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The Essentials of the UNIDO Approach to Benefit-Cost Analysis: An Introduction to the Guidelines for Project Evaluation 1/

by

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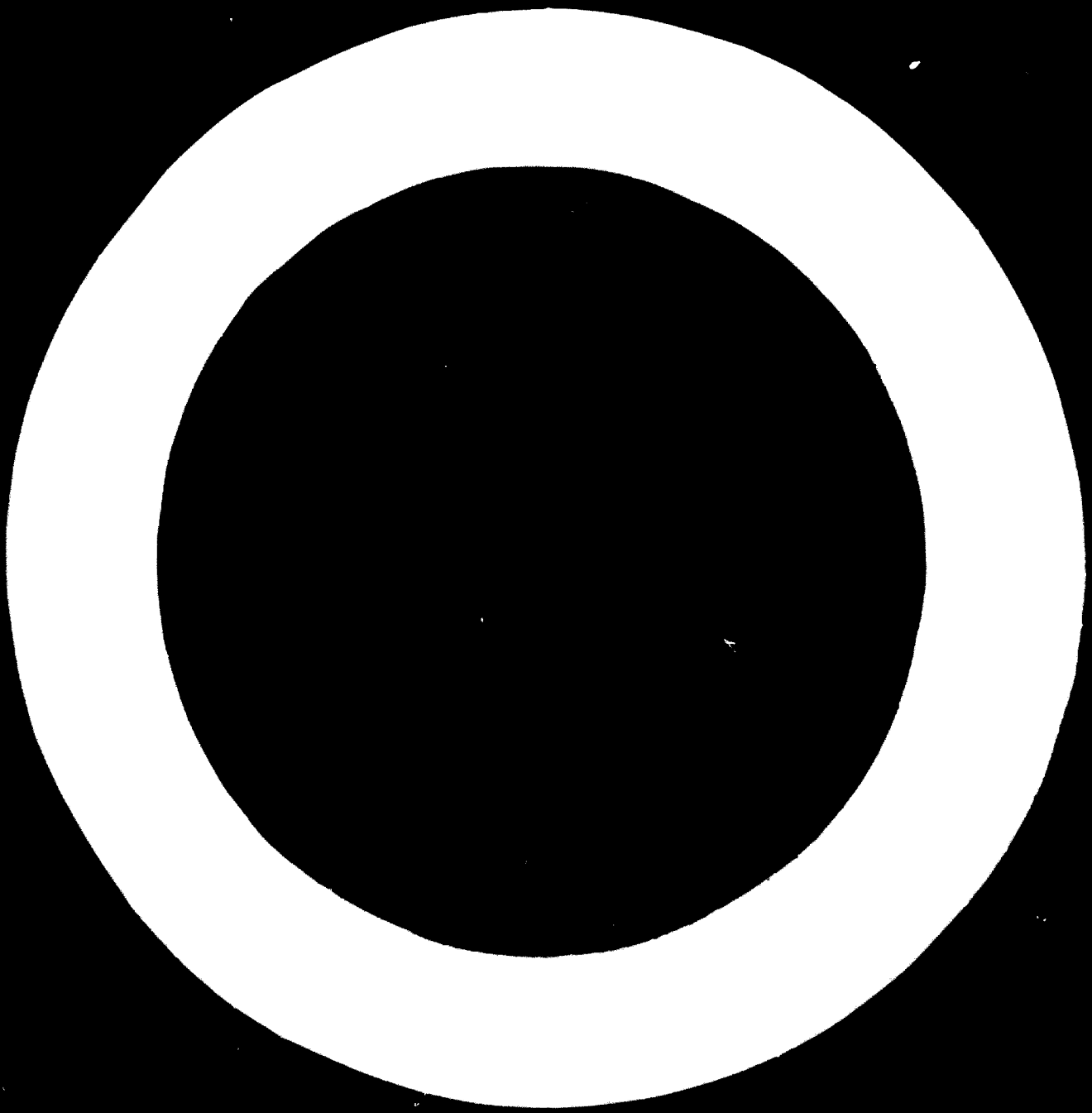

