

6

Calculating the Net Benefits to the Referent Group

Introduction

The referent group in a social benefit-cost analysis is unlikely to consist only of the equity holders of the private firm, at one extreme, or everyone affected by the project in the whole world, at the other extreme. The costs and benefits to the former group were analysed in Chapter 4, and those to the latter group in Chapter 5. In this Chapter we analyse the costs and benefits to the referent group. Our client will tell us what the referent group is, and she will normally nominate all groups affected by the project (sometimes referred to as “stakeholders”) who are resident in her State or country, including effects on government receipts or payments: in the ICP Case Study discussed in the Appendices, “Thailand” is the referent group.

As noted in Chapter 1 it is sometimes easier to specify who is *not* a member of the referent group than to identify all the relevant sub-groups; in the ICP Case Study, of those groups who benefit or incur costs, the foreign equity holders in the firm and the foreign financial institution which lends to the project are not members of the referent group. This means that the aggregate net benefits to the referent group can be calculated by subtracting the net cash flows experienced by these two groups from the efficiency net benefits of the project discussed in Chapter 5. Thus we can open Part 5 of our spreadsheet – the Referent Group Benefit-Cost Account – by entering the efficiency net benefits row less the equity holder’s and foreign financial institution’s net benefit rows. (See Figure A6.2, Table 5, row 4, page 142.) We have now completed the aggregate referent group (or “social”) BCA.

We also want a disaggregated analysis of the net benefits to the referent group for two reasons. The main reason is that our client will want information about the distribution of net benefits or costs among sub-groups because this will influence the project’s attractiveness to the political decision-maker. The other reason is that if we enumerate all the sub-groups affected by the project, measure the net benefits to each, sum them and get the same answer as our aggregate measure, we can be fairly sure the analysis is correct, or, at least, is internally consistent. It is very common to omit some benefits or costs in the first run of the analysis and having a check of this kind is extremely useful.

How to Identify Referent Group Benefits in Practice

It is sometimes difficult to identify all the sub-groups within the referent group who are affected by the project, and it is not unusual for some group or category of net benefit to be

omitted from the first draft of the Referent Group Benefit-Cost Account. Fortunately, as noted above, this kind of error can readily be detected within our project appraisal framework by the existence of a discrepancy between the measure of aggregate referent group net benefits computed by subtracting non-referent group benefits from the efficiency net benefits and the measure computed by aggregating the net benefits to various sub-groups within the referent group.

In principle there is a four-way classification of net benefits, illustrated by Table 6.1, distinguishing net benefits which accrue to the referent and non-referent groups respectively, and net benefits which either are, or are not properly measured by market prices.

Table 6.1 Classification of Net Benefits

	Net Benefits Accruing to:	
	Referent Group	Non-Referent Group
Net Benefits Measured by Market Prices	A	B
Net Benefits not Measured by Market Prices	C	D

Areas A, B and C correspond to the specific example illustrated by Figure 1.3 in Chapter 1. However, area D is a further potential category of net benefit which may be encountered in

