Excerpted from Swenson, Principles and Issues for Evaluating Public Sector Spending for Economic Development, and assorted lecture notes

I. Principles of Welfare Economics

Ours is a market economy. In a market economy we assume a competitive market place, we are intolerant of monopoly power, consumers (including workers and businesses) have knowledge of alternatives (goods and services), and the prices paid for a good or service are reflective of the value of the good and the costs of producing it. If these factors are in place, then we are said to have a successful market.

Market Failure

If we could get everything we need from the market, we would not need government. Indeed, the role of government in a well-running market economy is historically limited. It is limited because the majority of the decisions that are made that benefit citizens are made by consumers of private goods. There are, however, important functions of governments that enhance our well-being – functions that fall outside of market transactions. While markets reflect a system of private choices and the production and consumption of private goods, governments are instruments of collective choice and the production of public goods and services – goods and services, ideally, that cannot be produced efficiently in the marketplace.

The market fails, therefore, in the production of public goods – goods like public safety, clean air, access to public education, etc. – and we rely on governments to provide these goods among the many that are deemed necessary. Government must produce these goods or provide incentives for these goods to be produced because the market can not or will not produce them, or if the market does produce them, access to those goods might be exclusive and discriminatory.

The market also fails because private market activities often produce externalities. Externalities happen when private producers are able to shift some of the costs of production to society at large rather than have those costs reflected in the price of the goods that they sell in the market. Easy to understand externalities involve pollution, nuisances, noise, or risks to the health of workers or residents caused by industry. Because of the need to mitigate externalities, especially externalities that are directly harmful to public health and safety, governments must regulate and supervise certain aspects of market activity.

Finally the market fails in the case of a natural monopoly. The most common case of a natural monopoly is an electric utility. These firms have very high start-up costs, but average costs to consumers decline as production increases. Consequently, spatially, it is in the public’s interest to limit the number of these entities so that, with a circumscribed service territory, production is maximized among a customer base of sufficient size to produce lower average costs to consumers. Were two or more firms to try to serve the same customer base, average costs would be much higher. Therefore, natural monopolies are regulated by states to help to minimize this potential of cost-generating and highly wasteful competition. Occasionally, governments may themselves provide the service, as in the case of municipal power suppliers or telephone exchanges.
The Roles of Government in the Economy

The government interferes with or, stated differently, supports the economy in several ways. Among them:

- It can act to assure competitive markets by preventing trusts and monopolies and otherwise minimizing barriers to competition.
- It can act where production is inefficient (like natural monopolies).
- The market, *a priori*, needs government to provide the legal structure to resolve property disputes, protect trade and business secrets, and arbitrate disputes.
- Government provides goods that cannot or will not be provided by the market.
- It can offset market failures with its taxing power, regulatory power, or legal power (penalties and fines).
- It can influence the distribution of incomes and social benefits in a society using its taxing and appropriations powers.
- It can help to promote common economic objectives like full employment and socially desirable rates of growth.

Government promotion or interference in the distribution of private and public goods occurs in three major ways. **First**, it allocates public goods across its jurisdictions. **Second**, it attempts to equitably and effectively distribute economic and social resources through tax policies, subsidies, and income transfers. **Finally**, it attempts to stabilize or otherwise offset undesirable economic outcomes.

II. What is a Benefit?

Everyone involved in promoting the economy likes to tout the “benefits” of their actions. In economics and in governmental investment, however, the term “benefits” has a highly restrictive meaning, rendering nearly all other casual uses misleading and inappropriate. The term “benefits” is usually properly used in the context of a benefit-cost assessment. A benefit-cost assessment occurs when there is clear evidence that a particular set of public spending actions (costs) will produce a set of agreed-upon benefits. When the ratio of the benefits to the costs exceeds one, then the project is a go. When the ratio of the benefits to the costs is less than one, the project probably should not be funded.