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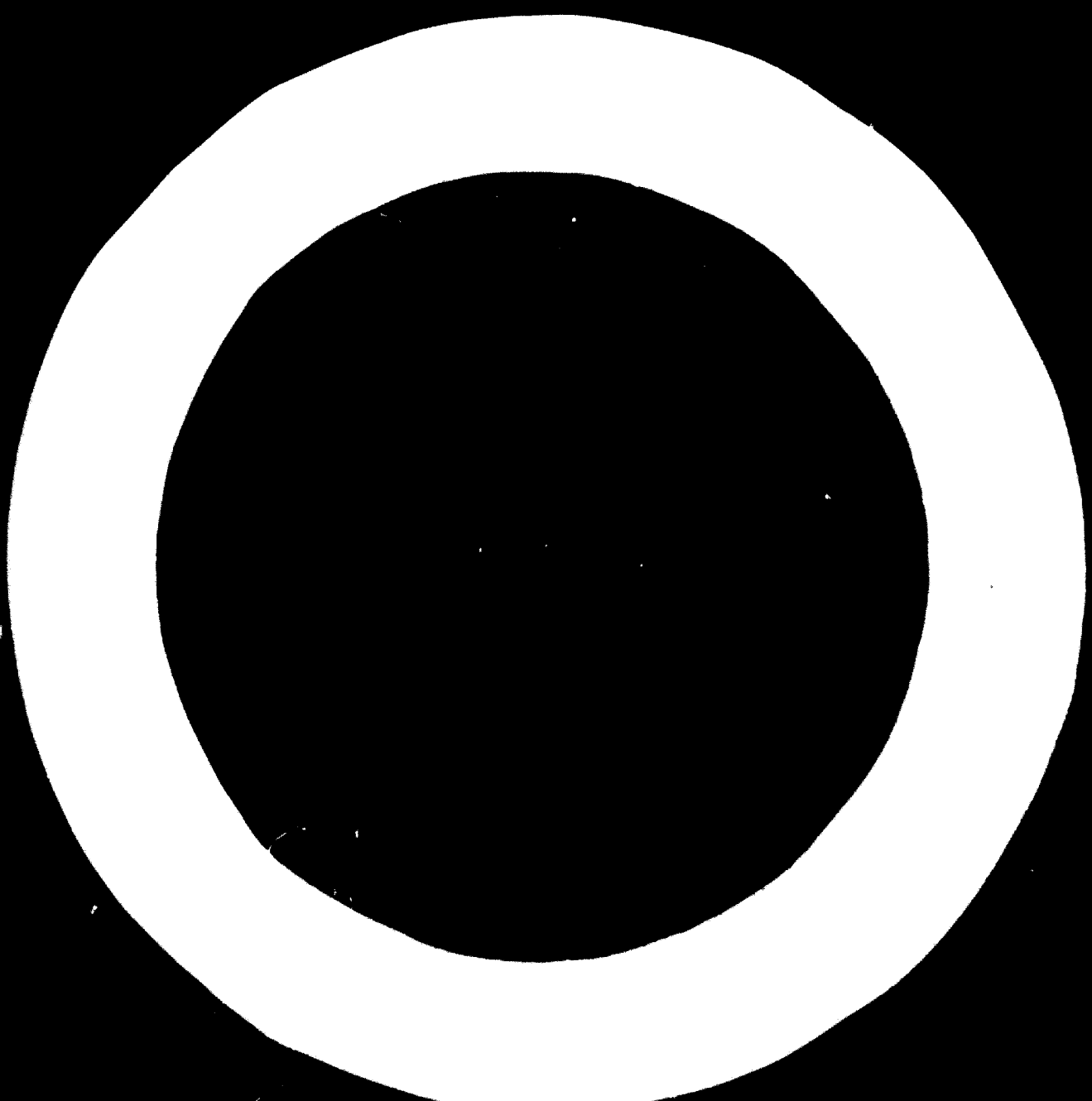

1. National and Commercial Profitability

The point of benefit-cost analysis in general is to do for a government ministry or agency what a cash-flow analysis does for a private investor: to provide guidance in the formulation and evaluation of investment projects. The essential difference is the point of view: cash-flow analysis examines projects from the vantage point of an owner for whom the assumed goal is the flow of funds into the company treasury; benefit-cost analysis examines projects from the vantage point of a government for which the assumed goal is the improvement of the quality of life.

The balance of a project's cash-flow account, its "commercial profitability", may be very different from the balance of its benefit-cost account, its "national economic profitability". For example, a project that would expand the supplies of an essential commodity might find markets only if the commodity's price is reduced by an amount that more than offsets the expanded volume of sales. The negative cash-flow of such a project would obviously make it commercially unprofitable even without any calculation of its costs. From a national point of view, however, the benefits to consumers from lower prices might make the project very desirable.

