An Economic Framework for Assessing Development Impact

Multilateral institutions such as the International Finance Corporation (IFC) and multilateral development banks such as the European Bank for Reconstruction and Development (EBRD) provide support to private projects in developing nations with the goal of stimulating growth and reducing poverty. The institutions may lend funds directly, provide support indirectly though guarantees, or take equity positions in project companies. As a basis for participation, they need to understand a project’s private and social returns. The private returns can be summarized by the project’s financial rate of return (the FRR, also referred to as the internal rate of return or IRR). The social returns can similarly be summarized by the economic rate of return (ERR), sometimes called the social rate of return. As a financial manager in a company seeking multilateral funding or negotiating with host governments, it is imperative to understand both calculations. By doing so, a financial manager will be better able to predict how a project will be received and, in some instances, will be able to modify the project or supply information that will promote outside assistance and encourage approval.

This note discusses the differences between private and social returns, and describes an economic framework for assessing a project’s ERR. The framework begins by analyzing a project’s impact from the perspective of the project financiers (the private return). The framework then identifies other stakeholders who might be affected, directly or indirectly, by the project, and examines the impact on each group. The overall development impact, the ERR, is the sum of the flows that are used to calculate the FRR and the individual net returns to each of the other stakeholders. This note assumes that readers have a working knowledge of cost-benefit analysis, microeconomics, and basic valuation mechanics.

1 While there has been extensive discussion in the development literature on the differences between working in terms of net present values (NPV’s) and rates of return (such as an ERR or FRR), for the purposes of this note, the differences are not important. At the level of generality of the issues being addressed here, working in terms of rates of return will not be a problem, yet it facilitates exposition.
Private vs. Social Returns

Adam Smith wrote in his 1776 classic, The Wealth of Nations, that a private businessman, worried only about the profitability of his investments, would be guided “as if by an invisible hand” to those actions which are best for society as a whole. If this is true, then why do we need to worry whether an investment is socially beneficial if we know that it is privately beneficial?

While Adam Smith’s insight is the foundation of modern economics, and a foundation to build on, Smith was also the first to note that the result does not always follow. There are several reasons why the profitability of an investment from society’s perspective may differ from the private sector’s perspective. For example, what a firm receives from the sale of its product may be less than the amount paid by the customer because a portion goes to taxes.

In conditions where people are free to decide which transactions they wish to enter into, there are four main reasons why the social returns may differ from the private returns:

- **Taxes, Tariffs, Subsidies, and Other Government Interventions**: Because governments collect taxes, there is a difference between the return the private investor receives and the total returns generated by the project. Similarly, tariffs, subsidies, and other public sector interventions lead to differences between private and social returns.

- **Transaction costs**: Transaction costs may prevent the private investor from collecting a fee for services it provides, resulting in an un-priced benefit to society. For example, an investor may need to build a bridge or upgrade a road to provide access to a new plant. The improved infrastructure helps those who live in the area and use the bridge or road. However, the cost of collecting the toll may exceed the actual toll itself. Nevertheless, society benefits even if the toll is not collected.

- **Externalities**: Non-market effects are known as externalities, and they are not captured in private returns. Externalities include such things as a project’s environmental impacts or its contribution to congestion on local highways. Network effects can also be considered externalities. A firm may work with a supplier to improve the quality of an input. While the improvement helps the firm, suppliers can provide these improved products to other customers. Demonstration effects are yet another type of externality. A project may demonstrate the viability of a new market, technology, or way of doing business, which others can then replicate.

- **Imperfect Markets**: In practice, especially in developing countries, there can be a significant difference between the price paid for a good and the opportunity cost of providing that good. For example, a worker may be paid much more in a modern factory than in a traditional occupation. Active and effective market competition should eliminate such differentials, but product, labor, and capital markets in developing countries do not always function smoothly. The markets can also be relatively “thin,” in that the production of the new plant, or the demand by it for labor or other inputs, can have non-trivial effects on prices.

