

**THE WELFARE AND POLITICAL ECONOMY DIMENSIONS OF
PRIVATE VS STATE ENTERPRISE**

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I. INTRODUCTION

There is little doubt that privatization has become a worldwide phenomenon over the last decade and a half. During that time much has been written about why privatization has had such widespread appeal. While there are no universally accepted explanations, the poor economic and financial performance of many public enterprises and the demonstration effect resulting from cases of successful privatization have been used as convincing arguments for privatization by the International Monetary Fund and the World Bank (Berg, 1981, Kikeri, Nellis and Shirley, 1992).

Explanations for the poor performance of public enterprises have been theorized from a variety of perspectives, collectively referred to as the theory of government failure. A central theme of these theories is the idea that public ownership leads to the pursuit of objectives that detract from economic welfare maximization (Willig, 1993; Boycko, Shleifer and Vishny, 1996). The combined force of the government failure literature, the principal-agent, property rights and public theories, conclude that enterprises operating under public ownership will be less efficient compared to their private sector counterparts.

The principal-agent critique relies on arguments based on the existence of information asymmetries and the absence of market mechanisms in the public sector to justify the non-welfare maximizing behaviour of public enterprises (Wolf, 1979; Vickers and Yarrow, 1988; Andic, 1992). The property rights theory supports privatization by arguing that a simple reassignment of property rights into private hands will improve efficiency through a change in the incentive system that alters decision-making behaviour. Despite the restrictive assumptions needed to arrive at this result, the theory continues to be used to rationalize the superiority of private over public ownership. Central to the public choice argument favouring privatization is the notion that everyone involved in decision-making in the public sector seeks to maximize their own vested interest, which in general, is not identical to the public interest. The result is again a picture of public enterprise that operates with higher costs and lower productive efficiency than comparable enterprises in the private sector.

The theoretical treatment of privatization in industrialized countries has largely concentrated on the 'ownership effect' that is deduced from the property rights and principal-agent perspectives (Vickers and

Yarrow, 1988). Public choice perspectives have not been fully integrated into the main theoretical literature on privatisation. The conventional starting point for a welfare analysis of public ownership assumes the operation of some 'ideal' public enterprise. This type of public enterprise maximizes welfare W , which is defined as some weighted sum of consumers' and producers' surplus. In this form the objective function of the enterprise is akin to that of a benevolent planner, as seen in the stylized representation given by Vickers and Yarrow (1988). They argue state ownership is superior to private ownership when the 'ownership effect' is absent. In this case, maximum W is attained at $AC = P$, the first-best position. Such an outcome assumes public enterprises operate in a competitive market, and other non-welfare inducing influences are not considered.

The theoretical treatment of public enterprises in developing countries has not been extensively developed. In general, the developing country case is simply represented as a deviation from the ideal or first-best state, with public enterprises operating inefficiently and with higher costs, that invariably absorb large amounts of public subsidy. Indeed, the significance of the budgetary burden and its ramification for international borrowing have featured large in the case made for privatization in developing countries (Cook and Kirkpatrick, 1995). In contrast, the importance of non-economic explanations of privatization in developing countries has received relatively little attention (Cook and Minogue, 1990; World Bank, 1995). Similarly there has been little attempt to explicitly model the economic and non-economic factors that influence the process of privatisation in developing countries and account for its consequences.

The purpose of this paper is to reassess and extend the theoretical treatment of the welfare and political economy dimensions of the choice between public ownership and privatization. We continue by outlining the characteristics of a more general model of public enterprise that is applicable to both industrial and developing countries. We then examine the welfare and political economy implications of public ownership and privatization under different assumptions for market structures. The final section draws conclusions.

II. THE MODEL

A. The Market

We begin by depicting the market for X as given by the demand function $P = a - bx$. This is the simplest but most often used starting point (Bradburd, 1992). The average cost c of producing X in a public enterprise is assumed to be constant and may not reflect a high degree of technical efficiency. Indeed the average cost is likely to vary with different market structures. The level of output is given by $P = c$, where the economically efficient output level for the prevailing market structure is $X^E = ((a-c)/b)$. This will be the reference point for subsequent analysis.

