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ECONOMIC PROJECT EVALUATION, PART 1: SOME LESSONS FOR THE 1990S

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Abstract: As countries reduce the size and extent of policy-induced distortions in their economies, the proper accounting for such distortions becomes just one among many aspects of economic project evaluation rather than its main purpose. Matters neglected in the past thus assume greater importance, such as the proper treatment of expected future changes in relative prices, and improving our calculation of expected benefits and costs through assigning probabilities to alternative future outcomes. It is also time to recognize the shortcomings of distributional weights (especially weights that decline exponentially with income) for cost-benefit analysis. The alternative schema of "basic needs externalities" is shown to be far less vulnerable. Special topics of interest for future work are: (a) the fact that there is now far less reason than earlier to turn to calculations in terms of border prices (which are often cumbersome and stilted); (b) the fact that the use of time preference rates to discount benefits and costs has vast implications for the analysis of current (in addition to capital) expenditures; (c) the proper accounting for externalities in cases where public-sector projects compete with or even displace similar private-sector operations; and (d) the appropriate ways in which cost-benefit analysis can be adapted in cases where pure economic efficiency is not the sole objective.

Résumé: Au moment où les pays réduisent le nombre et la portée des distorsions politiquement voulues dans leur économie, la comptabilité appropriée de ces distorsions devient un des nombreux aspects de l'évaluation du projet économique plutôt que sa finalité première. Ceci veut dire qu'il est temps de se pencher sur des questions importantes qui ont été négligées jusqu'ici: a) le traitement adéquat de changements prévus dans les prix relatifs (ou des tendances dans ce sens); b) l'amélioration de nos calculs des profits et coûts attendus en rattachant des probabilités aux résultats futurs possibles. Il est temps, aussi, de reconnaître les défauts des coefficients de pondération (surtout ceux qui déclinent en fonction exponentielle des bénéfices) dans

l'analyse des profits et coûts. Le schéma des «coûts sociaux des besoins fondamentaux» est indubitablement beaucoup moins vulnérable. Questions d'intérêt particulier pour le travail à faire sont: (a) il y a maintenant beaucoup moins de raisons qu'avant de commencer à faire des calculs en termes de prix limites (qui sont souvent encombrants et artificiels); (b) l'utilisation de taux préférentiels à terme pour actualiser les profits et coûts a d'importantes conséquences sur l'analyse des dépenses courantes (et d'investissement); (c) la comptabilité appropriée des coûts sociaux dans les cas où les projets du secteur public rivalisent avec des opérations semblables du secteur privé, ou même les déplacent; (d) les façons appropriées d'adapter l'analyse des coûts et profits dans les cas où la simple efficacité économique n'est pas le seul objectif.

In this paper I sketch a picture of the field of economic project evaluation that in part reflects where we are today and in part indicates the direction in which I believe we ought to try to move over the next decade or so.

The paper consists of three parts. In Section 2 I note that major policy changes during the last 20 years or so have reduced the importance of major distortions (very high tariffs, subsidies, marginal tax rates, etc.) on the economic scene in most countries. These distortions used to be the main focus of project evaluation manuals and procedures. Given the trend and extent of recent policy changes, we now need to concentrate on improving our estimation of the project profiles (the time paths of net flows of project benefits minus costs over the prospective life of the project). One important step in this direction is to consciously build into the calculation of project profiles the prospective changes over the project's life in the relative prices of project outputs and inputs; I give some indications of how to go about this task. The problem of bias in the estimation of project profiles is then addressed, the main diagnosis being that our methods of estimating project profiles do not really get at the expected values of the annual flows of costs and benefits. To better assess expected values, I advocate the fairly systematic use of rudimentary Monte Carlo techniques, incorporating as a minimum four or five alternative scenarios in which the project might develop, whose profiles would then be weighted by their respective assigned probabilities. The task of incorporating a probabilistic vision of the future is judged to be sufficiently daunting that it need not be attended by efforts to incorporate societal risk aversion into our project evaluation procedures. I present what I believe is a solid case in favor of maintaining the fundamental assumption that society is

neutral with respect to project risk. This enables us, even while dealing with a probabilistic vision of the future, to summarize that vision in a profile representing the expected value of net benefits as a function of time.

Section 3 of the paper, entitled "Focusing on the Disadvantaged," is intended to bring the discussion of distributional issues down from the stratosphere where it too often languishes. The first main point of this section is that distributional weights of the type (exponentially declining) and magnitude commonly employed in the economic literature have vast implications that in effect would ask governments to massively squeeze existing distributions of income into very narrow bands. The band can be widened by allowing the weights to decline very slowly as income increases, but this solution has unacceptable implications. I conclude that *if* distributional weights are to be used, the best weighting structure is one that gives preferential weight to those at the very bottom of the distribution, with the preference declining until it disappears at some point before the middle of the income distribution is reached.

Far preferable even to this use of distributional weights is, in my view, a system based on "basic needs externalities." Stripped of all complications, such a system asserts society's "willingness to pay" to raise the standards of education, health, housing, and nutrition of the most disadvantaged members of society. Projects that succeed in increasing those standards for certain groups of poor people would receive credit for the basic needs externalities they generated.

The dollar amounts of the externalities themselves would decline as the beneficiaries became less needy, that is, as they approached levels that were close to the community's norm. These dollar amounts would, moreover, be set not only to represent society's deemed willingness to pay but also with an eye to the least cost principle, with an eye to the costs of achieving similar benefits by other routes.

Lest this schema based on basic needs externalities be viewed as being itself a bit starry-eyed, I outline an approach to implementing it, building on what Chile has done in recent years to help focus its social expenditures on the poorest segments of society. It takes only small and manageable steps, starting from where the Chileans now are, to achieve a substantially full implementation of a schema incorporating basic needs externalities.

Section 3 concludes with general observations on distributional issues, once again urging colleagues to abandon the stratosphere and join the real world. The basic facts underlying this discussion are: (a) that few countries have tax structures that are very progressive overall, and (b) that most countries, and certainly most poor and middle-income countries, have expenditure structures in which the lowest quintile receives less than a fifth of the total benefits that people receive from government outlays.

The message is that "descriptive norms" in which taxation is extracted on a roughly proportional basis and in which the benefits of government expenditures are distributed in a roughly flat per capita basis provide a good center of gravity for our thinking about distributional matters in today's world. Thinking in this way turns out to be quite compatible with the other views presented in this paper — in particular with the traditional handling of taxes as distortions in the calculation of economic opportunity costs and elsewhere, and with the implementation of basic needs externalities (instead of the more exaggerated applications of distributional weights) as a means of taking distributional considerations into account.

In Section 4 four special topics are explored. First, I examine the controversy over whether to carry out project evaluations in terms of border prices or of national currency units. The use of border prices seems to have been motivated by a desire to ensure that the principle of comparative advantage is respected. It is, assuredly, easy to fly in the face of comparative advantage if bad techniques are used, or good ones wrongly applied; but a proper application of good techniques should lead to the same answers, regardless of whether the analysis is carried out in terms of border prices or of domestic currency units. A few simple examples are presented to help readers appreciate why this is so.

The second topic dealt with is the use of time preference rates (typically much lower than the economic opportunity cost of capital [EOCK]) for discounting as one implements cost-benefit analyses. The main thrust of the argument here concerns the "shadow price of investible funds," which all serious proponents of a time preference approach recognize as the handmaiden of using a low discount rate. For example, one could use an EOCK of 10%, together with no shadow pricing (i.e., a shadow price equal to unity) of investible funds; or one could use a time preference rate of 4%, together with a shadow price of 2.5 for investible funds, meaning that one dollar of

financial cost would be counted as $2.50 of economic cost. The main point is that the figure of 2.5 in such cases is derived in a way that has nothing to do with the uses to which the funds in question are put. It is derived by an exercise of marginal "sourcing" from the capital market. I then point out, following Sjaastad and Wisecarver (1977), that current as well as capital expenditures of the government can be and are financed from the capital market, and, more importantly, that any money saved through curtailing current expenditures can be paid into the capital market, generating a benefit, in our example, of $2.5 per dollar thus used. The conclusion is that *if* a time preference rate is used, the consequent shadow price should be viewed as and termed a shadow price of *public* funds, not just of *investible* funds, and should be applied in the evaluation of current as well as capital outlays.

The third topic of Section 4 is the "Campbell's Soup Problem," which deals with the potential anomaly of using project evaluation criteria to justify public investments in an industry (for instance, soup) when they yield, say, a 12% return, when market forces, including the taxes that private firms have to pay, require that private investments in that same industry yield, say, 16%. I show that a proper accounting for the external effects of such public investments — in particular, their effects in driving competing private-sector activities out of existence — will normally be adequate to eliminate the anomaly. That is, a public-sector project that gets away with yielding only a 12% return solely because it doesn't pay taxes will be rejected by a proper application of modern cost-benefit criteria. Wisdom and prudence also, in my view, militate in favor of requiring public projects that directly compete with the private sector to pass not just the standard tests of economic cost-benefit analysis, but also the same sorts of other tests as do private-sector projects. In particular, they should be required to pay the same taxes and abide by the same regulations as do similar private-sector operations.

IMPROVING PROJECT PROFILES

Looking Back and Looking Ahead

In my view, a lot has happened since the field of project evaluation first came to full flower in the 1960s. Most importantly, the world has changed dramatically, in terms of both the types of policies pursued and the way in which the makers of economic policy tend to define their tasks.