The difference in point of view makes it quite natural that commercial profitability and national economic profitability should diverge. The effects of a project on consumers, on employment, on the balance of international payments, on the distribution of

income - all of which are essential concerns of a government - are merely instrumental to a project's commercial profitability. It is only in an abstract model of the economy, one stripped of concentrations of economic power, of external effects and other inconvenient attributes of the real world, that the "invisible hand" of competitive markets can be counted upon to make the particular interest characterized by commercial profitability coincide with the general interest characterized by national economic profitability. In reality, commercial profitability is a poor guide to formulating and evaluating investment projects in the public interest.

This is not to say that calculations of national economic profitability can or ought to completely replace calculations of commercial profitability. A government that evaluates private sector projects in the role of development banker, or controller of foreign exchange or specific raw materials, cannot ignore a project's commercial viability. For it cannot in general enjoin a private firm to undertake the project or make substantial alterations in its design or operation in order to enhance its national economic profitability if these would wipe out the project's commercial profits. Whenever a private firm (or a public agency whose charter requires it to be self-financing) must be counted upon to implement a project, commercial profitability remains an essential consideration for a government as well as for the private firm. But even here the role of commercial profitability is not the same for the government as for the firm. For the government, commercial profitability appears, if at all, as a <u>constraint</u>, for the firm it is a primary <u>objective</u> and may be even the sole objective.

Thus a government's evaluation of an investment proposal may or may not include an analysis of its commercial profitability, depending on whether or not it must rely on private firms or self-financing public agencies to implement the project. Its evaluation should always include an analysis of the project's national economic profitability.

2. The Dimensions of National Economic Profitability

Commercial profitability is relatively easy to measure, at least in principle. One calculates receipts and expenses year by year and then discounts future returns and outlays to a common present value. National economic profitability is inherently more difficult to calculate because of the many elements that go to make up the quality of life. Even when attention is confined to the economic dimensions of life, as is customary in benefit-cost analysis, the vagueness of "national economic profitability" is obvious. Most governments profess concern to promote growth, equality, employment, self-reliance - all at the same time. Any attempt to provide guidelines on project evaluation must therefore begin by resolving the forces pulling ourselves in opposite directions: should we limit ourselves to a single "most important" dimension of economic performance (for example, growth in aggregate consumption) in the interest of easy quantification? Or do we consider a large number of dimensions, for the sake of comprehensiveness?

Various arguments have been advanced from time to time for emphasizing growth in aggregate consumption over all other dimensions of economic welfare. Among the more important, is first that growth in the aggregate is politically neutral, whereas other dimensions of welfare such as distributional equality involve value judgements that put them beyond the competence of the project analyst. Second, it has been argued that other dimensions can be handled adequately outside the project framework by means of general economic policies. For example, fiscal policy is to be relied upon for achieving a proper slicing of the economic pie, and the design and operation of projects can be formulated solely in terms of the size of the pie. Concretely put, an irrigation project that could equally well serve large scale, efficient and wealthy market-oriented farmers and small scale, inefficient and poor subsistence peasants would be designed to serve the rich, either on the grounds

that concern for the distribution of the project's benefits would introduce political dimensions into choice or on the grounds that taxes and subsidies could be employed to redistribute the benefits from the rich to the poor, if desired.

The UNIDO Guidelines for Project Evaluation[1/] rejects both these arguments and the implication that attention be confined to growth in aggregate consumption. Since the reasons why these arguments are rejected are basic to the UNIDO approach, it may be useful to review them briefly here. The first argument, the "political neutrality" of aggregate growth, falls almost of its own weight as soon as it is fully articulated: it is in fact (though logically) not an argument for maintaining the status quo with respect to distribution, since one of the effects of existing inequality is to make the relatively rich better able to make efficient use of investment projects. This is not the place for extensive analysis of the evidence; it will have to suffice to point out that virtually every social institution, running from informal networks of friendship through the family to highly formal educational establishments, serve to reinforce the disproportionate "absorptive capacity" of the rich with respect to the benefits of public or publicly supported investment. Whether calculated or not, the effect of "letting the chips fall where they may" is almost certainly to perpetuate inequality, hardly a neutral result in any meaningful sense of the word.

