

Valuation of Development Impacts: A Review of Critical Cost Benefit Analysis Opportunities, Issues, and Pitfalls for Appraisers

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Introduction

The Appraisal of Real Estate, eleventh edition, published by the Appraisal Institute in 1996, identifies several types of consulting studies that can be undertaken by appraisers: highest and best use studies, economic base studies, feasibility studies, market studies, marketability studies, pricing and rent projection studies, international valuation assignments, and cost-benefit studies. Other nontraditional valuation assignments were identified by Anthony Downs in a 1966 *Appraisal Journal* article titled, "Characteristics of Various Economic Studies." Downs noted that differences in the terminology used by economists and real estate appraisers has created confusion regarding how various studies are identified and described. This paper will attempt to clear up this confusion and further define the meaning and application of the terms and procedures used in cost-benefit studies.

Key Terms and Conditions

Economic development administrators, planners, business owners, politicians, and ordinary citizens use a variety of methods to evaluate and understand the costs and benefits associated with real estate development activities. According to Burchell and Listoken,¹ fiscal impact and cost effectiveness analysis are common approaches to understanding the costs and benefits of real estate and economic development projects. The methods used to evaluate community impacts can also be expanded, according to Schofield,² to include techniques such as the planning balance sheet or goals achievement matrix analysis models. These models simply define a project's costs and benefits by listing them and presenting the list to decision makers (politicians or government staff) to weigh the estimated values. Matrix display models can address different kinds of economic and non-economic impacts and can disaggregate the multiple inputs and outputs of complex projects.

ABSTRACT

Each year municipalities in the United States allocate billions of dollars to underwrite real estate and economic development projects. It is imperative that the valuation methods used by public administrators to allocate funds and make investment decisions be systematically researched and that the market analysis tools employed by appraisers be applied. Public administrators are seeking ways to determine the impacts and value of subsidized projects to the communities in which they are located. This paper addresses cost-benefit analysis and the emerging opportunities for appraisers to undertake cost-benefit analysis studies for local units of government. It reviews the major issues to be considered as appraisers become more involved in estimating increases in area property values, local employment and income growth, growth in the tax base, economic diversification and stabilization, infrastructure construction costs, pollution clean-up, and blight removal costs. With a better understanding of public project valuation methods, appraisers can make a substantial contribution to public decision making.

Real estate and economic development projects and the public subsidies provided to them can be evaluated from a variety of perspectives. Creating employment and generating additional tax revenue are just two of the benefits that can result from a project. Impact analyses undertaken by economic development officials also include the generic concepts of risk assessment, decision analysis, fiscal impact analysis, and environmental assessment. According to Fischhoff³ cost benefit analysis (CBA) adequately describes the broad spectrum of these techniques.

Public sector decision makers must, according to Gramlich,⁴ take the responsibility to look beyond financial gains and losses and define the costs and benefits of a project in terms of the welfare of all members of the community. Consequently, as pointed out by Levy,⁵ the analysis of public projects is made in an environment without the advantages of private sector market signals such as measures of return on investment or internal rate of return. CBA is, according to Schmid,⁶ Chawla,⁷ and Haveman and Margolis,⁸ a systematic framework that considers economic consequences and presents the public administrator or elected official with criteria for selecting the most suitable option. CBA includes consideration of the goals sought and the constraints faced by decision makers and, according to Burchell and Listokin,⁹ compares both the tangible and intangible costs and benefits of a particular project.

On the surface, CBA is a method that appears to have clear benefits for public decision making and resource allocation. Layard and Glaister,¹⁰ however, note that problems do arise over the measurement of benefits and costs and that many social impacts are qualitative, not quantitative, in nature. CBA is also subject to political forces that may alter the rational decision making environment.

Development of CBA Methods

Marglin¹¹ traced the underlying theory of CBA to an article by a French engineer, Jules Dupuit, titled, "On the Measurement of the Utility of Public Works." Dupuit recognized that public improvements such as bridges and roads can be valued by both the revenues produced and the willingness of the public to pay for their proposed benefits. The idea that there is a difference between the maximum amount a consumer is willing to pay for a good rather than do without it

and the market value of the good itself is known as the concept of consumers' surplus.