B. The Public Enterprise

The public enterprise is assumed to be a monopolist. This can be rationalised on the basis of a government fiat or as a result of the need for economies of scale. The public enterprise maximizes an unspecified objective function (an example is Willig's (1993) $[CS + PS + aJ]$, where J is a composite term that encapsules all political and self-serving influences) and produces at output level X^S . Whatever its level, we assume that it is some multiple of X^E , the economically efficient output level determined by setting price equal to average cost, i.e., $X^S = (1 + \beta)X^E$, where $-1 < \beta \leq 1$. If $\beta = 0$, we get the $AC = P$ firm associated with the work of Bradburd and others. If $\beta = 1$, then $X^S = 2X^E$ and we have what is generally known as a 'pure Niskanen type of public enterprise', i.e., one that produces at a level of output that is twice the economically efficient level. It is likely that in a large number of cases $\beta > 0$ since price increases have typically been experienced after enterprises have been privatised (Rees, 1984).

As long as $0 < \beta \leq 1$, then the state is subsidizing X . This is because $c > P$. The level of subsidy will rise as β rises. If $\beta < 0$, and $c < P$ then the public enterprise contributes positively to public sector finances. The size of the term β will be influenced either by political and extraneous factors or by the degree of monopoly power exercised by the public enterprise, especially where those who run it have some effective proprietary control over profits.

C. The Welfare Index

In order to compare the welfare outcome of a public enterprise against a private business, we extend the most straightforward welfare index, defined as $W = CS + PS$, to include state subsidies and the bureaucratic cost of the regime (Willig, 1993; Bradburd, 1992; Vickers and Yarrow, 1988). Thus, our welfare index is

$$W^i = CS^i + PS^i(1-r) - qS^i - J^i \quad (1)$$

where CS^i is consumer's surplus, PS^i is producer's surplus, S^i is the state subsidy provided to the enterprise and J^i the bureaucratic cost implied in regime i . We have $S^i \geq 0$ and $J^i \geq 0$. The term r refers to society's relative valuation of producer's and consumer's surplus. If $r = 0$, then $PS + CS$ are equally valued. If $r > 0$, then society places a greater emphasis on providing benefits to consumers and, therefore, CS is valued higher than PS . An $r < 0$ means PS is valued more than CS . Similarly, q is the value attached to the subsidy S by society. A $q = 1$ indicates that society values a subsidy to the state-operated enterprise as equal to the best alternative use of state funds. If $q > 1$, the subsidy is considered inferior to alternative uses of state funds and, therefore, implies a misallocation of resources. The social welfare level in case of the state-owned enterprise operating at X^S is then given by $W^S = CS^S + PS^S(1-r) - qS^S - J^S$. Since $PS^S = J^S = 0$ at regime S (i.e., the firm as a state-operated enterprise), $W^S = CS^S - qS^S$. By definition, the state subsidy is $S^S = (c-P^S)X^S$, where P^S is the price charged by the state enterprise. The level of welfare for a state-owned enterprise can, therefore, be fully represented by:

$$W^S = \int_0^{X^S} (a-bX) dX - cX^S + N^S = \int_0^{X^E(1-\beta)} (a-bX) dX - cX^E(1-\beta) + N^S \quad (2)$$

In this formulation the social opportunity cost of the subsidy is given by $N^S = cX^S(1-q) + P^S(q-1)X^S$. We first discuss the term under the integral. The first integral term in equation (2) equals the second integral term in the same equation. We find it easier to work with the second expression. Thus, the welfare level W^S is the integral from 0 to $X^E(1-\beta)$, less the cost of producing $X^E(1-\beta)$, less the cost of producing $X^E(1-\beta)$, plus N^S . Since $N^S = [(c-P^S)X^E(1+\beta)]/(1-q)$, which can be interpreted as the negative of the social opportunity cost of the state subsidy to the state-operated enterprise, a level of $q = 1$, will give $N^S = 0$, indicating that the subsidy is as valuable to the state as any alternative use, i.e., the opportunity cost is

zero. If $q < 1$, then $N^S > 0$, indicating that the subsidy is well spent in relation to the best alternative uses and, as a consequence social welfare will improve. If $q > 1$ then the term N^S becomes negative and welfare falls. However, if $c = P^S$, i.e., $X^S = X^E$, then $N^S = 0$ regardless of the value of q . It should also be noted that $(c - P^S) \geq 0$ if and only if $\beta \geq 0$. With this outcome N^S becomes a critical variable in the debate over private versus public ownership.

