

Distr.
RESTRICTED

E/CEPAL/BRAS/Sem.2/R.5

1 May 1983

ORIGINAL: ENGLISH

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ECLA
Economic Commission for Latin America
Office in Brasilia

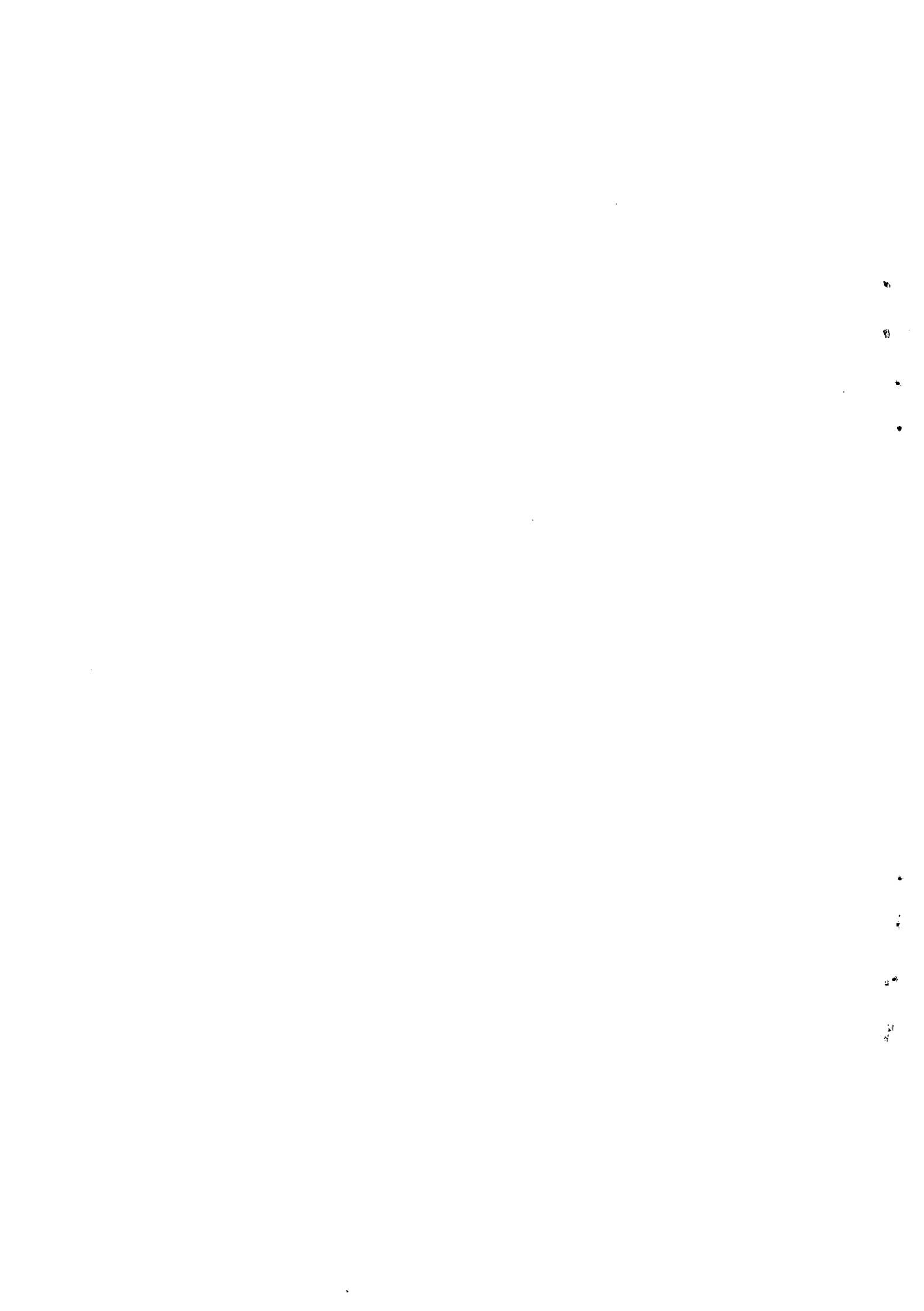
State Control and Planning of Public Enterprises
Seminar - organized within the framework of the Agreement
between the Economic Commission for Latin America (CEPAL) and
Brazil's Economic and Social Planning Institute (IPEA).