At the time that project evaluation as a field (or subdiscipline) of economics came into its own, the most common attitude of LDC (lesser developed countries) governments was that they had to plan, guide, and direct their economies. Development planning was the watchword; input-output matrices provided the data needed for "wise" long-run decision making; tariffs, quotas, prohibitions, license requirements, multiple processes of authorization and approval — these were the tools by which the authorities sought to channel, guide, and direct the future development of their countries.

The consequence of this type of attitude and this sort of approach to the development process was a situation in which it was very common for market prices to be greatly distorted, a world in which an import tariff of 40 or 50% was thought of as low and tariffs of 80 and 100 and even 200% were common. On top of tariffs, countries maintained long lists of prohibited imports — lists that, much to the consternation of project evaluators, were constantly being changed. Moreover, access to the foreign exchange market was typically not free, giving rise to parallel, gray and black markets, with exchange premia that sometimes were expressed in multiples rather than percentages.

Capital markets, too, were full of distortions. Rarely were banks free to compete among themselves to attract deposits by paying depositors a competitive rate of interest. Instead, interest on demand deposits was often prohibited by law or at the very least kept close to zero, and interest on time and savings deposits was also held far below what would have been its competitive level. In countries with significant inflation the interest rates received by depositors were almost invariably negative in real terms, sometimes to the point of virtual confiscation.

There were also, with or without inflation, huge implicit subsidies to certain classes of borrowers. Sometimes the Central Bank itself gave subsidized credits, sometimes it was other public-sector banks (e.g., development banks), and sometimes it was the commercial banks themselves (operating under legislative mandates or under directives from the government and/or the Central Bank).

Then there was the tax system. With few exceptions, the system of corporate income taxation was modeled after those of the industrial countries, giving rise, in principle, to a situation in which the marginal product of capital was higher in the corporate than in the noncorporate sector. But this broad tendency was often obscured by so-called tax incentives, which gave preferential treatment of vari-

ous kinds to favored classes of investment. In a number of countries, the accumulation of tax incentives over the years created a mare's nest of "special treatments," causing huge distortions in the way capital was allocated among industries, sectors, regions, and specific uses, and in the process virtually wiping out the revenue-generating capacity of the corporate income tax.

Other mechanisms besides import protection, subsidized credit, and tax incentives were used to stimulate production or use of particular products, so that one clearly had product market distortions side by side with trade distortions and capital-market distortions. All of these were quite well understood and reflected in the mainstream literature on project evaluation in the 1960s and early 1970s.

The project evaluation literature that appeared during this period was a natural outgrowth and in a sense a reflection of the policy environment just described. With distortions so rampant in the key markets of the economy, actual market prices were commonly quite far from representing the true economic cost of the good or service in question. This leads quite naturally to an attempt to quantify these true costs. Thus the profession arrived at what were variously called the shadow prices, or the social or economic opportunity costs of foreign exchange, of capital, sometimes of key commodities like oil, and of labor (about which more later).

To give an idea of how these economic opportunity costs came into play, consider a foreign exchange market with three classes of imports — M_1 with a 100% tariff, M_2 with a 50% tariff, and M_3 with zero tariff — and three classes of exports — X_1 with a 30% subsidy, X_2 with a 10% tax, and X_3 with no special treatment. The consensus solution of the literature of the time was that the economic opportunity cost of foreign exchange would be the relevant weighted average of the effective individual economic opportunity costs applicable to each "source" of foreign exchange. Thus, if it was deemed that an added dollar of demand for foreign exchange would be "sourced" 30% at the expense of M_1, 20% at the expense of M_2, 10% at the expense of M_3, and the rest would come from newly generated exports — 20% from ΔX_1 and 10% each from ΔX_2 and ΔX_3 — this would yield an economic opportunity cost of foreign exchange of 14.5 pesos per dollar as compared to a market exchange rate here assumed to be 10 pesos per dollar. (The calculation is given in Table 1.) Without here going into detail about the conceptual foundation and the practical estimation or assignment of the weights, it is quite clear that there is a huge difference between the two.

Table 1
The Economic Opportunity Cost of Foreign Exchange
With "Heavy" Trade Distortions

Sourcing From:	Weight (f_i)	Distortion	EOC_i	$f_i x EOC_i$
ΔM_1	30%	100%	20	6.0
ΔM_2	20%	50%	15	3.0
ΔM_3	10%	0%	10	1.0
ΔX_1	20%	30%	13	2.6
ΔX_2	10%	-10%	9	0.9
ΔX_3	10%	0%	10	1.0

$\sum_i f_i EOC_i$ = EOC of foreign exchange = 14.5
(Assumed market exchange rate = 10)

Let us now shift gears and, using the same weighting structure, apply a set of trade restrictions that comes closer to the targets countries are setting for themselves in the 1990s.

Here we get a weighted average economic opportunity cost of foreign exchange that is quite close to the market exchange rate (10 pesos in the examples of Tables 1 and 2).

The *main point* of this example is that the adjustment needed to account for distortions in the sourcing of foreign exchange is much smaller (in a typical LDC) today than it was 20 or 30 years ago. I believe these matters must still be dealt with as we focus on the next decade, but the amount of time devoted to them should be much less.

Table 2
The Economic Opportunity Cost of Foreign Exchange
With "Light" Trade Distortions

Sourcing From:	Weight (f_i)	Distortion	EOC_i	$f_i x EOC_i$
ΔM_1	30%	20%	12	3.6
ΔM_2	20%	10%	11	2.2
ΔM_3	10%	0%	10	1.0
ΔX_1	20%	0%	10	2.0
ΔX_2	10%	-10%	0.9	0.9
ΔX_3	10%	0%	1.0	1.0

$\sum_i f_i EOC_i$ = EOC of foreign exchange = 10.7
(Assumed market exchange rate = 10)

To buttress this point, consider the issue of expected changes in the real economic cost of foreign exchange over time. Recall that a typical investment project will have an expected life of 20 years or more, and that the profile of costs and benefits of such a project has to be projected over its entire lifetime.[1] There is little doubt in my mind that the expected time path of market real exchange rates is worth *at least* as much attention as the distortions that separate the economic opportunity cost of foreign exchange from the market exchange rate. Yet many writings on and courses in economic project evaluation devote no attention at all to this topic. Table 3 gives an indication of the volatility of the real exchange rate for a number of countries over two recent decades.

Table 3
Real Exchange Rate Indices
1980 = 100

		1970s		1980s	
		Highest	Lowest	Highest	Lowest
	Canada	97	66	100	74
111	United States	100	74	100	73
132	France	119	100	131	99
134	Germany	115	93	127	95
146	Switzerland	148	89	112	82
158	Japan	131	81	100	61
233	Colombia	119	92	154	83
273	Mexico	117	87	153	83
248	El Salvador	123	96	100	48
299	Venezuela	107	81	172	71
652	Ghana	472	111	457	36
694	Nigeria	185	107	312	60
636	Zaire	197	70	275	100

Note. **These indices are period averages. The real exchange rate is the nominal average price of the U.S. dollar during the period divided by the local consumer price index and multiplied by a weighted average of the wholesale price indexes of the United States (0.40), Germany (0.21), Japan (0.17), France (0.11), and the United Kingdom (0.11). The weights are those used since January 1991 to define the SDR (social discount rate). The basic data used for this table are quarterly average exchange rates against the U.S. dollar.**

Source: **Data from International Monetary Fund, *International Financial Statistics*, database diskette.**

Project Profiles Must Incorporate Changing Relative Prices

The above data on the volatility of real exchange rates testify to the importance of changing relative prices, at least for one key relative price. But others can be equally important. We all celebrate the phenomenon of economic growth, the more so when it is reflected in rising real wages over a wide spectrum of the labor market. Think, however, of the trouble that afflicts many industries in such cases, as they are squeezed between world prices for their (tradable) outputs that stay more or less constant (in real terms) and real wages that rise relentlessly at, say (in a rapidly growing economy), 5 or 6% per year. Many investments that turn sour under such pressure could probably have been avoided if prospective relative price (and wage) movements had been carefully projected when the investment decision was being made. Think, too, of the many hydroelectric projects that were decided upon in the heat of the second oil crisis, when oil was selling at 40 dollars a barrel, but which were rendered costly white elephants as oil prices shrank to less than half that level in nominal terms, and perhaps to a third or fourth of it in real terms.

It should be (and should always have been) completely obvious that one cannot build project profiles on the principle of a Laspeyres index. This kind of approach "freezes" relative prices at whatever values they had in the base year. Now, I would expect (or at least hope) that anyone involved in real-world project evaluation would recognize the fatal errors involved in this assumption, and would probably deny ever following it. But how then do we explain the dozens, even hundreds, of real-world project profiles in which the "operating" years of a project's life are represented by a perfectly flat benefit stream based on projected data for a "typical year"? Is it laziness on the part of project analysts? Or does it come from their sensing that the key relative prices will not change (by much) over the operating life of the project? Or is it perhaps the heavy hand of tradition, built up from past practice, plus countless classroom examples where the rectangular-shaped benefit profile has been the time-saving recourse of professors (myself included)?

We need not try to fathom the reasons for our past failings. We can simply take the forward-looking view that project analysis teaches us to take, and vow to do better in the future (starting in the 1990s). The critical point is that we should realize it is now very likely, at least for a considerable number of countries, that the errors made by neglecting prospective changes in relative prices can be more important, and in some cases far more important, than the errors to

be made by failing to adjust future profiles based on projected market prices, so as to take account of the distortions (tariffs, subsidies, taxes, etc.) likely to prevail in future periods.