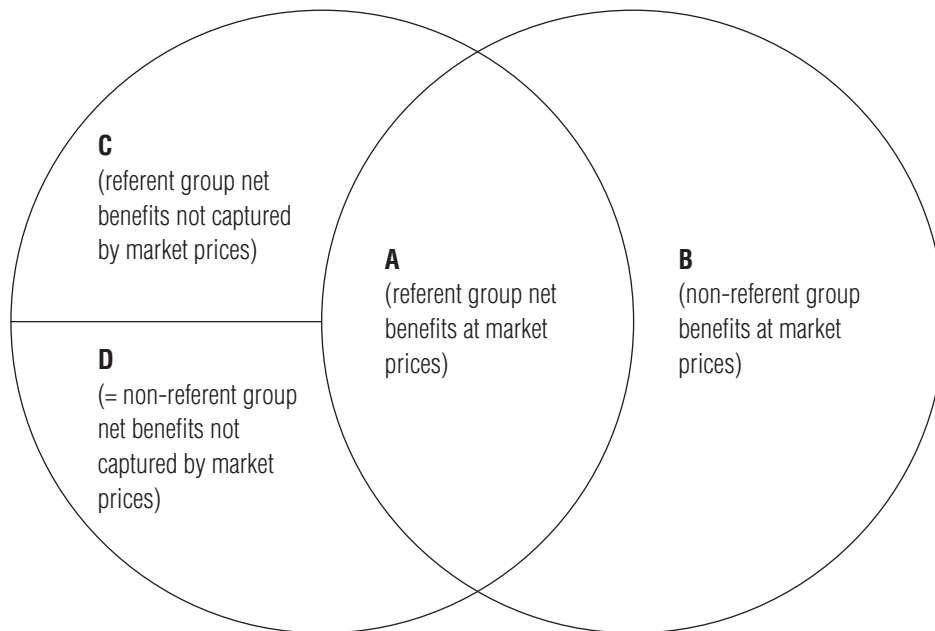


Figure 6.1 The Relationship between Referent Group and Non-referent Group Net Benefits at Market Prices and Efficiency Prices

general. Figure 1.3 can be updated to include this additional category, and the revised diagram is presented here as Figure 6.1.

The difference between Figures 6.1 and 1.3 is that **Area D** has been added. This allows for a situation where there are net benefits (costs) to non-referent group members arising because of divergences between market prices and efficiency prices. For example, if a negative externality, pollution, arising from a project is borne by stakeholders outside the referent group, perhaps across a state or international boundary, the cost of this should be included in the efficiency benefit-cost analysis (now defined as area $A+B+C+D$), but subtracted along with area B from the efficiency cash flow to derive the aggregate referent group cash flow (area $A+C$).

Table 6.1 and Figure 6.1 can be used to consider the categories of referent group and non-referent group net benefits in the ICP Case Study discussed in the Appendix. In this example:

- **Area A** contains the net benefits to the domestic financial institution and the government, which constitute the balance of the net benefits to referent group members identified by the project analysis at market prices.
- **Area B** contains the returns to foreign equity holders and foreign lenders, which constitute that part of the project net benefits, as measured by market prices, which accrues to non-referent group members.
- **Area C** contains referent group net benefits in the form of rents to the domestic insurance company, the electricity utility, and labour, which are external to the project. Since there are no non-market effects, such as increased pollution, referred to in the case study, this category is not included in the referent group analysis in this case. However, in general, non-marketed effects would be included in Area C or D of Figure 6.1.
- **Area D** is empty because, as noted above, in the case study there are no non-referent group net benefits not measured by market prices.

The scope for error in identifying referent group net benefits can be narrowed by following some simple guidelines as to where to expect to find referent group net benefits. There are two main ways of identifying referent group benefits: one way is to follow the tax and financing flows generated by the project, and the other is to examine the shadow-prices used in the analysis. Financial flows distribute the net benefits of a project among private sector stakeholders, and between the private and public sector. The public sector is normally part of the referent group, but some private sector agents, such as foreign firms, may be excluded. Shadow-prices identify differences between private and efficiency valuations of inputs or outputs, and the differences may represent benefits or costs to members of the referent group.

Consider first changes in tax or subsidy flows as a result of the project. The project may result in changes in direct tax revenues, such as income or company tax, and changes in indirect tax revenues, such as tariffs and sales taxes. When these tax revenue changes are transfers among members of the referent group they net out of the aggregate referent group net benefit calculation: in Example 5.4 in the previous chapter, for example, the project resulted in a reduction in diesel fuel consumption which provided a gain to government in the form of reduced fuel subsidies paid, and a loss to farmers in the form of reduced fuel subsidies received.

When changes in tax flows involve transfers between the referent group and the rest of the world, on the other hand, the referent group experiences a net gain or loss, depending on the direction of the flow. The net benefit is recorded as a gain or loss to the domestic government.

Now consider the private financing flows associated with the project. We have seen in Chapter 5 that these flows are not relevant to the efficiency benefit-cost analysis as they simply shift benefits and costs from one group to another. However they are relevant to the construction of the referent group benefit-cost account if they transfer net benefits between members and non-members of the referent group, or between members of the referent group, but are not relevant if they transfer net benefits among non-referent group members. An example of a financial flow which transfers net benefits between members and non-members of the referent group is provided by a domestic bank which lends money to a project to be undertaken by a foreign company. The bank advances a loan and then receives a series of interest payments and principal repayments. The initial loan is a cost to the domestic financial institutions section of the referent group benefit-cost account, while the interest and principal repayment flows are benefits. The present value of the net benefit to this sub-group will vary depending on the interest rate charged on the loan and the discount rate used in the social benefit-cost analysis.