The second argument - handling such objections as distributional equality through fiscal policy - is not much more robust than the first. Quite apart from the technical arguments that any system of transfers apart from "lump-sum" transfers, which is to say any practicable system of transfers, distorts incentives and thereby reduces aggregate consumption; there are two excellent reasons

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1/ Partha Dasgupta, Amartya Sen and Stephen Marglin, Guidelines for Project Evaluation, published by the United Nations Industrial Development Organization, New York, 1972, Sales No. E.72.II.B.11.

for not relying on taxes and subsidies to correct undesirable distributional consequences of projects. One is the moral repugnance that attaches to the dole or any system of subsidies that smacks of the dole. More important are the practical difficulties of taxing away the benefits enjoyed by the rich. Throughout most of the world political power is highly correlated with wealth and income, and the prosperous are generally able to avoid taxes that would effectively redistribute income, even where egalitarian ideals lead to tax laws that are on their face highly egalitarian. As a practical matter it is simply unrealistic to rely on taxes and subsidies to correct undesirable distributional consequences of investment projects.

This is not to suggest that to reflect distributional considerations in the criteria for project formulation and evaluation is to solve distributional problems. We are dealing with decisions at the margin, with the tactics of economic development, not basic strategy. And none of the objections of development can be adequately dealt with on a tactical basis alone, distribution included. But due regard for distribution at the project level may prevent matters from getting worse, and, more important, by bringing choices and conflicts out into the open in simple, clear and dramatic ways, can stimulate and focus debate and discussion about basic development strategy.

For these reasons the UNIDO approach begins with a definite commitment to the simultaneous pursuit of more than one objective, or dimension of welfare, in project formulation and evaluation. But we do not seek to capture every conceivable aspect of economic well-being in our analysis. First of all, we believe that the expansion of aggregate consumption and progress towards a more equal distribution are the most urgent and universal of the various economic goals of development. Other dimensions of welfare, although at first glance seemingly independent, can often be understood as instrumental to these goals. For example, employment

is an oft-stated goal of development. To a great extent, however, the expansion of employment opportunities is simply a means to a better distribution of income or the expansion of aggregate consumption. Improvement of the balance of trade, to take another example, is frequently a means of maintaining the expansion of consumption. To be sure, these objectives can conceivably go beyond distributional or aggregate-consumption considerations, and the UNIDO methodology is sufficiently flexible to incorporate them as distinct objectives, but most often we believe that the aggregate-consumption and redistribution objectives will be broad enough to encompass balance-of-trade and employment considerations.

In addition, the UNIDO Guidelines accept the propriety of including various special objectives that all too often are dismissed by professional economists because they are not based on the overt and manifest preferences of the "sovereign" consumer. Recognizing the social nature of preference formation, we consider it entirely appropriate that at times project formulation and evaluation will reflect policy makers' judgements with respect to people's needs even when these run counter to the desires of the population at large. Such a "merit wants" is education for girls in traditional male-oriented societies.

Thus the UNIDO approach represents a compromise between the arguments tending to minimize the number of distinct objectives and the arguments tending to enlarge the number. In general it is believed that simultaneous consideration of the contribution a project makes to aggregate consumption and the contribution it makes to improving the distribution of consumption will suffice. But the methodology is sufficiently flexible to allow for the introduction of other dimensions of the quality of life, as these appear to be important in specific situations.

3. Setting Relative Weights on Objectives: The Role of Policy Makers

It is relatively easier to agree on the importance of taking account of the multiplicity of developmental objectives in project analysis than to agree on how to do so. In fact one of the principle concerns of the UNIDO Guidelines is to outline an operational methodology for simultaneously considering more than a single objective in formulating and evaluating projects. Ideally, policy makers would articulate the relative importance of various objectives by attaching numerical weights to the contributions to each. For example, taking aggregate consumption as the unit of account, income generated to the lowest quintile might receive an additional weight of 0.5, 2.0 or 10.0, according to the importance attached to achieving equality relative to the importance of increasing consumption overall.

As a practical matter, however, this ideal seems to be at best attainable only after a long time. It certainly does not appear to be a basis for immediate action. Therefore in contrast with the "top-down" approach of pre-assigned weights, the UNIDO Guidelines proposes a "bottom-up" procedure in which the weights are generated by the formulation and evaluation procedure itself. In brief, the UNIDO system enjoins the project formulator to take the initiative in preparing alternative designs, each primarily responsive to a different development objective. In the irrigation choice posited earlier, for example, the technician responsible for the project would prepare two alternative designs of the dam and distribution system, one emphasizing the expansion of aggregate consumption and (presumably) therefore allocating all or virtually all of the water to large scale commercial growers, the other emphasising redistribution of income and therefore allocating all or virtually all of the water to the small scale subsistence peasants.