Thinking about Relative Price Trends

It should be clear that formulation (1) below is an unacceptable approach to defining (or conceptualizing) the net benefit flows (F_t) of a project. Some method must be found to incorporate expected relative price changes in the calculation of the F_t. This is not a hard task, because the job is automatically done for us when we think of the real flows as consisting of nominal flows deflated by some general price index $\bar{P}_t$, as in (1) and (2):

$$(1) \qquad F_t = \frac{\sum_i X_{it} P_{it} - \sum_j L_{jt} wjt}{\bar{P}_t}$$

$$(2) \qquad F_t = \sum_i X_{it}\left(\frac{P_{it}}{\bar{P}_t}\right) - \sum_j L_{jt}\left(\frac{w_{jt}}{\bar{P}_t}\right)$$

Expressions (1) and (2) say exactly the same thing in mathematical terms, but there is a world of difference between the ways of thinking they represent, and the applications to which they are relevant. Expression (1) is best thought of as "backward looking," expression (2) as "forward looking." Conceptually, expression (1) deals with the net flow of benefits and costs in nominal terms (the numerator), with this flow then being converted to real terms, deflating it by general price level. In contrast, expression (2) conceives of the flows in real terms, each periodic flow F_t being composed of quantities of outputs (X_{it}) and inputs (L_{jt}) multiplied by their respective *real prices* ($P_{it}/\bar{P}_t$) and ($w_{jt}/\bar{P}_t$).

Readers should have no trouble in visualizing how expression (1) can be used to formulate an *ex post* analysis of a project that has already run its course. One goes back to the data of the past, which almost invariably come to us in nominal terms. $\sum_i X_i P_{it}$ is typically something like "sales," and $\sum_j L_{jt} w_{jt}$ is typically something like "total operating costs" (recall that L_j includes inputs of materials as well as of labor). So one takes for each year "sales minus total operating costs" and deflates it by the general price level for that year, thus building up the time series of real flows F_t of net benefits (= benefits minus costs).

But the simplicity of applying expression (1) to past data turns to absolute treachery if one attempts to use it to project the future. The basic problem is that the most important fundamental determinants of the future path of $\bar{P}_t$ are beyond the realm of economic science. Who would have predicted, say, in 1987 or 1988, that Argentina would successfully implement parity between the peso and the dollar starting in 1991? Or who would have predicted, in 1992 or 1993, or even in February 1994, the catastrophe of Mexico's peso crisis in December of the latter year?

The fact is that bursts of inflation are mainly caused by events that lie outside the expertise of economists. Weak governments run fiscal deficits that end up being financed via the inflation tax, not because they desire the outcome but because they lack the strength to avoid it. Wars, crises, and natural disasters can lead in the same direction, even with a strong government.

Thus it is that no economist could plausibly have predicted the movement in prices over, say, a decade to within a factor of two or even three in any country that ended up with major inflation. And even in the major industrial nations, let us not forget that price levels more than doubled in the 1970s but showed remarkable stability between 1985 and 1995. Was either of these outcomes plausibly predictable?

In contrast, it is comparatively easy to set limits to the plausible movements of relative prices. It is truly unusual for real wages of any major category of labor to move by more than, say, 5% per year over any extended period. As to average real wages (of the labor force as a whole), their growth rates are pretty well approximated by the rate of growth of real GDP minus the rate of growth of the labor force. Both of these are things that we as economists can consider as parts of our natural realm, about which we can form judgments and make plausible projections.

The story is similar for the relative prices of copper and of coal, of houses and of computers, of haircuts and of fish. In each case our economics looks to the likely shifts of both supply and demand. For most things, the shifts of supply come mainly from real cost reductions (of whatever type, but certainly including technological advances) pushing relative prices down, and of rising real wages pushing relative prices up. Over an economy as a whole, these two forces roughly balance each other, so that for an "average" commodity producers recoup the extra costs of higher wages through the

benefits of greater efficiency (reduced real cost per unit of output). The growth of real wages (for given qualities of labor) throughout the economy is in fact largely determined by its average rate of technical advance. It is items like haircuts (which experience little or no technical advance) whose relative prices rise through time in a growing economy, and it is items like computers (with technical advance far more rapid than "average") whose relative prices fall through time. These items, like most goods and services, have very elastic long-run supplies; thus one must concentrate on the principal forces pushing their supply curves "up" or "down." For such items, the forces of demand hardly enter into the determination of the time path of relative price. But there are some items, of which copper and fish are good examples, whose supplies are not characterized by high elasticity. Here, projecting the long-run trend of prices entails assessing the forces (of discovery and depletion) leading to "outward" and "inward" shifts of supply, in addition to the "upward" and "downward" shifts mentioned above. For those items, the interaction of supply movements with those of demand obviously plays a much more critical role than it does for items with highly elastic supply.

Recognizing Short-Term Deviations from Long-Term Trends in Relative Prices

In addition to incorporating prospective or ongoing long-term trends in relative prices, project analysis must strive to recognize short-term deviations from these long-term trends, at least when such deviations are significant in size, and not so transitory that they will be over before spending on the project in question gets underway.

The major international commodity prices have traditionally exhibited high price volatility, stemming from low short-run elasticities of both supply and demand. Wheat in 1974 reached a real price that was close to three times its recent level, largely as a consequence of the USSR entering the world market as a massive purchaser. Coffee's world price tripled between 1975 and 1977, mainly as a result of crop failures. Sugar reached 40–50 cents a pound in 1974 and again in 1980. At such prices, there is hardly an arable acre in the world on which sugar cannot be profitably produced, yet little conversion of acreage took place because everybody was quite certain that the price would soon drop back to more normal levels.

Whenever an important price is temporarily out of line with its projected long-term central tendency, one faces the task of building into

the project profile a time path by which ($P_{it}/\bar{P}_t$) will return to its normal track. This is what "should" have been done for petroleum in 1979–80, when all those expensive hydroelectric projects were being analyzed and approved. The tracing of such an adjustment path obviously cannot be exact, nor do futures markets help much (as they rarely go more than a year or so into the future). But one can be quite sure that most of the unfortunate plans for hydroelectric projects could have been aborted, independently of whether one projected the drop in the real price of oil to come over a three- or a five- or a seven-year period. (Recall that for hydroelectric projects, the gestation period can be as long as a decade.)

Short-term deviations from trend can also occur for prices that are more central to an economy than those of one or two particular commodities. Here one should particularly note the real exchange rate and the real discount rate that is used in project evaluation.

In the early 1980s there was a spate of currency overvaluation in a set of countries (Argentina, Chile, Mexico, Uruguay, among others) that were the recipients of vast inflows of foreign capital. These inflows made the dollar extremely cheap (to local buyers) in real terms. But it could easily be verified that the rate of capital inflow was too high to be sustainable. The obvious conclusion was that the long-term real value of the dollar was significantly higher than the market value that then prevailed.

These are real cases in which the evidence favoring a future rise in the real peso price of the dollar was extremely strong. All four of the listed nations soon became the victims of the international debt crisis. Huge demands were made on them, mainly by the international banks that were their creditors, and their economies were put through wrenching adjustments. In the process their currencies underwent huge real devaluations. In each of the mentioned cases, the monthly series on real exchange rates has a peak that is more than twice the preceding trough. Moreover, this great swing took place within a relatively short time after the debt crisis struck.

Just as it was quite clear that the prevailing real exchange rate was below its long-run norm when the flood of capital was coming in, so too in the height of the adjustment that followed the debt crisis it reached points that were well above the norm. It is important for readers to realize that I am not at all asserting that these were points of disequilibrium — it is better to think of them as points of equilibrium characterizing transitory circumstances. When the capital flow

was large, the supply curve of foreign exchange can be thought of as shifting far to the right. This was transitory because the countries in question were moving quickly toward their maximum debt/GDP ratios. The existence of prudent limits to the debt ratio can hardly be denied, but continued borrowing at the pace of 1980 or 1981 (depending on the country) would soon carry it beyond such a limit.

In the reaction to the debt crisis the countries squeezed credit to the extreme as they strove to meet the demands for payment. In the process, GDP fell by an average of more than 10% in the four countries; imports were cut by more than half; unemployment soared. All these came as the result of shifting the countries' stance from one of receiving a massive inflow of capital to another in which a huge trade surplus had to be generated. The real exchange rate had to be high in such circumstances in order to deter imports and stimulate exports. But the short-run "equilibrium" of that moment was different from the longer-run equilibrium that would follow if for no other reason than the difference of supply response between the short run and the long run. When the debt crisis struck, the great bulk of the adjustment was borne by imports. Later, in response to the higher real exchange rate, exports (particularly nontraditional exports) grew significantly.

It should now be clear why the real exchange rate was low (but in equilibrium, given a huge capital inflow) in the early stage and high (but in equilibrium, given the demands of creditors) at a later stage, and why the longer run equilibrium reflecting a "normal" post-debt-crisis situation would produce a real exchange rate that was in between, but quite distant from, either of these extremes. Hence a project analyst working at the time of the big inflow should properly assume that the real exchange rate would increase from its then-prevailing level, whereas an analyst working at the time of the debt crisis should with equal assurance project a decline in the RER.

Other circumstances in which a change in RER should be projected include cases where a country's principal export good is experiencing an unsustainably high or an unsustainably low international price. In these cases there would be two price trajectories to trace — one for the principal export product as such, the other for the real exchange rate.

The social opportunity cost of capital should be connected to the measured productivity of capital in the economy, but in periods of clear stringency of supply of funds in relation to demand, the near-

term rates of discount should rise above the longer term rate. Over a period of several years Chile used a variable real rate that started at 20% for the first year, then went to 18% for the second, 16% for the third, and so on, down to 12% for the fifth year and beyond. This is an exemplary way to deal with a near-term stringency of funds that is not expected to be permanent.

