

Evaluation of Stakeholder Impacts in Cost-Benefit Analysis

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Abstract

The scope of the analyses of public and private investment projects is expanded beyond the traditional criteria of financial and economic net present value. If the economic and financial analyses are carried out using a common numeraire, they can include issues of stakeholder impacts, poverty impact, and an assessment of the long-term sustainability of the project. We can assess the income impacts on different interest groups. This forces the analyst to do reconciliation between the economic performance, the financial performance and the distributional impacts of project. Three examples are given of projects in Cyprus, Bangladesh and the Philippines: traditional economic and financial analyses would not have identified many of the most important aspects of the process that determined whether or not the projects would be implemented and sustainable.

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Stakeholder impacts

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Keywords: stakeholder impact; cost–benefit analysis; investment analysis

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TRADITIONAL APPROACHES to the appraisal of investment projects have tended to undertake the economic analysis in isolation from the financial analysis, hence ignoring the interaction of the financial and economic outcomes. More often than not, the impact of possible changes in the economic policy environment has not been factored into the design of the project and the assessment of its risk. Consequently, often analysts have failed to identify and make provisions for policy and institutional variables that are important determinants of the sustainability of many of these investments.

The economic distortions that subsidize a project financially, when removed, often become a source of failure for these investments. A reduction in the rate of trade protection is frequently such a case. An integrated financial/economic/distributive investment appraisal can be used to identify the project's stakeholders, the groups who benefit or lose as a consequence of the project.

A project's likelihood of successful implementation or long-term sustainability will be threatened if specific groups in society are hurt unwillingly by it. In many cases, the most important factor determining a project's sustainability is its impact on the government budget. For sustainability, the project's fiscal impact must be consistent with the ability of the public sector to finance such activities.¹

An integrated analysis

The social analysis of a project may be organized into two parts: estimating how the income changes caused by the project are distributed (including the

The difference between financial and economic values of an input/output represents a benefit/cost to a party other than the financial sponsors: it can be analyzed by distributive analysis allocating these externalities to affected parties

reconciliation of financial, economic, and distributional appraisals), 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 projects will facilitate or hinder the process of helping society address its basic needs. For example, a road project may not only reduce transportation costs, but also increase the level of security in a village or allow more children to attend school, both of which are viewed positively by society. In such cases, society may want to credit a net social external benefit to the project.

Distributive analysis

A traditional financial analysis examines the financial feasibility of the project from the owner's and total investment (banker's) 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 interest 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 as a result of a variety of market distortions such as taxes and subsidies, or because the item is sold to consumers at a price different from the marginal economic cost of additional supply.

Tariffs, export taxes and subsidies, excise and sales taxes, production subsidies and quantitative restrictions create common market externalities. Public goods are normally provided at prices different from their marginal economic costs. The economic values of common public services such as clean water and electricity are the maximum amounts people are willing to pay for them, and often are significantly greater than the financial prices people are required to 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 consists 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 (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;
- Reconcile the economic and financial resource flow statements with the distributional impacts.

In essence, a distributive analysis seeks to allocate the net benefits/losses generated by a project. This analysis is important to decision-makers, as it lets them estimate the impact of particular policies or projects on segments of society, and to predict which groups will be net beneficiaries and which net losers.

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.² When a project reduces the price of a good or service, the consumers of the output can acquire the good at a lower price. 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. In the case of water, the willingness of the poor to pay water vendors is often fairly high because of the necessity of water. Often the poorer areas with limited access to water are

paying more for marginal supplies than are the better-off consumers.

Thus, a new project that increases the supply of potable water and provides it at a lower price for everyone, but more importantly to the poorer strata of society, will contribute to poverty alleviation. To be able to quantify this impact we need to evaluate the differences between the economic value and financial cost of the water being consumed by the various income groups.

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

Need for a common numeraire

To undertake an integrated financial, economic and distributive investment appraisal or to evaluate the sustainability of a project, two steps need to be taken.