The next step is to clarify the implications of choosing one design or the other with respect to the relative importance of the two objectives. The UNIDO Guidelines employs sensitivity analysis to

this end. Obviously, if a high enough weight is placed on the income of the peasants, the subsistence-oriented alternative will show up better in terms of national economic profitability. Conversely, if we put a sufficiently low premium on peasants' income, the market-oriented alternative will be the more profitable. At an intermediate value, called the "switching value" in the Guidelines, the two alternatives are equally profitable. Hence choosing the subsistence-oriented design indicates an implicit weight higher than the switching value; choosing the market-oriented design indicates a weight lower than the switching value.

In the first instance, the alternatives are presented to policy makers together with the switching value. This is intended to clarify and facilitate choice by quantifying the implications of alternative courses of action with respect to the relative importance of different objectives. This exercise can be expected to offer significant gain over traditional practice in several ways. First, it will provide a systematic framework for considering competing objectives, especially the objectives for which there is in principle widespread support but in fact no highly concentrated politically powerful lobby. Second, it provides a quantitative focus for discussion and debate about alternatives. Third, it allows politically responsible and accountable officials to intervene in the process of formulation and evaluation at exactly the point where political value judgements must be exercised, for in the Guidelines approach it is the policy maker, not the technician, who resolves the conflicts between objectives. By contrast, traditional procedures allow the intrusion of conflicts between objectives in an ad hoc manner that usually blurs choice and responsibility and gives the technician a disproportionate role in resolving these conflicts in the same way that he might resolve the conflict between safety and economy in deciding the strength of a bridge or dam.

Even if the UNIDO approach did no more, it would therefore be a worthwhile improvement over present practice. But it holds out the hope of even greater improvement: after a number of projects have been formulated and evaluated in this manner, the range of switching values for each weight may become sufficiently narrow that for all practical intents and purposes, it becomes a point, a single number. From that time forward, the bottom-up procedure can give way to a top-down procedure in which the technician formulates a single design on the basis of pre-assigned weights. The UNIDO approach therefore has the merit of starting with an operational procedure that is in itself a worthwhile improvement on present practice and is moreover capable of evolving into a reasonable facsimile of ideal practice.

In general, there will be at least two weights to deal with, which makes the methodology somewhat more complicated (but not unreasonably so) than the preceding summary indicates. In addition to the weight on redistribution of income, there is a weight implicit in the "neutral" objective of expanding aggregate-consumption. This weight reflects the relative importance of marginal additions to aggregate consumption now and marginal additions later. This weight enters into benefit-cost analysis as a rate of discount. To distinguish this rate of discount from other rates (such as the rate or rates that may be relevant for determinations of commercial profitability in a cash-flow analysis), it is generally referred to as a "social" rate of discount.

The higher is the social rate of discount, the greater the discount placed on marginal increments to future consumption relative to increments to present consumption. The Guidelines contains a lengthy discussion of the principles underlying the choice of a social rate of discount. By way of summarizing that discussion, it must suffice here to mention only three points. First, in general the higher the assumed rate of growth, the more pressing at the margin is the present relative to the future; the higher

therefore is the social rate of discount. Second, in any case, the choice of a social rate of discount is a value judgement exactly analogous to the choice of a weight on the income of the poor relative to the income of the rich; market rates of interest, rates of "time preference" exhibited by or imputed to households, have only tangential relationship to the social rate of discount. (The marginal productivity of capital has an important role to play in the analysis, but it enters into the determination of the social value of investment, not the social rate of discount.) Third, the social rate of discount cannot in general be meaningfully determined in the abstract. A sensitivity analysis turning on switching values is enjoined as the appropriate way of determining the social rate of discount.

Other weights will be introduced as specific situations require the consideration of other objectives. In general they, in common with the redistribution weight and the social rate of discount, reflect political value judgements that are meaningfully quantified not in the abstract, but through a sensitivity analysis turning on switching values. One of the more important of these "other" weights is the value of foreign exchange. Whenever the value of increments of foreign exchange exceeds the domestic market value of the goods to which a marginal unit of foreign exchange would in fact be devoted, it is a fair inference that foreign exchange is valued over and above its contribution to aggregate consumption. Such "over-valuation" reflects a political value judgement that is tantamount to a merit-want objective of independence from the strings that inevitably attach to foreign gifts and loans, an objective that is called "self-reliance" for short in the UNIDO Guidelines.