**Surplus**

We want our governments to be both effective and efficient. Effective public policy does what is intended. The money is spent to produce a desired outcome. Efficient public policy produces the desired results with the minimum of public cost or the maximum of desirable outcome. Efficiency principles in the use of public funds demand that we maximize our outcomes as public dollars are scarce and are competed after by scores of worthy uses. When governments divert public resources from one use to another, they inevitably affect the welfare of society and of individuals. In short, defined broadly, governments want to enhance the welfare of individuals while minimizing the burdens that they place on them.
The historical methods of producing welfare gains have come from the incremental investment by governments in public goods. Bridges, roads, canals, navigations systems, dams, etc., are all forms of public investments that are designed to produce or enhance welfare gains. The same can be said of vaccinations, nutrition programs, screening children for disabilities, other important preventive health and social programs. The gains that are counted are measured as either producer or consumer surpluses over some reasonable period of time. Stated very simply, because of the timely and strategic investment by governments, as would be the case in a public works construction project, consumers and producers realize reductions in the costs of obtaining necessary goods and services or in the cost of selling their labor. In short, their welfares are enhanced because their individual or business costs are lowered yielding higher incomes and greater price competitiveness among firms. Over a standard period of time, the sum of those enhancements to welfare (usually consumer surplus as producer surplus in a competitive market results in price declines) can be summed.

In benefit-cost analysis, then, the discounted sum of all benefits over time (say 10, 20 or 30 years) are compared with all public costs in the project over the same time period. If the benefits exceed the costs, then the project is funded. If two or more projects are being evaluated, governments will look at both the benefit to cost ratio and the total of benefits to be achieved after costs have been accounted (net benefits). In most instances, choices that yield the most net benefits are most desirable.

Tangible Benefits versus Economic Outcomes

The benefits that are used in a benefit-cost calculation are defined very rigorously as enhancements to consumer surplus. To the extent that these benefits are monetary, they are tangible, meaning that they can be quantified and measured against costs. There may also be significant intangible benefits – outcomes from a project that may yield important economic, social, cultural, or environmental benefits that are difficult to quantify.

We use benefit-cost methodology to measure tangible benefits against public costs. We do not use benefit-cost methodology to measure intangible benefits. Many public officials confuse economic development outcomes – jobs, income, value added, regional sales, etc.—as tangible benefits of the kind appropriate for benefit-cost analysis. They are not. The outcomes from economic development are not benefits in the restricted use of the word, regardless of the tendency of public officials to term them as such. They are economic outcomes that are distinct from the welfare gains necessary for traditional benefits.

The distinction is not trivial. Economic activity occurs. Economies change over time. Benefits refer to an enhancement of total factor productivity net of the changes that are otherwise going on in the economy. Nearly all economic development activity in communities and in states, including that which might have been enticed to locate in a particular locality, would already have occurred somewhere in the regional or national market. The public money that is being spent on the firm, while admittedly a public cost, does not produce net benefits in the restricted sense. If anything, public assistance distorts the relationships among firms by allowing local taxpayers to subsidize the price of the goods sold by the recipient of the aid.
III. History/Basis for BCA

BCA as a practice owes its underlying assumptions to the subdiscipline of applied welfare economics, the central ideas of which were established in 1844 by French economist/engineer Jules Dupuit (more about him later).

In the USA the history of BCA goes back to the River and Harbor Act of 1902, which required the U.S. Corps of Engineers to assess federal expenditures for navigation against the benefits received commercially.

More importantly, historically, BCA became more systematically ingrained in federal decision making as a result of the Flood Control Act of 1936, which required that the government undertake projects (for flood control purposes), “if the benefits to whomsoever they may accrue are in excess of the estimated costs.”

[All of this needs to place within the historical context of the great depression, New Deal programs, public works projects, some grand undertakings by government for economic, political, and general relief purposes. Think of some of the great undertakings: The Columbia River projects, Grand Coolee Dam, Hoover Dam, the TVA]

Though these considerations were applied to public projects (U.S. Army Corps of Engineers, Bureau of Reclamation, TVA, etc.) each practicing entity developed its own standards and methods for applying BCA to its particular concerns: consequently, BCA was often manipulated to justify projects the respective bureaucracies were interested in pursuing, perhaps more so than used to actually document social benefits and costs.

With the end of World War II and the U.S. in full economic recovery, there was serious re-thinking of the value and necessity of government activity. Conditions had changed from public works and job creation. The U.S. was the major world power. It accumulated a tremendous amount of wealth rapidly.

Eventually, standards were hammered out in 1946 by the U.S. Federal Interagency River Basin Committee’s Subcommittee on Benefits and Costs, which produced a report that established agreed-upon principles for BCA entitled “Proposed Practices for Economic Analysis of River Basin Projects,” also known as the “Green Book.”