Brasilia, 15 - 17 June 1983



THE LINKAGE BETWEEN OBJECTIVES AND CONTROL MECHANISMS
IN THE PUBLIC MANUFACTURING SECTOR

This paper, prepared by Leroy P. Jones of Boston University, was originally presented at the UNIDO Conference on "The Changing Role and Function of the Public Industrial Sector in Development" held in Vienna, 1981, sponsored by United Nations.



I. THE ISSUES

This paper was commissioned as a link between the "why" papers concerning the "ends" of public enterprise (i.e., motives and goals) on the one hand and the "how" papers concerning "means" (e.g., organizational structure, performance evaluation) on the other. The basic question is: to what extent do different ends imply different means so that the appropriate control mechanisms vary in some systematic way across sets of enterprises with different objectives? More specifically, if public enterprises in manufacturing have different objectives than those in utilities, trade or finance, then does this imply different organizational structures, performance evaluation systems or degrees of enterprise autonomy?

These questions are asked in the hope that policy guidance can be derived from a specification of goals so that the perpetual controversies on appropriate public enterprise control policies can be narrowed, if not eliminated, by focusing on particular public enterprise sub-sets defined according to their objectives. That is, the underlying premises are: that policies must follow from objectives; that all too often common policies are applied to enterprises having diverse objectives; and that the mismatch between policies and objectives is particularly acute in the manufacturing sector.

There are abundant examples of public enterprise writings which follow this logic. One general form might run as follows: most public enterprises should pursue both commercial and non-commercial ob-

jectives, but the mix varies from enterprise to enterprise; as the role of commercial objectives increases, the enterprise should be increasingly responsible to markets instead of ministers; and this in turn implies such policies as more autonomy, and a greater role for profit as a performance indicator. For example, the original Morrisonian "Theory of the Public Corporation"^{1/} argued that the commercial activities of the government required more autonomy than that provided by the departmental legal form and subsequent literature has suggested a plethora of alternative control devices supposedly appropriate for commercial activities. None of these devices has proven broadly successful, leading some to the view that the mixing of commercial and non-commercial objectives in one institution is inherently uncontrollable, leading to failure to achieve either objective. The solution which follows is a strict institutional segregation of objectives with public enterprises being confined to commercial objectives and leaving all non-commercial objectives to other government agencies. What Morrison and Fernandez share is the notion that some control structures are more appropriate for some objectives than others.

^{1/}Herbert Morrison, Socialization and Transport (London: _____, 1933). For an excellent survey of the evolution of this body of literature, see: R. S. Arora, Administration of Government Industries (New Delhi: Indian Institute of Public Administration, 1969).

This paper assesses the strengths and limitations of such arguments. It can be thought of as a verbal matrix in which one dimension is objectives and the other is control policies. The two dimensions are defined in turn and their interdependence is then considered.

II. OBJECTIVES

A. General

The space constraint precludes discussion of specific objectives. Instead, this section distinguishes between various classes of objectives in an effort to clarify the issues.

B. Commercial versus Non-Commercial Objectives

The distinction between commercial and non-commercial objectives is both common and useful, but is not generally well defined. At the extremes of course, the distinction is clear: commercial objectives are similar to those of private firms and they include such things as increasing sales and keeping unit costs to a minimum. Non-commercial objectives concern external effects of enterprise operations such as opening up a backward area, or increasing national security. Fair enough, but what of cases where the objective is recognized by the private firm, but only partially (for example, generation of foreign exchange with an overvalued exchange rate)? Or, what about an objective which could be recognized by a private firm if the government chose to motivate it to do so (for example, reducing pollution through an effluent charge)? Are the objectives of earning foreign exchange or reducing pollution then commercial or non-commercial?