First, the project's financial profile should be compared on a period-by-period basis and not just summarized in a single statistic such as the NPV or the internal rate of return (IRR). Such summary criteria examined in isolation do not assess accurately the sustainability of a project or its riskiness. Consider a project that has both a large IRR and a large positive NPV, but also has negative financial cash flows in the early years of its life. Such a project may go bankrupt, jeopardizing its economic performance, long before it has a chance to generate the large positive net cash flows expected in later years.

It is the examination of the cash flows year-by-year over the project's lifetime that will give the analyst an indication of the sustainability and financial riskiness of the project. If a project is clearly not financially feasible on its own, a realistic assessment of the degree of budgetary support it is likely to receive from the government needs to be made.

Second, the financial and economic analysis must be expressed in the same unit of account or numeraire

As commercial transactions in most countries are in units of domestic currency at the domestic price level, this numeraire greatly facilitates communication for the analysis from all different points of view, including that of the economy

(Ward and Deren, 1991). If the units of account are different for the financial analysis and the economic analysis, the differences between the economic and financial values will have no significance or meaning. The three common choices for the numeraire found in the benefit-cost analysis literature are: domestic currency at domestic price level; domestic currency at the border price level; and foreign currency at the border price level.

Financial variables are usually expressed in domestic prices at the domestic price level because these are the currency and the price levels in which a country's markets operate. Therefore, the use of any other numeraire quickly diminishes the level of understanding that decision-makers will derive from the analysis. Analysts who want to take an integrated approach to examining the risk, sustainability and distributional impacts of a project, will usually find it much easier to work with domestic prices at the domestic price level so that the economic and financial analyses of a project can be readily compared (Jenkins, 1997).

Typically, analysts following the UNIDO (UN Industrial Development Organization) method (Dasgupta and Sen, 1972) or the approach developed by Harberger (1997) use domestic prices at the domestic price level as the numeraire, whereas those who follow the Little-Mirrlees (1979) approach use either domestic prices at the border price level or units of foreign exchange as the numeraire.

While the choice of the numeraire will not affect the use of the NPV as an economic criterion for project selection, it does make a profound difference in being able to undertake a meaningful stakeholder analysis. As commercial transactions in most countries are expressed in units of domestic currency at the domestic price level, the use of this numeraire greatly facilitates communication for the analysis to be carried out from all the different points of view, including that of the economy.

Integrating economic and financial values

When the economic values and corresponding financial values of variables are expressed in terms of the same numeraire, the economic value of any input or output can be expressed as the sum of its financial value and the externalities which cause the financial and economic value to differ. These externalities may be created by such things as taxes, subsidies, environmental impacts, changes in consumer and producer surplus or public good externalities. These externalities either accrue to, or have an impact on, different groups in a society.

If each of the variables are discounted using a common discount rate (usually the economic discount rate), it must be the case as well that the NPV of the economic net benefits is equal to that of the financial net benefits, plus the present value of the externalities.³

Major increase in supply of non-traded good

To illustrate the relationship between the economic, financial, and stakeholder impacts of an investment, let us first consider a project that creates a significant increase in the supply of a non-traded good in a market which is free of all taxes or other distortions. An example would be an increase in the supply of drinking water at a lower cost to consumers, hence, expanding total consumption, while also reducing the quantity supplied by higher cost plants or by water vendors.

In this case, the economic value of the additional drinking water will be equal to the financial value that people pay for it plus the consumer surplus that the consumer will receive because of the increased availability of the water at a lower cost, less any loss in profits that the other sources of supply (for example, water vendors) might suffer because of the availability of the additional lower priced supply.

In summary, when there are no distortions in a market, the gross value of a non-traded good or service from a project which causes a significant change in the price of the good or service can be decomposed into:

$$\begin{aligned} \text{Economic value} \\ \text{of output} &= \text{financial value of the output} \\ &+ \text{gain in consumer surplus} \\ &- \text{loss in producer surplus} \end{aligned}$$

While this example assumes there is a market-determined price before and after the project, this relationship also can be illustrated by a road improvement project that produces a public service where there is no market price. In this case, the economic value of the service provided by the project is the difference between the time, operation and road maintenance costs (per vehicle-mile) before the project, and the sum of these costs per vehicle-mile after the project.

