy \( |\eta| > 1 + \varepsilon_{\delta p} \). A vote-maximizing government will set the post-privatization wage rate such that the marginal political support deriving from an increase of one dollar in labor earnings, \( \phi_p \), is equated with the sum of the marginal political support of taxpayers, private investors, and consumers, \( \phi_p, \phi_2, \) and \( \phi_y \), respectively, weighted by their share in lost surplus caused by this increase.

When the self-sustainability constraint is binding, employees have significantly greater political influence than do taxpayers and potential private investors. As a result, they extract all of the rent from the firm. Mathematically, this event implies \( \theta = 1 \), so that \( V(P(m_2), y, w(m_2)) = 0 \), and \( \partial V(P(m_2), y, w(m_2)) / \partial w(m_2) = 0 \).

---

\(^{22}\) If \( |\eta| < 1 + \varepsilon_{\delta p} \), raising wage will trigger a rise in price such that revenue will rise by more than costs, due to inelastic demand, and the value of the firm, \( \delta V(m_2) \), will be greater.
Thus, equation 52 is reduced to

$$
\phi_4 \frac{\partial [\delta V(y, P(m_2), w_c)]}{\partial w(m_2)} = \phi_3 \frac{\partial \log c(y, w(m_2))}{\partial w(m_2)}
$$

where

$$
\frac{\partial [\delta V(y, P(m_2), w_c)]}{\partial w(m_2)} = \delta TR \frac{\partial \log c(y, w(m_2))}{\partial w(m_2)} [\epsilon_{\delta p} + \eta].
$$

$$
\frac{P(m_2) - c(y, w_c)}{P(m_2)} + 1
$$

Note that the Lagrange multiplier associated with the self-sustainability constraint is equal to the marginal political support of the workforce in this case. The post-privatization wage rate depends on the ability of the workforce to utilize the political process to generate rents while cutting down consumer surplus.  

Quantitatively, the effect of a marginal wage increase on employee rents depends on firm size, represented by total revenue, semi-elasticity of costs with respect to wage, price elasticities of demand and the business loss function, \( \delta \), and the markup relative to the unit cost based on a competitive wage rate. Assuming \( |\eta| > 1 + \epsilon_{\delta p} \), this effect is positive on the following condition:

$$
\frac{P(m_2)}{c(y, w_c)} < \frac{\epsilon_{\delta p} + \eta}{1 + \epsilon_{\delta p} + \eta}
$$

The next proposition formulates the result of equations 53 to 55.

**Proposition 7:** Assume that assumptions A2, A3, and A4 hold, and that the self-sustainability constraint is binding. Also let the price elasticity of demand satisfy \( |\eta| > 1 + \epsilon_{\delta p} \), and the post-privatization price satisfy inequality 55. A vote-

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23 Theoretically, \( w_c \) is another possible corner solution occurring when consumers are sufficiently more efficient in producing political pressure, relative to the other interest groups (see discussion below).
maximum government will set the post-privatization wage rate such that the marginal political support deriving from an increase of one dollar in labor earnings, \( \phi_p \) is equated with the marginal political support of consumers, \( \phi_d \), weighted by the loss of consumer surplus caused by this increase.

When this condition is met under public ownership, employees may lobby against privatization, possibly as an ingredient in a strategy of attrition (see Alesina and Drazen, 1991). When privatization occurs, it is likely that the operation will be sold to the workforce, to the management, or to both. In extreme cases, the entire operation may be handed over to the workforce. Legally, the enterprise might transform into (a single or few) worker cooperative(s) (see Pirie 1988, chs. 8-9).

Figure 4 provides a graphic description of the solution derived from equation 52. The marginal benefit (MB) curve portrays the marginal vote gain from employees. It declines with wage, since \( \phi_u < 0 \). When the self-sustainability constraint is binding, employee rent-seeking described in equation 54 also declines, provided \( |\eta| > 1 + \varepsilon_{gp} \). This outcome is based on assumption A2 concerning the diminishing returns to price lifting and on the derivation of the profit hill in micro foundations. The marginal cost (MC) curve is defined as the marginal vote loss from taxpayers, private investors, and/or consumers. As a rule, MC need not be increasing. However, stability conditions require that the MB curve be steeper than MC. Without loss of generality, and for simplicity's sake, MC was drawn increasing in the picture. This picture is consistent with situations in which the assumption of diminishing political returns to wealth transfers predominates, and with the notion of increasing marginal deadweight costs with the rate of taxation, expressed in Becker (1985).

