

Toward An Operational Approach To Social Cost-Benefit Analysis

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(Preliminary version [pages 1-34] concluding few pages to follow)

I. INTRODUCTION

In many parts of the world, the basic notions that lie behind social cost-benefit analysis appear now at long last to be gaining the acceptance required for a serious effort at practical implementation. Many different and interrelated developments have contributed to this situation: the academic literature on the subject has been strengthened in recent years; government leaders, pressing ahead with ambitious programs of social and economic development, have become more aware of the resource constraints that they face, and have sensed the need for making difficult choices among alternative strategies for achieving their goals; international lending agencies have continued to press for adequate documentation of the prospective benefits to society of the projects they finance. At the same time, the capacity of countries to satisfy the demand for better evaluation procedures has increased: courses and programs organized by international agencies, by universities, and by national governments themselves have multiplied in number and have by now in at least some countries produced enough trained personnel to make a respectable start at a national effort to analyze systematically the costs and benefits of prospective capital expenditures. Even though this technical capacity is still everywhere far short of the level that would be needed for a full-scale implementation

of modern evaluation procedures, it has in a number of places reached the point where one should appropriately think of instituting cost-benefit analysis on a much more ample scale. The time, in short, appears to have come when we can think about cost-benefit analysis not as something to be applied on an ad hoc basis to particular projects, or on an individual-agency basis by selected governmental entities, but rather as something which will evolve over time into a more-or-less standard procedure used for assessing a wide range of public-sector (and possibly even private sector) projects and programs.

The present paper can best be viewed as a series of notes and observations concerning the choices involved in establishing a "national" project-evaluation procedure designed for practical implementation. Its orientation is neither that of pure theory nor that of pure public administration, but rather something in between -- namely, how to strike an appropriate balance between the conflicting desiderata that we would like such a procedure to meet, such as its administrative simplicity, its concordance with economic theory, the possibility of meeting its data requirements, etc. The fact that these goals are indeed conflicting, and that therefore an effective operational cost-benefit methodology has to occupy some sort of "middle ground" among them, will, I hope, become clear as the exposition proceeds.

## II. The Role of Cost-Benefit Analysis in Defending the General Interest.

Perhaps the most obvious places where other considerations impinge on "pure theory" in the area under discussion lies in the potential conflict of interest between the proponents of a project or program and the rest of society. The conflict is really an old story; the benefits of public projects and programs are, more often than not, concentrated on a relatively limited sub-segment of the population. An irrigation dam serves the farmers in its command area; a highway project mainly benefits the users it serves; an urban housing project benefits a particular community. These people, perceiving the gains that the project will produce, will on that ground tend strongly to favor it. To the extent, however, that the costs of the project are paid in significant measure out of general government revenues, they are distributed widely over the whole society -- no single group perceives them as having a significant effect upon it. The predictable result is that the potential beneficiaries of a project will tend to form a vocal interest group in its favor, while the potential losers (those who bear the costs) are too diffuse a group, and their individual losses are too small, for them to become an effective counterpoise in the political process to the concentrated interest of the beneficiaries. In this way the political scales tend to be tipped in favor even of bad projects.

To put the matter more concretely, a project may cost 100 and have benefits only of 50, in an overall social sense, yet if the beneficiaries have to bear only 5 percent of the total cost, they will perceive the project as an exceedingly good one, and will press strongly for it -- probably just as strongly as they would if the costs of the project were only 25, of which they would have to bear 20 percent. The mere fact that the potential beneficiaries form a strong claque in a project's favor is in no sense a justification for its being undertaken. Rather, this fact is almost irrelevant in cases where most of the costs are borne by the society at large. What is urgently needed is some strong voice to defend the general interest, especially in cases where the costs are spread widely and the benefits relatively concentrated. And one of the prime functions of an institutionalized procedure of cost-benefit analysis is to fill this need.

The story does not end there, however, for there are also pressures for projects and programs that emanate from within the governmental structure itself. Projects are generated by ministries and agencies, and it is only natural -- indeed, in a real sense, appropriate -- that their cadres should view their work as important and their proposals as serving the general interest. Yet enthusiasm on the part of the relevant cadres is far from sufficient to guarantee that the projects they present are indeed socially worth their cost. For if this were so, we should have no need for formalized evaluation procedures at all.

We need such procedures because they help to avoid mistaken choices, and only wishful thinking would lead us to discard as a significant source of possible mistakes the very enthusiasm of the agencies within the government, and of their staffs, for the projects that they develop and present.

All of this suggests the importance of what might be called the "auditing" or "checking" function of a project evaluation procedure -- a very important function which receives little or no discussion in theoretical treatments of the subject. Even the most sophisticated approach to the analysis of benefits and costs can go astray if the wrong basic estimates of benefits and costs are fed into it; much care must therefore be taken to ensure the adequacy of these initial figures. Anyone who doubts the importance of this point need only look at the history of actual project performance -- almost always project costs turn out to be greater than those originally estimated, often by a substantial margin, and many cases exist where underestimates on the cost side go hand in hand with substantial overestimates on the benefit side.

