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THE WELFARE AND POLITICAL ECONOMY DIMENSIONS OF PRIVATE VS STATE ENTERPRISE

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I.   INTRODUCTION

There is little doubt that privatisation has become a worldwide phenomenon over the last two decades. During that time much has been written about why privatisation has had such widespread appeal. While there are no universally accepted explanations, the poor economic and financial performance of many state-owned enterprises and the demonstration effect resulting from cases of successful privatisation have been used as convincing arguments for privatisation (Kikeri, Nellis and Shirley, 1992).

Explanations for the poor performance of state-owned enterprises have been theorised from a variety of perspectives in recent years, collectively referred to as the theory of government failure. A central theme of these theories is the view that public ownership leads to the pursuit of objectives that detract from economic welfare maximisation (Willig, 1993; Boycko, Shleifer and Vishny, 1996). The combined force of the government failure literature, the principal-agent, property rights and public choice 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 explain the non-welfare maximising behaviour of state-owned enterprises (Wolf, 1979; Vickers and Yarrow, 1988; Andic, 1992). The crux of this literature is to examine the ways in which privatisation through a change in ownership creates a new principal-agent relationship. Privatisation is predicted to enhance managerial effort which will improve enterprise efficiency. This is achieved because the efficacy of the incentive system that is designed to maximise the effort of agents, even in an environment of incomplete information and incomplete contracts, is viewed as more effective under private than public ownership. Under certain conditions Shapiro and Willig (1990) also argue that state ownership actually provides more information than is obtainable in a private company. But this command

over information gives politicians and government officials a greater opportunity to exploit their own self-interested agendas with a consequent adverse implication for efficiency. The property rights theory supports privatisation 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 restrictive assumptions needed to arrive at this result, the theory continues to be used to rationalise the superiority of private over public ownership. Central to the public choice argument favouring privatisation is the notion that decision-makers in the public sector seek to maximise their own vested interest, which in general, is not identical to the public interest. The result is again a picture of state-owned enterprise that operates with higher costs and lower productive efficiency than comparable enterprises in the private sector (World Bank, 1995).

The theoretical treatment of privatisation has largely concentrated on the 'ownership effect' that is deduced from the property rights and principal-agent perspectives (Vickers and Yarrow, 1988). This literature traces the mechanisms by which different institutional arrangements affect incentives. In particular, the literature on contracts has been used to examine, in a multiprincipal framework, how differences in incentives arise between public and private ownership structures (Laffont and Tirole, 1991). Public choice perspectives have not been fully integrated into the main theoretical literature on privatisation, even though it has influenced policy-makers and international development agencies such as the World Bank (Cook, 1997). The importance of non-economic explanations of privatisation has received relatively little attention in both the theoretical and empirical literature (Cook and Minogue, 1990).

The conventional starting point for a theoretical analysis of public ownership assumes the operation of some 'ideal' state-owned enterprise. This type of state-owned enterprise maximises 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 stylised 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. From a theoretical perspective this result is achieved when state-owned

enterprises operate in a competitive market, and other non-economic, non-welfare inducing influences are assumed to be absent.

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 privatisation. The welfare analysis of privatisation presented in this paper can be used to examine a variety of situations. It could be used to analyse the implications of policies designed to reform state-owned enterprises without changing ownership or to investigate the welfare effects that the threat of privatisation rather than actual privatisation might entail. We continue by outlining the characteristics of a more general model of state-owned enterprise. We then examine the welfare and political economy implications of public ownership and privatisation 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 for the analysis of state-owned enterprises (Bradburd, 1992). The average cost c of producing X in a state-owned enterprise is assumed to be constant. This assumption does not necessarily imply that the public enterprise is operating with a high degree of technical efficiency. Indeed the average cost is likely to vary with different market structures. In this simple case 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 condition will be the reference point for subsequent analysis.