The optimal choice of \( w(m) \) depends on where the MB and MC curves intersect. Other things being equal, this optimum is positively related to \( \phi_d \) and negatively

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24 Pirie mentions the privatization of Britain's National Freight Company (1982), Vickers Shipyards (1986), National Bus Company (1986-7), and Leyland Bus (1986), as examples of management and employee buyouts. He also mentions the privatization of Havercroft services in 1984 as an instance in which the enterprise was given away to the management.
related to $\phi_1$, $\phi_2$, and/or $\phi_3$. As for corner solutions, ceteris paribus, when $\phi_4$ is sufficiently high relative to $\phi_1$, $\phi_2$, and $\phi_3$, the upper limit, $w_{\text{max}}$, is vote-maximizing. On the other hand, when $\phi_1$ and/or $\phi_2$, and/or $\phi_3$ are sufficiently high relative to $\phi_4$, that is, when either taxpayers, private investors, or consumers are able to dissipate union power so that the political and economic damage from industrial actions is negligible, the lower limit $w_c$, characterizes a political optimum.

As in the previous section, a corner solution in the positive setup may serve as the unique optimum, under alternative objective functions. Evidently, if only taxpayer interests are taken into consideration, then $w_c$ would be optimal since, according to equation 52, every wage increase adversely affects taxpayers. $W_c$ is also optimal under the normative paradigm. This conclusion is based on the

$W_{\text{max}}$ is characterized by the first order condition for a maximum as defined by equation 53. It depends on the optimal value the proportion of privatization, $y$, as well (see Subsection IV.C.4 below). The upper bound can be calculated from inequality 55, with the inequality sign replaced by an equal sign.

We define the competitive wage rate, $w_c$, as a lower bound, below which workers would leave the industry due to better paying alternatives.
result presented in Subsection IV.B, which implies that a welfare-maximizing government equates price with unit cost (i.e., θ = 1). Thus, since any price-lifting involves deadweight loss, \( w_c \) is socially optimal. The following corollary formalizes this argument, which is strikingly consistent with the intuition presented at the beginning of this subsection.

**Corollary 2:** A vote-maximizing government will tend to set post-privatization wage rates higher than the optimum from taxpayer and social welfare standpoint.

### C.3 Selection of the Price-Cost Ratio (θ)

Subsection II.E concluded that, based on the 'positive rationale', a vote-maximizing government will choose a point where raising price is harmful to consumers but benefits taxpayers and private investors. However, the mechanism employed by the government to choose the optimal θ out of the infinite number of points that conform with this rationale has not been specified. The following discussion refers to the case where θ is strictly greater than one, since the case of θ = 1 has been considered in Subsection IV.C.2 above.

Assuming that an internal solution exists, the first order condition for maximization w.r.t. θ would be

\[
\phi_1 \frac{\partial(dT)}{\partial \theta} + \phi_2 \frac{\partial(dI)}{\partial \theta} + \phi_3 \frac{\partial(dCS)}{\partial \theta} = 0 \tag{56}
\]

Based on the results of equations 10, 11, and 14, which specify the effect of privatization on the relevant interest groups, and following assumptions A2 and A3, which entail diminishing returns to price lifting and a price-cost relation (see equations 8 and 41), equation 56 can be reformulated as

\[
[\phi_1(1-y(1-k)) + \phi_2 y(1-k)]\frac{V(m_2)}{\theta}(\epsilon_{SP} + \eta + \frac{\theta}{\theta-1}) - \phi_3 \frac{TR}{\theta} = 0 \tag{57}
\]
As in the previous sections, the rationale underlying equation 57 is that, at the optimum, marginal vote gain is equated with marginal vote loss. In addition, equation 57 delineates the conditions under which the predictions stemming from the political tradeoff section hold. Specifically, assuming $|\eta| > 1 + \varepsilon_{\delta P}$, an increase in $\theta$ would benefit taxpayers and private investors as long as $\theta$ satisfies the following inequality

$$\theta < \frac{\varepsilon_{\delta P} + \eta}{1 + \varepsilon_{\delta P} + \eta}$$ (58)

The r.h.s. of inequality 58 defines $\theta_{\text{max}}$, i.e., the maximal value of $\theta$ beyond which taxpayer and private investor welfare declines with price increases. Again, size, represented by $V(m_2)$ and TR, and the price elasticities of demand and business loss function, $\delta$, play a major role in determining the optimal value of $\theta$.

As long as self-sustainability is guaranteed, the result of equation 57 is independent of assumptions A1 or A1' concerning the property rights model. This gives rise to the following proposition:

**Proposition 8:** Assume that assumptions A2, A3, and A4 hold. Also assume that the self-sustainability constraint is nonbinding, and let the price elasticity of demand satisfy $|\eta| > 1 + \varepsilon_{\delta P}$. If an internal solution exists, a vote-maximizing government will set the post-privatization price, $P(m_2)$, such that the benefits to taxpayers and private investors resulting from a marginal price increase, weighted by their marginal political support, are equated with the welfare loss to consumers deriving from the same price increase, weighted by their marginal political support.