This effort was highly influential with regard to the establishment of standards, and the first effort to ground BCA in economic theory (Dupuit). Led to the U.S. Bureau of the Budget’s “Budget Circular A-47 (1952), which established guidelines for BCA of all water projects.


There were other post-depression and post-war influences that set the stage for adoption of BCA-like methods in national decision making. The fields of planning and public administration evolved strongly after WW II. Lessons learned from the New Deal, the war mobilization efforts, and the innovations of business were systematically injected
into the curricula, and troops of public administrators and planners found their way into
the service of government.

On of the more influential early efforts to rationalize the government decision processes
came from the book Economics of Defense in the Nuclear Age (1960), by Hitch and
McKean of the Rand Corporation – a think tank. The book was sometimes referred to as
the “bible” of the defense industry. It involved the implementation of Rand-like
planning, budgetary, and analytic methods for management and decision making.
Ultimately it came to be known as PPBS (Planning, programming, and budgeting
system), and it implemented in the U.S. Defense Department (under then secretary
Robert MacNamara). The method was applied to other segments of federal
procurement and project development during the Johnson administration.

5 Elements of PPBS:
• Specification of program objectives
• Governmental outputs are analyzed
• Program costs are measured for multiple years
• Allowances for the comparison of alternative approaches
• Use of common and accepted analytic techniques

Time Line of the Evolution and Application of Benefit Cost Assessment

1. (early 1900s) Navigation primarily
2. (1930s – New Deal) Applications to dams, irrigation, land reclamation and
   stabilization, water supplies. There were hosts of public works projects some of
   which involved, primarily, providing meaningful employment to a severely
   underemployed workforce: WPA, CCC, etc. There were also public works
   projects provided in major cities.
3. (1940s – the war years) The urgencies of the war suspended non-war related
   public works.
4. (1950s – boom time) Rapid expansion in state and local government capital on
   streets, highways, community centers, and the beginnings of urban renewal
   (especially, in housing).
5. (1960s) Widespread expansion of social projects / programs: Income
   maintenance, nutrition, health care and public health programs, community
   action, urban renewal, education reforms (like Head Start), and defense
   programs (war in Viet Nam, the cold war).
   of occupational health and safety initiatives, job training (industrial ability to
   document costs associated with compliance or noncompliance was limited).
7. (1980s – deregulation and economic hardship) Application to the effects of
   regulation. Overall scrutiny of the appropriateness of government intervention in
   the economy is the basis of much b/c study – especially in areas of product
   safety, occupational safety and health, workplace hazards, and environmental
   impacts (industrial ability to document costs is much better as also is society’s
   ability to document new categories of benefits – i.e., the value of enhanced
   health).
8. (1990s – the era of “re-inventing government”) Lots of buzz words and changes in the ways in which government interacts with society and other governments: decline in the defense industry, expansions in technological investments, and much more state and local direct support of commercial development. There is much less use of BCA in practice and in principle. Much of what passes for evaluative research is simply a calculus apportioning sets of private or market outcomes as a ratio against some mix of public spending. There has been an abandonment of traditional BC criteria in favor of political and perceived expediency in government decision making. Much less principled. Much less concerned with distributive justice. Implicitly plutocratic.

IV. Elemental Benefit Cost Analysis and Governmental Decision Making

We’ve established that there are times when governmental action or policy helps to stimulate improvements in the distribution of resources. These improvements take the forms of

- More equitable provision of public goods, or
- The generation of social surplus in the forms of consumer or producer surplus improvements, usually through the generation of a Pareto improvement

In government policy making, we always have tension between equity and efficiency concerns. It is not usually possible to stimulate pure Pareto improvements without one party being made worse off. If gainers can be made to compensate losers either explicitly or implicitly, then we can claim an improvement. Under the Kaldor – Hicks principle an improvement is assumed if gainers could (if they were made to) compensate the losers and still be better off.

This means that, when we consider public programs and budgeting, we simply “select the alternative that produces the greatest net benefits.” How then do we determine the project with the greatest net benefits? Which of many gives society the best gains?