B. The State-Owned Enterprise

Initially the state-owned enterprise is assumed to be a monopolist. This can be rationalised on the basis of a government fiat or as a result of economies of scale. The state-owned enterprise maximises an unspecified objective function 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 $-1 \leq \beta \leq 1$. If $\beta = 0$, we return to the

AC = P condition associated with state-owned enterprises described by Bradburd and others. If $\beta =$ 1, then $X^S = 2X^E$ and we have what is generally known as a 'pure Niskanen type of state-owned 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 subsidising X. This is because $c > P$. The level of subsidy will rise as β rises. If $\beta < 0$, and $c < P$ then conversely the state-owned enterprise contributes positively to public 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 state-owned 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 state-owned enterprise against other regimes, we extend the most straightforward welfare index, defined as $W = CS + PS$, to include state subsidies and the regulatory cost of the regime (Willig, 1993; Bradburd, 1992; Vickers and Yarrow, 1988). Thus, our welfare index for regime i is

$$W^i = CS^i + PS^i(1\text{-}r) - qS^i - J^i \tag{1}$$

where CS^i is consumer's surplus, PS^i is producer's surplus, S^i is the state subsidy provided to the enterprise, (qS^i) is the social opportunity cost of the subsidy associated with regime i, and J^i the regulatory 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 and 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 $q = 0$ indicates that society values a subsidy to the state-operated enterprise as equal to the best alternative use of state funds and the opportunity cost is zero. If $q > 0$, the subsidy is considered inferior to alternative uses of state funds and, therefore, suggests a misallocation of resources.

The social welfare level in the regime of the state-owned enterprise, i.e., $i = S$, 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 and no additional regulatory mechanism exists), then $W^S = CS^S - qS^S$. 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:

$$W^S = \int_0^{X^S} (a-bX)dX - cX^S - q(c-P^S)X^S. \tag{2}$$

The welfare level W^S is the integral of the demand function from 0 to $X^E(1+\beta)$, less the cost of producing $X^E(1+\beta)$, less the opportunity cost of the subsidy. A $q < 0$ indicates that the subsidy is more valuable to the state than any alternative use, i.e., the opportunity cost is negative. However, if $c = P^S$, i.e., $X^S = X^E$, then the last term is zero regardless of the value of q. It should also be noted that $(c-P^S) \geq 0$ if and only if $\beta \geq 0$. The social cost of subsidy becomes a critical variable in the debate between private and public ownership. Note that $(c - P^S) = (a - c)\beta$ and (2) becomes:

$$W^S = X^E(a-c)2^{-1}[(1+\beta)(1-\beta(1+2q))]. \tag{3}$$

The welfare term W^S then represents the social value of the state-owned enterprise. It can be further noted that if $\beta = 0$, then the first best welfare level is retained as $W^S = W^E = [(a-c)^2/2b]$. At the other extreme, if $\beta = 1$ then $W^S = -qS^S$, i.e., the effect of overproduction is to completely dissipate the consumer's surplus which leaves only the cost of the subsidy. This complete dissipation represents the Niskanen limit. Note that $(\partial W^S/\partial\beta) = [+][1 - (1+2q)(2\beta + 1)] < 0$ if $q > 0$ but positive if $q \leq -0.5$. Also, $(\partial W^S/\partial q) = -[+](1 + \beta)2\beta < 0$ where $[+] = X^E(a-c)/2$. We summarize these in Claim 1.

Claim 1:
(a) $W^S = W^E$ if $\beta = 0$; $W^S = -qS^S$ if $\beta = 1$; $W^S = 0$ as $\beta(1+2q) = 1$;.
(b) $(\partial W^S/\partial\beta) < 0$ for $q > 0$ but positive if $q \leq -0.5$.
(c)   The social value of the state-operated enterprise falls as q rises as long as $\beta > 0$;

(d)   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';

Claim (1)(a) shows that overproduction separates a cost efficient state enterprise from first best. Claim (1)(b) says that W^S falls with a rise in β if $q > 0$. However, W^S rises with β if q is negative and less than (1/2) in absolute value. This suggests the inclination of the management of the state enterprise, when the opportunity cost of the subsidy is perceived to be negative ($q < 0$), to go for a raise in subsidy. Claim 1(d) is intuitive since it predicts that the management of a state-owned enterprise will attempt to exaggerate demand and under-report actual costs in order to justify its budget (Rees, 1984).

III.   PRIVATISATION AND MARKET STRUCTURE

The remainder of the paper examines the welfare consequences of privatisation under various market structures and behavioural assumptions (which we refer to as regimes). We first examine the case of a private monopoly that is unregulated and where privatisation entails no significant changes in managerial incentives as a result of the change in ownership. We then analyse the case when an ownership effect is present. The paper is then extended to show the predicted welfare outcomes when public enterprises are privatised as monopolies with regulation, and alternatively where some degree of competition exists in the market.

