Evaluation of Stakeholder Impacts in Project Appraisal, The Jamuna Bridge

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Abstract

The social analysis of a project may be organized in to two parts: estimating how the income changes caused by the project are distributed across the stakeholder of the project, and identifying the impact of the project on the principal objectives (basic needs) of society. Another aspect of the social analysis is concerned with situations where the project will facilitate or hinder the process of helping society address its basic needs.

The analysis is important to decision makers as it lets them evaluate the impact of particular policies or projects on segments of society, and to predict which groups will be net beneficiaries and which groups will be net loser.

This paper starts with explaining the distributive analysis and describes how to determine the impact of project on different parts of society and its effect to alleviate poverty. The application carried out in this paper is to allocate the cost and benefits of building a bridge over the Jamuna River as purposed by Government Bangladesh.

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Evaluation of Stakeholder Impacts In Project Appraisal:

The Jamuna Bridge:

1 Introduction

The social analysis of a project may be organized into two parts; estimating how the income changes caused by the project are distributed across the stakeholder of the project, and identifying the impact of the project on the principal objectives (basic needs) of the society.

The distributive analysis of the project asks the following questions: Who will benefit from the project and by how much? Who will pay for the project and how much will they pay? Project sustainability is heavily impacted by which party in the project's sphere of influence gains or loses. If an influential group is expected to bear the burden of losses, then the successful implementation of the project may be hindered. The risk of a strong political opposition to the project mobilized by the losing party is a contingency that the project implementers should be prepared to tackle.

Another aspect of the social analysis is concerned with cases in which project will facilitate or hinder process of helping society address its basic needs. For example, a road project may not only reduce transportation cost, but also may increase the level of security in a village or may allow more children to attend school, both of which are viewed positively by the society. In such cases society may want to credit a further social net benefit to the project.

2 Distributive Analysis

A traditional financial analysis examines the financial feasibility of the project from the owners or sponsors point of view. Economic analysis evaluates the feasibility from the point of view of the whole country or economy. A positive economic net present value

(NPV) implies a positive change in the wealth of the country, while a positive net present value from the point of view of those with a financial terest in it, indicates a positive expected change in the wealth of these particular stakeholders.

The difference between the financial and economic values of an input or output represents a benefit or a cost that accrues to some party other than the financial sponsors of the project. These differences can be analyzed by undertaking a distributive analysis that allocates these externalities (differences between economic and financial) to the various parties affected. For example, a project that causes the price of a good to fall will create economic benefits that are greater than its financial revenues. This difference between the financial and the economic values will represent a gain to the consumers of the output and a somewhat smaller loss to the other producers of the good or service who are competing in the market with the project. The differences between the financial and economic values of inputs and outputs also may arise due to a variety of market distortions such as taxes and subsidies, or because the item is sold to consumers at a price different from its marginal cost of production.

Public goods are normally provided at prices different than their marginal (economic) costs. The economic values of common public services such as transportation services are measured by people willingness to pay for these services. These economic values are often significantly greater than the financial prices people are actually pay for the services. Any of these factors will create divergences between the financial and the economic prices of goods and services consumed or produced by a project.

A distributive analysis is composed of six distinct steps:

- Identify the externalities;
- Measure the net impact of the externalities in each market as the real economic values of resource flows less the real financial values of resource flows;
- Measure the values of the various externalities throughout the life of the project and calculate their present values by using the economic discount rate;
- Allocate the externalities across the various stakeholders of the project;

- Summarize the distribution of the project's externalities and net benefits according to the key stakeholders in society; and
- Reconcile the economic and financial resource flow statements with the distributional impacts.

This analysis is important to decision makers as it lets them evaluate the impact of particular policies or projects on segments of society, and to predict which groups will be net beneficiaries and which groups will be net losers.