The Proposed Framework for Assessing Development Impact

A useful approach to working out the overall development impact of a project on society is to sum the estimated net impact on each of the individual groups affected by the project. For a private
sector project, the possible groups or “stakeholders” include: the financiers (those who will earn the private return), employees, customers, producers of complementary products, suppliers, competitors and new entrants, “neighboring” residents, and the rest of society. This classification includes everyone who may be affected whether they are a domestic resident or a foreign entity. In other words, the project’s impact is not limited by national boundaries.\(^2\) The process of assessing the project’s impact on each stakeholder provides a bridge between the traditional cost/benefit analysis and the social analyses utilized by development economists. In practice, projects are likely to affect only a few of the possible groups. One should focus on the groups where the impact is expected to be the greatest.

The list of affected groups helps break up the problem of the overall social impact into more manageable pieces. It also allows one to see the impacts on specific groups. While the overall social return of a project may be positive, the effect on any one group may be negative. As a result, opposition from these groups may arise even though the total social return is positive. Finally, this analysis may suggest whether compensation programs are warranted for those groups hurt by a specific project.

People familiar with traditional economic (sometimes called social) cost/benefit analysis may wonder how the traditional approach, with its focus on shadow prices, relates to the one presented here. The answer is that both, if properly applied, will produce identical answers (see Exhibit 1). But we have found that the 2-stage approach presented in this note is more intuitive especially for students with a business background and those who do not have advanced training in economics.

In traditional economic cost/benefit analysis, the analyst works out the private return based on actual market prices inclusive of taxes, and then calculates the social return using “shadow prices” whenever they differ from market prices. The shadow price reflects the opportunity cost to society of the good or service, and may differ from market prices for any of the four reasons noted above (i.e. taxes and subsidies, transactions costs, externalities, and imperfect markets). In the proposed 2-stage approach, one also uses shadow prices, but calculates the social return in two stages. First, you calculate the private return, as before, with market prices. Then you calculate the additional return to each of the relevant stakeholder groups as the difference between the actual market prices and the opportunity costs.\(^3\)

Exhibit 2 presents a graphical representation of stakeholders who may be affected by the project. The remainder of this section considers the possible impacts on each group. For each group, one must assess the net impacts of building the project relative to a scenario in which the project is not built (the “with investment” versus the “without investment” scenarios). It is very important to be clear and consistent when defining the “without investment” scenario.

\(^2\) Some people define a net return concept for only those people who reside within the national boundaries where the project is located. This concept, labeled the “return to the domestic economy” (RDE), is of particular interest for mining and other natural resource extraction projects. The stakeholder framework developed in this note can, in fact, serve as a first step towards working out the RDE.

\(^3\) To be precise, one should distinguish between the opportunity cost to the individual stakeholder and the opportunity cost to society as a whole. For example, in the case of suppliers, one would distinguish between the opportunity cost to the individual supplier (what the supplier would have received by selling the input to someone else) and the opportunity cost to society of that input. In most cases, however, these costs will be equal, at least to the level of precision needed for this kind of analysis. When the costs are not equal, it is relatively easy to recognize and account for the difference (e.g. cases where a subsidy is provided if the product is sold to one category of user and not another). A more common example would apply in countries where there is a system of unemployment compensation paid by the government. If a worker who was previously unemployed and receiving unemployment compensation is hired by a project, then one should include the savings in unemployment compensation paid as a benefit to the government and the increase in wages above what the worker had been receiving in unemployment compensation as a benefit to the worker.
The Project Financiers

The benefits and costs of the project from the private perspective are depicted in the center of Exhibit 2 as the square box for the project financiers. The stream of net private benefits is the annual total free cash flows generated by the project. The internal rate of return on this stream of earnings is referred to as the FRR, where the FRR summarizes the returns to all capital providers including both debt and equity.

Employees

The employees are depicted in Exhibit 2 as part of the central square because they are directly employed by the project and provide a key input (labor to the project company). The net benefits to employees fall into two categories:

- **The increased wages** (including all benefits such as health, pension, meals, special housing, etc.) employees receive to the extent, and only to the extent, they are greater than what the employees would receive from alternative employment opportunities. In other words, the benefit equals the value above the opportunity cost of labor. Because employees chose to take these new jobs, we typically assume the benefit is positive, or at least not negative.