A graphic representation of the solution implied by equation 57 is provided in Figure 5. The marginal benefit (MB) curve portrays the combined marginal vote gains from taxpayers and private investors when the self-sustainability constraint is nonbinding. The MB curve is declining, since $\phi_{ii}$ is negative and since the model assumed that there will be diminishing returns to price lifting--based on assumption A2 and the derivation of the profit hill in micro foundations. However,
the 'marginal cost' (MC) curve, defined as the marginal vote loss from consumers, need not be increasing since it is composed of two conflicting forces--increasing marginal political support and declining total costs (TC). Nevertheless, the optimal solution is obtainable as long as the stability condition is satisfied. Specifically, as long as the MB curve is steeper than the MC curve.

Figure 5. Maximization of Political Support.
Selecting the Optimal Price-Cost Ratio

\[ MB = \phi_1 \partial (dT)/\partial \theta + \phi_2 \partial (dI)/\partial \theta \]
\[ MC = -\phi_3 \partial (dCS)/\partial \theta = \phi_3 TR/\theta \]

Without loss of generality, and for simplicity's sake, MC is assumed to be increasing in the picture. \( \theta_{\text{max}} \), the edge of the relevant domain, is defined as the maximal \( \theta \) at which price increases will benefit taxpayers and private investors. The optimal choice of \( \theta \) would be at the intersection of the MB curve with the MC curve. Other things being equal, the location of the intersection is positively related to the \( \phi_1 \) and \( \phi_2 \) functions, and negatively related to the \( \phi_3 \) function. Therefore, a corner solution is possible when \( \phi_3 \) is sufficiently high relative to \( \phi_1 \) and \( \phi_2 \), in which case \( \theta \) would equal one; or when \( \phi_1 \) or \( \phi_2 \) are sufficiently high relative to \( \phi_3 \), in which case \( \theta' = \theta_{\text{max}} \).

\(^{27}\) Note that in our formulation \( TR/\theta = TC \), the total production costs in the industry.

\(^{28}\) The upper bound for \( \theta \) is given by inequality 58.
Apparently, some of the corner solutions seem to be optimal under the alternative objective functions discussed in this paper. Evidently, if the government maximizes taxpayer welfare, it would consider only the $dT$ component of the MB curve (i.e., $\partial(dT)/\partial\theta$). In this case, it would set the optimal $\theta$ as $\theta_{\text{max}}$. At the other end, given the result of equation 23, a government that maximizes aggregate social welfare would set $\theta = 1$ as optimum. The following corollary formalizes the prediction of the current analysis with respect to the post-privatization price-cost ratio.

**Corollary 3:** A vote-maximizing government will tend to set post-privatization prices higher than a government that maximizes social welfare, and lower than a government that maximizes taxpayer welfare.

C.4. Selection of the Proportion of Flotation ($y$)

In Subsection IV.A it was concluded that, when selecting the proportion of flotation, a government that maximizes taxpayer welfare seeks a balance between two conflicting forces: loss from underpricing of the initial public offering, and gain from greater efficiency resulting from greater private sector ownership. A government acting normatively, however, would rather privatize the entire public enterprise. The following analysis explores how a government, seeking maximum political support, selects the optimal proportion of private sector ownership.

It has been established earlier that changing $y$ affects taxpayers, private investors, and consumers. Moreover, when the self-sustainability constraint is binding, it was noted that the workforce would be interested in influencing choice variables other than the wage rate (see Subsection IV.C.2). Hence, assuming that an internal solution exists, the first order condition for maximization w.r.t. $y$ is given by

$$\phi_1 \frac{\partial(dT)}{\partial y} + \phi_2 \frac{\partial(dI)}{\partial y} + \phi_3 \frac{\partial(dCS)}{\partial y} + \lambda \frac{\partial[V(P(m_2), y, w_r)]}{\partial y} = 0 \quad (59)$$
Consider the case where the self-sustainability constraint is nonbinding (i.e., $\lambda = 0$). Due to the modification of equation 41, the effect of changing $y$ on the welfare of taxpayers contains an additional component reflecting the effect of $y$ on the market share of the firms that originate in the public enterprise. Thus, differentiation of equation 9 w.r.t. $y$ yields

$$
\frac{\partial (dT)}{\partial y} = -(1-k)\delta V(y,m_2) + \frac{\partial \log c(y,w(m_2))}{\partial y} (\epsilon_{\delta p} + \eta + 1)
$$

While the first term on the r.h.s. of equation 60 is identical to the corresponding phrase in equation 37, the second term contains a market share effect. This expression, representing the firm value effect, is positive by the continuity of the property rights model (specified in inequality 35), provided the price elasticity of demand satisfies $|\eta| > 1 + \epsilon_{\delta p}$. Moreover, as in equation 37, the first element, representing losses from underpricing, is negative. Regardless of its sign, the magnitude of the firm value effect hinges on the size of marginal improvements in efficiency due to a greater proportion of private sector holdings, and on firm size measured by $V(m_2)$.