In the final analysis there is probably only one solution to the problem of getting as accurate estimates of benefits and costs as possible -- namely, the "professionalization" of the personnel involved in the process at all levels. Those who develop projects at the agency level are the key people here, for it is they who are closest to the relevant basic data, and in general devote more time

than subsequent evaluators at higher levels to the study of the project in question. Yet they are also the most susceptible to the natural enthusiasm of those involved in the planning of a project, and to pressures from their non-professional colleagues within the agency, who are likely to take an exaggeratedly rosy view of the project's prospects.

Perhaps the most natural way of achieving professionalism throughout the evaluation hierarchy would be the establishment of a special corps of project experts, in which those deputed to work within a particular operating agency would look for their professional future not within that agency but within the evaluation corps itself. This would keep them free from undue agency influence in much the same way as those who audit the accounts of the governmental entity are kept relatively free from administrative and career pressures from the agencies with which they work. This solution appears premature, however, for India and for most other developing countries, mainly because it presupposes a much more ample supply of project evaluation talent than yet exists. As matters now stand, the most natural source of people capable of developing, say, highway or irrigation or power projects, is within the agencies handling these respective fields of public investment. It is difficult to imagine that one could draw in from outside these agencies enough people to take over their tasks of project development for them, and it is likewise hard to picture significant numbers of them being transferred out of their present agencies to function as representatives of some new national project

authority.

I thus feel that for the present at least it is wisest to proceed on the supposition that those who design and generate projects will continue to be functionaries of the operating agencies, and will hence be subject to pressures from within. The problem is how to limit such pressures to a minimum, or, perhaps better put, to place the project technicians in as good a position as possible to resist these almost-inevitable pressures. Again I return to professionalism as the only reasonable solution to the dilemma. The higher levels of the project evaluation authority (i.e., those to which the originating agency must appeal for approval and/or funding) should take it as their task to instil as much professional discipline as possible in the project-generating mechanisms at the agency level. To put it another way, the overall project authority should do all it can to make it in the interest of the originating agencies themselves to do a thoroughly competent job of project development and presentation. The premium of quick decisions should go to the agency presenting careful and sober analyses of its projects, in which the bases for the projection of costs and benefits are well documented, and relevant alternatives to the projects under consideration are adequately explored. On the other hand, the agency presenting projects with inadequate technical support should be subject to the penalty of further delay as it reworks its project proposals to the point where they meet the required professional standards. This procedure will give the agencies the incentive to place an appropriately high value on competence in its

own project staff, and to overcome the temptation to view that staff as simply having the function of writing up project proposals in terms sufficiently glowing to elicit the necessary approvals. In the end, it is to be hoped, this procedure will lead to most "bad" projects being cut short within the originating agency itself, as a consequence of their first serious analysis by that agency's own project staff. But the subtle yet important key to this result is that the revelation by its project team that a particular investment (which, let us presume, has some enthusiastic and powerful supporters within and outside the agency) is probably not up to standard, and probably will not meet with approval at higher levels, should be viewed by the agency with at least a grudging sort of appreciation, and not regarded as an act of disloyalty on the part of its project analysts.

### III. The Evaluation Function at the Supra-Agency Level.

In what has been said so far, the existence of some body (or bodies), above the level of the originating ministries or agencies, which decides in favor of or against the projects that they present, has clearly been presumed. Moreover, it should be self-evident that in order to perform the function imputed to it, of imposing a professional discipline on the project-generating activities of other public-sector bodies, it must have significant powers of its own. Its natural location within the governmental structure is thus the place where investment funds are distributed -- the planning agency, the budget agency, or the finance ministry, as the case may be.



But while the power to grant (and to deny or withhold) funds is essential to give operational force to the project evaluation function, care must be taken to ensure that this power is used positively and not simply to add another layer of bureaucratic exigencies to the process by which projects are formulated, developed and implemented. In this connection there are several points that bear mention.

First, it should be recognized that there are substantial differences among classes of projects in terms of the ease and accuracy with which their prospective benefits and costs can be quantified. It is much more difficult, for example, to estimate the potential benefits of building a penetration road (which opens up an area to highway traffic for the first time) than of improving an existing road (where much of the benefit will consist of reducing the already-known costs of transport associated with already-existing traffic volumes). The quantification of benefits of health programs is also notoriously inexact, involving quite uncertain impacts on mortality and morbidity on the one hand, and the fundamental problem of placing a monetary value on such benefits on the other. By the same token, flood control projects are, because of the highly probabilistic nature of their benefits, more difficult to evaluate than irrigation projects, and the value of irrigation in turn is easier to assess when it involves expanding the amount of water available in an already-irrigated area than when it entails introducing irrigation into a new area for the first time. In all these cases the problem facing the overall project authority is a delicate one. The natural temptation, for a technically-oriented entity, is for it to

be biased in favor of those project types for which the technical quantification of benefits and costs is surest and easiest. This temptation is something to be resisted, however, yet obviously not to the point of tipping the balance the other way, and falling prey to romantic and over-optimistic assessments of benefits in those areas where there are no hard figures to dissuade one. Perhaps the best that can be said at this level is that the overall project agency should insist on the use of good estimating methods wherever they are feasible and applicable, and that it should be aware of the necessity of imposing a good deal of discipline upon itself (in both directions) in reaching its judgments in areas where quantification is difficult.