Another clue to the existence of referent group net benefits lies in the rationale for shadow-pricing. Suppose that an input, such as labour, is assigned a shadow-price lower than its market price. This tells us that the wage exceeds the opportunity cost of labour, and, hence, that the labour employed on the project is receiving a net benefit. Since domestic labour is one of the sub-groups within the referent group, that net benefit should be recorded among the referent group net benefits. Now suppose that an input was assigned a shadow-price in excess of its market price. For example, labour to be diverted from a monopoly or monopsony to work on the project would be shadow-priced at the value of the marginal product of labour. The fact that the shadow-price of the input exceeds the market price tells us that the project is imposing a loss somewhere in the economy and this loss will generally be experienced by a member of the referent group. In the present example, there is a loss of profit to the domestic monopoly or monopsony which is part of the referent group.

We have considered cases where the shadow-pricing of inputs may help us identify categories of referent group net benefits. The same applies to the shadow-pricing of outputs. For example, suppose that a project produces an import-replacing good. Instead of valuing output at its market price, which is the border price plus the tariff, we shadow-price it at the border price. When a project output is shadow-priced at a lower price than the market price this generally indicates a loss to some members of the referent group. In the example of an import-replacing project, the loss is incurred by the government in the form of a reduction in tariff revenue. Now suppose that a project output is shadow-priced at a price above its market price. This will generally indicate a benefit to members of the referent group. An example is influenza vaccinations which may command a price in the market, but will have a social value in excess of the individual willingness to pay for them because, in addition to the benefit they confer on the buyer, they reduce the chance of others catching the disease. While it is difficult to place a dollar value on a non-marketed service of this nature, it is nevertheless clearly a referent group net benefit.

In summarizing the relationship between shadow-prices and referent group net benefits, we can conclude that where the market price of an input exceeds (is less than) its shadow-price, there are likely to be referent group benefits (costs); and where the market price of an output exceeds (is less than) its shadow-price, there are likely to be referent group costs (benefits). Table 6.2 summarizes this simple rule and provides an example of each of the four cases.

Table 6.2 Using Shadow-prices to Identify Referent Group Benefits and Costs

	INPUT	OUTPUT
MARKET PRICE GREATER THAN SHADOW-PRICE	BENEFIT TO OWNER OF THE INPUT e.g. Otherwise unemployed labour	COST TO GOVERNMENT OR PUBLIC e.g. Loss of tariff revenue, cost of pollution generated by use
MARKET PRICE LESS THAN SHADOW-PRICE	COST TO PREVIOUS USER OF THE INPUT e.g. Monopoly or monopsony firm	BENEFIT TO PUBLIC e.g. Value of vaccination to those other than the vaccinated

Some Examples of Referent Group Net Benefits

We now extend some of the examples considered in Chapter 5 to identify and measure benefits or costs to members of the referent group. We identify Project, Efficiency, Referent Group and Non-Referent Group net benefits. Private net benefits, reported in Table 3 of the benefit-cost analysis spreadsheet (see Figure 1.4 in Chapter 1), are a subset of project net benefits, and are not identified in the following discussion.

It will be seen in the following examples that government receipts and outlays sometimes appear in Area A, which includes that part of referent group net benefit which is captured by market prices, and sometimes in Area C, which includes referent group net benefits not captured by market prices. Market prices are gross of indirect taxes and net of subsidies, whereas as noted in Chapter 5, in the presence of distortionary taxes or subsidies, the analysis of efficiency benefits may be based on prices either gross or net of taxes or subsidies, depending on whether an output or an input is being valued, and depending on whether the commodity meets additional demand or satisfies existing demand from alternative sources, or whether the input is in addition to existing supply or is diverted from alternative uses. In consequence the project analysis at market prices will sometimes overvalue or undervalue outputs or inputs from an efficiency viewpoint and the required correction will be entered in Area C of Figure 6.1 showing the distribution of net benefits.

A further point to note is that when government enters the private market to commission production of goods and services, it does so because the private market in these goods and

services is either non-existent or imperfect. This means that the revenue the firm receives from the government is related to the cost of production of the commissioned commodity, rather than to the value in use. Value in use is entered in Area C, along with any other non-market effects. To avoid double-counting of project benefits the government payment to the private firm is also entered in Area C. Thus it appears as a positive in Area A and a negative in Area C and cancels out in the efficiency analysis when Areas A and D are summed. The efficiency analysis then accounts for the project benefit in Area C and the project cost, measured at market prices, in Area A.