The effect of changing $y$ on private investors can be derived by differentiating equation 14 w.r.t. $y$. That is,

$$
\frac{\partial (dI)}{\partial y} = (1-k)\delta V(y,m_2) + y(1-k)\delta V(y,m_2) \frac{\partial \log c(y,w(m_2))}{\partial y} (\epsilon_{\delta p} + \eta + 1)
$$

As in the taxpayers’ case, equation 61 contains two distinct elements: underpricing effect, and firm value effect. Whereas the first element is clearly positive, the sign of the firm value effect is ambiguous, by the same logic provided above. The sign of this effect hinges on the price elasticity of demand. The effect of $y$ on consumer welfare, calculated earlier in equation 43, is unambiguously positive.
It is also proportional to the marginal rate of cost decline, and to firm size represented by total revenue.

Taken together, these effects reveal that, when the self-sustainability constraint is nonbinding, besides the relative marginal political support of each group with respect to others, the optimal value of \( y \) depends on three major economic parameters: price elasticity of demand, firm size, and marginal productivity gains from privatization. Evidently, when elasticity of demand satisfies \( |\eta| > 1 + \varepsilon_{sp} \), there are more forces pushing in favor of full privatization. In this case, the effect of increasing \( y \) on private investors is unambiguously positive, and the firm value effect in the taxpayer equation is positive. The only negative term is \(-\phi_1 (1-k) \delta V(y, m_2)\), i.e., the underpricing effect. When the condition \( |\eta| > 1 + \varepsilon_{sp} \) is not met, the firm value effect turns negative. Consequently, the direction of the effect of increasing \( y \) on private investors is also ambiguous, and the two elements in the taxpayer equation are negative. The following proposition summarizes the discussion.

**Proposition 9:** Assume that assumptions A1', A2, A3, and A4 hold. Also assume that the self-sustainability constraint is nonbinding. A vote-maximizing government will tend to set a higher optimal value for \( y \) when the price elasticity of demand satisfies \( |\eta| > 1 + \varepsilon_{sp} \) and when marginal political support of taxpayers is sufficiently large relative to private investors. The last condition induces a small underpricing effect (see Subsection IV.C.1). Alternatively, the optimal value of \( y \) will be higher when marginal political support of taxpayers is sufficiently low relative to private investors, so that underpricing will not be politically costly. Moreover, a greater impact of private sector holdings on efficiency in production increases consumer incentive to lobby for a complete privatization.

When the self-sustainability constraint is binding, \( V(P(m_2), y, w(m_2)) = 0 \) and \( \partial V(P(m_2), y, w(m_2))/\partial y = 0 \) for all \( y \) in the permissible range. Hence the l.h.s. of equation 59 reduces to

\[
\phi_3 \frac{\partial (dCS)}{\partial y} + \lambda \frac{\partial \delta V(P(m_2), y, w_c)}{\partial y} = 0
\]

(62)
The effect of a marginal increase in the proportion of privatization on \( \delta V(P(m_2), y, w_c) \) is given by

\[
\frac{\partial [\delta V(P(m_2), y, w_c)]}{\partial y} = \frac{\partial log c(y, w(m_2))}{\partial y} \delta V(P(m_2), y, w_c)[\epsilon_{\delta P} + \eta + \frac{V(P(m_2), y, w(m_2))}{V(P(m_2), y, w_c)}]
\]  

(63)

The sign of this term is determined by the value of price elasticities of demand and the business loss function \( \delta \). The sign is positive whenever demand is elastic, and for a range of values when demand is inelastic. The limiting condition for a positive impact of greater \( y \) on employee utility is

\[
|\eta| > \frac{V(P(m_2), y, w(m_2))}{V(P(m_2), y, w_c)} + \epsilon_{\delta P}
\]  

(64)

Thus, given that condition 64 is fulfilled, full privatization is optimal for a government that maximizes political support. In the rather rare circumstances where this condition is not satisfied, the government will weigh consumer desire for full privatization against employee interest in somewhat restricted action. This conclusion is formalized with the following proposition.