In this case, the operators of the vehicles are both the consumers and a major part of the production of the transportation service. Hence, the benefit they see will be the sum of both the consumption and production effects that accrue to them.

Non-traded good sold into a market with a unit tax

We will now introduce a distortion into the market. Suppose we add a unit tax⁴ to the price of the non-traded good being produced by the project. Now an expansion of the consumption of the project's output will also cause an increase in tax revenues accruing to the government from this unit tax.

In this case, the gross economic value of the output produced by the project is equal to its financial value plus the change in government tax revenues plus the change in the consumer surplus minus the loss in producer surplus. Consumers gain as a result of the lower price of the good. Producers lose because of the

fall in price and reduced production; and the government collects more tax revenues, because of the expansion in the quantity consumed due to the lower price.

In summary, when the market is distorted by a unit tax,⁵ the gross economic value of the output of a project can be expressed as:

$$\begin{aligned} \text{Economic value} \\ \text{of output} &= \text{financial value of output} \\ &+ \text{change in government tax} \\ &\quad \text{revenues} \\ &+ \text{increases in consumer} \\ &\quad \text{surplus} \\ &- \text{loss in producers surplus} \end{aligned}$$

An importable input that is subject to tariff

In contrast to our previous examples of domestic goods that are not traded internationally, suppose we have a project that increases the use of an imported input that also is subject to import duties.

Because it is an importable good, this increase in demand will lead to an equal increase in the quantity of the item imported into the country. The financial cost of the additional imports is equal to the world price plus the amount of tariff charged when it is imported. The economic cost, however, is equal to the world price of the item converted into local currency by the economic exchange rate.

This economic exchange rate is often greater than the market exchange rate because of the tariffs, indirect taxes, and export subsidies in the economy. When this is the case, the difference between the economic and market exchange rates is referred to as the foreign exchange premium, and can be expressed as a percentage of the market exchange rate.

This premium measures the externality, usually tariff revenues foregone, from the use of foreign exchange to purchase the input. Tariff and taxes would have been paid if the foreign exchange required for this purchase had been used to purchase other imports. In comparing the economic and financial values of an imported input, this premium is an offset to the tariff revenues paid by the project when it imports these inputs.

The net distributional impact on the government is the difference between these two effects. The

An integrated analysis helps ascertain whether promoters might face difficulties in implementation, whether the authorities could be pressured to accept a bad project, or the project is likely to face risks in its sustainability

government gains revenue as a result of the imposition of the tariff, but loses revenue because of the reduction in the availability of foreign exchange to be used elsewhere in the economy, hence causing a reduction in tax revenues. (In the case in which the foreign exchange premium is created by import quotas, those who otherwise would have been able to get the additional import licenses would have been the beneficiaries of the premium on the foreign exchange.)

In summary, for the case of an importable good subject to a tariff, the economic cost of the input can be expressed as:

$$\begin{aligned} \text{Economic cost of} \\ \text{importable input} = & \text{financial cost} \\ & - \text{gain to government from} \\ & \quad \text{tariff revenues paid on} \\ & \quad \text{purchase of item} \\ & + \text{loss in government revenues} \\ & \quad \text{because of foreign exchange} \\ & \quad \text{premium on foreign exchange} \\ & \quad \text{used to purchase this input} \end{aligned}$$

Applications of an integrated analysis

If each of the values for the input and output variables that make up a project are broken down into their economic, financial and distributional components, the end result will be that the project's economic NPV will be equal to the NPV of the financial outcome of the project, plus the present value of a series of distributional impacts on the various stakeholders of the project.

The three cases presented here illustrate how the estimation of shareholder impacts are carried out and how the distributional analysis can be conducted for a range of project types. The output of an integrated analysis will help to ascertain whether the project promoters are likely to face difficulties in project implementation, whether the authorities are likely to be pressured to accept a bad project, or whether the project is likely to face risks in its sustainability.