A.   The Private Unregulated Monopolist: No Ownership Effect

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

$$W^M = \int_0^{X^M} (a-bX)dX - cX^M - D^M = X^M(a - c)((3/4) - (r/2)). \qquad (4)$$

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Equation (4) gives the social value of the enterprise as an unregulated private monopolist after correcting for the differential treatment of PS. The welfare level of a private monopolist requires [r < (3/2)] to be positive. If r = 0, $W^M > 0$. Thus, the redistributive valuation is the crucial factor in the social welfare value. The welfare gain of privatising a technically cost-efficient state-owned enterprise into an unregulated private monopolist (using (3) and (4)) is:

$$W^M\text{-}W^S = X^M (a\text{-}c)[(3/4) - (r/2) - (1 +\beta)(1 - \beta(1 + 2q))].\tag{5}$$

We may also refer to equation (5) as the opportunity cost (if positive) of the state-owned enterprise relative to an unregulated private monopoly. Note the crucial role played by overproduction (β), social valuation of subsidy (q) and redistributive valuation r on the sign of the opportunity cost. We have the following:

Claim 2:   The privatisation of a cost-efficient state-owned enterprise into a private unregulated monopolist is welfare improving, whenever H < 0.75, where H = {(r/2) + (1+β)(1-β-2βq)}.

Note that H rises with a rise in r, the bias against producer's surplus, rises with a rise in q, the social value attached to state subsidy and rises with β (specifically the derivative of (1+β)(1-β(1+2q)) with respect to β is -2q (1+ β) < 0). Stating these formally, we have:

Claim 3:   The likelihood of a welfare-improving privatisation of a state-owned enterprise into an unregulated monopoly rises with a fall in r, with a rise in q and with rise in β.

In this formulation, whether or not privatisation is considered welfare improving will obviously be conditioned by how society values the state subsidy and producer's surplus. It is these two variables that can tilt the balance in favour of privatisation. In the 1950s and 1960s the prevailing consensus among policy-makers in both industrialised and developing countries seemed to be that q is less than 0 and r is positive. In this case a subsidy used for public enterprises represented a superior use

of resources. For example, the Labour government in the United Kingdom in the early 1970s could be expected to feel comfortable with q < 0 and r > 0 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 state subsidy and producer's surplus seems to have shifted in the late 1970s and into the 1980s towards q > 0 and r ≤ 0, with the consequence that subsidies to state enterprises were devalued in political terms. A MORI opinion poll conducted in the late 1970s in the UK indicated that a growing number of people believed that private enterprises were more efficient than nationalised industries (Heald, 1988). 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 adopted for q is influenced by a very wide range of factors. The growing disapproval of fiscal deficits is a factor. In the case of lower income countries, the valuation for q (moving towards q > 0) has been strongly influenced by the prevailing orthodoxy of the international financial institutions through their structural adjustment programmes, which emphasise private sector development and hard budget constraints (Cook and Kirkpatrick, 1995).

The value of q will undoubtedly depend also on the nature of the industry. In the UK the completion of the privatisation programme by the mid-1990s indicates that society's perception of q rose for all industries. In some instances, low values of q were retained for some industries, such as railways, even when the general view regarded a subsidy to state enterprise as wasteful. The value of q may be heavily influenced by the political process over time. In the example of railways above, subsidies were initially regarded highly (as they were for coal and water during the 1980s), since the public knew railways were loss-making but were not prepared to let them be privatised. Over time, the demonstration effect from other acknowledged successful privatisations and vigorous campaigning as to the benefits to be derived from privatisation by the government,

succeeded in changing popular opinion away from using public funds to support the industries that had not yet been privatised.

In some countries the view of the subsidy to state-owned enterprises may also be shaped by the extent to which alternative mechanisms and institutions for redistribution have been developed. In lower income countries a preference for a low value of q may be retained simply because it is believed that state enterprises constitute the most viable means to implement redistributional policies because the fiscal system is inadequately developed. Whether or not a low value of q can be sustained under severe fiscal pressure is debatable. Clearly, in the case of low income countries trade liberalisation measures may contribute to declining fiscal revenue which change the publics' perception of the high cost of subsidies to state-owned enterprises and actually increases political pressure for privatisation (Yarrow, 1999).

We extend the analysis to examine the cases of different types of state-operated enterprise. First, consider the state-owned enterprise that produces at P = 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 1:   The privatisation of a cost efficient Lerner state-owned enterprise into an unregulated private monopolist is welfare improving if $r \leq -0.5$ (i.e., society has a anti-redistribution bias). It is welfare-reducing otherwise.