There are many ways to answer this question, but I would suggest the following definition as being operationally useful--commercial objectives are reflected in the accounting system of the enterprise while non-commercial objectives are not. Achievement of commercial objectives may be evaluated at either privately relevant or publicly relevant prices. Generation of foreign exchange is then a commercial objective whose value will vary depending on the price which the accounting system places on a dollar of foreign earnings or savings. Pollution control, on the other hand, can be either commercial or non-commercial depending on whether or not it is both quantified (e.g. in terms of particulate count) and charged within the accounting framework (e.g. as a tax per unit of particulate).

Under this definition, the commercial versus non-commercial partitioning of objectives is not immutable, but varies with the policy environment. This is a critical observation, because it says that the commercial versus non-commercial bifurcation of objectives is not an exogenous variable but an instrumental variable. That is, one major set of public enterprise policy decisions involves the degree to which objectives are commercialized. A common theme of public enterprise reform efforts (e.g. the French NORA Report) is that non-commercial objectives should either be compensated or ignored. One may not wish to go this far, of course, but the main point cannot be ignored--commercialization is one major policy tool for dealing with the problems raised by non-commercial objectives.

C. Existential versus Operational Objectives

Existential objectives are achieved by the very existence of the enterprise and do not alter operational behavior. They affect investment decisions but not operating decisions. Project evaluation criteria are altered, but not performance evaluation criteria. For example, the government might decide to build a large integrated iron and steel plant to achieve objectives such as national security and self-sufficiency in strategic materials. These non-commercial existential objectives are achieved so long as the plant is built and actually produces steel, and the operational objectives are strictly commercial (e.g., to produce as much steel as possible while keeping costs down). Similarly a plant may be located in a backward area in part to achieve the objective of regional development through job creation and spread effects. Once the location decision is made, however, this objective has been achieved and the plant can still be operated according to commercial principles. Other objectives are operational and can only be achieved by altering on-going behavior. A particularly important sub-category is pursuit of income distribution objectives which require sale at a subsidized rate. Or, in the context of regional development, an enterprise may be required to spend some of its operational funds on roads, schools, housing, sanitation, etc.

The distinction between existential and operational objectives is germane because of its relationship with the commercial versus non-commercial bifurcation. The reason is that many non-commercial objectives for manufacturing firms are existential rather than opera-

tional. To the extent this is so, an enterprise established in part to achieve non-commercial objectives can nonetheless operate according to commercial principles. To be sure, it may earn a lower rate of commercial return (say, in a backward region) but the interests of society can be served by its operating so as to make that return as high as possible (assuming the return is measured correctly). The degree to which non-commercial objectives are existential is open to question, but I would suggest that in the manufacturing sector, the correspondence is great and that failure to appreciate this is a fundamental source of difficulty. To illustrate, in pursuit of job creation it is legitimate to choose a technology involving 50 men and 50 shovels over a technology employing one bulldozer and one man; the existential choice of technology decision having been made, the enterprise should then operate to maximize its surplus, generating resources to be used to buy more shovels and generate more employment (or pursue other social objectives). Instead, many public enterprises buy the bulldozer and then hire 50 workers, absorbing surplus in welfare payments to redundant workers and precluding further investment in real jobs. The problem is that an operational tool has been used to do an existential job.

The argument is not that there are no legitimate operational non-commercial objectives in public manufacturing enterprises, only that their share is small relative to both existential non-commercial and operational commercial objectives. If so, then there are clear implications for control procedures. One of these is that commercial accounts serve as a useful starting point for performance evaluation

(though these accounts need to be adjusted to reflect publicly rather than privately relevant profit). Any remaining non-commercial operational objectives can then be allowed for by "commercialization" through a social adjustment account, program contract, or other mechanism. Such devices are necessarily imperfect but may be adequate in a manufacturing firm where their weight is relatively small. It would be quite different in a regional development bank, where non-commercial operational objectives dominate and errors in measurement would be so large as to make the effort questionable as a control tool.