Case 1: Paphos Holiday Complex

The first case we consider is the Paphos Holiday Complex (Andreou *et al*, 1989). This is a project that was both innovative and showed great promise. Although it passed both the financial and economic criteria for implementation, it was never built because of local opposition from the other hoteliers in the area. The stakeholder analysis provided a strong indication that this opposition would arise unless the government provided some form of compensation.

Basic facts

1. The Paphos Holiday Complex was a proposed

five-star hotel resort sponsored by the Cyprus Development Bank in 1990.

2. The project consisted of a main building with 350 rooms and an additional 200 rooms in bungalow-type accommodation. The features of the resort included superior sport facilities, extensive landscaping, low construction density, and exclusive personal service.
3. The Paphos complex targeted the upper-class segment of the West European tourism market, and was expected to out-perform its immediate competitors (five four-star hotels) in comfort and recreational activities. This competitive advantage was considered to be sustainable during the operating life of the project.
4. Because of its competitive edge, the resort was projected to attain a higher occupancy level than its immediate competition, particularly during the low season. In addition, it was anticipated that it would attract a significant number of people from other hotels in the area during the off-season. The project was also expected to be able to charge marginally higher-than-average prices for accommodation and food.
5. Implementation of the project was planned to take four years, with the resort being fully operational in 1994. The project cost at the 1990 price level was estimated at 19.2 million Cyprus pounds (cp).
6. Hotel operating expenses are broken down into eight categories (food, beverage, departmental, fuel, electricity and water, repairs and maintenance, administration and maintenance, and staff costs). Each of these categories has a fixed- and a variable-cost component. The project staff consists of 370 permanent staff and temporary staff employed during the high season. Payroll costs are the most significant component of the project operating costs.
7. The Paphos Holiday Complex was subject to an income tax rate of 30%.
8. The financial real cost of capital was estimated to be equal to 9.2%.
9. The economic benefits of the project arise from:
 - Incremental guest nights, including:
 - Hotel revenues,
 - Taxes paid by tourists,
 - Foreign exchange premium associated with tourist spending both inside and outside the hotel (at that time Cyprus had a rather high average rate of tariff);
 - Non-incremental guest nights, including the savings from the reduction of the variable costs of competing hotels associated with the non-incremental guest nights.
10. The ratio of the economic exchange rate to the market exchange rate in 1990 was estimated to be 1.14 (as a consequence of the level of tariffs).
11. The economic opportunity cost of capital in 1990 was calculated to be 9.5%.

Table 1. Paphos Holiday Complex financial appraisal (in '000 CP) total investment point of view

	PV@9.5%	1990	...1993	1994	1995	1996	...2004
Revenues from:							
– incremental guest nights	33,307			5,565	6,586	7,316	
– non-increment guest nights	8,818			1,065	1,625	2,042	
Service charges	1,616			248	313	360	
In-use value of assets	2,886						10,282
Total benefits	46,627			6,878	8,524	9,718	10,282
Investment cost	14,069	2,452	6,023				
Operating costs	26,901			4,569	5,197	5,687	
Corporate tax	3,301			69	190	276	
Δ in A/R, A/P and C/B (working capital)	225			244	109	84	(345)
Total outflow	44,496	2,452	6,023	4,882	5,496	6,047	(345)
Net cash flow	2,131	(2,452)	(6,023)	1,996	3,028	3,671	10,627
NPV financial @ 9.2%	2,452						
NPV financial @ 9.5%	2,131						

Note: A/R = accounts receivable
A/P = accounts payable
C/B = cost/benefit

Project outcome

Tables 1, 2 and 3 summarize the financial, economic, and distributive analysis of this hotel project. Finally, a reconciliation is made of the economic outcome of the project with the financial outcome and the expected distributional impacts.