Second, consider the Niskanen (1971) type state-owned 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 2:   The privatisation of a cost efficient Niskanen state-owned enterprise into an unregulated private monopolist (a) where the opportunity cost of state subsidy $q = 0$, is *always welfare improving* as long as $r < 1.5$; and (b) where the redistribution bias does not exist ($r = 0$) is welfare-improving if $q > 0$ or if negative, $q < -(3/16)$.

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Corollary 1 is of some interest because we can equate the initial Vickers and Yarrow state-owned enterprise (i.e., the ideal state enterprise) with the Lerner state enterprise. Both will be producing at $AC = P$, where output equals X^E and $\beta = 0$. We give the condition for the conclusion of Vickers and Yarrow as to when state ownership is preferred to private ownership. Corollary 2 shows that even without an ownership effect, with neutral valuation or no strong redistributive type of subsidy, privatisation can still be welfare improving. In this case a welfare improvement is conditioned by an initial value for β, i.e., by how much the output of the state-owned enterprise exceeds the economically efficient level.

The model also permits us to examine how the gains or losses from privatisation 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 'b'. We have, therefore, from equation (5):

Corollary 3:   The welfare gain (loss) from the privatisation 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 ("b"falls);
        (c)   rises as cost efficiency rises ('c' falls).

This result has a political economy implication. It is likely that the management of the state-owned enterprise will attempt to switch strategy once privatisation 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 ('b' reported as higher) and overstating actual costs. The interesting policy implication that arises from this is that managers of state-owned enterprises could be required to defend their budgets to a privatisation authority. In this instance it could be the case that the threat of privatisation 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 (Kikeri, Nellis and Shirley, 1992; Galal et al, 1994), although the findings are by no means conclusive. Numerous studies have found no cost differences between private and public monopolies (Millward and Parker, 1983; Millward, 1988).

We formalise the effect of a shift to private ownership as a reduction in average cost 'c', i.e., the average cost under private monopoly becomes $c^0 = c(1-e)$, $0 \le e < 1$. If $e = 0$, then the ownership effect is absent and we are back to Section III.A. A value of $e > 0$ implies that a change in the incentive structure, property rights and monitoring intensity of the privatised 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 $P^{MO} = (a+c^0)/2$. Clearly, $X^{MO} > X^M$ and $P^{MO} < P^M$. The welfare level W^{MO} associated with X^{MO} is (analogous to (4)).

$$W^{MO} = X^{MO}(a-c^O)((3/2) - (r/2)). \qquad (6)$$

Clearly, where $X^{MO} - X^M \ge 0$ for $0 \le e < 1$. The welfare gain associated with privatisation into a private unregulated monopoly *with an ownership effect* rises with e.

Claim 4:   The likelihood of a welfare-improving privatisation to an unregulated monopoly rises with ownership effect. The effects of q, r and β are the same as in Claim 3.

If, as in the case above, the ownership effect matters, then the high cost argument typically used to oppose privatisation by the old management of state enterprises has to be rejected. This is because privatisation has an ownership effect. This result is compatible with that of Vickers and Yarrow (1988), where the required sufficiency condition for a welfare improvement from privatisation 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 privatisation. We recognise that the arguments for government failure can be extended to the process of privatisation. There is evidence that opportunities for political patronage may simply not be removed through privatisation (Hood, 1994).

C.   The Regulated Private Monopolist

The shift from a publicly-owned monopoly to a privately-owned monopoly need not result in unconstrained profit maximisation. Regulation has become a feature of the post-privatisation game. There are various ways of accomplishing this:

(i)   Partial Privatisation - 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-privatised enterprise then maximises 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 privatisation 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 overcapitalisation), 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 state-owned enterprise where the ownership effect is absent, i.e., the average cost 'c' does not change with privatisation. 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 or lowering average cost c of the privatised enterprise, i.e., if c is the real average cost, any of these regulatory approaches will then force management to operate 'as if' the *effective average* cost is $c' = c(1-t)$, $0 \le t \le (a-c)c^{-1}$. The upper limit of t will become clear later. For example, the enterprise may be forced by the regulators to lower its price to the public. Thus, the enterprise's output decision is dictated by $MR = c(1-t)$. We will call t the "regulatory depth" over the post-privatisation monopoly. If $t > 0$, the price of the regulated monopolist is lower than if unregulated. Thus, the regulatory processes outlined above are likely to force the enterprise to operate 'as if' its average cost is lower at c'. The output level provided by this condition is $X^R = [(a-c')/2b]$. This increases with t. The social valuation of PS is $D^R = r[P^R - c]X^R = [r(a-c-ct)/4b][a-c']$. This falls as t rises.