Consider the following simple table and the following set of questions

<table>
<thead>
<tr>
<th>Amounts in millions</th>
<th>Gains to Consumers</th>
<th>Losses to Suppliers</th>
<th>Costs to Taxpayers</th>
<th>Net Benefits</th>
<th>Benefit/ Cost Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Transit (vouchers)</td>
<td>200</td>
<td>50</td>
<td>100</td>
<td>50</td>
<td>1.50</td>
</tr>
<tr>
<td>B. Transit (minibuses)</td>
<td>200</td>
<td>50</td>
<td>200</td>
<td>-50</td>
<td>0.75</td>
</tr>
<tr>
<td>C. Job Training (daytime)</td>
<td>450</td>
<td>50</td>
<td>300</td>
<td>100</td>
<td>1.33</td>
</tr>
<tr>
<td>D. Job Training (nighttime)</td>
<td>100</td>
<td>10</td>
<td>100</td>
<td>-10</td>
<td>0.90</td>
</tr>
<tr>
<td>E. Dam -- (recreational uses)</td>
<td>650</td>
<td>0</td>
<td>500</td>
<td>150</td>
<td>1.30</td>
</tr>
</tbody>
</table>

Basic Definitions:

Gross Benefits = Gains to Consumers – Losses to Suppliers
Costs = All Public Costs
B/C ratio = Gross Benefits / Costs
Net Benefits = Benefits - Costs
Considerations:

Q. Assuming complete information and no otherwise identified constraints, which are viable projects?
A. A C & E

Q. What, then, would be the total budget recommendation?
A. A=$100 C=$300 D=$500; total = $900

Q. What would be the total benefits?
A. A=$150 C=$150 D=$150; total =$450

Q. What would be the net benefits?
A. A=$50 C=$100 D=$150; total =$300

Q. If we were unable to identify the gains to consumers in A and B, which program would likely be funded (assuming both were designed to serve the same number of people).
A. Program A; it is the least expensive

Q. If we were unable to identify the gains to consumers in C and D, which program would likely be funded?
A. Program D; it is the least expensive

Q. Which would be funded if all that we knew was that C served 400,000 recipients annually and D served 110,000?
A. Program C; costs per person served are less.

Q. Suppose Speaker Pelosi, in her ever-vigilance, decides that only $400 million can be spent. Which should be funded?
A. A & C

Q. Suppose the President counters that he will veto this package if it comes in at an amount less that $800 million. Which should be funded?
A. Program C & E

Q. Suppose that project D is in the state where the senate finance committee chair hails and that the entire package will not make it out of committee unless D is funded. Which projects will be funded given the President's last offer?
A. A D & E

There are, of course, a host of considerations inherent in the previous example. For example, is it appropriate to consider that the sum of A and B instead of them separately? Can the benefits received in A be used to pay for the inefficiencies apparent in B? A similar question could be asked of C and D. What if D was designed to assist persons already working but in need of new skills, whereas C was designed for persons who were not working? Would it be practical and useful to society to combine rather than segregate the programs?
If we did, though, what would be gained and what would be lost? It is now apparent that values must enter into the considerations and that these values are informed in the political decision process by voters, special interests, and overall societal goals.

Constraints to our choices:

1. Average benefits versus marginal benefits.
2. Choices cannot be made independent of other decisions.
3. Political – what does it take to get a bill through. Rarely is the “best” package funded.
4. Practical/Analytic – there is always an underlying uncertainty that we are in fact accurately estimating benefits and costs.

Benefits and Costs over Time: An Introduction to Discounting

One of the fundamental problems or challenges of BCA is that costs are incurred and benefits are received at different points in time.

Our preferences of how to value money, benefits, consumption, and investments depends on a variety of factors:
1. our present needs
2. our present financial situation
3. monetary and inflationary factors
4. our perceptions of future needs

When we do BCA, we must rely on

1. present value computations – the explicit acknowledgment that a dollar now does not have the same value or purchasing power as a dollar in the future.
2. Discounting – the rate of preference for computing future values into present values.

Present Value of Benefits (or costs) Formula:

\[
\text{Present Value Benefits} = \sum \frac{B_i}{(1+r)^i} \\
\text{Present Value Costs} = \sum \frac{C_i}{(1+r)^i}
\]

Where \( t = \text{time} \) and \( r = \text{discount rate} \), \( B = \text{benefits} \), \( C = \text{costs} \)