Closely related to the above, but conceptually distinct, is a second set of problems, which arises when non-economic benefits and costs enter the picture. The distinction is in part that between a benefit which, once fully known, is in principle measurable in economic terms (the problem residing in the technical estimation of its magnitude) and one whose economic quantification would be problematical even if it were fully known. But the line may be drawn in another way as well -- namely, the degree to which the assessment of a particular type of benefit or cost can be delegated to project technicians as against remaining in the hands of higher political authorities. National-defense aspects of a project come immediately to mind here; many projects which do not meet the cost-benefit test on strictly economic grounds may be judged to be advisable in the light of national-defense considerations. But the ultimate judges here will presumably not be the technicians whose

main job is project formulation and assessment but rather some higher governmental body (e.g., a minister and his chief advisers, the cabinet as a whole, etc.).

I also believe that issues connected with the distribution of income and wealth contain elements which cannot be formally incorporated into the technical procedures of project evaluation and hence must in the final analysis be decided by political authorities at a higher level. This argues that at the topmost level the overall project authority should have ample political representation (i.e., should not be an exclusively technical body), and that this topmost level itself have relatively easy access to still higher political authorities (e.g., the cabinet) and should in a sense represent them in bringing what I have called non-economic considerations to bear in the project-evaluation process.

In short, the task to be done by the project-evaluation authority is basically a technical one; its cadres must therefore be made up of technicians, subject to the discipline of professionalism emphasized above. Yet at the same time the final decisions cannot and will not be governed by purely technical criteria, and a place must be found in the process for political (in the broadest sense) factors to be reflected. To try to infuse these factors at all levels would quickly destroy the professionalism that is sought, and would probably be administratively impossible in any case (highway engineers cannot be expected to be repositories of political wisdom). Yet they must somewhere be represented. The natural place for such representation is at the top of the project-

evaluation hierarchy, where final decisions are made. If one regards the decision-making process as a basically political one, then the lower echelons of the project-evaluation hierarchy are needed to ensure that due weight is given to strictly economic considerations. If, on the other hand, one views the process as a technical one, the presence of the political element at the highest level is needed to prevent the purely economic factors from taking an unwarranted preeminence in governing final decisions.

A third problem with respect to the central project authority lies in the relations between it and the project-generating agencies. I earlier emphasized the importance of the central authority in instilling professionalism into the generating agencies which submit projects. The idea was that an agency with a good cadre of technicians, doing a good job of project formulation and presentation, would find the going easier than an agency in which the relevant technical skills were not adequately developed, or in which technical criteria were not given sufficient weight. This part of the picture, in which the central agency has something of the role of the schoolmaster, giving marks, so to speak, to the performance of its client entities, is quite essential if professionalism is to be developed and preserved. Yet it carries with it the danger that the central agency will end up being too much a schoolmaster, or perhaps a bad one in the sense of paying inadequate attention to the weaker pupils. The spirit of the relationship between the central agency and its clients should be basically one in which there is pressure on the latter to bring their technical procedures up to standard, but also where the former is willing to be helpful in this process. Potentially good

projects should not be overlooked simply because the sponsoring agency did a bad job of initially presenting them.

These considerations suggest that the central project agency should have a training function as an important part of its overall task. This function should definitely include, but not be limited to, courses in which it would directly seek to raise the level of expertise in its client agencies. There should also be, in addition, a collaborative element in the training function, in which individuals or teams from the central agency would work directly with client-agency technicians to help overcome the weaknesses perceived in their initial studies of particular projects.

#### IV. The Macroeconomic Framework for Cost-Benefit Studies

In the division of labor between the central project evaluation entity and the operating agencies which formulate and present projects, there are certain tasks which quite naturally fall within the central agency's responsibility. These are basically those elements which involve the economy as a whole, and whose analysis by each project agency, or as a part of each individual project evaluation, would entail major duplications of effort, as well as introducing substantial problems of consistency among the various facets of the evaluation process. Many of these elements are naturally taken care of by the agency responsible for overall planning and budgeting -- I refer here to items such as the projection of the rate of growth of national product, its distribution by major sectors, etc. It is obvious that the most

sensible course is for project appraisals to take advantage of the macroeconomic framework thus generated, so little more need be said on the subject, except perhaps to note that this particular use of macroeconomic projections makes it all the more important that they be developed on the basis of a realistic assessment of likely future prospects, and not (as is often the case) as targets worth striving and hoping for, but whose achievement within the given time frame is not really the most likely outcome.