From Table 1 we find that the financial NPV at a 9.2% discount rate is 2.4 million cp. The cash flow after the project is built is projected to be positive in

1994 and continuously positive through 2003. The financial NPV when discounted at the economic discount rate of 9.5% is slightly lower at 2.1 million cp. The NPV is evaluated as of the first year of the project, 1990, with all cash flow expressed in real prices at the price level of 1990.

We can see from Table 2 that the economic appraisal indicates that this project is good for the country. The NPV of the economic outcome evaluated, as of 1990, is 6.9 million cp using a real rate of

Table 2. Paphos Holiday Complex economic appraisal (in '000 CP)

	CF	PV@9.5%	1990	...1993	1994	1995	1996	...2004
Revenues from:								
– incremental guest nights	1.14	37,970			6,344	7,508	8,341	
– non-incremental guest nights	0.35	3,048			349	556	71	
Taxes	1.14	1,648			271	324	363	
Spending outside hotel	0.07	1,176			193	231	259	
Service charges	1.14	1,419			234	280	312	
In-use value of assets	0.98	2,819						10,042
Total benefits		48,079			7,391	8,899	9,985	10,042
Investment cost	0.97	13,777	2,390	6,004				
Operating costs	1.008	27,122			4,611	5,242	5,734	
Corporate tax	-	-			-	-	-	
Δ in A/R, A/P and C/B (working capital)	0.94	211			227	104	80	(322)
Total outflow		41,111	2,390	6,004	4,838	5,346	5,814	(322)
Net benefits		6,968	(2,390)	(6,004)	2,553	3,553	4,171	10,364
NPV economic @ 9.5%		6,968						

Note: A/R = accounts receivable
A/P = accounts payable
C/B = cost/benefit

Table 3. Paphos Holiday Complex: impacts on stakeholders
(in '000 CP)

	PV government @ 9.5%	PV other hotels @ 9.5%
Distributional impacts arising from		
– incremental guest nights	4,663	
– non-incremental guest nights	374	–6,146
Taxes	1,648	
Spending outside hotel	1,176	
Service charge	174	–371
In-use value of assets	–67	
Investment cost	292	
Operating costs	–221	
Corporate tax	3,301	
Δ in A/R, A/P and C/B	14	
Total impacts	11,354	–6,517

Note: A/R = accounts receivable
A/P = accounts payable
C/B = cost/benefit

discount of 9.5%. Again the net benefits to the project were expected to become positive after 1994 and remain positive to 2003. From an economic point of view, this project is expected to contribute positively to the overall growth of the economy.

Table 3 shows the distributional impacts of this project. The values in the table are obtained by subtracting the present value of the rows in Table 1 from the corresponding present values of the rows in Table 2 and decomposing the differences into the various distributional impacts. In addition to the positive impact that this project will have on the owners of 2.1 million cp, we find that the net fiscal impact accruing to the government is a positive 11.4 million cp.

The government gains from this project through a series of taxation impacts. The tourist industry in Cyprus draws tourists from around the world who pay for this service in foreign exchange. There is a foreign exchange premium of 14% which accrues to the government (via tariff revenue) on all incremental sales which are made by this hotel complex. On the non-incremental guest nights we find that there is a slight benefit to the government that comes about because of the higher price people are willing to pay for this hotel over the other hotels in which they would have stayed.

At the same time, there is a significant loss of 6.5 million cp that accrues to the other hotels. This arises because the other hotels in the off-season charge a price that is above their marginal cost of operation for the tourists who are expected to now go to the new hotel. Hence, when the guests leave these hotels and move to the proposed Paphos Holiday Complex, there is a loss of profits to the other hotels, equal to the difference between the prices they were paying to the other hotels and the marginal operating cost of these hotels. The government also obtains indirect taxes from spending which is made outside the hotel, as

well as the corporate income tax being paid by the hotel.