Example 6.1: A Minimum Wage (based on Example 5.1)

A domestic firm hires \$100 worth of labour at the minimum wage and constructs a walking track for which it is paid \$110 by the government. No fee is charged to access the track, and it has a present value of \$120 to consumers. The labour would otherwise be unemployed and would be engaged in non-market activities valued at \$50. The efficiency benefit-cost analysis tells us that the efficiency NPV of the project is \$70: the present value of the output (\$120) of the project less the present value of the opportunity cost (\$100 worth of labour shadow-priced at 50% of the wage). We now enumerate the sub-groups comprising the referent group: the domestic firm; government; labour; and consumers. The net benefits to each group are, respectively, \$10 (profit), -\$110 (expenditure), \$50 (labour rent), and \$120 (use value). The aggregate net benefits sum to \$70 which corresponds to the result of the efficiency analysis.

The example illustrates the simple premise on which the disaggregated analysis is based: if a project has an aggregate net benefit of \$70 some groups, whether referent or not, must be receiving the benefits and incurring the costs of that project; the sum of the net benefits to all groups must equal the aggregate net benefit. In the example above, all groups affected by the project are members of the referent group, and hence the sum of referent group net benefits equals the aggregate net benefit.

Using the categories and symbols presented in Table 6.1, this example can be summarised as follows:

$$\text{Project net benefit (A+B)} = \$10$$

$$\text{Efficiency net benefit (A+B+C+D)} = \$70$$

$$\text{Referent Group net benefit (A+C or (A+B+C+D) - (B+D))} = \$70$$

$$\text{Non-referent Group net benefit (B+D)} = \$0$$

Distribution of Net Benefits

A=\$10 Profits to firm (\$110 - 100 = \$10)	B=\$0 None
C=\$60 Rent to labour (\$100 - 50 = \$50) Benefits to Users (\$120) Loss to Government (-\$110)	D=\$0 None

Example 6.2: A Maximum Price (based on Example 5.3)

The State Government hires a computer programmer from another State for a month, at a cost of \$200, which is \$50 more than she would normally expect to earn, and pays \$100 for the accommodation of the programmer in a rent-controlled apartment with a market value of \$125. The programmer revises some of the government's programs leading to a cost saving of \$400. The referent group is defined as the residents of the State. The efficiency benefit is \$400 and the opportunity cost is \$275 – the wage forgone by the programmer plus the market value of the apartment – so that the efficiency net benefit is \$125. The net benefits to the referent group are the efficiency net benefits less the net benefits to the non-referent group; in this case the programmer is not part of the referent group and her net benefit of \$50 is subtracted from efficiency net benefits to give \$75. Two sub-groups within the referent group are affected by the project: the government has a net benefit of \$100 and potential renters of the rent-controlled apartment lose \$25. The sum of these disaggregated referent group benefits (\$75) equals the aggregate measure as required.

Using the categories and symbols presented in Table 6.1, this example can be summarized as follows:

$$\text{Project net benefit (A+B)} = \$100$$

$$\text{Efficiency net benefit (A+B+C+D)} = \$125$$

$$\text{Referent Group net benefit (A+C or (A+B+C+D) - (B+D))} = \$75$$

$$\text{Non-referent Group net benefit (B+D)} = \$50$$

Distribution of Net Benefits

A=\$100	B=\$0
Net Benefits to Government Department [\$400 - (200+100) = \$100]	None
C= -\$25	D=\$50
Loss of Rent to potential renters (\$25)	Rent to labour (\$200 - 150 = \$50)

Example 6.3: An Indirect Tax – a Tariff on Imports (based on Example 5.4)

A domestic firm proposes to import \$100 worth of gadgets for use in a manufacturing project. The \$100 includes the c.i.f. (landed) value of the imported goods of \$75 plus \$25 in tariffs. Other costs are \$200 for skilled labour, and the resulting output will sell on the domestic market for \$400. The efficiency net benefit is given by the value of the output less the opportunity costs of the inputs – \$75 worth of imports and \$200 worth of skilled labour – giving a net value of \$125. In this example there are no non-referent group net benefits. The members of the referent group are the government, gaining \$25 in tariff revenue, and the firm, gaining a profit of \$100.