- The second benefit comes from **training** received as a consequence of employment in the project company. Part of this benefit goes to the company, which is providing the training in order to raise the worker’s productivity. This higher productivity is captured in the private returns (the higher productivity leads to increased output or lower costs). The personal benefit to the worker stems from the increased skills gained from training that can be useful in other jobs. It may be difficult to measure this value, but a reasonable approximation is that the benefit to the worker is equal to the training cost. The benefit here should always be positive, or at least not less than zero.

Customers

Those who consume the project’s goods or services may benefit from access to a product previously unavailable, of better quality, or for sale at a lower price.

- **New good or service:** Consumers benefit if a project provides a good or service that was previously unavailable in the market. The benefit to the consumer equals the price they are willing to pay for the good or service, i.e. the total area under the market demand curve less what they have to pay for it (the market price). Hence, the net benefit to the consumer (the consumers’ surplus) is the triangular area below the demand curve and above the market price line in a simple diagram of supply and demand curves. Consumers’ surplus can be

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4 Free Cash Flow (FCF) equals earnings before interest but after-tax (EBIAT) plus depreciation (non-cash charges), less capital expenditures, and less increases in net working capital.

5 The qualitative direction of these and the other impacts are important to keep in mind. When certain effects cannot be quantified, but are known to be positive, the calculated ERR will be a lower bound on the true return. That is, we know the economic return of the project is at least as high as the calculated return, and is in fact higher but by an undeterminable amount. As discussed below, the impacts on various groups (e.g. workers who choose to be employed at the plant, or consumers who choose to buy the product) are typically positive, but difficult to quantify. The two possible exceptions, also discussed below, are impacts on neighbors from higher pollution levels or greater congestion, and the net impact of taxes, tariffs, and subsidies.
quite significant for certain projects, but it can be difficult to estimate quantitatively because the demand curve is not directly observable.

- **Better quality product**: Consumers clearly benefit from an improved good or service that sells for the same price. This benefit can also be difficult to quantify.

- **Increased supply leading to a lower price for the good or service**: When a project increases the supply of a product facing a downward sloping demand curve, the market price falls. These conditions may hold in developing countries for infrastructure projects or, more generally, for the production of non-tradable goods. One would not expect it to apply to the production of goods that can be imported or exported because the demand curve in these cases is normally flat (the product can be imported or exported at a constant price). But where the conditions do apply, consumers benefit from a lower price. Incremental consumer surplus can be calculated as the area of a triangle equal to: \( \frac{1}{2} \times \text{change in price} \times \text{increase in output due to project} \) (area E in Exhibit 3).

**Producers of Complementary Products**

The project may also benefit producers of complementary goods. A complementary good is one whose value to the consumer increases as the supply of another good increases. For example, consider a gasoline station located near the exit of a new toll road. After building the toll road, demand for gasoline increases and the owner of the gasoline station benefits from increased sales. In general, it is difficult to quantify the value derived from this effect (it depends on an estimate of how far the demand curve shifts upward, but the demand curve is not observable). But, where relevant, the effect is positive.

There may be indirect benefits as well. For example, additional workers now employed in the production of the complementary goods benefit to the extent they receive a wage that is higher than what they were receiving before the project was built. How far one goes to calculate these indirect benefits depends on the project, and on how important they appear to be.

A question to address is why, if the producers of complementary goods benefit, don’t the project sponsors vertically integrate to produce the complementary good? For toll roads, one in fact often sees such vertical integration (i.e. the toll road builder also gets the development rights around the road), and such integration can be critical to the project’s financial success. If such integration exists, the benefits are already included in the FRR calculation. But if integration does not occur, and yet we believe the benefits are large, then why did it not occur? There may be good reasons for this outcome. For example, the organizers of the core project may not have special expertise (core competencies) or other advantages, which the producers of the complementary products might have. Alternatively, the lack of vertical integration may suggest that the benefits may not, in fact, be as large as initially estimated. In this case, it is worth re-checking the basic assumptions.