Let the cost of regulation be $J^R = sh(t)X^R n^{-1}$, $s > 0$, $h(0) = 0$ and $h' \ge 0$, i.e., the cost of regulation is directly proportional to the product of the average output $X^R n^{-1}$, and some function h(.) of regulation depth t. In this case, $n = 1$. The welfare level associated with X^R, which is produced at true average cost c, is:

$$W^R = \int_0^{XR}(a-bX)dX - cX^R - J^R - D^R =. \ X^R(a-c)[1-(a-c')(4(a-c))^{-1} -$$

$$sh(t)(a-c)^{-1} - (r/2)(a-c+ct)(a-c)^{-1}].$$

(7)

Note as a check that if $t = 0$, this is exactly equal to (4), the welfare outcome of privatisation to a private monopolist without ownership effect or $W^R = W^M$. Note that W^R is a function of regulatory depth t. Likewise, we have: (i) $D^R = (r/4b)[(a-c) - (ct)^2]$ which falls as t rises; (ii) the partial of $\int^{XR}(a-bX)dX - cX^R$ with respect to t is $(c/4b)[a-c-ct] \ge 0$ for $t \le (a-c)c^{-1}$; (iii) J^R rises with t if $h' >$

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0. Thus, the response of J^R is small due to small s or if h' is small or equal to zero, then W^R rises unambiguously with a rise in t. We have:

<u>Claim 5</u>: (i) If h'(t) is small or equal to zero (i.e., J^R does not change with t), or for small enough s, then the higher the regulatory depth, the higher is the welfare, W^R, associated with a private monopolist. (ii) If $t = (a - c)c^{-1}$, then $X^E = X^R$ and $W^R = W^E - J^E$, where $J^E = sh(t)X^E > 0$.

<u>Proof</u>: We show (ii). Note that for $t = (a-c)c^{-1}$, $X^R = (a - c + ct)(2b)^{-1} = 2(a-c)(2b)^{-1} = (a-c)/b = X^E$. The parenthesised expression [.] in (7) becomes $[1 - (1/4) [(a-c)(a-c)^{-1} + c(a-c)c^{-1}/(a-c) - sh((a-c)c^{-1}) - (r/2)(1-1)] = [0.5 - sh(t)(a-c)^{-1}]$. Thus, $W^R = X^E(a-c)[0.5 - sh(t)(a-c)^{-1}] = W^E - X^E sh(t) = W^E - J^E$.

Claim (5)(ii) says that even an extremely aggressive regulator, who aims for first best output X^E, will never attain W^E due to the attendant cost of regulation. But a regulator, under the circumstance, always improves the welfare outcome. Thus, regulation raises the possibility of welfare-improving privatisation.

D. Privatisation with Varying Degrees of Deregulation

Thus far we have looked at cases of privatisation into a monopoly, whether regulated or unregulated, and with or 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 privatisation of a state enterprise into an oligopoly of n firms. This can arise when enterprises are restructured and broken up into smaller enterprises during the pre-privatisation 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 $X^N = [(a-c(n))/b][n/(n+1)]$. $p^N = [0 + c(n)](1+n)^{-1}$. We need to define the industry long-run 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 initial average cost to C(1-e) as before, where "C" now stands in for the fixed "c" in the previous sections, the initial average cost of the state monopolist. But competition among n firms forces a further reduction of the complete average cost to $c(n) = C(1-e)(1-d(n))$. We recognise that in some circumstances an increase in the number of firms can also reduce efficiency (Martin, 1993). The condition $c'(n) < 0$ 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. Likewise, $d(1) = 0$. 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. To keep the treatment simple, 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 c(n) is the same 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. This tends *ab initio* to underestimate the gains from privatisation. Now $D^N = r[P^N - c]X^N$, and $J^N = sh(t)X^N n^{-1}$ as in the previous section.

The associated welfare W^N is:

$$W^N = \int_o^{X^N}(a-bX)dX - c(n)X^N - D^N = X^N(a - c(n)) \,[(2 + n)(2(1 + n)^{-1} - r(1 + n)^{-1}$$
$$sh(t)(a - c(n))n^{-1}]. \tag{8}$$

Note that for $n = 1$ and $t = 0$, $W^N = W^M$ without ownership effect. Furthermore, as $n \to \infty$, $W^N \to W^E$.

Claim 6: (a) If $n = 1$ and $t = 0$, $W^N = W^M$; (b) As $n \to \infty$, $W^N \to W^E$, the Walrasian competitive market outcome.