In summary, we then have:

$$W^S = ((a-c)/b)(1-\beta)[a-c-(b/2)((a-c)/b)(1-\beta)] + N^S, \quad (3)$$

which reduces to:

$$W^E = [(a-c)^2/2b][1-\beta^2] + N^S. \quad (4)$$

The welfare term W^S then represents the social value of the public enterprise. It can be further noted that if $\beta = 0$, then the first best welfare level is retained as $W^S = W^E = [(q-c)^2/2b]$. At the other extreme, if $\beta = 1$ then $W^S = N^S$, i.e., the effect of overproduction is to completely dissipate the consumer's surplus which leaves the cost of the subsidy. This complete dissipation is the Niskanen limit.

The welfare equation (4) provides implications for the managerial behaviour of state owned enterprises as follows:-

- Claim 1: (a) The social value of the state-operated enterprise rises with a rise in demand ('a' rises), a fall in the average cost 'c' provided $q \leq 1$ and a reduction in the demand slope 'b';
- (b) If $q > 1$ and b is close to 1 or if q is close to 1 and $b > |0.5|$ then the social value of the state-operated enterprise is negative;
- (c) The social value of the state-operated enterprise falls as q rises;
- (d) If $q \geq 1$, the social value falls as β rises.

Claim 1(a) is intuitive since it predicts that the management of state-operated enterprise will attempt to exaggerate demand and under-report actual costs in order to justify its budget (Rees, 1984). Claim 1(b) implies that management will spend resources to support the proposition that the state subsidy is valuable

to society, with the result that the production level will be in excess of the efficient level in the partial equilibrium sense.

III. PRIVATIZATION AND MARKET STRUCTURE

The remainder of the paper examines the welfare consequences of privatization under various market structures and behavioural assumptions (which we refer to as regimes). We first examine the case of an unregulated monopolist when there is no ownership effect resulting from privatization. We then analysis the case when an ownership effect is present. The final part of this section of the paper brings in the contrasting cases of privatization with forms of regulation and deregulation.

A. The Private Unregulated Monopolist: No Ownership Effect

The unregulated private monopolist sets $MR = P$. If we assume there is no ownership effect after the privatization i.e., either the public enterprise is already technically efficient (Borcherding, et.al., 1982; Millward and Parker, 1983) or that the absence of competition after privatization maintains the previous cost inefficiency (Kay and Thompson, 1986), then output is $X^M = ((a-c)/2b)$ and $P^M = (a+c)/2$. The welfare level with this type of monopolist, W^M , given that S^M and J^M are zero, is defined as:

$$W^M = \int_0^{X^M} (a-bX)dX - cX^M - D^M = a[(a-c)/2b] - (b/2)((a-c)/2b)^2 - (c(a-c)/2b) - D^M, \quad (5)$$

where $D^M = rPS = r(P^M - c)X^M = [r(a-c)^2]$. Equation (5) gives the social value of the enterprise as an unregulated private monopolist after correcting for the differential treatment of PS. The welfare gain (loss) of privatizing a technically cost-efficient public enterprise into an unregulated private monopolist (using (4) and (5)) is:

$$W^M - W^S = ((a-c)^2/2b)(\beta^2 - 0.25) - N^S - D^M. \quad (6)$$

We may also refer to equation (6) as the opportunity cost (if positive) of the public enterprise relative to an unregulated private monopoly. Note the prominence of both N^S and D^M ; if $q > 1$, then N^S becomes

negative and adds to the welfare gain from privatization. If $r > 0$, then D^M is positive and reduces the gain from privatization.

Equation (6) decomposes the opportunity cost of the public enterprise into three main effects: (i) $((a-c)^2/2b)(\beta^2-0.25)$ shows the overproduction effect; (ii) N^S can be referred to as the subsidy valuation effect; and (iii) D^M the redistributive effect resulting from privatization. Using this formulation we can derive the definition of N^S and D^M :

Claim 2: When $q > 1 - [(\beta^2-0.25-(r/2))/2(1+\beta)\beta]$, then $W^M - W^S > 0$, i.e., the privatization of a cost-efficient public enterprise into a private unregulated monopolist is welfare improving.

Claim 2 shows the valuation of the subsidy q , given b and r , that is needed to make the privatization of an unregulated monopolist welfare improving. Claim 2 also allows for a number of interesting special cases. Consider the example of neutral social valuation, i.e., $q = 1$ and $r = 0$.

Corollary 1: Suppose $q = 1$ and $r = 0$. Then a β value of greater than plus or minus $|0.5|$ is a necessary and sufficient condition for welfare improvement.