4. Shadow Prices and the Division of Labour between the Center and the Field

It should be noted here that the value of foreign exchange appropriate for calculations of national economic profitability

may differ from the official values of foreign exchange even when self-reliance does not enter the picture as a separate objective. For many reasons official exchange rates may underestimate the value of foreign exchange, even viewed solely in terms of the aggregate-consumption objective. The Guidelines indicates a procedure for calculating the appropriate value of foreign exchange relative to the aggregate-consumption objective. In the context of aggregate-consumption, this value is called a "shadow price" rather than a weight, to emphasize that no new value judgements are required in order to calculate it. Another shadow price of importance in many countries is the shadow wage, a wage rate that reflects the existence of unemployment, overt and disguised, endemic to much of the developing world. These shadow prices, as well as the weights reflecting value judgements, belong to the category called "national parameters" in the Guidelines. National parameters are distinguished by their simultaneous relevance to a large number of projects. This makes it necessary and appropriate to centralize their computation.

By contrast, other shadow prices are best left to field-level technicians to calculate. Take for instance the cement going into a concrete dam in an area in which there is a severe cement shortage accompanied by rationing and other forms of non-market allocation. In such a situation the market price of cement is likely to understate its value in terms of national economic profitability, and the market price must be replaced by a shadow price. But the calculation of this shadow price, and many of the shadow prices that enter into benefit-cost analysis, is most appropriately delegated to field-level planners who can take local conditions into account.

This is not to say that no general principles are necessary for calculating field-level shadow prices. On the contrary: much of the discussion of applying the UNIDO methodology at the project level is devoted to laying out a general rationale for computing those shadow prices that are assigned to individual project planners.

In addition, the project level planner bears the responsibility for making the estimates of benefits and costs meaningful. The Guidelines therefore devotes considerable attention to translating abstractions like "aggregate consumption" and "redistribution" into operational categories into which field-level planners can fit the consequences of the projects they analyze. Separate chapters are devoted to the measurement of direct aggregate-consumption benefits, direct aggregate-consumption costs, indirect aggregate-consumption benefits and costs, and redistribution benefits and costs. The greater number of chapters devoted to the aggregate-consumption objective reflects no greater importance for this objective, but rather a common set of principles for this and the redistribution objective. For both, the basic measure of benefits and costs is "willingness to pay", that is, the value of goods and services to individuals. The difference between the two objectives lies in the restriction of the redistribution objective to specific groups of disadvantaged people, defined in general either by income class or by region.

5. Actual vs. Optimal Resources Allocation on the Basis of Shadow Prices and Weights

The UNIDO approach to benefit-cost analysis corrects existing market prices, both to reflect differences between aggregate-consumption and private market values and to reflect significant additional dimensions of economic well-being that are not measured by the level of aggregate consumption. A basic tenet of the Guidelines is that all corrections to market prices - all shadow prices and weights - should reflect the actual allocation of resources, present and prospective, rather than an optimal allocation of resources. It is tempting to prescribe recipes for project analysis in the context of optimality, for such prescriptions are both more elegant and conceptually simpler. Indeed, were we writing a treatise that comprehended both the strategy and tactics of development, which - and this is the real sticking point - we

could anticipate with real confidence would be put into effect throughout the economy, we might have yielded to temptation. But our goals are more modest and we think more realistic. We do not anticipate that the efforts of a handful of technicians and politicians concerned with project analysis can bring about a wholesale reform of economic policy. And so we have taken "what is" and "what is likely to be" as the starting point for the calculation of shadow prices and weights, rather than "what ought to be".

One example will indicate the difference between correcting market prices on the basis of "what is" and correcting them on the basis of "what ought to be". We advise basing the shadow price of foreign exchange in terms of aggregate consumption on the actual (and anticipated) allocation of foreign exchange at the margin, even if an alternative allocation can be shown to be superior in terms of individual willingness to pay. To calculate the shadow price on the basis of an "optimal" allocation of foreign exchange would be appropriate only if one could reasonably anticipate that the necessary policy changes will in fact take place, and this appears to us to impute unrealistic power and influence to project analysts in bringing about changes in policy outside their area of immediate responsibility.[2/] The UNIDO Guidelines avowedly reflects a disequilibrium approach to benefit-cost analysis; governmental power is assumed to be fragmented rather than concentrated so that the government is better thought of as divided against itself rather than as monolithically pursuing or capable of pursuing policies that can be meaningfully characterized as optimal.