Apart from the standard national income and product magnitudes, however, there are other items which are essentially of economy-wide significance, and which enter as important inputs into project reports and appraisals. I refer here to items such as the prices of the principal final products (foodgrains, textiles, etc.), intermediate inputs (steel, cement, fertilizers) and raw materials (coal, petroleum), as well as of labor services of various skills and types. All too often the benefits and costs of projects are assessed on the assumption that the current prices of outputs and inputs will continue to prevail into the indefinite future. This assumption may be the best possible one in some cases (given that prospective inflation has been at least implicitly taken into account, so that cost and benefit estimates are expressed in terms of units of constant general purchasing power), but it can also be far wide of the mark. Where the relative price of a product is currently out of line with its long-term norm, this situation should be identified, and the path by which the price is expected to move back to its norm should be specified. And there are significant

numbers of cases where the norm itself will not be constant through time -- the case of forest products comes particularly to mind here (where the forces of economic growth are likely to generate increasing demands for wood and wood pulp, and at the same time to entail increasing shifts of acreage from forest to agricultural uses), but in principle the necessity of assessing future price trends also applies to agricultural, mineral, and other products as well. A little reflection will reveal that the task of assessing the probable future trends of relative prices is far from easy, yet quite critical for reaching an adequate assessment of project costs and benefits. Its importance merits a significant dedication of resources by the central project agency to this task, which academic discussions of project appraisal tend simply to assume has been somehow accomplished before the cost-benefit analyst enters the scene.

Particular attention should be focussed, in the process of projecting the relative prices of various items, on those corresponding to various classes and grades of labor services. For while on the product side there is a sense in which the typical relative price will be constant (in the sense that some prices rising relative to the average will necessarily be counterbalanced by others falling relative to the average), it is not so with respect to the labor input. Here the very fact of economic development ordinarily implies rising levels of wages and salaries in real terms; to conduct project analysis on the basis of constancy of real wages thus would, implicitly at least, be an advance confession of defeat for the development efforts of the years

to come. The most natural point of departure for the projection of real wages and salaries is probably the assumption that they will rise in the future at approximately the same rate as national product per worker, with the projections deviating from this norm as the result of special demand and/or supply conditions applying in particular subsegments of the labor market. The astonishing truth is that most actual project evaluations do not even take the first step of forecasting growth in real wages along with GNP per worker, let alone reach the point of refining such projections on the basis of specific labor-market characteristics.

From the above it should be evident that labor-market forecasting has an important place in the work of a central project-evaluation authority -- one that could be extremely demanding of expert time and talent. This gives rise to the suggestion that close links be established between the project authority on the one hand and the agencies responsible for labor-market statistics on the other, so that the data-gathering process can be improved and adapted to meet the project authority's continuing requirements. I cannot restrain the temptation to reiterate here a complaint that I have made many times: that in nearly every country the data on the labor market are grossly deficient. This is most particularly true of wage data, which one ideally would like to have available in the form of consistent time series for a substantial number of different grades and classes of workers, and for different geographical labor market areas. The first step is to record the average wages paid to each type of labor, the second is to identify the principal sources of wage differentials (by region, type of firm, etc.), and the third is to develop a consistent interpretation of the forces



giving rise to the differentials observed. This information is not only important for the work of project evaluation; it can also serve as a most valuable basis for wage policy itself, for an understanding of the phenomena of unemployment and underemployment, and for policies to cope with them. If the agency involved in gathering labor statistics did an adequate job of assembling the data just referred to, the project authority could concentrate its inputs into labor-market analysis on the problems (largely of forecasting) that fall most naturally within its own purview.

#### V. On Shadow Prices for Social Project Evaluation.

Considering the importance which recent contributions (including my own) to the literature on social project evaluation have given to this subject, it is a bit surprising (even to me) that the present memorandum has reached this point without even mentioning it. Personally, I feel there is a significant lesson to be drawn from this fact -- namely, that the implementation of a general system of public sector project evaluation entails many important, difficult and challenging tasks that are in a sense independent of the precise way in which the controversial issues surrounding the shadow-pricing problem are resolved. No matter what form this resolution takes, the project authority will still have to face its role in representing the general national interest as against the strong pressures of potential beneficiary groups. It also has the profound responsibility of seeing to it that the prospective financial costs and benefits of projects are estimated as accurately as possible -- a

responsibility that entails major efforts at developing a healthy basis for interaction with client agencies, as well as major market-forecasting work by its own staff.

Yet on top of these tasks there are the special problems posed by the fact that in virtually every country there are significant distortions in major markets, giving rise to the likelihood that purely market-price-oriented project evaluations would contain errors and biases that a more sophisticated approach, which attempted to grapple explicitly with divergences between market prices and social values, would help to avoid. To take just two examples, on which we shall concentrate in this section, there can be no doubt that market rates of exchange significantly understate the true economic value of foreign currency, and that the market interest rates on bank loans and government bonds are poor reflections of the true scarcity value of capital in most developing countries. Evaluation procedures built on market rates would therefore tend to be too prodigal in their use of the limited amounts of foreign currency and of investible capital funds that are likely to be available. Some corrective element should be introduced into the evaluation process to guard against this bias; and this is precisely what shadow prices for foreign exchange and for capital are designed to do.