The course of real wages will largely be determined by the rate of growth of GDP per worker, so a country projecting a 6% growth rate of real GDP will have a very different outlook for real wages than one that projects GDP growth at 3% per year. In projecting the growth of the general level of real wages, we must also look at the situation of different segments of the labor market. When developing countries pass through a stage of rapid modernization, liberalization of capital and financial markets, and the like, there typically arise significant labor market premiums for the particular skills associated with financial analysis, the management of financial institutions, and other such fields. At the same time, modernization does not exert pressing demands on the unskilled labor force, so it is quite common for the unskilled wage rate to lag well behind the average rise of real wages during modernization periods.

The above comments reflect the level at which I would attempt to communicate some of the issues surrounding the projection of relative prices in, say, a course of relatively short duration devoted to the general topic of social project evaluation. They do not go far enough to constitute guidelines for those who will actually do the projections of relative price trajectories. But they are certainly adequate to sensitize participants to the need to build changing relative prices into their projection procedures. They also indicate some of the main types of situations in which this need is most likely to arise.

Avoiding Bias in the Projection of Project Profiles

It is a sad commentary on the present state of economic project evaluation that one should feel impelled to devote a section of one's paper to the topic of avoiding bias. But the fact is that there are mountains of evidence indicating a pervasive tendency to underestimate costs and overestimate benefits. Analysts insert "contingency allowances," routinely in the range of 10% to 20%, to augment the estimated costs of projects, but nonetheless we find that cost overruns (above and beyond the contingency allowances) are more the rule

than the exception. This is true even without counting the implicit "interest" charges that accrue when the construction phase of the project is extended beyond the originally planned completion date.

Similar situations also emerge on the benefit side. Every commuter rail or subway project is accompanied by projections of its use by commuters. But how many cases do we know of where actual usage was massively greater than was projected in the planning stage? In contrast, most of us know (or have heard) of many cases where actual use was far below what was projected.

Our experience with past projects thus strongly suggests that actual project profiles do not come close to reflecting expected values of the annual project flows of net benefits in real terms. Much more apt is their description as plausible "comfortable scenarios" about how the project might evolve.

It is likely that subtle forces work systematically to produce this result. In the first place, most of the projects that are typically being analyzed using the methodology of economic project evaluation are eligible for "special" financing of one kind or another. Either they will get their money from public funds, or they will borrow in private markets with government guarantees, or they will receive financing from, say, the World Bank and/or one of the regional development banks. In any of these places, the projects are likely to get a "friendly" hearing, not the cold, almost hostile and adversarial reception that new projects typically receive from a private venture capital fund. I believe such funds are the relevant private entities for such a comparison, because they are typically asked to finance something that looks like a project, whereas commercial banks allocate most of their financing to going concerns. Commercial banks care fundamentally about the likelihood of their being repaid, and this likelihood often depends only marginally on the project being "financed." Banks are more concerned with the overall liquidity, the overall asset position, the overall cash flow, and the prospective future overall profitability of their client firms, as it is these things that mainly govern their prospects of repayment.

To get at the kind of situation in which the World Bank, for instance, would naturally adopt a more rigorous attitude toward estimating project profiles, consider the hypothetical case of a loan to finance an irrigation project, in which the only source of repayment of the loan would be the proceeds of sales of water or water rights. This hypothetical project would stand by itself, with a cushion of equity

owned by the government and/or the participating farmers. But the conditions of the loan would be that, as is the case with home mortgages in some states and countries, the lender had no claim to assets or income of the borrower, apart from the assets and income of the project itself. In such a case, the World Bank would surely want there to be a substantial "cushion" in the distribution of expected outcomes. It would not be content with a situation in which in the best outcome both it and the equity holders received a normal rate of return on their respective investments, and in all other cases one or both would be only partially repaid.

The way I read the tea leaves on irrigation and electricity projects, the international banks are constantly pressing the client public enterprises to set tariffs at rates that will barely cover full economic costs under favorable scenarios, but that will fall short of covering them if anything goes wrong. This automatically leads to the expected value of revenues falling short of what is required.

More importantly, the fact that loans by the World Bank and other international financial institutions are guaranteed by the full faith and credit of the client governments renders them simply "not vulnerable" to an unfavorable outcome. Hence these institutions are quite naturally less worried about such contingencies than they would be if their vulnerability were clear, open, and transparent.

More on Expected Values: The Monte Carlo Method

The previous section focused on the ambient pressures that lead toward a "comfortable scenario" as the source of data from which project profiles are developed. In this section we will turn to what might (and probably should) be done to try to offset the biases implicit in this comfortable scenario.

My own experience with dam projects (irrigation, hydroelectric, or both) may be a good starting point. Fortune has led to my being personally involved in one or more phases of the evaluation of dam projects in Argentina (Ullum), Chile (Colbun), Costa Rica (Boruca), and Honduras (El Cajon), and to my reviewing with some care the economic evaluations of perhaps a dozen or more others. In all of this experience, I must confess that no single evaluation ever mentioned the probability that the dam might break. Now, granting that this probability is small, one must also recognize that the cost associated with a dam breaking is very large — large enough to have a

measurable (i.e., non-negligible) impact on the net present value of the project.

The above example also illustrates one of the dilemmas facing economic project evaluation in general. It would be quite a task to do a good job of estimating the probability of a dam's breaking, plus its associated cost. But who, pray tell, is willing to finance that task? In my experience, those who finance the economic evaluation of projects have scant patience with suggestions that important funding allocations be made for such purposes. The unfortunate conclusion is that if allowance is to be made for this and other unfavorable contingencies, it will almost certainly have to be done quickly, roughly, and cheaply.

Thinking about practical ways to bring real-world project profiles closer to the goal of representing true expected values, I find myself gravitating more and more to a generalized advocacy of the use of Monte Carlo techniques. Monte Carlo techniques entail the development of alternative scenarios, with probabilities assigned to each. Unfortunately, this is a door that, once opened, can easily give rise to a Pandora's box of possibilities, so even as I advocate their use I want to argue in favor of maintaining a high degree of economy and simplicity in their application.

The simplest use of Monte Carlo methods is to develop four or five alternative scenarios, keyed to the variable that is most important in determining the success or failure of the project. For some projects this variable may be the rate of growth of per capita income in the country; for others it may be the future path of the world price of the principal output of the project; for a new commuter railway project it may be the fraction of the relevant population that will decide to rely on that mode as the future unfolds.

The idea is for the project evaluator to face different alternatives that are quite unfavorable, somewhat unfavorable, more or less "normal," somewhat favorable, and quite favorable. Then, having worked out a project profile for each such scenario, the evaluator assigns probabilities to them. Using these probabilities, the evaluator averages the net present values of the constituent profiles or, alternatively, averages the annual flows of the individual profiles to generate one amalgamated profile representing each year's expected flow, F_t.

Working with four or five different scenarios keyed to the variable that is most critical to the project's outcome is probably the most

promising simple way to apply Monte Carlo techniques, because it is an easy way to build in likely covariances among key variables. High GDP growth is likely to be accompanied by high real wages paid by the project as well as by high demand for its output. High world prices for copper may be accompanied by high real wages for copper workers, as well as high project output. But beyond the simple-scenarios approach, there are, as I have already suggested, virtually limitless possibilities, some easier than others to put into practice. A more full-blown Monte Carlo exercise might posit a probabilistic distribution of the future rate of growth of real wages in the economy in question, together with a different probability distribution of the world price of the principal output of the project (say, copper), and another one for an important traded input (say, petroleum for electricity generation). With good luck, these three probability distributions would be independent of each other. Alternative project profiles would then be generated by sampling from each of these three distributions. With more good luck, the calculation of the project profile could be formatted so that each sampling could be fed into the computer, which would then produce a project profile and calculate a net present value. The end product of the process would be a probability distribution of net present values of this project. Its shape would naturally be determined by the assumptions made about the underlying probability distributions of the time paths, in this case, of real wages, real international copper prices, and real international petroleum prices.

Beyond this simple level one can think of working with assumed distributions for five or ten or even more key variables, perhaps imposing positive or negative correlations among them (e.g., a lower quantity when its price is high, a higher quantity when its price is low). But these applications are probably for a future further away than the next decade. For now, I would be quite content to see simple, robust Monte Carlo exercises, such as those mentioned in the preceding paragraphs, being widely implemented.

Still More on Expected Values: The Issue of Risk

There are two quite different definitions of risk in the literature of finance and economics. One of these is what we see in risk premia on lowgrade bonds. It is what is called default risk; its function is simply to allow for the probability that the expected payments will simply not be made. The second definition of risk is portfolio risk; it has to do with the variability of outcomes to which a given portfolio is subject.

When economists talk about risk aversion or risk preference or risk neutrality, they are speaking of the attitudes of individuals toward the risk they see (or bear) on their actual or potential portfolios. Most of the literature assumes that market participants are generally risk averse. The market itself seems to reflect risk aversion in the way it prices many (though not all) assets.

It is not easy today to infer how risk is evaluated in the market, because it is not true that risk is inherent in a particular asset. That was the old-fashioned and very easy way of viewing risk: an asset's riskiness was simply measured by its coefficient of variation (standard deviation ÷ mean) of income, appropriately measured. High-variance assets were risky, and low-variance ones were non-risky.

The modern view looks at the entire portfolio — if a portfolio consists of assets that are cyclically sensitive, one does not aim to reduce risk by adding a new asset with low variance. Rather, one looks for a new asset whose performance is countercyclical. If such an asset can be found, high variance in it might well be a very positive attribute, for it can then more powerfully offset the cyclical riskiness of the existing portfolio.