We can summarize the tables as follows:

$$NPV_{eco}^{ECO} = NPV_{eco}^{FIN} + PV_{eco}^{EXT}$$

$$6,968 = 2,131 + (11,354 - 6,517)$$

While this hotel has a positive financial NPV of over 2 million cp, we find that it has two very significant distributional impacts. The government will receive 11.3 million cp, while other hoteliers in the region will lose 6.5 million cp. In a relatively small country like Cyprus, the political pressures that can be exerted by competing hoteliers are very strong. As a result, this hotel was the subject of controversy and has not been built to date.

Although the government could have compensated the other hoteliers for their losses, it chose not to do so, perhaps for very good political-economic reasons. At the same time, the owners of the proposed hotel were not going to make sufficient profit to be able to compensate the other hoteliers.

This integrated analysis of the economic, financial and distribution impacts gives us a very clear picture of the position of the various stakeholders affected by this project. With this knowledge, the analyst could either redesign the flow of benefits and costs to the various stakeholders so the project can go forward, or recommend removing this project from active consideration at an early stage.

Case 2: Jamuna Bridge project

Basic facts

1. The Bangladesh government proposes to build a bridge over the Jamuna River to link East and West Bangladesh (Jenkins and Shukla, 1997).
2. At present, the ferry service is poor, creating delays ranging from one to eight hours for light vehicles to between 30 and 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 (as given by the tolls they are

The knowledge from the integrated analysis allows the analyst either to redesign the flow of benefits and costs to the various stakeholders so the project can go forward, or to recommend removing it from active consideration at an early stage

Table 4. Jamuna Bridge: distribution of project net benefits (billion of 1994 takas)

Light vehicle passengers	Bus passengers	Truckers, producers and consumers of cargo	Power company	Government and aid agencies	Locality	Ferry operators	Total
0.627	1.952	31.094	2.544	-27.701	.457	-1.841	7.132

willing to pay). 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 and was completed ahead of schedule in 1998.

Project outcome

The incremental financial NPV of the bridge project (with the specified set of tolls) as compared to the existing ferry system is a positive 1.07 billion takas (US\$27 million) when discounted by the financial discount rate. When discounted using the economic discount rate, the incremental financial NPV is 0.643 billion takas.

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 incremental real economic NPV of the bridge project is 7.77 billion takas (US\$195 million).⁶

When comparing the economic and financial analysis of this project, we find that the major net beneficiaries are the truckers, the producers and consumers of cargo, the power company and the bus passengers. On the other hand, the Government, aid agencies and the ferry operators lose. Truck operators, 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. Table 4

summarizes the distributive analysis of this project.

We can summarize the analysis of this project as follows:

$$NPV_{eco}^{ECO} = NPV_{eco}^{FIN} + NPV_{eco}^{EXT}$$

yielding,

$$7.77 = 0.643 + 7.13$$

A key feature of this project was the large amount of subsidized financing it received. As a consequence of these subsidies, we find that, from the distribution analysis, the total financial subsidies amounted, in present value terms, to -27.701 billion takas. This is a result of the interest subsidy on the loan (19.888 billion takas), the government grant (2.455 billion takas) and the premium lost on the foreign exchange used to purchase traded goods components of the investment cost of the bridge (5.358 billion takas).

On the other hand, we find that truckers, shippers and consumers are going to benefit from the lower transportation cost of the cargo to the amount of 31.094 billion takas, which is more than the entire investment cost of the bridge.

These results would indicate that, if a tariff structure were redesigned so that the tolls captured more of the benefits received by the consumers and producers of the cargo, little or no subsidy would have been needed to build the bridge. 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 because of a scarcity of resources. Perhaps the overall development impact of these US\$600 million of low-cost loans might have been greater if somewhat less had been provided to the Jamuna Bridge Project, and more were used to subsidize other public investments, such as education and health, where the application of user fees may be more difficult to implement.

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.