**Suppliers**

Suppliers to the project enjoy increased demand for the goods or services they provide, and often higher profits. Once again, because the supplier is choosing to sell to the project company, this impact should be positive or at least non-negative. If the increased demand for this particular input leads to a rise in its market price, an attempt should be made to estimate the size of the increased profits, and to include these benefits in the social return. The impact is depicted graphically in Exhibit 4. The project’s suppliers gain a net amount equal to the area E. This value is equal to the
area of a simple triangle: \( \frac{1}{2} \) \text{times} \ the \ change \ in \ the \ price \ (a \ rise) \ \text{times} \ the \ amount \ purchased \ by \ the \ project \ of \ this \ input.

There may also be increased wages (again, beyond what they could receive under alternative employment) of the additional workers employed by the suppliers, which should be counted if significant. If there is information and it appears to be important, the chain can continue to the suppliers of the suppliers, and so on. In practice, however, such indirect impacts rapidly diminish in importance to the point where it is no longer worthwhile to estimate them.

Aside from the simple increase in demand generated by backward linkages, project managers often assist their suppliers in producing better quality or cheaper products by providing assistance in managerial or organizational skills, technology, finance (e.g. trade credit), and so on. This assistance may be especially clear when the project entity is taking the initiative in developing a network of new suppliers (e.g. the suppliers of car parts to a car plant, or of sugar cane to a sugar mill). The actions assist the core project (already reflected in the project’s profits and its FRR), but benefit the suppliers as well. While it may be difficult to determine the value to the supplier of this benefit, one should try to estimate it if it is likely to be significant.

The impact on suppliers is an example of a backward linkage, while the impact on customers (who may themselves be producers, using the product as an input to something they are making), as well as on producers of complementary products, are examples of forward linkages. Development economists have argued that linkages, both forward and backward, are among the most important sources of development impact.

Competitors and New Entrants

In contrast to suppliers, competitors may see a reduction in demand and thus a lower price for their product as a result of a new project. Such increased competition is not a loss, however, from the point of view of society as a whole. Consumers benefit from the lower prices in an equal and offsetting amount.

On the other hand, competitors may benefit from demonstration effects and network effects. The project might demonstrate, for example, the feasibility and profitability of a new technology, a new way of managing or organizing business, or the viability of some market segment, which competitors can copy. These demonstration effects may also encourage new firms to enter the market. Additionally, competitors may benefit from the network effects with suppliers. For example, a new hotel may work with local farmers to grow fresh fruits and vegetables of a type and quality needed in its restaurants. Competing hotels and restaurants may then benefit from the improved inputs.

Neighbors

The category “neighbors” refers to the impacts a project has on the surrounding community other than through some market-intermediated effect (i.e. an unpriced transaction). These impacts may result from environmental externalities, new or improved infrastructure, and other interactions the firm has with the community.

There is normally some impact on the environment. It may be positive or negative, depending on what would have happened in the “without investment” counterfactual case. For example, if the project involves building a new factory, the effects can be negative and should be taken into account.
However, if the new factory is relatively clean (by utilizing new technology) and displaces an older, dirtier plant, the net environmental impact may be positive.

A new project may also lead to negative effects through infrastructure congestion. The cost of additional congestion imposed on the surrounding community should be counted as part of the project’s social cost. Alternatively, a project may build or improve the availability of infrastructure such as roads, water, and power networks. Neighbors may benefit from the increased availability of this infrastructure, and may either pay nothing for it (e.g. a new road with no toll) or pay a price that is below what it is worth to them. If the project paid for the new infrastructure, then the costs of the infrastructure as well as the benefits to the project itself are included in the FRR. However, for the ERR, the benefits to the neighbors should also be counted. Note that if the host government paid for the infrastructure, then the cost should be included in the project’s costs, with the government expenditure counted as a subsidy if the project is not otherwise charged (see below).

Finally, there may be other impacts on the surrounding community. Large firms often contribute to the local community by funding scholarship or training programs, building schools or community centers, or by making available on-site facilities and services (such as medical care) to community members. It is often difficult to measure the value of such community programs, but a reasonable assumption is that the benefits are at least equal to the cost of providing the services. This assumption helps bound the size of the potential benefits.