D. Multiple Objectives versus Plural Principals

No discussion of public enterprise objectives can be complete without reference to the problem of multiple objectives. Public enterprises are called upon to pursue a mix of commercial and non-commercial objectives which can include such diverse goals as earning profits, redistributing income, subsidizing particular regions and sectors, earning foreign exchange, generating employment, and increasing the probability that the party in power will be re-elected. Having such a plethora of objectives can be equivalent to having no objective and management is all too often left free to pursue either its own interests or a constantly shifting, incoherent mix.

While the problem of multiple objectives is certainly real, it is also misstated. As Leonid Hurwicz has pointed out,^{2/} the real dif-

^{2/}In discussions at the Second BAPEG Conference on Public Enterprises in Mixed Economy LDC's, April 1980.

difficulty is not one of multiple objectives but of plural principals. The simplest private enterprise faces a conflict between reducing inputs and costs while increasing output and revenues. A variety of programming techniques are available for handling more complicated cases and much of the economics profession is concerned with establishing weights (prices) to allocate resources so as to maximize objective functions involving multiple objectives. The real difficulty occurs when different individuals have different preferences. For a private enterprise, this is a comparatively minor problem since the various stockholders are likely to have similar trade-offs which can be captured in the objective of profit (which is still a complex variable incorporating weights on various conflicting objectives). Similar agreement is unlikely on the weights of the various elements of the social profit function of a public enterprise. The Ministry of Labor may be primarily interested in employment, the Ministry of Finance in profit, the politicians in low prices in an election year, and so forth. The underlying problem is thus one of plural principals with different objective functions.

The problem of multiple objectives then is largely (though not entirely, as we shall see below) one of plural principals which in turn is in part a measurement problem. To clarify matters further, a digression on measurement is necessary.

E. Measurement of Objectives: A Digression

Measurement of objectives has two steps. Both a price and a quantity must be established. The quantity determines the degree of

achievement of the objective, while the price establishes the weight (trade-off) between that objective and others. The product of price times quantity yields a "value" which is the true end of measurement. For some objectives we can quantify the achievement, but not be able to put a price on it. For example, pollution reduction can be quantified in terms of particulate count, but it is much more difficult to decide just how many dollars a particular reduction is worth to society. That is, a quantity can be established, but not a price. For other objectives both quantity and price are difficult to determine; for example, the prestige added by having a national airline or the increment to security from having a domestic munitions factory. The problem of plural principals can then exist when either quantities or prices cannot be agreed upon. For industrial projects the failure to agree on price is probably the more common problem. We can measure both the foreign exchange and the employment generated by a project but the Ministries of Labor and Finance might be expected to disagree on the relative prices to be assigned to the two objectives. Note, however, that a problem can still exist with only a single principal. This will occur if either the quantity cannot be established or if he is unable to decide on his own relative weighting.

The main point, then, is that both the problems of multiple objectives and plural principals can be reduced to the fundamental underlying difficulty of measurement. Difficulties such as these are of course not an obstacle but a challenge to the imagination of the academic community, and a variety of procedures have been proposed for dealing with the problem (e.g., through conjoint measurement the-

ory).^{3/} The applicability of such procedures for alleviating the problem may be debated. Here, the only point is that the critical feature distinguishing various classes of objectives is the degree to which their achievement can be quantified and prices, weights or trade-offs established. The question of the relationship between objectives and control devices can then be reformulated as follows: to what extent does the particular control device vary with the difficulty of measuring objectives? To this question we now turn.

III. CONTROL SYSTEMS

A. Control Systems: The Issues

It is useful to begin by defining a "control system" in the broadest possible sense as the answer to the question: "who makes which decision and why?" At the highest level of generality, the "who" answers may be confined to four foci: the government, the enterprise, the market, or the community. The "which" question is important because it emphasizes that there is no single optimal level of enterprise autonomy. If anything, the search is for an optimal pattern of autonomy, since different decisions should ideally be made in different locations. The choice between different locations for a particular decision depends on the "why" question. Which individual or institution has the information, the professional capability and the motivation to use the decision-making power in the national interest?

^{3/}Howard Raiffa, "Decision-Making in the State-Owned Enterprise." In State-Owned Enterprises in the Western Economies (pp. 54-62), edited by Raymond Vernon and Yair Aharoni (New York: St. Martin's Press, 1981).