3. Poverty Alleviation

The magnitude of a project's direct impact on poverty alleviation is a variable that the feasibility study of a project is frequently expected to estimate.[1] When a project reduces the cost of a transportation service, the consumers of the service will be able to acquire it at a lower cost, provided that user charges are not raised by the full amount of the cost savings. This net benefit will be identified and quantified in the distributive analysis. If the poor are the consumers, this project will have a poverty alleviation impact. The reduction in transportation costs can have a direct impact on poorer groups in society if they the users of the new or improved service. Furthermore, they will benefit if the transportation services reduces the cost of delivering goods they sell to the market and/ or reduces the transportation costs of goods they purchase.

To quantify this impact one needs to evaluate the differences between the costs that various users of the transportation facility incur before and after the project.

Another channel for a project to have an impact on the incidence of poverty is through the labor market. When the lower income groups sell their services to projects that pay a wage rate significantly above the workers supply prices for their labor, they are likely to be made better off by the project. The differences between the supply price of labor and

[1] James D. Wolfensohn (President, The World Bank Group): "The Challenge of Inclusion," address to the Board of Governors, Hong Kong, China. September 23rd, 1997.

the financial wage paid will be measured as a distributive externality and can be allocated according to the various income groups, to determine if the project has a direct impact on poverty alleviation.

4. Reconciliation of Economic and Financial Values of Inputs and Outputs

When the economic values and corresponding financial values of variables are expressed in terms of the same numeraire, then the economic value of an input or output is equal to its financial value plus the sum of the externalities created by the use or production of the item. These externalities may be reflecting things such as taxes, subsidies, changes in consumer and producer surplus or public good externalities.

If each of the variables are discounted using a common discount rate (in this case the economic discount rate), it must also be the case that the present value of the economic net benefits are equal to the present value of the financial net benefits, plus the present value of the externalities.

This relationship can be expressed as in equation (1):

$$(1) \qquad NPV^{e}_{e} = NPV^{f}_{e} + \sum PV_{e}\ (EXT_{i}),$$

where NPV^{e}_{e} is the net present value of economic benefits and costs, NPV_{e}^{f} is the net present value of the financial benefits and costs, and $\sum PV_{e}\ (EXT_{i})$ is the sum of the present value of all the externalities generated by the project; all discounted using a common rate of discount (economic discount rate).

To indicate how this analysis might be applied we consider the case of the Jamuna Bridge Project in Bangladesh.

5. Linking East and West Bangladesh: The Jamuna Bridge Project [2]

Basic Facts

1. The Bangladesh government proposes to build a bridge over the Jamuna River.

2. At present, the ferry service is poor, creating delays ranging from one to eight hours for light vehicles and buses to 30/40 hours for heavy vehicles.

3. The economic benefits arise from the savings in vehicle operating costs and reduced waiting times plus the willingness to pay by newly generated traffic. Financial revenues will arise from the tolls charged. This bridge will not only facilitate the transport of passengers and freight, but will also enable natural gas, electricity, and telecommunication links to be made across the river.

4. As part of the financial and economic analysis, the option of improving the existing ferry service was considered.

5. The bridge is expected to facilitate economic growth within the country by improving the links between the relatively more developed region east of the Jamuna River and the agricultural region to the west.

6. The project is expected to cost approximately US$700 million. Approximately $600 million of loans were given by bilateral and multilateral agencies to the Government of Bangladesh at a nominal interest rate of 1%. The rest of the financing was provided as a grant by the government.

7. Implementation of the project began in 1996.

8. When considering the potential sustainability of this bridge, in terms of maintenance and construction of access roads, it is clear that sufficient funds could be generated by tolls to cover these costs. For this bridge, the maintenance of the river training infrastructure and the construction of access roads will be critical for the success of its long term operation.

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[2] Jenkins, Glenn P. and Shukla, Gangadhar P: "Linking East and West Bangladesh: The Jamuna Bridge Project." *The Canadian Journal of Program Evaluation*, Special Issue 1997, pages 121-145.