Table 5. Makar Port Project financial and economic outcomes (millions of pesos)

	With project	Without project	Incremental
NPV (total investment point of view)	13.4	47.2	(33.8)
NPV (economic point of view)	(101.6)	64.4	(166.0)

Case 3: Makar Port Project

Basic facts

1. Makar Port, located in General Santos City at the northern side of Sarangani Bay, a well-protected bay in Mindanao, Philippines, lies along the main North-South trading axis which skirts Mindanao on its western shore.
2. The objectives of the project are to increase the capacity and improve the efficiency of cargo handling facilities at the port to accommodate future flows (Jenkins and Lorenzo, 1994).
3. The project will cost approximately 635 million pesos.⁷
4. Seventy-five percent of the total project cost will be provided as a grant by the US Agency for International Development (USAID); the other 25% will be provided from a counterpart contribution by the Philippine Government.
5. User fees are charged to cover the cost of running the port.

Project outcome

The results summarized in Table 5 show that the project should not have been recommended using either the financial or economic NPV criterion. The comparison of the with- and without-project situation shows that, on an incremental basis, the project is a waste of economic resources and creates a loss in terms of financial performance. The project, however, was implemented.

This case is of particular interest because the initial appraisal done for USAID was carried out by examining only the combined project and only from a financial point of view. When we consider that particular scenario, we find that the financial NPV is 13.4 million pesos. However, when we look at the financial

Although the projected performance of the Makar Port project is dismal from both an economic and financial point of view, it was implemented, because the users of the project were receiving substantial, positive benefits

Table 6. Makar's distributive analysis of incremental cash flows (millions of pesos)

	Impacts on stakeholders		
	Government	Shipowners/ customers	Total
USAID grant	-402.3		
Other	13.5		
Reduction in ship's waiting time		183.8	
Reduction in animal's weight loss		75.3	
Other		1.4	
Subtotal	-388.8	260.5	-128.5

NPV of the existing facility without the project, it has an financial NPV of 47.2 million pesos, giving us an incremental NPV financial for the new project of -33.9 million pesos. From a financial point of view, this project would not be undertaken by a rational private-sector investor.

The economic analysis shows that the project is a clear disaster. The economic NPV of the combined project is -101.6 million pesos, as compared to the base case (without project) which has an economic NPV of 64.4 million pesos. Hence, the incremental NPV economic is -166.0 million pesos.

Although the projected performance from both an economic and financial point of view is truly dismal, this project was implemented. We might want to ask why? The reason for this is much clearer when we look at the results of the distributive analysis of the project. While both the financial and economic NPVs are negative, we find that the users of this project (as shown in Table 6) are receiving substantial, positive net benefits.

Evaluated using the economic rate of discount, the ship owners and the consumers of the services of this port will receive a total positive NPV of 260.5 million pesos. In effect, shipowners gain 184 million pesos from the savings as a result of reduced ship's waiting time; livestock shippers would save about 75 million pesos from the reduction of animal weight loss, while port revenues generated would be around 1.43 million pesos. Other customers would gain from the competitive nature of the inter-island shipping industry.

The losers of this project are those living in the rest of the country. The Philippine Government is using this USAID grant of 402.3 million pesos to subsidize this project rather than putting it to better use elsewhere, while only 13.4 million pesos came from other sources. Overall, the present value of the externalities is a negative 128.3 million pesos. The incremental financial net cash flow when discounted by the economic discount rate becomes -37.7 million pesos.

The integration of the financial, economic and distributive analysis is expressed as follows:⁸

$$NPV_{eco}^{ECO} = NPV_{eco}^{FIN} + PV_{eco}^{EXT}$$

yielding,

$$-166.0 = -37.7 + -128.3$$

There was no doubt it was strong political pressure that persuaded the authorities to go ahead with the project, even though its overall benefit to the country is negative.

Conclusions

The type of integrated financial, economic and distributive analysis proposed in this paper has a number of advantages for evaluating both public- and private-sector investments. First, it assures that the economic and financial analyses are done in a consistent manner. If the economic and the financial analyses are done correctly, the differences will be equal to a series of distributional impacts that can be identified and measured. Hence, the possibility of error in completing the analysis will be substantially reduced.