Rest of Society

Under the category “Rest of Society”, one would include the effects of taxes, subsidies, tariffs, and other government interventions.

- **Profit Taxes:** The profit generated by a project equals the revenues minus the costs, but a portion of the profits goes to the government in the form of taxes. For the private return (the FRR), one calculates the free cash flows after any profit taxes due; for the social return (the ERR), one includes the profit taxes as part of the overall return. This calculation has nothing to do with what the government does with the tax revenues. To the extent taxes are redistributed in a way that benefits society, there may be second or third order effects that should be counted, if they are meaningful. The decision on whether to calculate these multiplier effects should be approached pragmatically.

- **Value-Added, Sales, and Excise Taxes:** Government collection of value-added taxes (VAT) will rise if overall sales increase. If, however, the product is imported, and the project simply leads to a substitution for imports, then total sales on the market (from domestic and imported sources) will be unchanged. Because value-added taxes are normally charged on imports (and at the final price of the import inclusive of any import tariffs charged), the mere substitution of domestic for imported supply has no effect on overall VAT receipts. However, if the increased supply on the market due to the project leads to an increase in overall sales, then VAT receipts will rise by an amount equal to the VAT rate times the increase in sales. This amount must be included in the ERR calculations. Sales and excise taxes should be treated similarly. Of course, this analysis assumes equivalent effectiveness in collecting taxes, which may not always be true.

- **Subsidies:** The cost of providing subsidies to the project, while a benefit to the private owner (and hence included in the FRR) should clearly be subtracted in the ERR calculation. If the subsidies were used to construct associated infrastructure or if the infrastructure was
provided in kind, then the costs should be subtracted in the ERR calculation, net of any associated benefits accruing to others (e.g. neighbors who enjoy access to the infrastructure).

- **Import Tariffs, and Export Taxes or Subsidies:** If the project produces or makes use of goods that are subject to tariffs (or non-tariff barriers), then the private prices will differ from the social costs. The cost to society is the world price at which the goods can be imported: the tariffs are a transfer to the government and the domestic price will rise by the amount of the tariff due to competition (or, more precisely, the restriction on competition from potential imports). Thus for goods produced by the project, the social revenue stream should be reduced by the portion of the price that is accounted for by the tariff (or the tariff equivalent for non-tariff barriers). For inputs, the costs should also be adjusted to reflect the existence of tariffs. Similar adjustments should be made to incorporate the effects of export taxes or subsidies.

**Considerations When Applying The Framework**

The following list of issues should be considered when applying this framework:

- **Information Gap:** Not all the costs and benefits generated by a project can be qualified easily or accurately. For example, there may be no way to calculate the value of demonstration effects. And even when an estimation procedure is possible, the effort may not be worthwhile. In such cases, a description of the impact may be sufficient. In these instances, it is most important to understand the direction of the impact. If the non-quantified impacts are positive, then the actual ERR will be greater than the calculated ERR. And if the calculated ERR is already sufficient to warrant project approval, then one has the information required to make a decision.

- **Discount Rate:** This note does not discuss the appropriate discount rate for societal cash flows. The concept of one “social” discount rate may be too simplistic and does not properly weigh the risk associated with various flows. Yet assigning multiple discount rates to each component of flow can be arbitrary. Needless to say, there has been a lot of disagreements among development economists about what discount rates to apply and when. As a rule of thumb, the IFC generally uses a 10% real discount rate for social cost/benefit analysis.

- **Shadow Foreign Exchange Rates:** Traditional social cost/benefit analysis, as developed in the 1960s and 1970s, paid a great deal of attention to the proper determination of shadow foreign exchange rates. The shadow foreign exchange rate is an estimate of the opportunity cost to society of using or producing foreign exchange, and differs from the actual rate paid for foreign exchange when foreign exchange markets are subject to capital controls. Distortions of this kind were far more prevalent during the 1960s and 1970s than they are today. As a result, the issue is less important now. However, in certain countries and in certain circumstances, it may still be worthwhile to estimate and apply a shadow exchange rate. Probably more important today than adjusting the current market exchange rate for possible distortions is to use suitable projections of real movements in the market exchange rate over time to account for the possibility that the real exchange rate will depreciate or appreciate relative to current rates.