6. Summary: The Distinguishing Features of the Guidelines for Project Evaluation

This is not the place to attempt a detailed, point-by-point

2/ For a more detailed discussion of this point, see Amartya Sen, "Accounting Prices and Control Areas: An Approach to Project Evaluation", Economic Journal.

comparison with alternative approaches to benefit-cost analysis.3/ Rather it is probably more useful to summarize the distinctive features of the UNIDO Guidelines, the important points that we believe set it apart from other approaches and make it a superior vehicle for accomplishing the general purposes of benefit-cost analysis. First, as the title indicates, UNIDO's aim is to provide Guidelines for Project Evaluation, not to provide a comprehensive manual. Early on, the authors despaired of writing a set of detailed instructions capable of comprehending the problems of countries diverse as Mexico and Cuba, India and Ceylon, Egypt and the Ivory Coast. Detailed manuals can only be written country by country, by individuals intimately conversant with the economic, social and political structure of the countries for which they write. This is partly because the great variations in the quality and availability of data on which shadow prices and weights rest necessitate corresponding variations in the analytic framework. But it is more because the shadow prices and weights depend as much on institutional patterns as on technology and resources. The aim of the Guidelines is to provide a basis for writing comprehensive manuals, to direct thinking about projects along the lines that have been outlined in this brief essay and are elaborated in the Guidelines themselves.

The second distinctive feature of the Guidelines is the emphasis on the multiplicity of objectives relevant to project formulation and evaluation. Other approaches may bring in more than one objective, but this is customarily done in an ad hoc or peripheral fashion that hides the conflict between objectives and generally attaches second-class status to considerations other than the size of the economic pie.

3/ For a comparison between the UNIDO Guidelines and the OECD's Manual of Industrial Project Analysis in Developing Countries (Volume II: Social Cost Benefit Analysis, authored by Ian Little and James Mirrlees, published by the Organization for Economic Co-operation and Development, Paris, 1969), see Partha Dasgupta, "Two Approaches to Project Evaluation in Developing Countries", Industrialization and Productivity.

Third, the Guidelines offers a practical approach to defining the weights that are the quantitative expression of the relative importance attaching to various objectives. The sensitivity analysis on which the analysis of projects turns has the twin merits of an immediate improvement in formulation and evaluation and the gradual approach to a superior system in which weights can be assigned prior to project design. It not only clarifies the nature of the political value judgements inherent in public investment decisions, it also allows - and indeed, obliges - responsible and accountable policy makers to participate in the decision process at exactly the point where these value judgements can be most effectively translated into action.

Fourth, and finally, the UNIDO Guidelines is based on the assumption that any methodology for benefit-cost analysis can have at best a modest impact on the overall framework of economic policy. This is, to be perfectly clear, to assume a relatively permanent state of disequilibrium, with all its accompanying inoptimality. It is to assume that overall economic policy reflects a division of classes and interest groups, rather than a consistent set of measures conceived and carried out by a monolithic government.