The modern approach to risk was a big help to financial managers and advisers, but it is of no help at all to those who engage in social project evaluation. We do not even know how to define "society's" portfolio. We wouldn't know how to begin measuring what a project like a dam or a road does to the total variance of outcomes of society's portfolio. We have not the slightest idea how society judges the riskiness of the portfolio we have not even been able to define.

The good news is that we can go a long way without ever having to confront the above conundrums. The key is to assume that society is neutral with respect to risk. So long as we can work with that assumption, we need only ask, of each project, What is the expected value of the net benefits that it will generate?

It is quite easy to build a case that society should be treated as neutral with respect to risk as far as social project evaluation is concerned. The key concept in the analysis of risk preference and aversion is a function describing the utility attaching to each level of wealth. A function in which the marginal utility of wealth declines as wealth increases displays risk aversion; one with increasing marginal utility of wealth shows risk preference. A function that is a straight line over a certain range shows risk neutrality over that range.

Now try to draw an analogy to the above for society. Society's wealth is probably two or three or four times national income (Y) in most countries. Hardly any project is of a size larger than 10% of national income. A risky large project might have the outcome that society's wealth is 3.1 times Y with 50% probability and 3.3 times Y with the other 50% probability. The social valuation of that package is not likely to differ much from the social valuation of a wealth of 3.2 times Y for sure. In order to get the result that society really values the risky option much less than the sure option, you would have to have very sharply declining marginal utility of wealth over the very narrow range where wealth is between $3.1Y$ and $3.3Y$.

The prudent conclusion to draw from the above sketch, and from similar reasoning carried out at greater length, is that it is not at all implausible to assume that society's marginal utility of wealth is approximately constant over the probabilistic range of outcomes associated with even a very large project.

Dealing with "Risk" in the Next Decade

Some may feel that the assumption of risk neutrality simply assumes away the problem. It gives a result that seems to make the analyst's life easy, and thus looks like a lazy person's way out. Such a notion is far from the truth. The fact is that the art and science of project evaluation are far from extracting the full meat from the simple assumption of risk neutrality.

We have seen in preceding sections how long a road economic project evaluation has to travel before it reaches the point where project profiles come reasonably close to reflecting the expected values of the flows (of net benefits or costs) in question. We have seen, too, how, in order to come closer to expected values, we should explicitly deal with probability distributions, both as inputs (in the form of price distributions, growth rate distributions, etc.) and as outputs (in the form of distributions of net present values of a given project) of our evaluations procedures.

The suggestion has been that we must be more explicit about good and bad scenarios, in addition to normal ones, in order to get a better idea of the expected flows of benefits and costs, and the expected net present values corresponding to each project. The assumption of risk neutrality (for society as a whole) is an extremely convenient and simplifying assumption because it permits us to stop with ex-

pected values. If we drop that assumption, we are driven to go much further — to assess the value of "society's portfolio" now and into the distant future, determined by the typical project's life; then to assess the riskiness of this social portfolio, in the form of a probability distribution of it; then, for each project, to determine what its presence does to the probability distribution just described; and finally, using an assumed function relating society's utility to its wealth, to determine what social gain or loss is entailed in passing from one probability distribution of wealth (without "our" project) to another (with "our" project). I think most readers will agree with me that we would have to be intellectually quite brave indeed (not to say arrogant) to venture into this treacherous terrain. Far safer, and I think far better, to be content with the cleanness and simplicity offered by the highly plausible assumption that, within the range relevant for most projects, society is neutral with respect to risk.

FOCUSING ON THE DISADVANTAGED

The final basic postulate of applied welfare economics — which provides for the algebraic canceling of benefits and costs, regardless of to whom (within the relevant "society") they accrue — has always been the most problematic of the three. People react with varying degrees of distaste to the idea that a dollar of benefit to a wealthy group is allowed to cancel a dollar of cost to a poor group. Faced with the direct question, "Should a dollar of benefit to the rich count exactly the same as a dollar of benefit to the poor?" most people instinctively answer no.

This section would be an easy one to write if further thought simply confirmed this common, instinctive answer. However, it does not. The more one peels the onion, looking ever more closely at the problem, the more difficulties one encounters with this answer. In the rest of this section we first examine the implications of distributional weights of the type that appear to follow from the preceding question and answer. We then proceed to an alternative (but not incompatible) way of incorporating a focus on the disadvantaged into our cost-benefit and project evaluation procedures. Finally, some general comments on distributional issues are presented.

On Distributional Weights

At the most elemental level one can ask, Who are the poor? The troubling answer to this is that there is a very substantial differ-

ence between the poor and the needy, at least when standard measures such as income are used to define poverty. Most graduate students, most teenagers who have left the parental roof, plus hordes of retired people living on annuities would qualify as poor by a straightforward income-per-household criterion, yet the great bulk of these are not generally viewed as appropriate targets for public transfers. But a straightforward application of the idea that their marginal dollar of benefit should be given more weight than those accruing to richer people provides a direct justification for such transfers.

To find ways to escape this apparent contradiction, we can look at the solutions many societies have adopted in their social programs. Rather than rest the justification for public transfers on something as crude as income, they sometimes provide certain services as a "right" to everybody (e.g., universal free primary education) and sometimes set up a series of filters through which households must pass before they achieve eligibility (e.g., access to cheap public housing, to free medical services, or to food subsidies). Such a set of filters is fully compatible with differential weighting of benefits received by different groups, but it greatly complicates the identification of such groups.

I believe that a prima facie case can be made against the unquestioning use of income as the basis for assigning different weights to the benefits of different people (or households). Nonetheless, such a role for income has deep roots in the literature of economics, going back to Bentham and the utilitarian school and carrying up to the optimal income tax literature of recent decades. So for the moment I shall abide by that tradition, and make some comments that fit within its own terms.

The most particular target of these comments is the use of a utility function for which the marginal utility of income declines exponentially as income increases. Such functional forms are common in the literature, with parameters that imply a quite rapid decline of marginal utility as income increases. What I mean by rapid, as well as why such functions are my target, will become clear from the example that follows.

Nothing is lost in this context if we substitute for "marginal utility of income" the concept of "distributional weight." Let the norm for distributional weights be unity (for an "average" person, somehow

defined). Then people with less than average income will have weights that are greater than one, and those with incomes above the average will have weights that are lower than one.

A case of very rapidly declining weights would have the weight be cut in half every time income doubled. A case of more slowly declining weights might have the weight be cut in half every time income multiplied by four. But both these cases have enormous implications for social policy. Let us suppose that we have at hand tax-transfer mechanisms such that we can reliably effect a transfer from group *A* to group *B* at an efficiency cost of no more than 75% of the amount transferred. This means that we have to take up to 100 away from *A* in order to deliver 25 to *B* — a highly inefficient transfer mechanism.

The implication I draw from this is that in the first case (of unit-elastic weights) we would be impelled to compress all incomes within the range of a factor of four — say, between incomes of half the average and incomes of double the average. Taking 100 from a person with double the average income would have a "social cost" of only 50, because that person's distributional weight would be one-half. Giving 25 to a person with half the average income would have a "social benefit" of 50, because that person's weight would be two. In principle, as long as anyone remained who had more than double the average income, along with someone else who had less than half the average, this would signal the viability of yet another transfer.

By changing the elasticity of the weighting function, all we do is extend the above limits. In our second case, the upper limit could be four times the average income, and the lower could be one-fourth of the average. Thus with the second set of weights, all incomes (after taxes and transfers) should end up compressed within a band whose upper limit was 16 times its lower limit. By making the tax-transfer mechanism more efficient, we only narrow the band.

Why did not the dozens of authors who used exponential weighting schemes within the range spanned by our two examples stop to explore these very dramatic implications of such schemes? I ask this because they derived implications, for example, for the rate structure of a graduated income tax with the implicit message that these were reasonable lessons for real-world countries. If the weighting schemes they used have implications as unacceptable as those of our two examples, one would expect them to jettison these schemas in favor, perhaps, of others whose implications were less drastic.

My own conclusion from this exercise is to reject exponential weighting schemes entirely. Granted, one could find schemes where the decline of weights was so gradual — say, falling by half as income multiplied by 20, or 30, or 50 — that we do not find their implications belied by the payroll lists of perfectly ordinary firms, universities, and governments. But still, exponential weighting schemes carry uncomfortable messages — such as that if it pays to effect transfers from people with incomes of $10X$ to people with incomes of X, it also pays to effect transfers from people with incomes of $100X$ to people with incomes of $10X$.

I, and I believe most people, feel much more comfortable with a weighting scheme that gives a premium to people in a range at the bottom of the scale (e.g., below a "poverty line") but does not distinguish between incomes above a certain point. Such a weighting scheme justifies programs to alleviate poverty and otherwise offset the disadvantages shared by the very poor, without impelling us (or society) to drastic redistributive actions rarely if ever encountered in real life. So if I were in some way forced to adopt a system of distributional weights, I would opt for one that declined from, say, one and a half or two times the average weight at, say, zero income, down to an average weight at, say, half of an average income or two-thirds of a median income.

On "Basic Needs Externalities"

Notwithstanding what has just been said, my true preference is not to use distributional weights at all, but to rely on "basic needs externalities." The intellectual underpinnings of distributional weights are altruistic in the extreme — the desire of the donors being to add to the utility of the recipients. The underpinnings of basic needs externalities are more paternalistic, with the donors seeking to elicit certain behavior or certain results from the recipients, and being willing to pay for that behavior or those results.