The more typical view of the control system is narrower in two respects: first, it focuses on the distribution of autonomy between the enterprise and government, and more particularly on the distribution within government; second it tends to ignore the "why" issues. It thus focuses on such choices as: legal form (departmental enterprise versus public corporation versus joint stock company); buffering (use of a holding company); type of parent ministry (single public enterprise ministry versus functional tutelary ministries); audit control (commercial auditor and/or governmental Board of Audit); etc. While such decisions are certainly important, the position taken here is that they are second-order decisions. First-order considerations involve which decisions should be left to government; it is a second-order consideration as to just where in government it should be taken. This is not to minimize the importance of the second-order decisions. They can be critical, as will be emphasized in other conference papers. Here, however, attention will be confined to the first-order question.

The market and the community must also be considered as alternative control devices. As already noted, markets are an alternative to ministers. In Turkey, credit allocations to public enterprises are made by ministry level decisions, with the (public) banks simply validating the decision by issuing the required credit. Many U.S. public authorities, on the other hand, have the power to issue their own bonds in the market. This is sometimes described as giving the U.S. authority more autonomy. More correctly, however, it should be viewed

as a shift in power from the minister to the market. In neither case can the manager issue his own credit. The difference is that in Turkey he has to convince ministers that he is credit worthy; in the other, he has to convince the market in the form of large private institutional investors. To be sure, the two control organs are likely to define "credit worthiness" in a quite different manner, creating quite different problems for managers, but it is by no means clear that the manager has "more" autonomy. The point is not that control via markets is necessarily superior to control via ministers. Indonesia's Pertamina was for many years allowed to borrow freely in international markets with disastrous results. The point is only that the market must be considered as an alternative to government control and one must ask in what circumstances one is superior to the other. Similarly for community control, as will now be discussed with regard to the specific question of who sets objectives.

B. Who is the Principal? Who is the Agent?

One of the most important elements of the control system, and the one most germane to the present paper, is who sets objectives and why. The answer may seem obvious. Conceptually, it is usually held that the government is the shareholding principal and the enterprise the executing agent. It is then the function of the government to set objectives and the function of the enterprise to achieve them. Despite the obviousness of this notion, it has been disputed by at least two writers.

Aharoni^{4/} has argued that the real principal is the public at large, for whom a variety of agents act, including political parties, the legislative and executive branches of government, and the public enterprises. In short, Hurwicz's "plural principals" become Aharoni's "abundant agents." Each agent's view of the public interest is influenced by their own individual and group interests, thus diminishing their ability to establish trade-offs on behalf of the public. It is then not surprising that public enterprise managers sometimes view themselves as having at least as much of a claim on the objective-setting function as their erstwhile bureaucratic and political superiors. This particular view seems more common among public enterprise managers in individualistic societies such as Israel and the United States,^{5/} and it is easy to think of a number of reasons why the government might be preferred as a setter of objectives (more directly responsible to the people; superior unit in a hierarchy of agents; better equipped with information on broader social goals, etc.) Nonetheless, the basic question is legitimate in asking just which of a tier of agents is best suited to interpret the interests of the citizens who collectively constitute the true principal. Aharoni suggests a pragmatic solution in the form of an independent "goal audit" which provides a periodic public forum for public scrutiny of the

^{4/}Yair Aharoni, "The State-Owned Enterprises: An Agent Without a Principal," in Public Enterprise in Less Developed Countries, edited by Leroy Jones with Richard Mallon, Edward Mason, Paul Rosenstein-Rodan and Raymond Vernon (New York: Cambridge University Press, forthcoming).

^{5/}For a discussion of the impact of cultural differences on public enterprises, see: Ira Sharkansky, Wither the State: Politics and Public Enterprise in Three Countries (Chatham: Chatham House, 1979).

actions of various agents. Howard^{6/} shares Aharoni's skepticism of relying solely on government, but suggests that the problems arising from a chain of agents can be short-circuited by direct community input in the form of worker, community and consumer representation on Boards of Directors and by legal and other institutional intermediary groups to watch over the public interest.