Second, the clear identification of the stakeholders and how they will fare as a consequence of a project is a key ingredient in determining the likelihood of its successful implementation, as well as in causing the authorities to consider redesigning the project so that the impact on the stakeholders is more favorable. Although most projects will have negative impacts on some segments of the population, if they are clearly identified and their political strengths assessed, the chances of surprises and stalled implementation may be substantially reduced.

If a project is to be sustainable, it should not be subject to continued political pressure for its suspension. The stakeholder analysis which we undertake through the comparison of the economic and financial outcomes provides us with a clear signal of the groups which are likely to promote and those which will not favor a project. In addition, if the project inflicts a continuous fiscal drain on the public-sector budget, it is likely to be at some risk in terms of its long-term sustainability. Through the identification of the fiscal and stakeholder impacts, we are able to make a more realistic assessment of the long-term sustainability of a proposed investment.

Third, this analysis can also be used to identify the likely impact of the project on the incidence of poverty in particular groups. For example, in the case of the Jamuna Bridge, the consumers and producers of the cargo that will be transported across the bridge will be given a substantial benefit because of the subsidized tolls, which are to be charged on cargo. Similarly, the producers of cargo who use the Mindanao Port may receive some benefits because there will be smaller weight losses by the animals when they are transported to market.

Such an analysis may not address all the questions of a political-economy nature in determining what projects should be selected and implemented, but at least it is a quantitative basis for making judgments as to the attractiveness of the project, and provides the basis for assessing the roots of support and opposition that the project is likely to face.

Notes

1. For a more comprehensive treatment of the fiscal impact of projects see Belli *et al* (1996, chapter 2).
2. This issue has been identified as a major reason for development assistance by the World Bank, see Wolfensohn (1997).
3. This relationship can be expressed as:

$$NPV_e^e = NPV_e^f + \sum PV_e (EXT_i),$$

where NPV_e^e is the NPV economic benefits and costs, NPV_e^f is the NPV 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.

4. The illustration in this case is for a unit tax, but the same results also hold for *ad valorem* taxes imposed on goods or services.
5. The same relationship holds for *ad valorem* taxes and subsidies as for unit taxes and subsidies.
6. In 1994, the exchange rate was 39.8 takas/1US\$.
7. Peso is the Philippine currency and in Year 1 is equal to 0.037 US\$ (1994).
8. The financial NPV (at financial discount rate) is equal to $NPV_{fin}^{FIN} = -33,889$.

References

- A Andreou, G P Jenkins, and S Savvakis (1989), "Tourism, environment and profitability: the case of the Paphos Holiday Complex", HIID Development Discussion Paper #330, Harvard Institute for International Development, Cambridge, Massachusetts, November.
- P Belli, J Anderson, H Barnum, J Dixon, J P Tan (1996), *Handbook on Economic Analysis of Investment Operations* (World Bank, Washington DC).
- P Dasgupta, S A Marglin and A K Sen (1972), *Guidelines for Project Evaluation* (United Nations, UNIDO, New York).
- A C Harberger (1997), "Economic project evaluation: some lessons for the 1990s", *Canadian Journal of Program Evaluation* (Calgary, Canada).
- G P Jenkins (1997), "Project appraisal and the World Bank", *American Economic Review*, May.
- G P Jenkins and P Lorenzo, Jr (1994), "Port rehabilitation and expansion: the Makar Project in the Philippines", Harvard Institute for International Development, Cambridge, Massachusetts, December.
- G P Jenkins and G P Shukla (1997), "Linking East and West Bangladesh: the Jamuna Bridge Project", *The Canadian Journal of Program Evaluation*, special (spring) issue, pages 121-145.
- I M D Little and J A Mirrlees (1979 and 1982), *Project Appraisal and Planning for Developing Countries* (Basic Books, New York).
- W Ward and B J Deren (1991), "Choosing numeraires and decision criteria: practicality and sensitivity", *The Economics of Project Analysis* (The World Bank, Washington, DC) pages 129-138.
- James D Wolfensohn (President, The World Bank Group) (1997), "The challenge of inclusion", address to the Board of Governors, Hong Kong, China, 23 September.