In approaching the problem of how to set these key shadow prices, I would like to focus on two important constraints that I believe are applicable to any operational project evaluation procedure. The first is simply the recognition that the relevant shadow prices are all in the future, insofar as we are dealing with projects that are yet to be

undertaken. The second is that to the extent that shadow pricing makes a difference in the evaluation process, it is going to lead to the rejection of some projects -- and presumably some of significant size and importance -- which would not be rejected under standard market-price criteria. The first of these constraints argues against excessive elegance and sophistication in the estimation of shadow prices -- our view of the future is clouded and imprecise in any case. The second argues that the figures used should have a certain robustness -- the project authority should be able to defend its use of them even against powerful pressures from within and outside the government in favor of those projects which could be rejected on account of their use. In combination, the two constraints suggest that the procedures used to generate shadow-price estimates should be simple and easy to communicate to people who are not themselves experts in the field.

Bearing these constraints and requirements in mind, let us turn briefly to some of the more technical problems involved in the estimation of shadow prices. With respect to foreign exchange, there can be little doubt that the simplest and most communicable conceptual approach to the measurement of the shadow price is to estimate the value that say, a dollar of foreign exchange used in a particular project would have had its normal alternative use. If allocating an extra dollar to this project would necessarily entail a dollar less of crude petroleum imports, and if this in turn would mean denying to the Indian market petroleum products whose internal value would be Rs.15.00, then Rs.15.00 would be the relevant shadow price of the dollar.

The problem that emerges here is twofold: in the first place, the foreign exchange used by a particular project is likely to come at the expense not of one (crude petroleum) but of several classes of imports; in the second place, the internal value of a dollar of imports of a given type is not itself easy to estimate. When several classes of imports are involved, there emerges the need to estimate first the relative shares contributed by each to the foreign exchange made available to the project in question, and then the internal value of a dollar of imports of each class, taking then an average of the resulting internal values weighted by relative shares. For example, if 10 percent of additional project needs for foreign exchange were to be met by contracting imports of type 1, 20 percent from contracting of imports of type 2, 30 percent from cuts in imports of type 3, and 40 percent from reductions in imports of type 4; and if the internal values of a dollar's worth of imports were, respectively: Rs.20, Rs.15, Rs.10, and Rs.7.5 the estimated shadow price of foreign exchange would be  $(Rs.20 \times .1) + (Rs.15 \times .2) + (Rs.10 \times .3) + (Rs.7.5 \times .4) = Rs.11$  per dollar.

If the economy in question is basically a market-oriented one, with trade restrictions taking the form of tariffs, and importation being fully allowed so long as the tariff is paid, then the internal value of a dollar's worth of foreign exchange in any use would simply be the market exchange rate augmented by the applicable tariff, and the weights attaching to the different classes of imports would reflect the responsiveness of

their respective demands to increased stringency in the foreign exchange market.<sup>1/</sup> In general, the task of estimating the shadow price of foreign exchange boils down to that of estimating how the markets for different imports react to changes in the overall stringency of the foreign exchange market, (i.e., of estimating the weights to be attached to various import classes), data on tariff rates themselves being readily available.

When the economy in question is less market-oriented, and the available foreign exchange is allocated to different imports through a licensing procedure, additional complications enter the picture. In the first place, when licensing is the rule, it is rarely true that the internal value of an import item will be approximated by the world price, augmented by the tariff. In general, the internal value will be higher than this, so long as the licensing authority does not freely permit all demands (which in any event would pay the tariff-inclusive price) to be met. But how much higher we cannot tell without a detailed investigation of the internal market for each relevant class of import goods. Such an investigation might reveal, for example, that a class of imports whose tariff-inclusive c.i.f. price was Rs.10 per dollar might in fact be

<sup>1/</sup> See for example, Edmar Bacha and Lance Taylor "Foreign Exchange Shadow Prices: A Critical Review of Current Theories," Quarterly Journal of Economics, (May, 1967), pp. 125-137. It should also be mentioned that the reaction in a market-oriented economy to additional demands for foreign exchange would normally also include some increase in exports of various classes, in which case they should also be reflected in the weighted average representing the shadow price of foreign exchange, with the price attaching to a dollar of foreign exchange generated in each such export category being the resource cost involved in producing it. See my Project Evaluation (London: MacMillan, 1972 pp. 124-5).

selling, once inside India, for Rs.18 per dollar, in which case the latter figure should replace the former in the process of estimating the shadow price of foreign exchange. But it is exceedingly difficult to imagine a study of internal markets which would come close to a complete catalogue of the relevant internal prices for different imported goods. Moreover, in most situations governed by licensing procedures, there are substantial restrictions on the freedom of licensees to resell the imported goods domestically. In general, where raw materials or capital goods are involved, the regulations tend to stipulate that these should be used in the licensee's own operations, and not resold or otherwise transacted, once imported. When this is the case, the task of assigning an internal value to the imported goods becomes even more formidable, entailing estimation of the value-in-use,<sup>2/</sup> (which can vary substantially from one user of the same good to another, and is not directly observable), rather than the open-market value (which, but for transport costs, should in principle be the same for all users, and is normally directly observable).