The question then is which agent, under which circumstances, is best qualified to set objectives on behalf of the public principal. In particular, does the answer vary with the type of objective? In a loose sense it seems apparent that the more important non-commercial objectives are, the greater the need for Aharoni/Howard kinds of checks on the objective setting powers of the government. There is of course a logical circularity here with the class of objective determining the appropriate agent who in turn chooses the objective, etc. Nonetheless, it seems to make sense to argue that community/public input is much more important for activities such as a regional development bank, where non-commercial objectives dominate. In such a situation, the community/public representatives constitute a sample whose preferences might be taken as the basis for some Raiffa type of weighting procedure to establish trade-offs. The Aharoni/Howard suggestions then become means for mitigating the measurement problem. At the other extreme, such steps might be trivial for a purely commercial oil exporter whose sole function is to generate surplus to be handed over to the government.

^{6/} John Howard, "The Social Accountability of Public Enterprises: Law and Community Controls in the New Development Strategies," in Jones with others.

C. A Model Control System

If the preceding problem is solved and a proxy principal (best individual or collective) established for the enterprise, then what should the distribution of other decisions be as between the government and the enterprise? The optimal pattern, if there is such a thing, will of course vary across activities, across countries, and across organizations with different histories. Nonetheless, a useful starting point can come from viewing the public enterprise sector as a particular variant of a more general organizational form. To a considerable extent the public enterprise sector can be treated (like a multinational corporation) as a special case of the multidivisional firm. The parent Ministry functions as the head office, the sector corporation is the regional or product-line division and the companies are operating units. In such organizations, what classes of decisions ought to be made at the center, and which at the periphery? More generally, what decisions should be made by any superior unit in a hierarchy? The answers provided to these questions by Williamson^{7/} (for the multi-divisional firm) and Jaques^{8/} (for general hierarchies) are surprisingly similar and may be paraphrased as follows, The head office (or superior unit) should:

- 1) set objectives;
- 2) evaluate performance according to those objectives;

^{7/}Oliver Williamson, Markets and Hierarchies (New York: The Free Press, 1975), pp. 132-154.

^{8/}Elliot Jaques, A General Theory of Bureaucracy (London: Heinemann, 1976), pp. 62-86.

- 3) reward and penalize the chief executive officer according to that evaluation;
- 4) appoint the chief executive officers;
- 5) provide resources (finance);
- 6) conduct long-range planning and coordination among units; and
- 7) do (almost) nothing else.

There are thus six narrow prescriptions and one broad proscription. The proscription is particularly important since it is so often violated. To the extent it is violated, it is no longer possible to hold managers accountable for performance according to objectives. The advantages of hierarchical specialization then break down.

D. Sources of Degeneration

If the foregoing provides an appealing normative pattern for public enterprises, then has the control problem been solved? Unfortunately not, for there is an organizational second-best problem involved. That is, there is an interdependence among the seven precepts such that if one is violated, it is no longer optimal to follow the others. Most importantly, if the prescriptions concerning setting objectives and rewarding achievement fail because of measurement problems, then it is no longer necessarily desirable to follow the proscription.

It is widely held that excessive government intervention in the internal affairs of enterprises is due to reasons such as civil service traditions, political interference, failure of bureaucrats to un-

derstand management practices, etc. While such illegitimate reasons for interference of course are common, it is important to recognize that there are legitimate reasons as well. Briefly, if the government cannot exercise control over results (because it cannot measure and reward performance), then it must exercise control over processes.

