

NOTE ON THE DIFFERENCES BETWEEN
SOCIAL BENEFIT-COST, FINANCIAL, AND REGIONAL INCOME ANALYSES¹

Public policies and public projects are often evaluated using social benefit-cost analysis, financial analysis and regional income analysis. These three types of analyses serve very different purposes but are frequently confused with one another. This note provides a brief overview of the three methods, focusing particularly on the differences between social benefit-cost and the other two types.

Three Types of Analysis

Financial or Budgetary Analysis FISCAL ANALYSIS

Financial or budgetary analysis is used by government agencies to measure the impact of a project on agency budgets. Financial analysis focuses on the payments that the agency must make and the revenues that it will receive as a result of the project or policy. Financial analysis is obviously critical to insure that the project does not create cash flow problems or bankrupt the agency.

Regional Income Analysis

Regional income analysis measures the effect of a project on the incomes of local residents. It is typically employed when a major new investment financed largely with funds from outside the region is to be either initiated or withdrawn. Examples include the construction of a new dam or highway to be financed by the federal government, the opening of a major new manufacturing plant of a national or international firm, or the closing of a military base or private plant.

Regional income analyses use a "multiplier" to estimate the effects of the external

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infusion (or withdrawal) of funds on local incomes. The idea of the multiplier is that the construction workers building the new federally financed highway or the auto workers at the new auto plant will create additional new local income because they spend part of their wages on locally produced goods and services. When they buy food, for example, the local supermarkets will need to add more clerks; if some of the foods they buy are locally produced, local bakeries, farms and others will also need to hire more workers. These new local supermarket, bakery and farm workers will, in turn, use some of their income to buy services and products that are locally produced, etc., etc.

Economists measure multipliers by studying how much of the goods and services local residents consume are also locally produced. The larger and more self-sufficient the region, the larger the multiplier. A very large metropolitan region, like New York, can have a multiplier as great as 3 or 3.5 because it produces much of what its residents consume. A multiplier of 3.5 means that for every dollar of extra income that comes in from outside the region (say, in the form of wages paid employees on a federal construction project or at an auto plant that exports its output), local payrolls and business profits will increase by another 2 to 2.5 dollars. A small town or a farming region, by contrast, may have a multiplier of only 1.1 or 1.2 since it imports most of the goods and services that its residents consume; a multiplier of 1.2 implies that each dollar of new outside income generates only an additional 20 cents in local payrolls and profits.

Social Benefit-Cost Analysis

Social benefit-cost analysis attempts to measure the net increase in goods or services that a project or a policy produces for society as a whole. In benefit-cost analysis:

-- Social benefits are defined as the new goods, services or amenities that the project creates for society. A new health clinic ~~creates~~ reduces mortality and morbidity of the people it serves, for example, while a new highway saves them travel time or a new park provides them opportunities that for walking, ball playing or other leisure activities.

-- Social costs are defined as the goods, services and amenities that society must forgo or give up to produce the project. The doctors and nurses employed at the new clinic could have improved the mortality and morbidity of some other community if they weren't employed at the clinic. Similarly, the construction workers or concrete used to build the new clinic or highway could have been used to build some other building. The land occupied by the clinic, highway and park could have been put to other uses, such as for housing.

If analysts can place a dollar value on each of the goods, services, or amenities created or foregone by the project, they usually report the results of their analysis in one (or both) of two summary measures. The first is the net social benefits of the project, defined as the

difference between the dollar values of the benefits and the costs:²

$$(\text{net social benefits}) = (\text{dollar value of social benefits}) - (\text{dollar value of social costs})$$

The second is the benefit-cost ratio, defined as the ratio of the dollar values of the benefits and the costs:

$$\frac{(\text{dollar value of social benefits})}{(\text{dollar value of social costs})}$$

Typically analysts recommend implementing projects or policies with positive net social benefits or with a benefit-cost ratio greater than one.³

Where analysts can easily place a dollar value on the costs but not on the benefits, they often use a variant of benefit-cost analysis called cost-effectiveness analysis. Such analyses are sometimes used in the health or traffic safety areas, for example, because the analysts feel uncomfortable placing a dollar value on the principle benefit: years of life saved. Analysts typically summarize their results in cost-effectiveness ratios:

$$\frac{(\text{dollar value of social costs})}{(\text{quantity of benefit or output})}$$

Analysts typically recommend implementing first those projects that have the lowest cost per unit of output (for example, projects that have the lowest cost per year of life saved).