The final complicating factor in the estimation of the shadow price of foreign exchange under an import-licensing regime is the difficulty

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<sup>2/</sup> The value-in-use of a particular imported input would presumably be obtained in a residual fashion, by deducting from the value of the end product(s) produced with the aid of that input the costs of other factors involved in their production. This is in principle a soluble problem when only one imported input is involved and where all the relevant other costs are known with reasonable accuracy. But it can easily become insoluble when several imported inputs are involved in producing the same end product. In this case a residual value can be obtained for the whole package of imported inputs, used, say, by a particular firm, but the division of this "global residual value" into parts assigned to each particular imported input would in general be arbitrary.

of assigning weights to the distinct classes of imports. At first glance, one might think that the solution here would be simply to ask the exchange allocation authority what its policy is. But this approach breaks down once it is realized that there are substantial shifts in a licensing agency's notions of relative priorities even within a period of a year or two, let alone over the long span of time involved in the cost-benefit picture for most projects. Moreover, it is likely that the agency will not have a consciously articulated principle of allocation. Its natural response to an inquiry about how it would use additional supplies of foreign exchange would be to say it would allocate them to high-priority uses, while if asked how it would respond to a reduction in available supplies it would likely say that cuts would be forced in imports of low-priority status. There is an implicit contradiction between these two hypothetical replies, since even without any change in foreign exchange availabilities shifts could be made from low-priority to high-priority uses. When the allocation has been adjusted so that in the view of the licensing authority no further such shifts are warranted, then, in a sense, the distinction between low and high priority uses ceases to have meaning, at least for marginal changes in the total amount of available foreign currency.<sup>3/</sup>

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<sup>3/</sup> Relative priority status may still have meaning with respect to overall allocations, low priority items having been cut substantially, and high-priority areas relatively little, below their market-determined levels of demand, before it is judged that no further shifts are warranted. But this distinction is not relevant for determining allocations of changes in the available quantum of exchange, once it is decided that further shifts of allocations are unwarranted.

At this point the more interesting distinction is that between firm and flexible allocations, the idea being that the firm allocations will be changed relatively little in the face of fluctuations in the total amounts of exchange available, while products in the flexible-allocation category will bear the larger share of increments in allocation as the total amount available varies. A good idea of the relative "flexibility" of allocations to different products would be their elasticity with respect to total foreign-exchange availabilities - the percentage by which they would increase (or decrease) for each one percent rise (or fall) in the total amount of exchange to be allocated. The weight attaching to each import good for determining the shadow price of foreign currency would then be its share in the existing allocation, multiplied by its allocation-elasticity as just defined.

The preceding description of the problems of assessing the shadow price of foreign exchange in a licensing context should make it clear that a full-scale effort in this direction would likely be frustrated, even if it had the very modest objective of estimating the shadow price only for the present period, let alone for perhaps twenty or thirty or forty years into the future (when the shares of particular imports in the total, their relative allocation-elasticities, and also their internal scarcity prices would likely be very different from what they are at present).

We are thus faced with the task of coming to a simple if not ideal solution to the problem at hand, and one which is at the same time capable of being readily communicated to non-experts. It seems to me that these requirements are best met by the use of the concept of a standard or "canonical" alternative use of foreign exchange, which



is built up on the basis of available data. Such an alternative could in principle entail the explicit assignment of weights to particular imported goods, and the explicit projection of the internal value of a dollar's worth of imports of each of them. But given the uncertainty with which the future is necessarily clouded, I feel that this would on the one hand convey a false impression of precision, and on the other would be extremely vulnerable to criticism questioning why a particular weighting pattern and a particular set of forecasts of domestic values were chosen. To avoid these pitfalls, I would suggest the development of shadow-price estimates for foreign exchange on the basis of firm data from the past. The starting point would be what has been called the "force of tariff" estimation procedure, which simply augments the going exchange rate by the percentage which tariff revenues bear to total imports. The figure thus obtained is clearly a minimum estimate of the internal value of a typical dollar's worth of imports in each past year. To this figure should then be added an adjustment for the internal excise and/or sales taxes to which imported goods (or in the case of imported inputs, the domestic products made from them) have been subject. This adjustment is necessary because it makes no difference whether an internal value of Rs.15 per dollars worth of an import was generated because of a 100 percent tariff, or because a 100 percent excise tax was applied to the product after it entered the country free of duty. And it should be emphasized that the adjustment can be exceedingly important. To take a single example, the central excise taxes paid in India on petroleum products alone amounted, in 1967-68, to some Rs.400 crores -- approximately the same order of magnitude as total customs receipts.