In this case, if $\beta > 0.5$ the overproduction of the public enterprise is consuming more of the subsidy than it is creating consumer's surplus. This is true even if $q = 1$, i.e., the subsidy is as valuable as any other use of state funds. If $\beta < -0.5$, the public enterprise is currently producing a greater Harberger loss than even a private monopolist. Thus, privatization always pays. Interesting cases similarly arise when $q = 1$, $\beta > 0$ and $r = 0$.

Whether privatization is considered welfare improving or not is obviously then conditioned by how society values the state subsidy. It is this variable that can tilt the balance in favour of privatization. In the 1950s and 1960s the prevailing consensus seemed to be that q is less than 1. This means that the subsidy used in this way represents a superior use of resources. For example, the Labour government in the United Kingdom could be expected to feel comfortable with $q < 1$ because it was its voting constituency that benefited from the state subsidy and redistribution was a compelling social goal. This is in keeping with the view expressed by Boycko, Shleifer and Vishny (1996) that public ownership is less transparent

and therefore is the preferred way to transfer rent to a favourite electoral constituency. This is especially the case if it can be disguised through other goods.

The societal valuation of q seems to have shifted in the late 1970s and into the 1980s towards $q > 1$, with the consequence that subsidies to state enterprises were devalued in political terms. Again, the Conservative government elected in the UK after 1979, found it imperative for electoral as much as efficiency ends (the 'British Disease') to cut subsidies. Clearly the value established for q is influenced by a very wide range of factors. In terms of developing countries the valuation for q (moving towards $q > 1$) has been strongly influenced by the prevailing orthodoxy of the international financial institutions through their structural adjustment programmes.

We extend the analysis to examine the cases of different types of state-operated enterprise. First, consider the public enterprise that produces at $P = \text{Average Cost}$ (a Lerner enterprise). This means that it produces at X^E and $\beta = 0$ (and $c = P^S$). We have from Claim 2:

Corollary 2: The privatization of a cost efficient Lerner public enterprise into an unregulated private monopolist is (a) *always welfare reducing* if $r \geq 0$ (i.e., society has a redistribution bias, and (b) *welfare improving* if $r \leq -0.5$ (i.e., society has a anti-redistribution bias).

Second, consider the Niskanen (1971) public enterprise. This type of enterprise produces at an output level twice the economically efficient output level, i.e., $X^S = 2X^E$ and $\beta = 1$. From Claim 2, we have:

Corollary 3: (a) The privatization of a cost efficient Niskanen public enterprise into an unregulated private monopolist is *always welfare improving* as long as $q \geq 1$ and $r \geq 0$.

Corollary 2 is of some interest because we can equate the Vickers and Yarrow public enterprise (i.e., the ideal public enterprise) with the Lerner public enterprise. Both will be producing at $AC = P$, where output equals X^E and $\beta = 0$. In this situation we reach the same conclusion as Vickers and Yarrow via corollary 2(a) that state ownership is preferred to private ownership. Our model shows, however, that even without an ownership effect, with neutral valuation and no strong redistributive type of subsidy, privatization can still be welfare improving. In this case a welfare improvement is conditioned by an

initial value for $\beta > |0.5|$, i.e., the output of the public enterprise either exceeds the economically efficient level by a half or falls short of the output level that would be set by a monopolist (Corollary 1).

Further, our model allows us to say something more definite about the Niskanen public enterprise, and account for the Willig (1993) observation that, as the weight 'a' given to J (the non-welfare-bound influences) rises, the government will prefer to privatize. As 'a' rises, β also rises (and presumably q rises) and, as a result, the likelihood of a welfare improving privatization rises.

The model also permits us to examine how the gains or losses from privatization vary with changes in the structure of demand. The demand elasticity here is not unique and changes with output. The structure of demand is thus represented directly by the intercept 'a' and the slope ' β '. We have, therefore, from equation (6):

Corollary 4: The welfare gain (loss) from the privatization of a cost-efficient state-operated enterprise into an unregulated monopolist:-

- (a) rises as the market expands ('a' rises);
- (b) rises as access to substitutes falls (' β ' falls);
- (c) rises as cost efficiency rises ('c' falls) as long as $q = 1$.