To illustrate, consider the determination of the level of working capital. In a private enterprise the power to set the level of working capital is almost invariably delegated to the chief executive officer by the shareholders and the Board of Directors. The assumption is that the manager will keep as much working capital as necessary for efficient operation, but no more, since the funds could otherwise be used to generate income directly (in economists' jargon, he will acquire working capital only up to a point where its marginal cost equals its marginal revenue). The reason that this is a safe assumption is that the manager is judged and rewarded on the basis of profit, which will rise or fall (in part) according to the correctness of decisions on the level of working capital. The board can therefore exercise its control function by examining outcomes (profit) rather than the process by which the outcome is generated. If, on the other hand, the manager has little or no reason to be concerned with raising the profit of the firm, then he might not be expected to make the correct decision on the level of working capital. He might divert funds from more productive uses by keeping levels of inventory and cash far beyond the level necessitated by prudent management, so as to reduce risk and avoid any possible difficult decision--it is after all easier to keep all your funds in a checking deposit account than to con-

stantly shuttle them between short and long-term interest-bearing deposits. Or, he might wish to have the working capital available to absorb possible losses and hence disguise inefficiency and keep the enterprise from being shut down. In such situations, the shareholder cannot wholly delegate the working capital decision.

In the case of public enterprise there are two reasons for government involvement in the working capital decision. The first is macroeconomic control of the aggregate level of credit. This, however, could be accomplished by setting an overall credit ceiling to be allocated by price rationing. This effective delegation to the market would fail, however, if it were feared that managers would take "too much" regardless of the price. As a result of this second reason, various representatives of the government--often high level--can find themselves involved in trying to take detailed decisions as to just what constitutes legitimate working capital levels for individual firms. The difficulties are that the process is time consuming, that the ministries often lack the information and the business expertise to know just what levels are "reasonable" and that scarce ministerial talent could be better used elsewhere. In sum, by any standard of modern management, the working capital decision should be delegated to the enterprise, but given inadequate measurement and reward of objective achievement, it often cannot be.

The foregoing is merely one minor instance of a more general phenomenon. It also can explain ministerial involvement in hiring of

middle-level-management, wage setting, procurement policies, foreign travel, and much else. The legitimate explanation is that when the principal cannot control outcomes, he must control processes. Delegation of operational decisions to an agent presupposes effective control of outcomes. This in turn requires that desirable outcomes be quantified and that there is some incentive mechanism to insure that the manager cares about the outcome. In sum, when the prescriptions are not carried out, then it is often legitimate to violate the prescription, legitimizing intervention as an organizational second-best solution.

We have now identified another link between objectives and policies. When objectives are measureable, then a much broader class of decisions can be delegated to the enterprise and the market.

IV. DISSENT, SYNTHESIS AND CONCLUSIONS

A. Muddling Through: A Dissenting View

The paper you have been reading was obviously written by a narrowly technical economist with a naive faith in a rational decision-making process based on clear specification of goals, establishment of trade-offs involving conflicting parties, followed by judicious choice of "least-cost" means of achieving those goals selected from among a comprehensive set of alternatives. This is all very fine in theory, but it is not the way things work in the real world. More importantly, it is not the way things should work. Lindbloom and others have argued that:

"such a synoptic or comprehensive attempt at problem solving is not possible to the degree that clarification of objectives founders on social conflict, that required information is either not available or available only at prohibitive cost, or that the problem is simply too complex for man's finite intellectual capacities."^{9/}

Instead, public policy decisions require a process of "muddling through" or "disjointed incrementalism" in which conflict is minimized and consensus built by explicitly avoiding focusing on goals, let alone quantifying trade-offs; rather, concern is focused on marginal changes from existing policies with the aim of forging temporary coalitions amongst interest groups who can agree on a particular policy while disagreeing fundamentally on basic objectives.

One piece of evidence for this view is the limited success (failure?) of McNamara's whiz-kids in implementing program budgeting, systems analysis, cost-effectiveness studies and other technocratic solutions in the U.S. Department of Defense. For the public enterprise sector, Murthy^{9/} has argued that one of the major "Stage One" tasks of managers is to adapt to an environment of plural principals by choosing

^{9/A.} O. Hirschman and C. E. Lindblom, "Economic Development, Research and Development, Policy Making: Some Converging Views" (Behavioral Science Vol. 7, 1962, pp. 211-222). For the seminal article, see: C. E. Lindblom, "The Science of 'Muddling Through.'" (Public Administration Review, Spring 1959, pp. 79-88). For a review of Lindblom and an attempted synthesis with the technocratic approach, see: Charles L. Schultze, The Politics and Economics of Public Spending, (Washington: The Brookings Institution, 1968). For a selection of papers on related issues, see: Ryan C. Amacher, Robert P. Tollison and Thomas D. Willett (editors), The Economic Approach to Public Policy: Selected Readings (Ithaca: Cornell University Press, 1976).