The Use of Market Prices in Benefit Cost Analysis

Benefit-cost analysts often use market prices or consumers' willingness-to-pay as measures of the relative value of different types of benefits and costs. If a project produces housing or irrigation water, for example, the social value of that housing or water is assumed to be measured by the price it would fetch in the private market. Similarly, the market prices


²The dollar values of the benefits and costs are usually discounted to place them in present value terms.

³These rules can be misleading if one must choose among projects that are mutually exclusive for some reason. Projects are usually mutually exclusive because they rely on the same key and scarce input. For example, an agency may have limited budget or limited human resources that permit it to pursue only a few of the potential projects. Similarly, a clinic, a park and a highway may all be proposed for the same small piece of land, so that building one precludes building any of the others. Where projects are mutually exclusive, one should pick the project with the highest net benefits (not the highest benefit-cost ratio).

for the land, labor and other inputs used in the project are assumed to reflect the values of the goods and services that society gives up by employing those inputs on the project.

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✂ For goods, services or amenities that are not directly traded in markets, economists will often look for other evidence of consumers' willingness to pay for them. If the primary benefit of a project is to reduce noise and visual blight along a highway by planting a buffer of trees, for example, an analyst may estimate the value of the benefits by examining how house values vary in quiet and noisy neighborhoods or between houses with attractive or unattractive views.

In using market prices as weights, these analysts are making powerful normative assumptions. At the risk of simplification, these include:

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- (1) That society exists to advance the welfare of individuals, that individuals are the best judge of their own welfare, and that society as a whole is made better off by any change that makes at least one individual better off and no other individuals worse off. These assumptions make markets attractive since all parties to a market transaction must consider themselves better off because market transactions are voluntary.
 - (2) That markets are reasonably competitive and that there are few important uncorrected "external" costs or benefits of production or consumption (such as pollution). Under these assumptions market prices are likely to be close to supplier marginal costs and supplier costs will reflect all relevant costs to society.
 - (3) That the distribution of resources or opportunities among individuals is equitable or will be corrected by some other means. This assumption is sometimes relaxed (as we will discuss later), but it implies that a dollar of benefit or cost to one individual has the same social value as a dollar to another.

Given these assumptions, consumers' willingness to pay for goods, services or amenities reflects the value they have to society. The market price of a good or service measures consumers' willingness to pay for small increases or reductions in the supply of a good or service.⁴

These assumptions also imply that the market prices or wages of the labor, materials

⁴If a project produces a large change in the amount of a good, service, or amenity available to society, it may change the market price for that good service or amenity. In that case, neither the pre-project nor the post-project market prices are an accurate measure of the value of the increase or decrease in supply. Where the project increases supply, the pre-project market price will overstate the value of the increase while the post-project price will understate it. Where the project reduces supply, the pre-project price understates and the post-project price overstates the value of the lost supply. The appropriate valuation involves the calculation of consumers' surplus changes, a topic beyond the scope of this note.

and other inputs employed on a public project measure the value of the final goods, services and amenities foregone by diverting those inputs from the private sector to the public project. If markets are reasonably competitive, then the market price of an input reflects the value of the goods and services that one more unit of that input could produce in a private firm. This is true because a private profit-maximizing firm will continue to hire additional units of an input as long as the value of the products the additional unit can produce exceeds its wage (since doing so adds to profits); at the point where the value of the product produced by an additional input equals the wage for that input, the firm will stop hiring additional units (since to hire more would reduce profits). Thus, at the margin, the market wage of an input just equals the market value of the additional output that one more unit of input could produce in all the private firms that use that input.

The use of market prices as weights makes benefit-cost analysis appear similar to financial and regional income analysis in that the results of all three types of analyses are usually summarized in dollar terms. Financial and regional income analyses are reported in dollars because the payments made or received by an agency and household incomes are all measured in dollars. Benefit-cost analyses are typically reported in dollars because the analysts are using market prices as measures of the social value of the benefits and costs.

These three types of analyses are far less similar than they appear, however. Their differences are more apparent when one considers how benefit-cost treats the distribution of benefits and costs among members of society.