Since W^E is first best welfare level (the technically efficient Lerner state enterprise), and since $W^E >$ W^S if $\beta \neq 0$, we have:

Corollary 4:   (a) Even suppressing ownership, redistribution and surplus valuation effects (e = 0, r = 0 and q = 0), there always exists n* > 0 such that the privatisation of a state enterprise into n* firms 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 dead-weight loss associated with the state enterprise. However, it should be noted that the result is also true for cases where $\beta < 0$, i.e. it holds even when the state-owned enterprise was not loss-making before privatisation.

Of course, allowing for the ownership and competition effects on cost (technical) efficiency raises the welfare gains of privatisation even if the state enterprise is initially of the Lerner (economically efficient) type ($\beta = 0$). From (8), we have:

Corollary 5:   At the Walrasian limit (n → ∞), the gain, if it occurs, from privatising a Lerner state enterprise ($\beta = 0$)   comes solely from improved technical inefficiency via the ownership and competition effects.

This gain comes either from the ownership effect on cost (-ec) or from the competition effect on welfare (-dc) or some combination of each. Equation (8) can be referred to as the 'pure privatisation 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 tradable good.

IV SUMMARY AND CONCLUSIONS

We first derived the welfare outcome W^S of a state-operated enterprise which incorporates the level of overproduction β and the social valuation of subsidy. This is equation (3). We note that $W^S = W^E$, the first best welfare outcome of a cost-effective Lerner state enterprise. If $\beta = 1$, W^S equals the cost of the subsidy and is negative if the alternative use of the subsidy is better (i.e., the subsidy implies a social opportunity cost). If the authorities perceive the subsidy to exhibit a negative opportunity cost, then a state-enterprise will always appear desirable (Claims 1(a), 1(b)). As the social valuation of the subsidy falls, the social value of the overproducing state enterprise falls (Claim 1(c)). The social value always falls with a rise in β; rises with a rise in demand or a fall in average cost.

We next turn to the welfare impact of privatisation into an unregulated private monopoly. A welfare improvement is more likely to occur with privatisation the higher is the overproduction (β) of the state enterprise, the lower is the opportunity cost of subsidy (q) and the lower is the social value of redistribution (r) from producer to consumers. The privatisation of a cost efficient Lerner state enterprise ($\beta = 0$) to an unregulated private monopolist is welfare improving if there is a social bias in favour of producers surplus to the tune of $r < 0.5$ (Corollary 1). If the state enterprise is a cost-efficient Niskanen one ($\beta = 1$), privatisation improves welfare as long as $r < 1.5$. In other words, the redistribution bias in favour of consumers should be extreme ($r \geq 1.5$) for privatisation to reduce welfare. If the redistribution bias does not exist ($r = 0$), then the welfare improvement in the case of Niskanen enterprise follows as long as $q > 0$ or if $q < 0$, it is small in absolute value, i.e., the social opportunity cost of subsidy is either positive or, if negative, quite small ($q < 3/16$). The gain from privatisation to an unregulated monopolist again rises with a rise in the market size, rises with access to substitutes and with a fall in average cost (Corollary 3). If private ownership reduces average cost, the welfare improvement of privatisation is strengthened since the reduction in average cost raises the welfare impact of privatisation (Claim 4).

The case of privatisation to a regulated private monopolist requires the explicit recognition of the cost of regulatory mechanism J. We assumed J to be proportional to average output of the industry (output of the private monopolist in this case) and the extent t of regulatory intervention. The

comparator here is the unregulated private monopolist. Higher regulatory depth (t) raises the likelihood of a welfare-improving privatisation to a private monopolist (Claim 5(ii)). Thus, the desirability of privatisation improves.

When privatisation is accompanied by varying degrees of deregulation proxied by the number of firms, we show that the welfare impact W^N is such that $W^M = W^N$ for n = 1 and $W^N \rightarrow W^E$ as n $\rightarrow$ ∞, the Walrasian limit. There always exists an n* > 1 so that privatisation of the state enterprise with $\beta \neq 0$ into n* firms is welfare-improving (Corollary 4). If the state enterprise is not under- or overproducing ($\beta = 0$), any welfare improvement from privatisation must come from efficiency improvement due to ownership and/or competition.

The purpose of this paper has been to demonstrate that efficiency gains were only part of the privatisation analysis in the 1970s and 1980s. The social value attached to redistribution in favour of consumers, the opportunity cost of subsidy and the political pressures associated by overproduction, were also crucial.

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