^{10/k.} R. S. Murthy, "Strategic Management of Public Enterprises: A Framework for Analysis." Paper presented at the Second BAPEG Conference on Public Enterprise in Mixed Economy LDC's, Boston, April 1980.

policies which reflect consensus or at least do not provoke opposition. To the extent he is successful in this effort, he is delegated increased autonomy and moves to a stage two of public enterprise evolution.

B. An Attempt at Synthesis for the Public Manufacturing Sector

As always, a synthesis is possible, whether or not it is desirable. The tactic is to bifurcate activities according to whether the preponderance of relevant objectives is commercial or non-commercial. At one extreme are decisions such as the trade-off between F-16 fighters and elementary education, or between redistributing jobs or income to one ethnic group, class or income decile. Here, synoptic rationality is inappropriate and disjointed incrementalism is unavoidable. The critical premise for this paper is that the activities of public manufacturing enterprises lie much nearer the other end of the spectrum, with non-commercial operational objectives being a small share of the total. An integrated steel mill in a backward area may have a legitimate non-commercial objective of contributing to community development through road-building, etc., but whatever value is put on such an activity will be small relative to the value of the steel output and the energy and iron inputs. For such an enterprise even large errors in measurement of non-commercial objectives will be a small share of total enterprise performance. Accordingly, efforts to commercialize non-commercial objectives through program contracts or social adjustment accounts, however imperfect, will involve acceptable margins of error. In this scheme the primary operational objective of the manufacturing sector is to generate surplus for transfer to the government for use for other

public purposes, with secondary non-commercial objectives being quantified and treated as dividends-in-kind. The distribution of surplus at the government level is necessarily governed by a muddling through decision process, but the generation of surplus at the enterprise level can be governed by synoptic rationalism.

This is of course contrary to common practice, since much public enterprise decision making is more aptly described by the model of disjointed incrementalism than that of synoptic rationalism. This may be defended but the price is high in terms of resulting cost inefficiencies. I have calculated^{11/} that the benefits from improving public enterprise efficiency by only 5% would:

- 1) in Egypt, amount to about five percent of GDP, equivalent to seventy-five percent of all government direct taxes or enough to triple government expenditures on education;
- 2) in Pakistan, amount to about 1% of GDP, equivalent to 53% of direct taxes or enough to fund a 46% increase in government expenditures on education;
- 3) in South Korea, amount to 1.7% of GDP or over one billion dollars in 1981.

^{11/}"Improving the Operational Efficiency of Public Industrial Enterprises in Egypt." Report for the U.S. Agency for International Development, August 1981.

"Efficiency of Public Manufacturing Enterprises in Pakistan." Report for Pakistan Ministry of Production and the World Bank, February 1981.

"Comments on Development of a Performance Evaluation System for Korean Public Enterprise Sector." Seoul: Korea Development Institute, June 1981.

C. Summary

This paper may be summarized in the following propositions.

- 1) For control purposes, the most important way in which objectives differ is in the ease with which they can be measured.
- 2) Where objectives are measurable, then a pure model of principal/agent relationships can be applied and the appropriate control system consists of six prescriptive functions to be carried out by the government with all remaining decisions delegated to the enterprise and the market.
- 3) Where objectives are not measurable then the hierarchical model breaks down and an inchoate process of "muddling through" must be resorted to. This can result in legitimate government intervention in the internal operations of the firm and has major efficiency costs.
- 4) Most, if not all, public enterprises have both commercial and non-commercial objectives, but in the manufacturing sector the operational non-commercial objectives are generally small relative to the total, rendering acceptable the errors in measurement inherent in devices for commercializing objectives such as program contracts or social adjustment accounting. Once such devices are in place, the model referred to above provides a norm towards which reform of the control system can aim.