**Proposition 10:** Assume that assumptions A1', A2, A3, and A4 hold, and that the self-sustainability constraint is binding. Also assume that condition 64 concerning price elasticity of demand is satisfied. Then complete privatization is the optimal solution for a vote-maximizing government.

Comparing this outcome with the results obtained under alternative objective functions, a government that maximizes taxpayer welfare will opt for full privatization when price elasticity of demand satisfies \( |\eta| > 1 + \epsilon_{\delta P} \). This corollary stems from the conclusion of Subsection IV.C.1, i.e., in this case, \( k = 1 \) so that the underpricing term vanishes. When demand is sufficiently inelastic,
and provided that the terminal condition of $dT > 0$ is met, the negative firm value effect confines the optimal proportion of privatization to $0.5 + \varepsilon$ in the no-agency case, where $\varepsilon$ is in the neighborhood of zero. Finally, for the sake of completeness, the result of Subsection IV.B is restated. Accordingly, full privatization is unambiguously optimal under the normative model. The following corollaries conclude the discussion.

**Corollary 4:** Assume that the price elasticity of demand satisfies $|\eta| > 1 + \varepsilon_{sp}$ and that the self-sustainability constraint is nonbinding. Then a vote-maximizing government might set the proportion of privatization less than 100%, where complete privatization is optimal for a government acting normatively or maximizing taxpayer welfare.

**Corollary 5:** Assume that the price elasticity of demand satisfies $|\eta| > 1 + \varepsilon_{sp}$ and that the self-sustainability constraint is binding. Then complete privatization is optimal under all three government objective functions.

**Corollary 6:** Assume that the restriction $|\eta| > 1 + \varepsilon_{sp}$ on the price elasticity of demand is not satisfied, then complete privatization is optimal under the normative model where less than 100% might be the optimal proportion for a government maximizing political support or taxpayer welfare.

V. Applications

A. Comments on the Motivation to Privatize

The investigation of motivation to privatize is closely related to assessment of the outcomes of possible dynamics in the parameters of the political market relevant to the choice of privatization design. Stigler (1971) argues that when a political party has a monopoly control over the machinery and power of the state, that party may be expected to reap most of the benefits of regulation, while disregarding the deadweight costs that such regulation imposes on others.
Since government regulation could take the form of nationalization, one possible force driving privatization may be lowering of barriers to entry into politics, which stimulates greater competition in the political market. According to this view, privatization can be interpreted as a means of adjusting temporary disequilibrium in the political market generated by exogenous changes in the political environment.

Likewise, a decline in the costs of acquiring information regarding government activity in general and public enterprises in particular, that may derive from a rise in the average level of education in the population, could exert additional pressure in favor of privatization. In addition, shifts in the economic structure of industries that are candidates for privatization may affect the deadweight costs associated with nationalization, and thereby intensify motivation to privatize (see Peltzman 1976, and Becker 1985).

B. Explaining Prevailing Models of Privatization

B.1. Differences Across Countries

In practice, we observe diverse models of privatization across countries. Definition of two polar prototypes of privatization is critical to understanding the continuum of existing patterns between them. The two prototypes are 'Popular Capitalism' and 'Nomenklatura Companies'. Popular Capitalism is characterized by mass flotations, normally monitored by checks and balances incorporated into a Golden Share held by the government. A major aspect of such measures is limitation on the proportion of holdings by individuals or control groups. This model of privatization is also associated with employee share-ownership and injecting competition into an industry and/or introducing of a regulation scheme aimed at consumer protection.

Above all, Popular Capitalism is identified with the British case. The Thatcher government sold a substantial amount of state-owned enterprises through public offerings while instituting employee share-ownership and profit-sharing mechanisms, small shareholder incentive schemes, and RPI-X regulation (see
Pirie 1988, and Vickers and Yarrow 1988). A special case of Popular Capitalism could be the voucher privatization scheme. In the Czech and Russian experience, this approach served as a means of overcoming the private wealth constraint (see Hanousek and Kroch, 1998). However, while arguing for the case of 'mass privatization', Boycko et al. (1994) acknowledge its subjectivity to political constraints, notably corporate governance, which distinguish it from the classical form of Popular Capitalism.