Not all of this would be allocable to imports of crude petroleum, since a part of India's crude oil supply is produced domestically. Nonetheless, the share of petroleum product excises allocable to imported crude is sufficiently large to entail a very significant upward adjustment in the simple "force of tariff" calculation of the shadow price of foreign exchange. When the relevant shares of Central excise taxes on other products, and of State excise taxes as well, are allocated to imports, the estimated shadow price of foreign exchange is likely to be affected dramatically. While limitations of time have prevented my undertaking an explicit study of the total impact of excise taxes on the shadow rate calculation, a cursory examination of the relevant data reveals that, while taking account of tariffs alone would lead to an estimated shadow exchange rate in the order of Rs.10 per dollar, bringing excise taxes into account as well would carry the estimation up to Rs.12.5 or Rs.13.0 or even more.

An estimate of the shadow rate derived on this basis would still, it should be emphasized, understate the true opportunity cost of the package of imports actually made in any given year, for it takes no account of the scarcity values created by the licensing allocations themselves. But precise data on these scarcity values are hard to come by, and the values themselves are subject to substantial variation in consequence of shifts in the practices of the licensing authority. The critical question for the project evaluation agency at this stage is whether to: (a) undertake a full-scale research program to estimate the scarcity values applying to each class of imports; (b) carry out a partial program of the above type, solely for the most important

imports, or for those whose scarcity values are judged to be the greatest; (c) make a rough blanket adjustment in the force-of-tariff-cum-excise-tax estimate of the shadow exchange rate, to allow in a general way for scarcity values, without attempting to attribute them to specific products; or (d) simply use the force-of-tariff-cum-excise-tax estimate as the basis for projecting the shadow price of foreign exchange.

The choice among these alternatives is clearly a tactical one, to which no obviously right solution exists. Nonetheless, I think a strong case can be made in favor of option (d). It clearly satisfies the requirements of simplicity and communicability, and is the least demanding of the four on the limited research resources of the project agency. Moreover, using it would place the agency in a strong position vis-a-vis those forces that would argue for a more generous treatment of foreign exchange costs in the evaluation process. For of the four it is most clearly an underestimate of the truly correct rate, and it is also the one which is most directly based on clearly observed facts. Its main disadvantage is also the very fact that it is an underestimate, and if it were to be rejected in favor of one of the other alternatives, it would have to be on this account. But here as in many other areas of policy work, the "best" may be the enemy of the "good." To my mind, alternative (d) has a firmness not enjoyed by the other options (for one thing, tax structures are less subject to change through time than are licensing policies), and a computational simplicity and conceptual clarity that argue strongly in its favor.

VI. On the Choice of a Discount Rate for Social Cost Benefit Analysis.

The issues surrounding the choice of the relevant discount rate for cost-benefit analysis are closely akin to those just treated in connection with the shadow exchange rate. Instead of the question of which imports will be sacrificed to yield up the foreign exchange to be used on a particular project, we here have the analogous question of what will be the sources from which the capital requirements of a project will be met. The principal sources are three: reduced investment in other lines of activity, reduced consumption (taken broadly to include both private and public consumption expenditures), and increased foreign borrowing. When alternative investments are sacrificed, the cost to the economy is measured by the social yield which those investments would have had (generally measured by their gross-of-tax-rate of return); when consumption is sacrificed, the marginal rate of time preference of the consumers in question (generally measured by their after-tax-rate of return on savings) plays the corresponding role; and when foreign borrowing is involved, the marginal cost to the national economy is the relevant figure. Ideally, one could think of the social discount rate being a weighted average of the rates attaching to each of these three major sources, perhaps broken down so as to allow for differences in the social yields of different classes of alternative investments, differences in the marginal rates of time preference of different consumer groups, and differences in the marginal costs of borrowing from the various foreign sources from which borrowed funds are obtained.

The above brief description should be sufficient to convey the magnitude and complexity of the task of pursuing an "ideal" measure of the social discount rate, along with the uncertainty surrounding the assignment of weights to be attached to the three major sources and their various subcomponents. The need for some way to cut through this complicated maze to find a relatively simple and easily communicable standard or "canonical" sourcing pattern for investable funds should be obvious. Without attempting to explore the possible options in detail, let me here suggest that the strongest candidate for such a canonical alternative is some measure of the overall social yield on investable funds in the country in question. Such a measure should in principle be capable of relatively easy computation from available data, so that the perspectives for the future can be developed in the light of actual past experience.

The choice of precisely which overall investment concept to take is probably mostly a matter of judgment and convenience. The overall yield of capital in the entire economy has appeal because of its inclusiveness, but typically the contributions of many public-sector (particularly infrastructure) investments to this figure are very difficult to measure. More concreteness can be obtained if the measure is confined to private-sector investments, where the main components of yield are the measured return to the investing entity plus the taxes assignable to that return. Perhaps, in the light of the special characteristics of investments in residential housing (in particular, the fact that their social yield is often not directly measurable), it

would be advisable to take as the relevant discount rate simply the overall social yield of private investments other than housing.