Let us alter this project to one which produces a good which is currently imported – an import-replacing project. Suppose that the project uses \$200 worth of skilled labour to produce

output valued on the domestic market at \$400. Domestic consumers could obtain that same quantity of output from abroad at a cost of \$300 c.i.f. plus \$100 tariff. The efficiency net benefits are the value of the output at the c.i.f. price, \$300, less the opportunity cost of the skilled labour, giving a net value of \$100. Two sub-groups of the referent group are affected: the firm makes a profit of \$200 and the government loses tariff revenue of \$100 because of the import replacement. Since there are no non-referent group beneficiaries, the sum of referent group net benefits (\$100) equals the total efficiency net benefit.

Using the categories and symbols presented in Table 6.1, this latter example can be summarized as follows:

$$\text{Project net benefit (A+B)} = \$200$$

$$\text{Efficiency net benefit (A+B+C+D)} = \$100$$

$$\text{Referent Group net benefit (A+C or (A+B+C+D) - (B+D))} = \$100$$

$$\text{Non-referent Group net benefit (B+D)} = \$0$$

Distribution of Net Benefits

A=\$200 Net Profits to Firm (\$400 - 200= \$200)	B=\$0 None
C= -\$100 Tariff Loss to Government (\$100)	D=\$0 None

Example 6.4: A Subsidy (based on Example 5.5)

The government spends \$100 on constructing wheat silos, the services of which are supplied free to users, which results in farmers saving \$75 worth of diesel fuel at the subsidized price. The subsidy paid on that quantity of fuel amounts to \$25. In an efficiency net benefit analysis the saving in fuel is valued at its unsubsidized cost, reflecting the opportunity cost of the inputs required to produce it, so the efficiency net benefit is zero. In terms of referent group benefits, the farmers benefit by \$75 and the government incurs costs of \$100, but benefits by \$25 in reduced fuel subsidies. The sum of the referent group net benefits (\$0) equals the total efficiency net benefit.

Using the categories and symbols presented in Table 6.1, this example can be summarized as follows:

$$\text{Project net benefit (A+B)} = -\$25$$

$$\text{Efficiency net benefit (A+B+C+D)} = \$0$$

$$\text{Referent Group net benefit (A+C or (A+B+C+D) - (B+D))} = \$0$$

$$\text{Non-referent Group net benefit (B+D)} = \$0$$

Distribution of Net Benefits

A= -\$25	B=\$0
Net Benefits to Farmers (\$75)	None
Project Cost to Government (-\$100)	
C= \$25	D=\$0
Government's saving on subsidies (\$25)	None

Example 6.5: A Regulated Utility (based on Example 5.6)

A foreign company proposes to construct a smelter at a cost of \$100 which will use \$50 worth of power at the current price. The output of the smelter will be worth \$400 on the world market and the company will pay \$100 in tax. The cost of producing the extra power is \$30. The efficiency net benefits are given by the value of output, \$400, less the opportunity cost of inputs – \$100 construction cost plus \$30 power cost – giving a net value of \$270. The net benefits of the referent group, which excludes the foreign firm, are the efficiency net benefits less the firm's after-tax profit of \$150, giving a total of \$120. The government and the power producer are the only referent group members affected, and their net benefits consist of \$100 tax and \$20 profit respectively.

Using the categories and symbols presented in Table 6.1, this example can be summarized as follows:

Project net benefit (A+B) = \$250

Efficiency net benefit (A+B+C+D) = \$270

Referent Group net benefit (A+C or (A+B+C+D) – (B+D)) = \$120

Non-referent Group net benefit (B+D) = \$150

Distribution of Net Benefits

A= \$100	B=\$150
Taxes paid to Government (\$100)	Profit to Foreign Company (\$400 – 150 – 100=\$150)
C= \$20	D=\$0
Profit on power supplies (\$50 – \$30)	None

Example 6.6: Monopoly Power (based on Example 5.7)

A domestic company has been appointed the country's sole supplier of cellular phones, which require skilled labour to produce. The government is considering establishing a factory to produce computers, which require the same type of skilled labour. Domestic skilled labour resources are fully employed, and skilled labour cannot be imported. As a monopoly the phone

producer maximizes profit by hiring labour to the point at which its marginal revenue product equals the wage. However the value of the marginal product of labour (its opportunity cost) is higher than this; in fact, it can be shown that the $VMP = MRP[1/(1 - 1/e)]$, where VMP is the value of the marginal product of labour, MRP is the marginal revenue product and e is the elasticity of demand for the product, expressed as a positive number, at the current level of output of phones.