Domanski (1994) refers to the establishment of Nomenklatura Companies by former Communist executives in Poland and other Eastern European countries, primarily Russia, as a method of privatizing the economy for the benefit of the ruling elite. Legally, in each case, a joint-stock limited liability company was formed by combining the physical assets of the state-owned enterprise with the paid-in capital of shareholders. The process is characterized by underassessment of the physical assets and artificial overstatement of the paid-in capital. Employee ownership is not evident nor have any steps been taken to improve consumer welfare. Domanski reports that the required approval of the employee council was achieved through co-optation. Moreover, while the majority of workers still belonged to the 'mother enterprise', in the newly created company employee councils were abolished and trade unions were not welcome. Referring to the Russian case, Boycko et al. (1994) describe this form of privatization as a "massive theft of state assets by managers" (p. 252).

Most privatization programs lie on the continuum of possibilities between the two prototypes. Evidently, underpricing is a universal feature of privatization due to the political nature of the process. Hence, in our view, investigation of the identity of the 'private investors' is essential to understanding any selected pattern of privatization. It is argued here that on the average, Popular Capitalism reflects greater government sensitivity to public criticism than do Nomenklatura Companies. In terms of the parameters of the model, this means that the marginal political support functions of taxpayers ($\phi_p$) and consumers ($\phi_c$) represent greater

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29 The list of such enterprises consists of British Telecom, British Airways, British Gas, British Airport Authority, Rolls Royce, and many others.
effectiveness in producing political pressure. In such a political climate, cooperation of the workforce is also essential for a successful privatization process, implying an effective $\phi_4$ function.

Operating in a political environment of a sort, our model predicts that the government will tend to dissipate opposition to privatization, caused by the underpricing term (see equations 50, 60, and 61, Propositions 5 and 9, and Corollaries 1 and 4) and by the threat of a substantial markup factor (see equation 57, Proposition 8, and Corollary 3), through an attempt to create an as much as possible overlap between the interests of taxpayers, private investors, and consumers. This is done by a public share issue complemented, whenever applicable, by a regulatory environment aimed at consumer protection. Encouragement for employee share-ownership creates yet another overlap between worker and private investor interests (see equation 52 and Proposition 6) thus insuring a smooth transfer of the enterprise to the private sector.

Supporting evidence for this conjecture can be found in Jones et al. (1994). Their study examined 168 public share offerings made by 137 companies from 34 countries, during the period 1961-1993. The results reveal that public share offerings are concentrated in democracies, especially in Europe.\(^{30}\) These issues tend to be very large and include allocations to employees and restrictions on foreign ownership. Moreover, governments initiating public share offerings often retain veto control over major changes in the structure and ownership of the firm. The findings detect an inverse relation between the amount of foreign allocation and the degree of underpricing, suggesting that underpricing is used to build domestic political support.

Countries where the government is less sensitive to public opinion, implying an ineffective $\phi_1$, $\phi_3$, and $\phi_4$ marginal support functions, are more likely to be characterized by a close relationship between government officials and a small number of private investors. Nomenklatura Companies are an extreme form of such privatization where a large-scale underpricing term is designated to the

\(^{30}\)Jones et al. report the results of a logit regression suggesting that public share offerings are more likely to occur the more stable the political environment in the country.
managers of the state-owned enterprises. Legislator compensation is more likely to be pecuniary than political in nature. It should be noted that such asset transfers have occurred a little bit before but also after the collapse of Communism and the institution of a democratically-elected government.

Voucher privatization has been implemented in Czechoslovakia, Lithuania, Poland, Russia, and Mongolia. In principle, this form of privatization could be classified as another form of Popular Capitalism. However, based on the cases of Russian, Czech, and Polish privatizations, Boycko et al. (1994) show how the specific elements of those programs were designed to meet different political constraints in each country. The low levels of accumulated private wealth and the extremely uneven distribution of public wealth have dictated that voucher privatization would be the only publicly acceptable program. A second constraint was the political power of incumbent managers. To overcome this constraint, managers were retained in office and allowed to acquire large ownership stakes at subsidized prices. Likewise, special demands of employees in privatizing companies were met by offering them exclusive privileges of stockholders, including free grants of shares. Thus although voucher privatization could theoretically take the form of classical Popular Capitalism, its implementation can be regarded as a midpoint on the continuum between the two extreme prototypes.

Another midway approach to privatization is to reserve a core shareholding for strategic investors with a significant stake in the company. This method of privatization could be justified on the grounds of the need to promote investment in infrastructure and to inject advanced technology into industries for the benefit of society at large. In many cases however, this form of divestiture reflects the actual forces operating in the political market of a given country. Notable examples are the first round of privatization in Chile, during the years 1974-1979 (see Hachette and Luders, 1993), and the case of Israel (see Giza, 1996). In addition, Lopez-de Silanes (1997) reports that in a study of all 236 privatization contracts made in Mexico between 1983 and 1992, 87% involved sales of control rights, while the remaining 13% were sales of government minority ownership in firms that had already been privately controlled.
This form of privatization is frequently associated with a stronger incentive to grant the privatized company a long-term monopoly concession. Moreover, the underpricing term is appropriated to the core control group. In sum, this variant of privatization tends to involve an intermediate level of government vulnerability to public criticism, i.e., a level lower than in Popular Capitalism but higher than in Nomenklatura Companies.