This result has a political economy implication. It is likely that the public enterprise management will attempt to switch strategy once privatization into an unregulated monopoly has been proposed. This could be achieved by underemphasizing the size of the market (making 'a' appear smaller), exaggerating access to substitutes (' β ' reported as higher) and overstating actual costs. The interesting policy implication that arises from this is that public enterprise managers could be required to defend their budgets to a privatization committee. In this instance it could be the case that the threat of privatization alone could influence managerial behaviour (Cook and Kirkpatrick, 1995).

B. Private Unregulated Monopolist: When Ownership Matters

The change from public to private ownership can also change the property rights and the incentive structure in the enterprise. Vickers and Yarrow (1985), Bos (1986) and Bos and Peters (1991) among

others, dwell on this aspect in detail. Empirical evidence seems also to lean in favour of the claim that ownership matters (Borcherding, et.al., 1982) although the findings are by no means conclusive. Numerous studies have found no cost differences between private and public monopolist (Millward and Parker, 1983; Millward, 1988).

We formalize the effect of a shift to private ownership as a reduction in average cost 'c', i.e., the average cost under private monopoly becomes $c^0 = c(1-o)$, $0 \leq o < 1$. If $o = 0$, then the ownership effect is absent. A value of $o > 0$ implies that a change in the incentive structure, property rights and monitoring intensity of the privatized enterprise will result in a reduction in average cost. This result is also obtained in Bradburd (1992).

In this case the unregulated monopoly output is $X^{Mo} = ((a-c^0)/2b)$ and $P^{Mo} = [(a+c^0)/2]$. The welfare level W^{Mo} associated with X^{Mo} is

$$W^{Mo} = a((a-c^0)/2b) - (b/2)((a-c^0)/2b)^2 - c^0((a-c^0)/2b) - D^{Mo}. \quad (7)$$

Where $D^{Mo} = r[(a-c^0)^2/4b]$. Since $c^0 < c$ for $o > 0$, if $r > 0$ where $D^{Mo} > D^M$. Since profit is larger as a result of the ownership effect but profitability is less valued, the deduction to welfare under ownership effect is larger. The welfare gain (loss) associated with privatization into a private unregulated monopoly with an ownership effect is, after rearranging:

Claim 4:

$$W^{Mo} - W^S = ((a-c)^2/2b)(b^2 - 0.25) + (oc/8b)[6(a-c) + 3oc] - N^S - D^{Mo}. \quad (8)$$

This generalizes equation (6) since if $o = 0$, equation (6) results.

Corollary 5: Suppose $r = 0$. A sufficient condition for welfare-improving privatization of an economically efficient (Lerner) public enterprise ($\beta = 0$) into an unregulated private monopolist is where the ownership effect on average cost (given by $-oc$) is $o > ((a-c)/=6c)$.

The implication of this condition is that when ownership matters, the high cost argument used to oppose privatization by the old public enterprise management has to be rejected. This is because privatization with an ownership effect, while reducing the first expression in equation (8), tends to raise the second, i.e., oc . Note that equation (8) is positive even if $(a = c)$. This result is compatible with that of Vickers and Yarrow (1988), where the required sufficiency condition for a welfare improvement from privatization is that the ratio of the monitoring cost for the private and public manager has to be less than a particular value. It also compares with the result obtained by Bradburd (1992). If $r < 0$ and $\beta > 0$, then many more possibilities open up for welfare improving privatization.

C. The Regulated Private Monopolist

The shift from a publicly-owned monopoly to a privately-owned monopoly need not result in unbridled profit maximization, when regulation becomes a feature of the post-privatization game. There are various ways of accomplishing this:

- (i) Parital Privatization - or the sale of only part of the total available shares of the enterprise which results in the formation of a mixed board of directors, is one way. The semi-privatized enterprise then maximizes an objective function that is a convex combination of profit and welfare. This process has been extensively investigated by Bos and Peters (1986, 1988, 1991). The consequence of this type of privatization is a movement down the demand curve with output settling somewhere between X^M and X^E .
- (ii) Price Cap - is a regulatory mechanism that restricts the prices charged to customers. The cap is set by a regulatory body (sometimes acting relatively independently, as in the UK case). The result of this type of regulation if it is binding is also a movement down the demand curve and output lying between X^M and X^E .
- (iii) Profit Rate Regulation - often referred to as rate of return regulation (examples are prevalent in the US and Jamaica) established for private utility companies. If binding, the result is again the same as above.

Although the microeconomic adjustments to these rent mitigating approaches may differ (e.g., profit rate regulation leads to overcapitalization), our treatment of them will dwell only on their common elements.