The Treatment of Distributional Issues in Benefit-Cost Analysis

The Typical Perspective of Benefit-Cost Analysis

Most (but not all) applications of benefit-cost analysis do not explicitly consider the distribution of the benefits and the costs of a project—that is who wins and who loses. *
These analyses assume that a dollar of benefit to any one individual can offset, from society's perspective, a dollar of loss to any other individual.

In such analyses, the only benefits included are the real goods, services and amenities created by the project, while the only costs included are real goods, services and amenities foregone. Transfers of resources from one individual to another are excluded, since these transfers do not, in and of themselves, either create or forego real goods, services, and amenities. Examples of activities that economists consider transfers include:

- social security or welfare payments, which transfer the opportunity to call on resources from government (or taxpayers) to the elderly or the poor;
- taxes, which are transfers of resources from taxpayers to the government (or to the clients of government programs); and even

-- revenues from fees charged users or purchasers of government or private goods and services, since the act of charging for a government service does not itself create or forego goods and services but merely transfers the responsibility for financing the service from the general taxpayer to the users.

In ignoring transfers and taking a society-wide perspective, benefit-cost analysis is fundamentally different from either financial or regional income analysis. In the first place, benefit-cost analysis takes a broader view of the relevant "society" than financial or regional income analyses do. Financial analysis considers the effects only on a particular government agency, for example, while regional income analysis considers income and jobs gained in a particular region. Benefit-cost analysis considers any good, service or amenity created or foregone, no matter who gains or loses it.

Moreover, financial and regional income analyses focus on the fiscal consequences of a project or policy while benefit-cost analysis focuses on the physical consequences, e.g. real goods, services and amenities created or foregone. Purely fiscal transfers are typically critical components of financial and regional income analyses, for example, but they are excluded completely from benefit-cost analysis. Benefit-cost analyses are summarized in dollars only because it is a convenient common measure for the value that society places on goods, services and amenities; in benefit-cost analysis it wouldn't matter whether the goods created by a project were given away or sold, only that they were created.⁵

The Rationale for Excluding Distributional Considerations

The practice of ignoring who gets the benefits and who suffers the costs seems both politically and ethically naive. The distribution of benefits and costs is clearly important in determining whether a project will be politically acceptable or not. Most people feel, moreover, that a dollar of benefit or cost to a rich person does not have the same value to society as a dollar to a poor or disadvantaged person. Indeed, collectively we support certain transfer programs--such as Medicaid (medical care for the indigent), Aid to Families with Dependent Children (welfare), or Social Security--precisely because we believe that society has an obligation to help the less fortunate. These transfer programs would not appear worthwhile in a conventional benefit cost analysis, since their major activity--transferring funds from taxpayers to others--would be considered neither a benefit nor a cost.

Economists defend the practice of ignoring distributional consequences on several different grounds, some practical and some philosophical.

Lack of consensus about distributional weights. Perhaps the least compelling defense is that there is no consensus on the weights that society should give to benefits and costs

⁵This is not quite true. If the goods were given away but no resale was allowed, for example, then the goods might be consumed by persons who valued them at less than the market price; in that case a value below market price would be placed on the goods.

received by different types of people. Compared to a dollar of benefit to a rich person, for example, should a dollar of benefit to a poor person be valued at \$1.20, \$1.50, or more? If such weights were provided, economists could aggregate the benefits and costs into a single net benefit figure or benefit-cost ratio. Economics offers no guidance on how to choose such weights, however, and politicians and public officials usually feel uncomfortable making explicit statements about such potentially controversial subjects.

This defense is not persuasive in part because most economists implicitly pick weights when they use market prices to value benefits and costs: in doing so, they imply that a dollar to a rich person is worth the same as a dollar to a poor person. Even if they don't know what weights to give the benefits and costs received by different types of persons, moreover, economists could at least point out which groups receive the benefits and which receive the costs and allow the reader of the study to decide whether the distribution was equitable. In fact, some economists present not just the aggregate net benefit figure or benefit-cost ratio but also estimates of the distribution of benefits and costs.

The difficulty of determining the incidence of benefits and costs. Even this last solution presents serious problems, however, because it is often very difficult to determine who actually gets the benefits or suffers the costs. The key problem is that market forces can shift the benefits and costs from their nominal recipients to others in ways that are often difficult to measure or predict.

You may be familiar with this type of shifting from debates over who really bears the burden of taxes. Although landlords nominally pay the property tax bill, for example, economists know that there are many circumstances under which landlords can pass all or part of the property tax on to their tenants in the form of higher rents.