B.2. Differences Across Industries

Even in the classic model of Popular Capitalism implemented enthusiastically by HM Government, there were differences across the various enterprises (see Price Waterhouse 1989 and 1990, and Pirie 1988). The current subsection attempts to explain this diversity, consisting of public share offerings, private sales to business groups, and management or employee buyouts, by reflecting on the nature of the political process (see Subsection IV.C above). A key factor in determining the effectiveness of the marginal political support functions of taxpayers and consumers, featuring the public at large, is the size of the per-capita stake. In our view, choice of privatization method is closely related to the motivation of these interest groups to respond politically to a given privatization plan.

The proposed model identifies major economic attributes of candidates for privatization, which approximate the interests of these stakeholders and hence affect the choice of divestment method. The first attribute is the size of the industry, represented either by $V(m_x)$ or by total revenue. This factor appears in all of the equations delineating the Kuhn-Tacker first order conditions for maximization. Apart from affecting per-capita stake directly, privatization of sizable firms almost always becomes a public issue, which is widely reported in the press. This enhances economies of scale in producing information. It is, therefore, anticipated that larger enterprises tend to be privatized through public share offerings.

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31 For the case in which the self-sustainability constraint is nonbinding, see equations 43, 50, 52, and 60.
The second and third attributes are price elasticities of demand and business loss function, \( \eta \) and \( \varepsilon_{\text{sp}} \), respectively. More elastic demand and greater potential for new entrants make the possibility that the new private owners will exploit the enterprise for generating monopoly rents less intimidating. Equation 57 implies that a greater elasticity of demand, or a larger \( \varepsilon_{\text{sp}} \), reduce expected private investor gains from price increases, perhaps due to the availability of good substitutes. This actuality is also articulated in inequality 58, which proposes a lower upper bound on \( \theta \). Moreover, inequality 55 reveals that these parameters have the same effect on the limiting value of the price-cost ratio when the self-sustainability constraint is binding. Therefore, as a first order effect, it is expected that public criticism of private sales will decline when competition is greater or when good substitutes are readily available. Nevertheless, \( \eta \) and \( \varepsilon_{\text{sp}} \) interact with the other economic attributes to magnify taxpayer per-capita stake, thereby offsetting this effect (see below).

The next major economic attribute of candidates for privatization is expected gains from more efficient production. This term, which appears in equations 60 and 43, raises the stakes of taxpayers and consumers, respectively. Greater expected efficiency gains are more likely to raise public concern that they would be exploited by the new private owners. Therefore, this attribute is expected to press in the direction of public share offering.

In analyzing equation 60, while the former consideration can be viewed as an 'income effect', an analogous 'substitution effect' can be ascribed to the term representing expected productivity gains as well. Other things being equal, this term magnifies the firm value effect, thereby emphasizing the relative insignificance of the underpricing term. Hence, the 'substitution effect' might make a staged privatization strategy that aims at cutting down revenue losses, less politically expedient. Since the expected rate of cost decline interacts with the price elasticities \( \eta \) and \( \varepsilon_{\text{sp}} \), a more elastic demand or greater business loss response to price increase magnify both 'income' and 'substitution' effects. As a second order effect, greater elasticity of demand may generate a one-stage public share offering. This may also occur when the business loss function is more sensitive with respect to price.
The last major economic attribute of an enterprise is technological. Equation 52 indicates that taxpayer and consumer per-capita losses from a marginal wage increase are proportional to the semi-elasticity of costs with respect to wage, representing labor share in costs. Thus, the proposed theory predicts that public opposition to an employee buyout will be stronger in more labor-intensive enterprises. Again, this effect is enhanced with η and ε^{sp}, due to greater deadweight costs. Nevertheless, since industry size forms the basis for estimating per-capita stake, this feature is expected to dominate the other attributes.

The British privatization program is used here to illustrate the validity of the theory, based on information for 69 firms that were privatized during the period 1977-1990.\footnote{The only case of privatization prior to 1979 was that of British Petroleum, where 17\% of the company was offered for sale in June 1977.} The data source is Price Waterhouse (1989, 1990). Thirty-seven firms were privatized through public share offerings, while 32 were divested through private sales. Table 1 contains a summary of the program's characteristics broken down by type of privatization. Evidently, public share offerings are typically much larger than private sales. The average gross proceeds from sale in the first issue is £780 million, compared with £55 million for private sales. Likewise, the average value of one percent in the first issue of flotations far exceeds the corresponding quantity of private sales (£10.1 million versus £0.6 million, respectively). Moreover, six of the public share offerings were staged privatizations, whereas all of the private sales were firms to be divested in one phase. This signifies some government sensitivity with respect to taxpayer criticism of revenue losses resulting from underpricing in sizable firms where the per-capita stake is relatively large.