Let the regulated output, for all the above cases, be X^R . We discuss the case of a technically efficient public enterprise where the ownership effect is redundant, i.e., the average cost 'c' does not change with privatization. There is some evidence of this. Pescatrice and Trapani (1980) claim that US public firms have lower cost than private regulated firms. We can incorporate the regulatory effect as artificially raising the total revenue of the privatized enterprise, i.e., if TR is real total revenue, either of these regulatory approaches will then force management to operate 'as if' the effective total revenue is $TR(1+e)$, $e > 0$. $TR(1+e)$ becomes the 'virtual' total revenue in the 'virtual' profit function. For example, the enterprise may be forced by environmentalists in the board to consider the positive externality effects of its output. Thus, the enterprise's output decision is dictated by $(1+e)MR = c$ which is similar to the way in which an externality would be treated. Note that e could well be negative. If we define $h(e) = e/(1+e)$, we can rewrite this condition as $MR = c' = c(1-h(e))$, $h' > 0$, $0 \leq h < 1$. Thus, the regulatory processes outlined above are likely to force the enterprise to operate as if its average cost is lower at $c' = (1-h(e))c$. The output level provided by this condition is $X^R = ((a-c(1-h(e)))/2b)$. Letting the cost of regulation be $J > 0$, the welfare level associated with X^R , which is produced at average cost c is:

$$W^R = \int_0^{X^R} (a-bX) dX - cX^R - JD^R = a((a-c')/2b) - (b-2)((a-c')/2b) - J - D^R, \quad (9)$$

where $D^R = [r(a-c')^2/4b]$ defined as above. The welfare gain or loss implied is:-

Claim 4:

$$W^R - W^S = ((a-c)^2/2b)(b^2-0.25) + ch(2(a-c)-ch)8b - J - N^S - D^R. \quad (10)$$

Once again the prospect for a welfare improving privatization, given J, is promising even with $b < 0.5$. Thus, from a policy perspective, the possibility of implementing monopoly regulation strengthens the position of those who argue in favour of privatization even if there little prospect of an ownership effect working after an enterprise is transferred to the private sector.

The gain from privatization if $q > 1$, $r \geq 0$ must be weighed against the regulation cost $J > 0$, which is considered a black box in our analysis. The expression $ch(2(a-c)-ch)$ can be positive or negative. This is because X^R maximizes 'virtual' profit at cost $c(1-h)$ while actual cost c is higher. This implies that X^R

does not maximize true profit. There is an area between c and $c(1-h)$, that the privatized enterprise is forced to subsidize.

D. Privatization with Deregulation

Thus far we have looked at cases of privatization into a monopoly, whether regulated or unregulated, and with and without an ownership effect. The above cases were appropriate for the so-called natural monopolies, e.g., public utilities. The authorities could, however, simply attempt to deregulate in the cases where natural monopolies do not exist. In this section we consider the situation with respect to the likely privatization of a public enterprise into an oligopoly of n firms. This can arise when enterprises are restructured and broken up into smaller enterprises during the pre-privatization period. We assume these firms are identical, producing a homogeneous product X and brandishing identical Cournot conjectural variation with respect to the behaviour of other players in the market. The aggregate output of n firms at Nash equilibrium is $X^N = [(a-c(n))/b][n/(n+1)]$. We need to define the average cost function $c(n)$.

In this case, we assume that there is both an ownership effect and a competitive effect on the cost function. The ownership effect reduces the average cost to $c(1-0)$ as before. But competition among n firms forces a further reduction of the average cost to $c(n)=c(1-0)(1-d(n))$. The condition $0 \leq d(n) \leq 1$ reflects the Schumpeterian idea that innovation and R & D activities are most pronounced in a competitive oligopoly where some rents are available and market power exists. Thus, $d'(n) > 0$ for some low $n \geq 2$ and $d'(n) \leq 0$ as n becomes large and rents disappear. This is best treated in a Chamberlinian product differentiation framework which allows for enterprise differentiation due to innovation and the flattening of the demand curve. Here we assume for analytical simplicity that differentiation by innovation is a short-run phenomenon while, in the long run, innovation diffusion takes over so that long-run average cost is the same $c(n)$ everywhere (or enterprises that fail to catch up collapse and are replaced). The cost of this assumption is that the demand curve does not flatten with a rise in the number of firms.