The more recent public management applications of CBA, noted by Boardman, Greenberg, Vining, and Weimer,¹² date from the 1936 Flood Control Act. This government program prescribed a test of feasibility that considered a project feasible if the benefits, to whomever they accrue, were in excess of the costs. The basic notion is very simple and suggested that specific procedures be followed to systematically consider the costs and benefits associated with publicly funded projects.

The application of CBA to publicly funded projects underwent a transformation during the 1950s with the publication of two important works: Otto Eckstein's *Water Resources Development: The Economics of Project Evaluation*¹³ and Roland McKean's, *Efficiency in Government Through Systems Analysis*.¹⁴ The first major applications of the principles of CBA theory related to water resources projects. Schmid¹⁵ found it interesting that many water resource projects were studied during this period, but few were selected on the basis of their CBA studies. Rather, CBA was used to qualify the eligible projects, but not to establish priorities based on project benefits or to determine the order in which the projects should be completed.

CBA has theoretical roots in the study of welfare economics, which is concerned with the efficient allocation of resources. According to Haveman and Margolis,¹⁶ CBA is an offshoot of resource allocation theory that addresses the private decisions of consuming and producing units. Nevertheless, CBA was solely concerned with public sector decision making. Burchell and Listokin¹⁷ contended that the application of CBA is focused on improving the allocation of economic resources in the public sector.

Often the effectiveness of public sector projects has to be judged based on an economic measurement even though the activity is directed toward a qualitative outcome. Market prices cannot be used to evaluate the effectiveness or social contribution of public projects, but some economic basis is needed to judge these undertakings. CBA provides that basis.

According to Gramlich,¹⁸ the first widespread governmental system of program selection and evaluation that required the use of CBA as an analytical technique was the Planning, Programming, and Budgeting (PPB) system implemented in 1965. This system required all federal agencies to conduct a

review that incorporated program costs and benefits into the project evaluation process. Under these requirements, the cost implications of program proposals would be known and the overall program objectives would be better articulated. According to Campen,¹⁹ CBA was viewed at this time as a tool for guiding the expansion of government spending and for facilitating the planning and management of the government's economic activities.

As a method of program evaluation, CBA rapidly captured the attention of public administrators in federal, state, and local governments. The Demonstration Cities and Metropolitan Development Act of 1966, Model Cities Program, required participating cities to use PPB program evaluation analysis techniques in the grant administration process.²⁰

Applications of Cost Benefit Analysis in Real Estate Decision Making

The application of CBA to problems of real estate development was first investigated by Jerome Rothenberg.²¹ Rothenberg's research model adopted the metropolitan-wide economic view that housing redevelopment produced additional external benefits including increases in the value of surrounding neighborhood properties and reductions in the social costs of health, fire safety, and crime prevention.²² Another researcher, Stephen Messner,²³ used Rothenberg's model to evaluate three redevelopment projects in Indianapolis, Indiana. He found that the renewal site's productivity benefits increased from redevelopment.²⁴

One of the key attributes of Rothenberg's research is the multiple settings in which CBA can be employed and the value of its comprehensive and systematic approach to the interrelationships impacting redevelopment. Rothenberg²⁵ applied CBA to five urban renewal projects in Chicago. Rothenberg first estimated the total publicly funded redevelopment costs for each project. (Land costs were deducted.) He then estimated the increase in project site land prices, the increased value of neighboring real estate, and the decrease in the social costs associated with the redeveloped areas.

Hirsch²⁶ found that the strength of the Rothenberg model rested with its ability to correlate the benefits of the redeveloped property in relation to neighboring properties, the income redistribution resulting from changes in the structure of the housing stock, and changes in the social costs generated in the

community. This approach serves as the basis for modern CBA models investigating the benefits associated with real estate development projects.

According to Schofield,²⁷ CBA serves as a valuable starting point from which we can consider the multitude of economic, social, political, and physical impacts associated with real estate development. As the qualitative issues considered in this type of analysis expand in scope, the monetary assessment of the costs and benefits developed in a CBA model becomes more illusive.

The limitations of a CBA approach center on the fact that the project impacts are measured and reported in economic terms, which have limited usefulness. Simply stated, benefits resulting from real estate and economic development can come from a variety of sources. Project benefits are often intangible in nature, unanticipated at the outset, and subjectively evaluated.