When our societies provide free education, they do not give parents the money and allow them to spend it on education only if they choose to. Our societies rarely get to the stage of putting money in the hands of parents — the education is delivered either directly and "in kind," or else as a tuition payment to an approved school. Similarly, medical services, free or subsidized housing, and free or subsidized food are all typically delivered to their recipients "in kind." And where delivery is not exactly in kind, efforts are made to see to it that the

subsidy is used for the purpose intended. Taxpayers are usually shocked to hear that even when food stamps are used to buy food, they rarely have more impact on total food purchases than would an equivalent cash subsidy. They feel downright defrauded when they learn of foodstamps being used to buy six-packs of beer and copies of the *National Enquirer*.

What these taxpayers have as a goal is to improve the diets and health of food stamp recipients, to improve the educational level of the beneficiaries of educational expenditures, to give more and better medical care to those receiving public assistance in this area, and so on. The most natural way to incorporate such goals into the process of project evaluation, and into applied welfare economics generally, is to work with an *index of family welfare*. Such an index would have component indices of, say, access to education, access to medical care and sanitation, level of nutrition, and quality of housing. If a level of 100 in a component index represented the national average, some level (most likely less than 100) would be selected below which a basic needs externality would be asserted. The size of the externality, representing society's "willingness to pay" to raise one individual's index level by one point, would be zero at the critical level (say, 90) and would rise by, say, one dollar per point as one moved down from the critical level. Thus, starting with an externality of zero at 90, one might go to an externality of $10 at an index level of 80 and of $20 at an index level of 70.

If the above data applied to a combined index incorporating all four (or perhaps more) basic needs externalities, then a project that succeeded in raising from 70 to 75 the levels of living of 1,000 families averaging four persons each would get credit for a basic needs externality of $340,000. This would be composed of a benefit of $85 (= $19 + $18 + $17 + $16 + $15) for raising each person from index level 70 to index level 75, multiplied by 4,000, the number of individuals to whom such benefit accrues.

This approach to issues connected with poverty is obviously well suited to projects dealing with the specific basic needs (education, health, housing, nutrition, and perhaps others) that are accounted for in the process. But it also accommodates cases in which the particular benefits in question come as byproducts of the project. Consider a shipyard to be constructed in Brazil. If it is built in Santos, it will draw on a labor force that earns well over the national median; its impact on poverty will be minimal. If, on the other hand, it is built in Fortaleza (in the impoverished northeast of the country),

the rise in level of living might simply stem from the fact that the project paid above-market ("protected-sector") wages to 1,000 workers who would otherwise be much poorer. With the higher wages, they themselves would quite naturally keep their children in school longer, go more often to the clinic and perhaps spend more on medicines, upgrade their family dwelling units, and feed their families more and better food. In the process, all the components of the family welfare index will move up a few notches, and a series of credits like those mentioned in the preceding paragraph will be generated over the expected life of the project. It is easy to imagine a case where, without taking these credits into account, the project would be located in Santos, but that once the value of the basic needs externalities is incorporated into the analysis, Fortaleza becomes the preferable location. In other words, society pays a "price," in terms of efficiency, in order to locate the project in Fortaleza, but this location is justified because the basic needs externality (the amount that society is *willing* to pay) exceeds this price. It should be clear that the size of the price for each successive point of shortfalls in the index of family welfare is in principle a matter for society (and in practice a matter for its political representatives) to decide.

It is probably worth mentioning that at least one of the historical roots of the idea of basic needs externalities, as presented here, was the "map of extreme poverty" developed in Chile in the 1970s and used by the Chilean government in designing economic policies focused on the very poor. The maintenance of such a map has been a pillar of Chile's social programs ever since. The resulting policies have made notable strides in helping to overcome the traditional biases through which the principal beneficiaries of social programs have been the upper quintiles of the populations. Chile's policies have surely had some flaws, but they have been recognized as substantial success stories in numerous World Bank publications, in the UNDP's *Human Development Reports,* and elsewhere. Moreover, they have served as practical examples that other countries have used as real-world (if not ideal) models as they developed their own social programs and policies.

I bring up the Chilean example because it gives one a sense of how a government could go about building up an index of family welfare. The approach taken by the Chileans was to use census data and sampling results to identify key charactristics of poor farmers. Then, using those characteristics, individual families are classified by a system called the CAS index. On the basis of a family's CAS index, it is considered to be extremely poor, poor, not-so-poor, and so on.

This classification in turn (in a sense, the CAS number itself) determines the family's level of subsidy in respect of particular types of government services.

Starting with where the Chileans are now, we can easily imagine a process of feedback, in which something like the existing CAS indexes could be used as indicators to calibrate basic needs externalities. As we gain experience in their use for this purpose, new items could be added to the index to make it reflect elements that are now neglected. Similarly, with experience, the weights of the different components of the index could be modified, so that a one-point increment of the index (from a given starting point) will be judged to carry approximately the same monetary value of externality regardless of which component accounts for that one-point movement. Such calibration of the index will call for extensive soul-searching on the part of policymakers, as existing policies are shown to reveal large differences in "externality per dollar of cost" as among different existing policies. But the process holds considerable promise of a gradual rationalization of a country's social expenditures in response to successive approximations of the index, and to the feedbacks that they generate.

An added attribute of the schema of basic needs externalities is that the size of the monetary premium assigned to any given notch of a benefit index can be calibrated with an eye to the least cost principle. It is rarely realistic to attempt to follow that principle slavishly, by refusing to provide a benefit by one route so long as there exists another route that might provide it more cheaply. But this does not mean that a society should incur huge excess costs. Thus, when the monetary values of successive notches are set, a good principle to follow would be to set those values below the cheapest alternative cost as one gets close to the critical level where the externality disappears, and to be willing to go somewhat higher than least alternative cost to deal with notches that represent extreme deficiency in meeting the basic need in question (e.g., an index of 70, when 90 is the level at which the externality is deemed to disappear).

Some General Observations

In all the realm of economic policy it is hard to find any terrain more plagued by confusion and contradictions than is the area roughly described by the term "distributional issues." This may stem in part from the fact that many economists once thought govern-

ments could with relative ease use their tax, transfer, and expenditure mechanisms to bring about whatever changes in income distribution they wanted. It may also stem in part from the lamentable tendency of almost everyone (the press, electorates, the politicians themselves) to blame the last government for whatever unwanted distributional changes took place during its tenure, and to imply that it is the task of the next government to reverse them.

The first truth to be recognized is that the broad shape of a nation's income distribution is determined by forces that are largely beyond the control of governments in the short and middle run, at least if one sticks to policies that are not economically self-destructive. Without a doubt, three of the most important factors determining the distribution of income are: (a) the distribution of education, (b) the distribution of marketable wealth, and (c) the rate of return to capital in an economy. None of these is easy to change quickly, at least by policies most of us would regard as economically healthy. Education has long been recognized as the most reliable tool by which governments can, over time, significantly influence a country's income distribution.

Secondly, it is folly to think that a government can concentrate its "social" expenditures exclusively or mainly on the less fortunate. For one thing, those who lack economic power also tend to lack political power. Cases like that of Chile, where serious efforts have been made to focus on the bottom quintile of the population, do not end up with a total concentration of social expenditures on that quintile. It is closer to the truth to say that such focusing helps to bring the lowest quintile's benefits up to the average benefit received by the population as a whole from government expenditures. In very poor countries, the children of the poorest quintile get virtually no education, their families receive virtually no medical care, and even the simplest public health amenities (like potable water and minimal sewage facilities) are often lacking. In such cases, one can be practically certain that the bottom quintile does not receive as much as a fifth of the total benefit that citizens receive from government spending. Even in middle-income countries, the quantity and quality of public schooling is far lower in poor urban neighborhoods or in poor rural areas that it is, on average, for the country as a whole. One reaches similar conclusions when one inquires about medical care, sanitation, and other such matters. The bottom line is that for many if not most countries, a reasonable target for a more humane distribution of public expenditures is to move them from a pattern skewed (on a per capita basis) toward the middle and upper quintiles,

in the direction of a pattern in which the lower quintiles receive an equal share. The Chilean experience shows that it can take a great deal of effort to reach or moderately surpass this goal.

This leads to my third observation, which has to do with the view that "economics" takes of the role of government, particularly where distributive issues are concerned. I have already noted that setting the post-tax-and-transfer distribution of income is a virtually impossible task for government to assume, and also that it is utterly unrealistic to think of a very tight concentration of social outlays on the very poor, even though that is something we might like to contemplate in our more altruistic moments.

How, then, should we look at government? In my view, the best analogy is with a large club or other association. The collectivity takes on tasks that are in some sense acceptable to the membership. These tasks have costs, which then must be shared by the membership in one way or another. Many patterns are possible, but the underlying principle is that the costs should be shared in a way that is viewed as equitable by the collectivity itself. This analogy helps us to see why nation-states do not concentrate their expenditures just on the very poor (the other members of society also expect to receive benefits from this association), and why the tax systems we observe in the world do not deviate dramatically from the norm of proportionality (most people think it is fair that the rich should pay more than the poor, but we should recognize that this automatically happens, on a per capita basis, when the tax system is roughly proportional).

The analogy also may give us a set of norms by which to describe what governments do. These are descriptive rather than "normative" norms, in that no connotation of approval or disapproval need be involved. The descriptive norm for government expenditures would be a flat per capita incidence of those expenditures (not including those for defense, nor for the whole administrative structure, but certainly including those for education, health, housing, perhaps even highways) that can be reasonably traced as bringing benefits to different groups of people. The bottom quintile's receiving more than a fifth of the measured benefits would reflect special altruism; indeed, I know of no case where they receive two-fifths of such benefits. The bottom quintile's receiving greatly less than a fifth would be a modern reflection of the human condition according to Hobbes. On the tax side, the descriptive norm would be proportionality. A tax system that was progressive overall (as distinct from simply containing some individual taxes that were progressive)

would reflect a country in which the upper deciles were generous or in which the lower quintiles joined to impose proportionately heavier taxes on the rich.