Let $c(N) = -c(n)-c = cd(n) + c(1-d(n))$. The associated welfare W^N is:-

$$W^N = \int_0^{X^N} (a-bX)dX - c(n)X^N = a[(a-c(n))/b][n/(n+1)] - (b/2)[(a-c(n))n/(n+1)b]^2 - c(n)[a-c(n)][n/(n+1)b] - N^S - D^N, \quad (11)$$

where $D^N = [r(a-c(n))/4b]$. The privatization gain (loss) in this case is

Claim 5:

$$\begin{aligned} W^N - W^S = & [(a-c)^2/b][(b^2/2)-0.5+(n+2)n/2(n+1)^2] \\ & + [(c(N)/b)(n/(n+1))][(a-c)(n+2)/2(n+1)] \\ & + [((a-c)/b)+(c(N)/b)][n/(n+1)][c(N)(n+2)/2(n+1)] - N^S - D^N. \end{aligned} \quad (12)$$

Equation (12) shows the social opportunity cost of the public enterprise relative to privatization with deregulation. If we let $n = 1$ and $c(N) = oc$, we get the result obtained in equation (8). If $c(N) = 0$, i.e., there are no ownership and competition effects on cost, and $n \rightarrow \infty$, we see that $[(n+2)n/2(n+1)^2] \rightarrow 0.5$ and $W^N - W^S \rightarrow ((a-c)^2/b)(b^2/2)$. Thus:

Corollary 6: Suppressing ownership, competition and valuation effects ($q = 1$), the privatization of a public enterprise into a Walrasian competitive environment ($n \rightarrow \infty$) is always welfare improving as long as $\beta \neq 0$.

In general, this result is also independent of any cost efficiency gains. It depends solely on the existence of either a fiscal deficit or a Harberger deadweight loss associated with the public enterprise. However, it should be noted that the result is also true for cases where $B < 0$, i.e. it holds even when the public enterprise was not loss-making before privatization.

Of course, allowing for the ownership and competition effects on cost (technical) efficiency raises the welfare gains of privatization even if the public enterprise is initially of the Lerner (economically efficient) type ($\beta = 0$). From (12), we have:

Corollary 7: At the Walrasian limit ($n \rightarrow \infty$), the gain from privatizing a Lerner public enterprise is

$$[c(N)/2b][(a-c)(b+2) + 1] > 0. \quad (13)$$

This gain comes purely from $c(N) > 0$, i.e., either from the ownership effect on cost (-oc) or from the competition effect on welfare (-dc) or some combination of each. Equation (13) can be referred to as the 'pure privatization with deregulation effect', since it is attained via a cost reduction which is not possible under public ownership. These are inherently connected with property rights and competition. Note that the concept of Walrasian limit can also be associated with free trade if X is a tradeable good.

IV SUMMARY AND CONCLUSIONS

Despite the obvious limitations of our analysis we have shown that the welfare gain or loss from privatization depends critically on the initial assumptions made about public enterprise operations prior to privatization (the size of β), on the social valuation of the subsidy extended to the state-operated enterprise (the size of q) and on the type of privatization undertaken. This is the case irrespective of whether we are analysing the situation in an industrialised or a developing country context.

We have been able to derive a number of general conclusions with respect to the outcome of privatization, which will be different according to the types of market structures that have been assumed and the degree to which the authorities plan to intervene through forms of regulation. In the case of (i) a private unregulated monopolist, the parameters β (representing overproduction due to non-welfare inducing influences) and q (social valuation of the subsidy) are of critical importance. An initial state of $\beta > |0.5|$ is a condition for welfare privatization if $q = 1$. If $q > 1$ then the scope for welfare improvements arising from privatization is broader. We feel that the shift to higher values for q in recent years, with q becoming a more significant variable than efficiency, has stimulated the move to privatization in the world economy.

With regard to (ii) a private unregulated monopolist with an ownership effect, privatization can be welfare improving even if $\beta = 0$. In this case the public enterprise is economically efficient but not technically efficient. For (iii) a regulated monopolist, the welfare result is ambiguous owing to the potential cost of regulation and the potential losses to the enterprise. Nonetheless, the larger is the initial β the higher the prospect for a welfare gain from privatization. With respect to (iv) an oligopoly with an ownership and competition effect on cost, privatization can be welfare improving even if $\beta = 0$. In this instance the public enterprise is economically efficient, at the Walrasian limit.

Finally, the welfare analysis of privatization presented in this paper can be used to analyse the behaviour of public enterprises when faced with only the threat or prospect of privatization.

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