The same sort of shifting occurs with the benefits and costs in a benefit-cost analysis. Consider, for example, a project which extends a subway line from the downtown to a neighborhood that didn't have rapid transit service before. The principal good, service or amenity created by this project is the travel time savings that the subway provides for those who commute from the neighborhood to the downtown. The time saved can now be used for other activities, such as leisure, family activities or work. Although the commuters are the nominal recipients of this benefit, landlords in the neighborhood may be able to capture all or part of it. In particular, the landlords should be able to raise their rents because the neighborhood is now a relatively more attractive place for downtown workers to live. Thus a project that appears at first glance to benefit workers may in fact primarily benefit property owners.

In practice, predicting how market forces will shift the incidence of benefits and costs is often extremely complex and uncertain. In economists jargon, one has to know a great deal about the elasticities of supply and demand for all the different goods, services and amenities created or foregone and for the inputs used by the project.

The problems of determining the incidence of benefits and costs become even more acute if one attempts to do a benefit-cost analysis from the perspective of a particular city or region rather than the country as a whole. In that case, one has to determine not just how market forces shift benefits and costs among consumers and producers of goods and services, but also how many of the consumers and producers are city or regional residents. In the subway example above, one would have to predict not only how the benefits will be shared between commuters and landlords but also how many of the landlords live out of town.

Given all these difficulties, many economists believe it is more responsible to adopt a simple "society wide" perspective rather to produce estimates of the incidence of benefits and costs that are highly uncertain and likely to be misleading.

Aggregate welfare and the possibility of compensation. Perhaps the most persuasive defense for adopting the aggregate, society-wide perspective is that it helps identify those projects that have the potential to make some people better off without harming others. A benefit-cost ratio greater than one means that the value of the benefits, as measured by the willingness to pay of those who receive them, is larger than the value of the costs, as measured by the willingness to pay of those who suffer them. This implies that the beneficiaries of the project could pay the losers enough to compensate them for their costs and still have some value left over. This left over value (the net social benefit of the project) could be kept by the beneficiaries, shared with the (former) losers, or given to others.⁶

The obvious flaw in this argument is that the winners don't always compensate the losers. As a result, while in principle everyone could be made better off by the project, in practice some people may be made better off at the expense of others.

Nevertheless, identifying projects with the potential to make everyone better off is an important task in society. It is only through such projects that the aggregate social wealth can be increased, and increasing aggregate wealth increases the possibilities for alleviating distributional or other inequities. Compensation may take place when many projects are considered together, moreover, even if it does not take place on a project-by-project basis. The U.S. Congress insures that the benefits rural states receive from federal irrigation projects, for example, are balanced by the benefits urban states receive from federally funded mass transit projects. In short, benefit-cost analysis doesn't answer every relevant question about the merits of a public policy or project, especially because it does not give much guidance on distributional issues. But it does provide an important perspective that must be considered if society as a whole is to become better off.

⁶The criterion that society should undertake any project that makes at least one person better off and none worse off is known as the Pareto criterion, named after its original proponent the economist Wilredo Pareto. The criterion that any project should be undertaken that is potentially Pareto efficient--that is, where the winners could compensate the losers--is known as the Hicks-Kaldor criterion, after the two economists that originally advocated it.

Summary

In summary, social benefit-cost, financial, and regional income analysis may appear very similar, since their results are usually expressed in dollars, but in fact they are very different. Financial and regional income analysis focus on the budget or employment effects for a particular agency or region, while social benefit-cost analysis usually focuses on the net increase in goods, services, and amenities available to society as a whole. Because financial and regional income analysis take a more parochial perspective, purely fiscal impacts are important. Because benefit-cost analysis typically takes an aggregate society-wide perspective, only the physical impacts of a project--the real goods, amenities and services created or foregone--are included as benefits and costs. In such analyses, activities that only transfer resources of resources from one group of individuals to another are counted neither as benefits or costs.

Most benefit-cost analysis do not explicitly address the distributional consequences of the projects or policies that they are evaluating. This is often because the analysts recognize that tracing the incidence of benefits and costs to particular groups is very difficult. Moreover, they argue that if benefits exceed the costs the winners could compensate the losers so that everyone is better off. Although this compensation often does not take place on a project by project basis, pursuing such projects is the only means by which aggregate social wealth can be increased and this, in turn, may make addressing equity and distributional problems less painful and controversial.