I am trying to avoid using value-loaded words as I describe these descriptive norms and possible deviations from them. The main idea is that most real-world cases are somewhere in this ballpark, not in the tight bands to which one is led by exponentially declining distributional weights, and not in the starry-eyed classroom exercises by which we sometimes illustrate our own "ideal" distributions of the burdens of taxation and the benefits of public expenditures. The distributions that we see in the real world emerge from the interplay of complex political and economic forces, which in turn differ in important ways from one society to another. But all (or nearly all) fit reasonably in the ballpark I have outlined.

Into the confines of this ballpark, we can quite comfortably insert a system of project evaluation based on the three postulates of applied welfare economics and incorporating basic needs externalities that give special weight to improvements in the family welfare levels of the poorer segments of society. Within this framework, the tax and expenditure systems are viewed as the fruits of past history plus the give-and-take of ongoing political processes. We measure the efficiency costs of taxes in the traditional way (with possible nuances for basic needs externalities). This motivates our treatment of taxes as distortions in the measurement of the social opportunity costs of labor, capital, and foreign exchange, as well as generally throughout any exercise in economic project evaluation. And it gives us a system that is the natural progeny of the tradition dating back some 200 years out of which has grown the field of applied welfare economics.

SPECIAL TOPICS

The Use of Border Prices

It is quite natural that methodologies of economic project evaluation developed during the 1960s and early 1970s should reflect the attributes and problems of that era. This makes it easy to understand the insistence of some of the leading experts in the field (e.g., Little & Mirrlees, 1974; Squire & van der Tak, 1972) that evaluations be carried out in terms of border prices. Their motivation was quite clearly to avoid the unwitting endorsement of projects that

did not reflect a nation's comparative advantage. A local activity protected by a 50% tariff might have costs that were 1.4 times the world price of the product and yet be profitable at internal prices. One way of preventing such a project from being incorrectly (though perhaps unwittingly) deemed acceptable is to insist that all tradable goods be valued at border prices.

The trouble with working with border prices (i.e., expressing benefits and costs in terms of an international medium of exchange like the U.S. dollar) is that it requires one to somewhat artificially value nontradable goods in international currency units. This sort of translation seems to many practitioners to be much less easy and natural than the standard one by which we express world market prices in local currency terms via the exchange rate. It is more natural to convert the world price of wheat into a peso price than it is to convert the peso price of a haircut or a taxi ride into a "border price" that has no concrete observable reflection.

In fact, there is no important difference between carrying out one's analysis in terms of dollars (i.e., at border prices) or in terms of pesos (i.e., at domestic prices), provided that one is in both cases using sound procedures. Table 4 gives some illustrative calculations using the two methods. Row (a) shows economic costs, here assumed to be exclusively spent on domestic, nontradable resources. Row (b) represents the saving of foreign exchange, equal to the output of the project times the dollar price of its product (e.g., one million men's shirts × $10). Row (c) gives the economic opportunity cost of foreign exchange (EOCFX) in pesos per dollar, and row (d) gives the market exchange rate. Recall that the difference between these two represents mainly the import duties "lost" when imports are displaced (or gained when they are generated). Here we look at the true product of our project as the dollars that are saved when, say, one million men's shirts are produced at home. These $10 million are then valued at the economic opportunity costs of foreign exchange in order to obtain the gross benefits of the project using domestic prices (P. 120 million in column [1]). On the cost side, we must augment the direct economic cost (a) by an external cost (b), representing the import duties lost because this project has displaced $10 million worth of imported men's shirts. This gives a total cost of P. 192 million, generating a negative net benefit (= -P. 72 million, see row [g]).

To do the same thing at border prices, we must use the dollar amount of foreign exchange saved (= $10 million) as the benefit of the project, and then convert the domestic resource cost (a) plus the external

Table 4
Alternative Net Benefit Calculations Using Domestic Prices and Border Prices

		(1)	(2)	(3)
(a)	Economic cost	P. 142 million	P. 100 million	P. 120 million
(b)	Foreign exchange saved	$10 million	$10 million	$10 million
(c)	Economic opportunity cost of foreign exchange (EOCFX, in pesos per dollar)	12	15	12
(d)	Market exchange rate (E_m, in pesos per dollar)	10	10	10
(e)	Tariff on product	50%	50%	0%
(f)	External cost due to tariff on product/revenue lost because project displaces $10 million of shirt imports	P. 50 million	P. 50 million	0
(g)	Net benefit (= [b × c] - a - f)	-P. 72 million	zero	zero
(h)	Net benefit using border prices (= b - [a+f]/c)	-$6 million	zero	zero

cost (f) into dollars, using the inverse of the EOCFX. The net benefit calculated this way is shown in row (h). It is easy to see from the formulas for net benefit in rows (g) and (h) that the two measures are equivalent; we move from one to the other simply by dividing by (c), the EOCFX.

In column (1) we have an uneconomic project, one that runs counter to the country's comparative advantage. In columns (2) and (3) we show two cases of economically viable projects. To get from (1) to (2) we reduce the domestic resource cost of the project to P. 100 million, and augment the EOCFX from 12 to 15 pesos per dollar. The displacement of $10 million of imports of men's shirts leads to an external cost (lost tariff revenue on displaced imports of shirts) of P. 50 million. But this is made up as the resulting $10 million is dumped on the foreign exchange market, producing an external benefit equal to P. 50 million (= [EOCFX - E_m] × $10 million).

To get from column (1) to column (3) we change the domestic resource cost to P. 120 million, and simultaneously eliminate the tariff on the product. This project would not withstand the market test in the presence of the existing distortions. But it nonetheless passes the economic test, because the excess of domestic cost over the value at E_m of the displaced imports is annulled when we value those same displaced imports at EOCFX.

An interesting special application of column (3) is the case where imports of the product in question are subject to quantitative constraints. One option in this case is to follow a scenario in which the effective "product" of the project is not 1 million men's shirts valued at the internal price of shirts, but instead 1 million shirts valued at $10, the relevant border price. This treatment basically assumes that the effective economic product of an increase in the internal production of a tradable good is the dollars that are (or could be) saved by that increment in the production. If we are calculating in domestic prices, we value these dollars at EOCFX, thus "justifying" the domestic resource cost of P. 120 million. If we are calculating at border prices, we deflate the domestic resource cost by EOCFX. In both cases, the final answer is the same: the project is viable. But if domestic resource cost is raised even a little above P. 120 million, the project will turn out to be nonviable under both calculations.

It should be obvious from the above that one cannot say, as between making calculations in domestic prices and making them in border prices, that one approach is right and the other wrong. For we have just shown that for all practical purposes the two approaches lead to the same results. Hence we can say that it is a matter of simple preference, or that the choice should be guided by which method is likely to be more familiar to, or more readily communicated to, a wider group of people. It is on the latter ground that I find calculation in domestic prices to be preferable.

On Discount Rates and Shadow Prices of Funds

This section reviews and extends the treatment given to this subject in Harberger (1987, pp. 169–75). I focus here quite explicitly on the discount rate to be used in social project evaluation. We deal with a distorted capital market in which we have a marginal productivity of capital ρ (assumed = 12%), a marginal rate of time preference r (assumed = 4%), and a market interest rate i (assumed = 6%). We assume that when some individual or entity enters the capital market with a new demand for funds, these funds are "sourced" from displaced investment (entailing a social cost of ρ per year) and from newly stimulated savings (with a supply price, and hence social cost, of r% per year). Thus we get an economic opportunity cost of capital equal to ω_s (= $f_1\rho + f_2 r$), a weighted average of ρ and r, with the weights representing the fractions of sourcing from the two alternative sources. In our numerical examples we will assume f_1 = .75 and f_2 = .25, yielding ω_s = 10%.

Some economists have argued for the use of r as the discount rate, on the ground that r is the rate individuals use in making their choices between present and future consumption. The use of such a low rate seems to encourage a whole flood of projects, but in fact it does not. For these economists recognize the distortions existing in the economy, with ρ and i differing mainly because of corporation and property taxes, i and r differing mainly because of personal income taxes. They recognize, in particular, that drawing 1,000 of funds from the economy entails (under our numerical assumptions) forgoing a perpetual stream of 90 per year (= 750 of displaced investment times its productivity rate of 12%) of productivity from forgone investment, and also requiring a payment of 10 per year (= 250 of newly stimulated savings times a supply price of 4%) of compensation to the new savers (required to elicit their choice to save more). Thus we have a total flow of 100 per year, into the indefinite future, which is the "cost" of raising 1,000 in the capital market today. Those who use r as the discount rate then proceed to discount this 100 per year flow at the rate r (here, 4%) to obtain a present value of 2,500. From this operation comes a "shadow price of investible funds" of 2.5 ($= \omega_s/r$).

So we have a divide between those who would use r as the discount rate and those who would use ω_s ($= f_1\rho+f_2r$). The first group is impelled to use a shadow price of investible funds equal to (ω^s/r), and the second group uses a shadow price of 1.0 (i.e., makes no adjustment to the normal measure of capital outlays).

In Harberger (1987) I mention three reasons for preferring the combination [ω_s,1.0] over the alternative combination [r,(ω_s/r)]: communicability of the procedure, implications with respect to current expenditures, and implications for handling situations with different time preference for different groups. Here I will concentrate on the second of these reasons, referring readers back to the original for observations on the first and third.