- **Efficiency Versus Equity:** The ERR calculation focuses on the efficiency of resource allocation, and treats the returns to each group equally. It does not address the question of whether society should place a higher value on the net benefits to certain groups (e.g. the poor) than
the net benefits going to others (e.g. the rich). The analysis outlined in this note provides a first step towards incorporating such distributional issues, as one could apply different weights to the net returns of the different groups identified. But determining the weights is fundamentally a political decision.

- **Accounting for the Future:** Project analysis is generally undertaken prior to the start of a project to assist in the decision on whether to proceed. It should incorporate any changes that are expected to take place, such as price changes (including expected changes in the real exchange rate, or in the real wage rate). More fundamentally, standard project cost/benefit analysis is static in the sense that it takes into account only what is known or expected for the future as of a certain date. It does not take into account the fact that one will know more in the future. That is, standard cost/benefit analysis does not take into account the value of flexibility inherent in current actions. But taking account of the embedded optionality raises an entirely new set of issues that are beyond the scope of this note.
Exhibit 1  Two Equivalent Methods for Calculating Social Returns

Assumptions: Suppose a project produces a service that requires only one input, labor. Further assume that there is only one price (the price of labor), where the opportunity cost (the shadow price) differs from the market price observed. Assuming there are no taxes and no other distortions in this simple example, we can calculate the private returns and then calculate the social returns in either of two ways: the traditional approach or the proposed 2-step approach. Under both approaches, the private returns equal:

$$\text{Private Returns} = \text{Actual Revenues} - \text{Actual Wages Paid}$$

Method 1: The Traditional Approach for Calculating Social Returns:

Social Returns  = Actual Revenues – Wages at Opportunity Cost

where:

Wages at Opportunity Cost = Wages at Shadow Price of Labor

Method 2: The Proposed 2-Step Approach for Calculating Social Returns

Social Returns  = Actual Revenues – Wages at Opportunity Cost

= Actual Revenues - Wages at Opportunity Cost

+ (Actual Wages Paid - Actual Wages Paid)

re-arrange the terms:

= (Actual Revenues - Actual Wages Paid)

+ (Actual Wages Paid - Wages at Opportunity Cost)

= Private Returns + Gain to Labor

where:

Private Returns = Actual Revenues - Actual Wages Paid

Gain to Labor = Actual Wages Paid – Wages at Opportunity Cost

6 This example assumes there is a difference between the market price of labor and the opportunity cost of labor, but that the opportunity cost to society equals the opportunity cost to the worker (see footnote c above). It also assumes the output (the service) is sold in a competitive market.
Exhibit 2 Project Stakeholders

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Source: Casewriters.
Exhibit 3  Gain to Consumers Resulting From the Increased Supply Coming From the Project

![Graph showing supply and demand]

**Consumer Surplus:**
- Initial = A  
- Final = A + B + E  
- Change = B + E

**Producer Surplus:**
- Initial = B + C  
- Final = C + D  
- Change = D - B

Total Change = E + D

Area D = Value to Producer, but is already included in the FRR flows

Area E = Gain in Consumer Surplus not offset by decline in Producer Surplus

Source: Casewriters.
Exhibit 4  Gain to Suppliers Resulting from the Increased Demand for Inputs by the Project

![Graph showing the relationship between price and quantity]  

<table>
<thead>
<tr>
<th>Consumer Surplus:</th>
<th>Producer Surplus:</th>
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<tr>
<td>Initial = B + C</td>
<td>Initial = D</td>
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<tr>
<td>Final = A + B</td>
<td>Final = C + D + E</td>
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<tr>
<td>Change = A - C</td>
<td>Change = C + E</td>
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Total Change = A + E

Area A = Value to Project Entity, but is already included in the FRR flows

Area E = Gain in Producer Surplus of the supplier not offset by decline in Consumer Surplus

Source: Casewriters.
Endnotes