Errors in CBA studies occur for many reasons. When CBA has been used to evaluate decision alternatives, according to Boardman, Greenberg, Vining, and Weimer,²⁸ management has sometimes consciously overestimated project benefits and underestimated costs. Another limitation of CBA is the failure to consider unforeseen impacts. Accurate CBA techniques can be undermined by errors in forecasting, measuring, and valuing project impacts. People can manipulate information to achieve a goal or desired outcome. As Mark Twain commented, "It is important to understand the facts before you misrepresent them." An unknown observer once noted: "If you torture the assumptions, an economic model will confess to anything."

Components of Cost Benefit Analysis Study and Decision Making

In 1989, Schmid²⁹ identified 10 CBA topics that economists have consistently questioned and extensively researched.

1. Theory of public investment: Why are we making this investment?
2. Program information structure: What outcomes will be produced and how can they be measured?
3. Estimate of project effects: What benefits will occur?
4. Valuation of direct effects: What additional outcomes will occur?

5. Opportunity cost adjustments: How do we value the cost of projects not undertaken?
6. Non-marginal projects: What is the role of politics in the valuation of project costs and benefits?
7. Distribution effects: How are multiple-product projects to be valued in terms of the distribution of benefits to different parts of society?
8. Valuation over time: How do benefits and costs flow over time and how can a discount rate be determined?
9. Uncertainty: How can adjustments be made for risk in benefits and costs?
10. Political economy of budgeting: How is decision making subject to political negotiation?

Steps in Preparing a CBA Study

The key to preparing a CBA study is to develop an understanding of the multiple benefits and costs associated with a proposed project. Simply put, if the benefits of a project outweigh the costs, then the community would be enhanced by undertaking the project. If, however, the project costs outweigh the benefits, then the project is not in the best interests of the community. The benefits and costs of a project are measured with a simple formula:

$$B/C = \text{benefit cost ratio}$$

Where B is the sum of the discounted value of all benefits and C is the sum of the discounted value of all costs.

The question that comes to mind is: How do we take a complex problem and break it down into a simple relationship between two potentially infinite variables—project costs and benefits? The following example illustrates the process.

A Cost-Benefit Analysis Problem

Appraiser Jones is contacted by his community's director of economic development, who explains that the planning commission has made the commitment to finish developing one of two industrial parks in the city. The overall community goals in finishing construction of the industrial park include growth and diversification of the tax base, increasing local wages and income, the creation of spin-off industries, improving the community's image as a place to

conduct business, and new home construction for workers moving into the community. The city is planning to issue bonds to pay for roads, utilities, and an assortment of construction and other business incentives that are needed to attract companies to the industrial park.

The director of economic development knows that there are many variables affecting the costs and benefits of any project of this size and complexity. Consequently, Jones has been recruited to prepare a proposal and head a team of experts that will recommend which of the two industrial parks should be completed. Jones has a good grasp of finance, the local and regional real estate markets, industrial site and construction needs, and property values, so he feels competent to evaluate the complexity of the assignment and prepares a bid.

Jones' first tasks are to review the literature on cost-benefit analysis and to find a systematic and organized way to analyze the development issues and the costs and benefits associated with the projects. Recognizing that this CBA problem is not unique to his community and that he may have the opportunity to perform similar assignments in the future, Jones performs a second review of the literature on major CBA issues facing economic development administrators. After completing these two research projects, Jones accepts the assignment and proceeds to prepare the CBA study.

CBA Study: Step-by-Step

Step 1. Identify the important variables associated with the public project. Jones immediately recognized the need to understand the "big picture" goals: the options, alternatives, and constraints of the project; groups that could benefit and groups that would incur costs; and the perspectives of the planning commission and economic development director. He asked himself which considerations were both relevant and important in the decision-making process. Jones concluded that city-wide development and growth were the key goals and that the city's elected officials, involved citizens, and business leaders were committed to building the economic base of the community within 10 years.