It is but a simple step, following the numerical example presented above, to assume that the 1,000 of borrowed funds was being used to pay for the salaries of nurses or police or tax collectors or teachers. If the shadow cost of the 1,000 is 2,500 when it is used to pay for electric-generating capacity, that shadow cost must also be 2,500 when it is used to pay for the current expenses of government. Or, consider the quite realistic case of a government that is always borrowing (debt increasing every year as the economy grows). Any reduction of 1,000 in current expenses — be it in nurses' or teachers'

salaries or in garbage or tax collection — will naturally lead there to be 1,000 less of borrowing than would otherwise be the case, resulting in a saving of future costs having a present value of 2,500. (This rather roundabout way of stating things is my response to those who say that "governments don't typically borrow to cover current expenses." This may sometimes be true, but still any autonomous reduction in current outlays will have its effect in reduced borrowing during the period in question).

I am not arguing that the use of a 4% discount rate and a shadow price of investible funds of 2.5 entails some fundamental flaw of logic or analysis. But I am arguing that the label "shadow price of investible funds" is misplaced. It should be the "shadow price of *public* funds," not just investible funds. Once this is recognized, one sees its powerful implication: each and every current outlay should produce benefits equal to 2.5 times its cost! (See Sjaastad & Wisecarver, 1977.)

For myself, I prefer the much less shocking implications of using ω_s as the discount rate and 1.0 as the shadow price of public funds (for both capital and current outlays).

The "Campbell's Soup Problem"

On quite a different plane, those of us engaged in real-world project evaluation may from time to time run into what I have always called the "Campbell's Soup Problem." Suppose that, following a weighted average procedure to obtain ω_s, we are using an economic opportunity cost of capital of 10%, and the marginal productivity (the gross-of-tax earnings) of capital in the private-sector soup industry is 15%. Suppose, too, that we have a project to build a soup factory (say, as an operation of the Ministry of Industry), in which the calculated economic rate of return is 12%. A strict application of the methodology presented here might lead to that project's being accepted. The question is, should it be?

The issue turns in part on whether the Ministry of Industry's project would drive Campbell's Soup out of business. The main point to be recognized is that if this were indeed the expected outcome, the project should in principle be saddled with external costs associated with the taxes that would have been paid on Campbell's Soup's output, on its profits, and so on, had it remained in business. These taxes would be individual distortions Di in the formula $\sum i$ Di ΔXi,

and the changes in Campbell's output, profits, and so on, induced by the ministry's new project would be included among the ΔXi, the "external" effects of our project on the levels Xi of other activities in the economy. In all likelihood, if the "advantage" of the ministry's project derived exclusively from the fact that it did not have to pay the taxes Campbell's Soup has to pay, the proper inclusion of the Campbell's Soup externalities would render the ministry's project nonviable.

On a perhaps more practical level, the advice of most professionals who have looked at this type of problem is that where a potential public-sector project competes directly with similar private-sector activities, the public-sector project should actually be required to pay the same taxes and abide by the same regulations as its private-sector competitors. The public-sector project would then be required both to meet a financial constraint, equivalent to that which regularly applies to private-sector firms, and to pass the standard test of economic cost-benefit analysis that one would apply to any public-sector investment project. This counsel to impose a dual constraint in such cases cannot be defended as technically optimal, but it definitely succeeds in imposing the same economic criteria as our standard procedures apply for projects that do not compete with the private sector, while obviating the potential irony of using public-sector investments as a device for getting around a set of distortions (like taxes on corporate income and on other private-sector activities) that were put in place by that same public sector.

Economic Project Evaluation and Decision Making

In conclusion, I would like to express a view concerning how economic project evaluation fits into the process of social decision making in contemporary polities. The bottom line of this view is that economists should not try to become disciplinary and cultural imperialists, attempting to extend the boundaries of their own discipline so as to embrace considerations and concerns stemming from everywhere else. I liken the economist's role in project and program evaluation to the medical profession's role in the public debate over how to treat tobacco products and the tobacco industry. Medical doctors are not the only players seated at the table, but they are the only ones capable of bringing medical expertise to bear in the discussion.

In just the same way, it is natural for economists to be the ones to point out the efficiency costs of tariffs and sugar subsidies, and to

call attention to the huge negative net present values of economically wasteful projects. But just as individuals often choose not to work at the most lucrative job within their reach, so polities and societies must weigh a host of other considerations in their decision making process. Economists, thinking imperialistically, sometimes try to embrace all these considerations under a grand rubric like the "social welfare function." But I strongly believe that if we were to do so in a serious way, we would end by debasing our own coinage.

Our natural role at the table of political and social debate is to bring to it those elements that we, perhaps alone, can contribute. Beyond that contribution, we can and should still express our individual preferences. But once we go outside the realm of our professional comparative advantage, we should expect to speak just as individuals, not as a profession.

I believe that the above has a great deal of genuine content, particularly in warning that the very concept of a "social welfare function" extends far beyond what economists are trained to do. We have no real business involving ourselves in grand issues like the relation of the state to organized religion, whether to be hawks or doves on defense, or to what lengths Canada should go to preserve its union. Nor do we have any basis for claiming a special voice in issues with heavy moral overtones, such as how easy or hard it should be for a woman to get an abortion, or how many errors of the second kind (punishing the innocent) the criminal justice system should be willing to accept for every thousand errors of the first kind (letting the guilty go unpunished).

As I see it, we have a very clear area of expertise, where for two centuries or more applied welfare economics has earned its stars. Here economists speak almost in unison, especially if the ground rules are laid out, clearly delimiting the analysis to considerations of economic efficiency.

Abutting that area are others (air and water pollution and other environmental externalities are good examples) that fit quite easily within the framework of cost-benefit analysis, yet nonetheless pose problems for economists. These problems stem from the great difficulty of defining and measuring the relevant benefits and costs. I believe that two main guidelines can prove useful to economists as they year by year make inroads into these as yet poorly charted regions.

First, we should not expect society to pay much attention to us on issues on which we are very far from a genuine solution and perhaps even farther from a professional consensus. The guidelines would be to treat such issues in much the same way as we treat the great social debates mentioned earlier, and simply allow the relevant extra-economic considerations to be given "due weight" in society's decision making processes, without economists themselves claiming to be able to measure that weight.

Second, when we feel that we are somewhat closer to successful measurement of the relevant benefits and costs, the guideline would be to move modestly toward incorporating such measurements in our analysis. Modesty here would entail our being willing to consciously lean toward the side of understatement, as we introduce hitherto unmeasured items into our calculus. Put another way, because we can reach greater consensus among ourselves on the statement that travel time is worth at least four dollars per vehicle hour than on the statement that it is worth approximately ten dollars, there may be merit in concentrating our professional attention on that subset of decisions for which even the first statement has strong policy implications. Similar reasoning would argue for going slowly, and working for a time with lower limits on pollution costs and other environmental externalities — limits that would approach point estimates as our measurements became sharper and our professional consensus more complete.

Finally, it must be noted that whenever we insert a noneconomic benefit into cost-benefit analysis, we are inviting the acceptance, as a tradeoff, of conventionally measured inefficiencies up to the amount of that benefit. No analytical flaw is involved up to this point. But the least-cost principle asserts that we should also explore alternative ways of achieving the same or similar benefits. A strict application of this principle is that we should never value a given benefit at more than the least alternative cost of achieving it.

Cost-benefit analysis routinely deviates from this principle, as when we take weighted-average measures of the social opportunity cost of capital, of foreign exchange, and of labor. The modification of the least-cost principle here recognizes that the only way to get additional foreign exchange at least cost is to stimulate just the heaviest-taxed export goods, which in turn means reducing the tax on them. Similarly, the only way to get extra capital at the least cost is to stimulate savings just by the heaviest-taxed group of savers, which

can only be done by preferentially reducing the high tax rates they face. We do not insist on the least-cost principle in these cases because it is idle to think that we, the cost-benefit fraternity, can dictate the government's tax policy. Our alternative assumptions are that additional foreign exchange is obtained by buying in the foreign exchange market, and that additional capital funds are obtained by borrowing in the capital market. These assumptions are highly plausible and realistic. This is why they, and not the stilted least-cost alternatives mentioned above, are embodied in our conventional weighted-average measures of economic opportunity cost.

I believe that our task, when dealing with noneconomic benefits of any kind, should be to stay alert to the least-cost principle in a plausible, sensible way. When asserting a given benefit, we need not use the strict least-cost principle if it presupposes an implausible alternative route to the same benefits. But we should always be ready to limit the benefits we assert to levels that are no greater than plausible, sensible alternative costs of their achievement.

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This paper began as a result of an invitation from the *Canadian Journal of Program Evaluation* for me to present a "diagnosis and outlook" on the present state of the field of economic project evaluation. When I realized that this would entail my drawing on earlier papers I had written for the Economic Development Institute of the World Bank, I naturally requested their permission. The response, to my pleasure and surprise, was an invitation to create a paper they could use in training teachers of project evaluation from developing countries, and in disseminating project evaluation techniques within the World Bank itself. I am grateful for both invitations, and for financial support from the World Bank.

NOTE

1. Perhaps the most common and egregious error in standard project evaluation over the years has been the failure to deal with prospective changes in relative prices. This error is reflected in reports that delineate in great detail the path of investment outlays over the gestation period, and then blithely project the "typical year" of operation, once the project gets going. There are surely numerous cases in which the consequences of this error are mild, but they cannot be

known in advance without facing the problem of changing relative prices. The most critical instances of changing relative prices are found in cases where the present price is out of line with the long-run expected equilibrium prices.

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