Whichever of these choices is ultimately made, it must be recognized that it necessarily contains some arbitrary elements. Yet it also contains elements of contact with reality that are quite important. Consider the case of the social yield on private sector capital. Regardless of how the government gets its revenues -- e.g., from one or another pattern of taxes or from one or another source of foreign borrowing -- it always has as one of the options available to it that of making these funds available to the private capital market. And this is a quite natural and easy option to follow, as it simply entails engaging in less domestic borrowing than would otherwise be the case. If this path is followed, the net result would be that the private sector would fill the domestic-borrowing gap left by the government, with the consequence that more private investment would take place. In this sense, when the government chooses to use its new funds to finance new public-sector projects, it does so against the quite reasonable alternative of using the same funds to reduce its domestic borrowing and hence expand private investment. At this point it becomes natural to require that the particular projects in which the government invests the funds should promise to generate a social yield at least as great as that of private-sector investment in general. And this is precisely the requirement that is imposed when the private-sector's social yield is the discount rate that is used in evaluating public-sector projects.

If the above-suggested procedure involves some arbitrariness, it is not nearly so great as that entailed in the choice of alternative ways to derive the relevant discount rate. For example, one could imagine a system in which the government always met incremental revenue needs by varying a particular tax-rate, and used any incremental revenues from other sources to reduce that particular rate. One could also imagine that foreign borrowing might play the "residual role" assigned to domestic borrowing in the preceding paragraph, with incremental funds, when needed, typically coming from this source, and incremental revenues from other sources typically being reflected in reductions in foreign indebtedness. But these imagined setups ring far less true, to me at least, than the notion of the private capital market as the natural balancing element among the various sources and uses of public funds.

I hope that it is clear from the above discussion that the suggestion of using the social yield of private investment as the standard or canonical norm against which public-sector projects are weighed does not in any way imply that the private capital market operates in a nearly perfect fashion. That market can be imperfect, segmented, and otherwise substantially distorted, and still provide a sound and sensible basis from which to derive the social discount rate. Whereas a perfect market would reveal equal or nearly-equal yields on investments in all subsegments of the private sector, the average yield which I would espouse as the basis for the discount-rate calculation can be an average of widely differing rates of yield in these different subsegments. Nor

need the interest rate charged to private borrowers be a full-equilibrium rate, equalizing the supply and demand for private credit. That rate can be significantly below the equilibrium rate, as it probably is in India, with capital rationing by banks, and investment allocation by government authorities, entering into the credit-allocation process. Yet this would not provide a significant argument against the use of an overall private-sector yield as the relevant discount rate.

In fact, the market interest rate paid by private-sector borrowers need play no direct role in the process of estimating the social yield of private investment. The latter can best be obtained by estimating the total return to capital -- profits plus interest plus rents -- generated in the private sector, and dividing it by an estimate of the private-sector capital stock. A national accounts framework will generally yield most of the required data for this calculation, the biggest problem here being the estimation of the precise part of "income of unincorporated enterprises" which should be allocated as a return to the capital factor, and which part as a return to labor. A subsidiary problem is that of estimating the capital stock figure that enters as the denominator of the yield ratio. Neither of these problems is in the least insoluble; indeed, both have been handled adequately in many different institutional contexts. For India, in particular, an excellent start on dealing with both problems has already been made in the doctoral dissertation of B. H. Dholakia, "The Sources of Economic Growth in India." (Baroda, 1973).

The discussion of the discount rate would not be complete without a mention of that strand of the economic literature which focuses on the



"social rate of time preference" as the relevant rate to be used in discounting costs and benefits. In the context of the three main sources of funds for public investment described earlier, this approach may be regarded as focusing on foregone consumption as the relevant alternative, and using as the relevant rate of discount some weighted average of the different after-tax rates of return on saving earned by various segments of the population. (Sometimes the social rate of time preference is taken to come instead from an assumed social consensus, or as a result of an explicit social decision-making process; the comments which follow are equally applicable to this variant so long as the relevant time-preference rate lies below the social yield of private capital).

The special problem which emerges when a social time preference approach is taken is the need to introduce into the cost-benefit calculation a shadow price of investable funds. If for example, investment yields average 15 percent, while a social time preference rate of only 5 percent is used for discounting purposes, then 100 of investment, generating a perpetual annual benefit of 15, will have a present value of benefits equal to  $300 = \frac{15}{.05}$ . The shadow price of investible funds would in this case be 3.0, indicating that an investment whose discounted benefits are equal to less than three times its cost is not up to the required standard. There can be no doubt that this additional shadow price complicates the cost-benefit procedure, and at the same time introduces an added problem of communication between the experts (i.e., those well-versed in the conceptual nuances involved) and the rest of the public. It is not easy to explain to a layman that a project should

be rejected because its benefits have a present value of only twice its costs!

And it should be realized that this particular solution to the discount rate issue only comes as a result of bringing consumption into what I have called the standard or canonical alternative to be considered when public investment decisions are being made. I believe that a reasonable case has already been made for considering this alternative to be private-sector investment. And I feel it is an added advantage of such a choice that it avoids altogether the need for shadow-pricing of investable funds.