Step 2. Define the measures that could be used to quantify the alternative benefits and costs of each project. Jones knew that, to the extent possible, he had to identify the project costs and benefits and quantify them in a way

that would facilitate present value calculations. Although he talked with many public officials about long-term goals for the community, Jones knew that they were relying on him to furnish an accurate analysis and identify the "right" decision in allocating public monies. He also knew that a public decision like this involves multiple impacts that require the application of multiple evaluation criteria. In his review of the economic development literature, Jones identified the most common costs and benefits associated with this type of project. From a cost perspective, Jones knew the city would incur substantial costs for the land and infrastructure concessions, property taxes foregone, and holding costs for the industrial park not selected for development. But Jones was unsure of the social service needs created by new workers, traffic and congestion, and potential changes in the quality of life in the community. He was also concerned about the unintended consequences of the development process.

From a benefits standpoint, Jones knew that the tax abatements were for a fixed term and he could estimate the future property tax rates for each of the industrial parks under consideration. He was also familiar with local income multipliers and could estimate the impact of potential new businesses and employment growth in the local economy from each industrial park. Other factors could not be so easily quantified. These more intangible benefits included any enhancement of the community's image associated with each industrial park, the value of economic base diversification, and the political benefits resulting from each of the two development choices.

Step 3. Evaluate the benefit and cost performance of the proposed alternatives over the life of the project. Given the above information, Jones wondered how the performance (costs and benefits) of each industrial park would compare with the other. He was able to correlate the benefits and costs of each park by studying site plans, lot sizes, site conditions, and estimated property tax rates. One industrial park had a locational advantage for sewer and water and a distinct transportation advantage as well. These factors alone produced a direct benefit in project marketing time and project image enhancement. Jones then compared the site plans of the two industrial parks for adverse impacts on the community.

Step 4. Assign a monetary amount to each cost and benefit. Jones developed detailed estimates of the costs and benefits derived from the industrial parks and was

able to estimate the immediate and future costs of the projects in an organized and systematic manner. The benefits resulting from each project were also documented and compared. Jones found it difficult to assign a monetary value to some of the costs and benefits of the two alternative projects. The intangible costs and benefits that defied an economic classification included the value of community image, political benefits, social service costs, community education costs, and economic base diversification. Jones presented these unquantifiable costs and benefits in a matrix display model, which ultimately played a valuable role in the final report and project recommendations. Jones presented the model to the planning commission as part of his final report and the commission accepted the responsibility for assigning a value to these non-economic variables.

Step 5. Discount for time to determine the present values. The director of economic development told Jones that the discount rate to be used in determining the present value of project costs and benefits was the rate at which the government would borrow the funds to underwrite the selected project. Jones felt that a more accurate measure would be the private sector rate of return for similar projects because it more accurately reflected the opportunity cost of capital used on the project. The selection of an appropriate discount rate is a controversial component of cost-benefit studies. Because government projects usually involve large initial expenditures that provide a long-term flow of benefits, a low discount rate increases the net present value of project benefits.

Step 6. Total the costs and benefits for the projects under consideration. Jones simply added all of the costs and benefits for each project and applied the appropriate discount rate to the calculation.

Step 7. Perform a sensitivity analysis on the assumptions incorporated into the model. In his research on CBA, Jones learned that a review of the model's assumptions and discount rate can be useful in determining how "sensitive" the analysis was in terms of changes in outcomes, the roles of the variables, and changes in the discount rate. If a model is sensitive to small changes, one would expect to find other problems in the model's assumptions or values. Because the project choices were so similar, however, Jones felt that there was little to learn from such an exercise.

Step 8. Describe the conclusions and caveats of the CBA study. Jones had carefully evaluated the cost and benefit impacts of the alternative industrial park projects. His results were very systematic and well organized. One project under consideration had a substantially higher cost-benefit ratio. The decision to choose this project was supported by the detailed list (matrix display model) that Jones prepared to present the nonmonetary benefits and costs resulting from each of the two alternatives. The project with the higher cost-benefit ratio also had several qualitative advantages over the other project.

Conclusion

When performing a CBA study, an appraiser could easily get distracted by the plethora of issues surrounding the real estate or economic development project. The outside issues that may be encountered include: community and political conditions, how and why the project was proposed, the need or lack of need for anticipated project outcomes, unjustified perceptions of unintended outcomes, and disagreement about resource allocation issues among or between projects. There are no easy answers to these issues and the many other potential questions posed in a CBA study. The CBA analyst must approach projects with common sense and develop a rational and systematic methodology to solve the problem under consideration. By undertaking a CBA in this manner, an appraiser can make a substantial contribution to his or her community.

Notes

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