Project Outcomes

An economic analysis was performed to determine whether the project would be beneficial to the overall economy of Bangladesh. The analysis revealed that as compared to the existing ferry system, the real economic NPV of the bridge project is 7.77 billion Takas (US$ 195 million).[3]

Comparing the financial profitability of the bridge project (with the specified set of tolls) with the existing ferry system indicates that the financial NPV of the bridge project is a positive 642 million Takas (US$ 16 million).

When comparing the economic and financial analysis of this project, we find that the major net beneficiaries are the shippers, the producers and consumers of cargo, the power company and the bus passengers. On the other hand, both the government and aid agencies as well as the ferry operators lose. Cargo producers, shippers and consumers would realize savings of about 31.09 billion Takas, while bus passengers and light vehicle owners and passengers would gain only 1.95 and 0.63 billion Takas respectively. The present ferry operators would incur a negative financial impact amounting to 1.84 billion Takas.

[3] In 1994, the exchange rate was 39.8 Takas/US$

Allocation of Externalities among its stakeholders

The following table summarizes the distributive analysis of this project.

Table 1

Jamuna Bridge Project: Distribution of Project Net Benefits
(million of 1994 Takas)

	Light Vehicles Passengers	Bus Passengers	Producers and Consumers of Cargo	Power Company	Government and Aid Agencies	Locality	Ferry Operators
	627	1951.6	31094.1	2544.3	-27700.7	456.9	-1840.8
Total	7132.3						

Reconciliation of the Project

Using Equation (1), we can summarize the analysis of this project as follows,

$$NPV^{ECO}{}_{eco} = NPV^{FIN}{}_{eco} + NPV^{EXT}{}_{eco}$$

yielding,

$$7774.9 = 642.5 + 7132.3$$

A key feature of this project was the large amount of subsidized financing it received. As a consequence of these subsidies, the distribution analysis shows that the total subsidies amounted, in present value terms, to -27,700 million Takas. This is a result of the interest subsidy on the loan (19,851 million Takas), the government grant (2,455 million Takas) and the premium lost on the foreign exchange used to purchase traded goods components of the investment cost of the bridge (5,358 million).

On the other hand, we find that cargo producers, shippers and consumers who are going to benefit from the lower transportation cost of the cargo to the amount of 31,094 million

Takas even after they pay the bridge tolls. This amount is more than the entire investment cost of the bridge.

Tolls and Stakeholder Impacts

These results would indicate that if a tariff structure was designed that would capture the benefits received by the consumers and producers of the cargo, little or no subsidy would have been needed. Perhaps for economic development and distributional reasons, it would be desirable to allow the users of the bridge to receive a substantial portion of the benefits from the bridge. In a country like Bangladesh, however, there are many pressing social and economic needs which are not being met due to a scarcity of resources. An important issue with this transportation facility is the design of the tolls. As the variable costs are quite low (perhaps zero) the toll is essentially an excise tax, with the same propensity to create economic efficiency costs as do excise taxes applied to other goods and services.

Using the project's feasibility study model the following ex-ante results can be derived:

1. The economic efficiency costs of raising sufficient revenues to service the debts are approximately 10 percent of the financial revenues raised. This is likely to be less than the economic cost of raising the taxes in Bangladesh.

2. The economic efficiency costs of raising additional revenue by doubling the tolls are approximately 20 percent of the incremental revenues raised.

3. If poverty groups are associated with bus transportation, producers and consumers of cargo, it is likely that charging a modest level of tolls is consistent with an relatively efficient source of revenue and a strategy to leave the benefits of the bridge with poorer groups in society.

Final Observation

The observed demand to cross the Jamuna River, and the level of coping costs prior to the construction of the bridge, is a good indication of the value people place on this transportation facility. Due to the broad span of the society that use the services of the bridge, it is going to benefit both the rich and poor directly. Furthermore, by reducing the costs of production it will make commerce more profitable and lead to the expansion of activities that employ labor. Ultimately the poor are helped most by increasing the value of their principal asset, which is the labor services they can offer to the market.

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