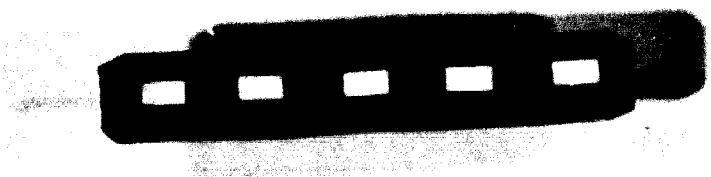
7. Concluding Comment

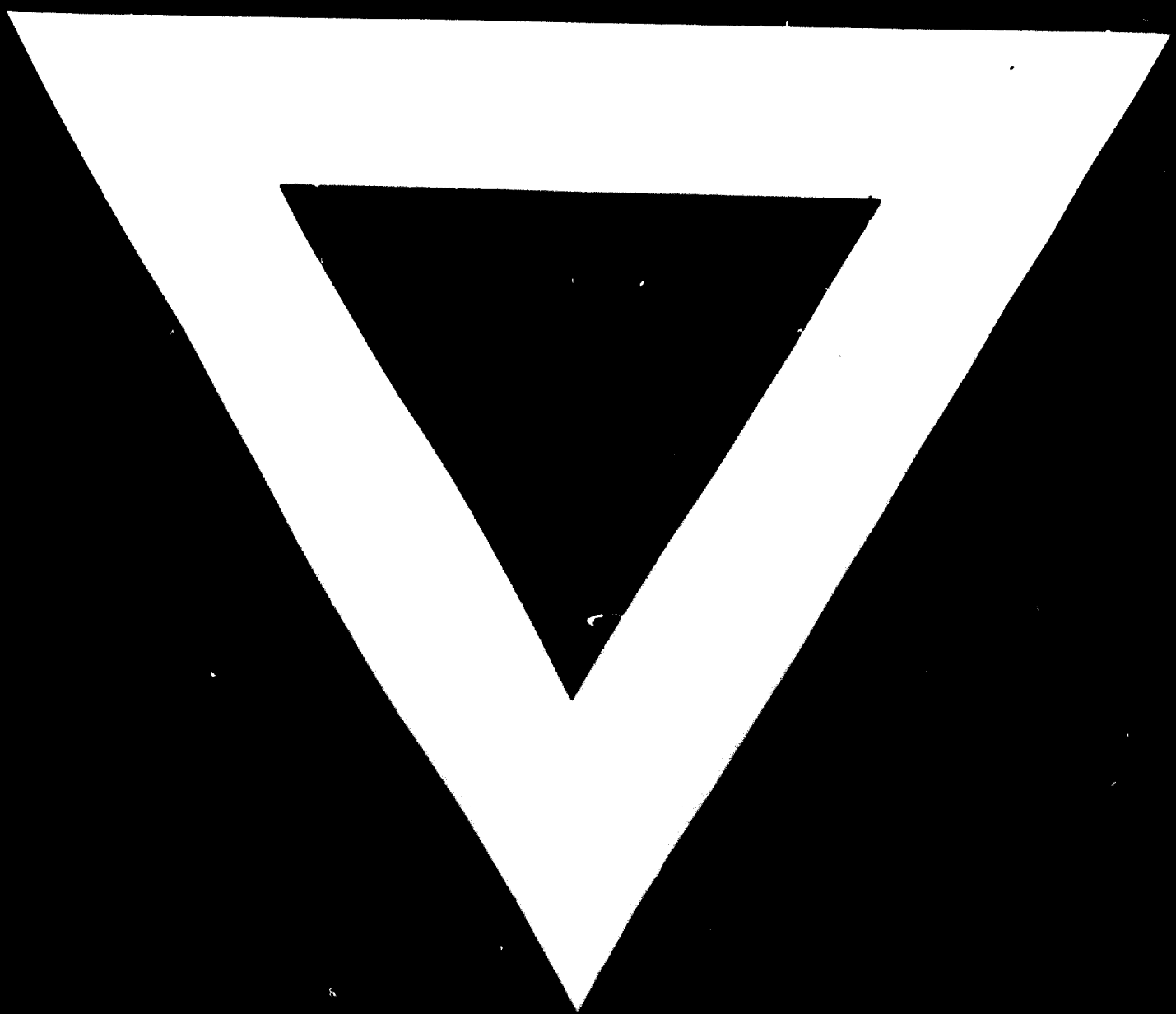
An impartial and unbiased judgement on the UNIDO Guidelines is hardly to be expected from one of its authors. Naturally, I believe that the Guidelines represents a significant and worthwhile step forward in the art of project formulation and evaluation. Nevertheless, candor requires that I speak to the Guidelines' limitations as well as its virtues. Candor is reinforced, I hasten to add, by common sense. For nothing could do the Guidelines or, indeed, benefit-cost analysis generally, more harm than to claim more than is to be realistically expected, and to have these claims disappointed. The major limitation of the Guidelines is that, like any framework for project analysis, it deals with the tactics of

development, not crisis strategy. The guidelines is not terribly useful for comparing a new steel mill with the expansion of primary education, or even industrial training spurring the expansion of primary education with the expansion of university education. For these questions deal with basic issues of strategy that cannot be meaningfully reduced to one or a few figures.

The appropriate role of benefit-cost analysis is the comparison of alternative uses for given physical resources, or of alternative sources of supplying the same goods. The earlier example of a choice between commercial and subsistence utilization of irrigation illustrates very well the first kind of comparison. The second is illustrated by the comparison of nuclear and conventional sources of electricity. For some time to come, it appears sensible to restrict calculations of national economic profitability to comparisons of alternatives that fall within a single ministry's or agency's budget, and to rely on other instruments for co-ordination between ministries and agencies.

It may well be asked whether such modest gains are worth the risks of creating or exacerbating conflict that our methodology, with its emphasis on the multiplicity of objectives, appears to introduce. The position of the Guidelines is that conflict is created not by this or that methodology for benefit-cost analysis but by the paths along which economic development takes place. Muting conflict, which is the best that alternative methodologies (including the alternative of no methodology) offer, will naturally appeal disproportionally to those whose interests are best served by following customary and traditional forms of compromise. Dramatizing conflict will appear not as a cost, but as a benefit to those who have the ideals of equality and social justice on their side but who, lacking ways of translating these ideals into concrete terms, have traditionally received the worse end of the bargain.





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