In addition, 26 of the 37 public share offerings are classified as industries with limited competition: 10 are water holding companies, 12 are regional electricity providers, two are port authorities, one is a gas supplier, and the last is a telecom carrier. All of these enterprises, except for one, were subject to regulatory constraints aimed at consumer protection (see Beesley and Littlechild, 1989). Finally, in 32 of the 37 public share offerings the government secured a
Table 1. UK Privatization Program 1977-1990. Summary of Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Public Share Offering</th>
<th>Private Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Enterprises</td>
<td>37</td>
<td>32</td>
</tr>
<tr>
<td>Utilities, Telecommunications or Ports</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>Management or Employee Buyouts</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>Special Share with Veto Rights</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td>Subject to Regulatory Constraints</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>No. of Staged Privatizations</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Average Gross Proceeds From Sale in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the First Issue (m £)</td>
<td>780</td>
<td>55</td>
</tr>
<tr>
<td>Average Value of One Percent in the First Issue (m £)</td>
<td>10.1</td>
<td>0.6</td>
</tr>
</tbody>
</table>


special share with veto rights aimed at protecting the public interest. In private sales, only one firm was subject to such a procedure. Hence, this primary examination of the UK privatization program is consistent with the predictions of the theory presented in this paper with respect to size and price elasticities of demand and the business loss function.

VI. Summary and Conclusion

The current paper attempts to explain the prevalence of different divestment methods across countries and industries. Emphasis has been placed on the distribution of the benefits from increased efficiency among the different groups, shedding some light on the Pareto-efficiency aspects of privatization. The analysis does not restrict the impact on individual groups to positive gains. Rather, it proposes a method for testing the hypothesis that privatization is initiated by the political sector as a response to changes in the parameters of the political market. According to this view, privatization introduces a Pareto-dominating mode of
operation, which generates greater political support. Therefore, when applied to specific cases, this analysis helps determine the validity of the approach that views privatization as an application of Coase’s Theorem (1960).

By comparing the relative wealth effects of the different interest groups, one can learn about the political influence of these groups in a given industry. Moreover, through identification of the major political and economic parameters relevant to privatization, the proposed model improves predictions with respect to the choice of an industry as a candidate for privatization, timing of the transition, the form it will take, and the allocation of resources it will bring about. Likewise, it helps explain the different approaches to privatization across countries, based on the distinctive political constraints faced by empowered governments. Consequently, this approach enhances understanding of the process and ultimately provides a broader basis for modeling government behavior.

The continuum of possibilities for a country’s privatization program ranges from Popular Capitalism to Nomenklatura Companies. It is argued here that since underpricing is a universal phenomenon during privatization, the key to understanding any selected pattern of privatization lies in the identity of the individuals constituting the seemingly innocent term ‘private investors’. It is hypothesized that governments that are more vulnerable to public criticism will generally exhibit a greater tendency towards Popular Capitalism, and thereby attempt to spread the underpricing term across a larger constituency. Less sensitive governments are more likely to opt for such midpoints on this continuum as a voucher privatization scheme or a core shareholding privatization. Nomenklatura Companies represent the extreme case in which managers overtake the company’s valuable assets at a negligible cost.

In an attempt to explain cross-industry differences, principal economic attributes affecting taxpayer and consumer per-capita stake are identified. The current analysis shows that industry or firm size, price elasticities of demand and business loss function, and expected gains from more efficient operation are positively related to these groups’ stakes. This implies a greater tendency toward public share offerings. Moreover, greater labor intensity enhances public opposition to an employee buyout.
When examined in light of actual instances of privatization, the current analysis concludes that greater political influence of taxpayers will not necessarily result in less underpricing of shares in divested enterprises. It is more likely that such influence will affect the distribution of the underpricing component across the country's population. Moreover, revenue maximization, normally thought of as a distinctive economic objective to be analyzed separately, can be obtained as an optimum under certain conditions in the political market. The ability to predict rather than assume this pattern of government behavior attests to the power of the theory.

References


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33 Jones et al. (1994) refer to this objective by claiming that "in the absence of politics, the purely economic motivation for SIPs (share issue privatization) is to maximize offering proceeds by selling to the highest valued users...".


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