Suppose that, under the proposed computer project, the demand elasticity is 1.5 (we know it must exceed 1 since marginal revenue falls to zero as demand elasticity declines to 1); this means that an additional \$100 worth of skilled labour used in phone production results in an extra \$300 worth of output. Suppose that the proposed computer plant would employ \$100 worth of skilled labour and produce \$300 worth of computers. In the efficiency benefit-cost analysis we cost the labour at \$300 because, under the assumption of full employment, the labour is diverted from phone production and \$300 is the value of its marginal product in that activity, and we find that the net value of the project is zero. In terms of disaggregated referent group net benefits, the proposed computer operation earns a profit of \$200, but this is offset by a \$200 fall in the profits of the phone company.

Using the categories and symbols presented in Table 6.1, this example can be summarized as follows:

Project net benefit (A+B) = \$200

Efficiency net benefit (A+B+C+D) = \$0

Referent Group net benefit (A+C or (A+B+C+D) – (B+D)) = \$0

Non-referent Group net benefit (B+D) = \$0

Distribution of Net Benefits

A= \$200 Profits to Computer Firm (\$300 – 100=\$200)	B=\$0 None
C= -\$200 Losses to Telephone Company (-\$200)	D=\$0 None

Example 6.7: Monopsony Power (based on Example 5.8)

A domestic company which produces fabricated metal for the export market is the main employer in a remote town. Because the company has monopsony power in the labour market, it maximizes profit by restricting its hiring to drive down the market wage: it hires labour to the point at which the marginal factor cost (the addition to cost as a result of hiring an extra unit of labour) equals the value of the marginal product of labour (the addition to revenue as a result of selling the extra output on the world market). It can be shown that the marginal factor cost, $MFC = W(1+1/e)$, where W is the market wage and e is the elasticity of supply of labour at the current level of employment. Suppose that the labour supply elasticity is 1 (it can generally take any positive value) then \$100 worth of extra labour adds \$200 to the value of

output. Suppose that the government proposes establishing a factory which will use \$100 worth of local labour to produce output of some other good valued at \$300. In the efficiency benefit-cost analysis the labour is costed at \$200, on the assumption that it is diverted from the monopsony's workforce, and the net value of the project is found to be \$100. In terms of referent group net benefits, the proposed factory earns a profit of \$200 which is partially offset by a \$100 reduction in profit to the company already operating in the town.

Using the categories and symbols presented in Table 6.1, this example can be summarized as follows:

$$\text{Project net benefit (A+B)} = \$200$$

$$\text{Efficiency net benefit (A+B+C+D)} = \$100$$

$$\text{Referent Group net benefit (A+C or (A+B+C+D) - (B+D))} = \$100$$

$$\text{Non-referent Group net benefit (B+D)} = \$0$$

Distribution of Net Benefits

A= \$200 Profits to new company (\$300 - 100)	B=\$0 None
C= -\$100 Losses to existing company (-\$100)	D=\$0 None

Further Examples

To complete the discussion of possible combinations of categories of project net benefits, two further examples follow.

Example 6.8: Where the Project and Efficiency Net Benefits are the Same

A local firm engages a foreign contractor to assist with the upgrade of an existing plant. The foreign contractor is paid a management fee at the going international rate of \$300. The firm spends a further \$500 on new technology, purchased abroad at the current world price. The result is an increase in the firm's output of exports, sold at the going world price, equal in value to \$1200. The firm pays \$100 additional taxes to government and shares the remaining profit 50:50 with the foreign contractor, who is not considered as part of the referent group. In this case the project net benefit is \$400, and the private net benefit to the local firm after tax and profit sharing is \$150. As all market prices relevant to the project reflect opportunity costs, and there are no non-marketed effects, the efficiency net benefit is also \$400. The aggregate referent group benefits are \$250: government receives \$100 in taxes and the local firm's equity holders receive \$150:

$$\text{Project net benefit (A+B)} = \$400$$

$$\text{Efficiency net benefit (A+B+C+D)} = \$400$$

Referent Group net benefit $(A+C \text{ or } (A+B+C+D) - (B+D)) = \250

Non-referent Group net benefit $(B+D) = \$150$

Distribution of Net Benefits

A=\$250	B=\$150
Profits to local firm (\$1200 – 800 – 150 – 100)	Profits to foreign contractor [50% x (\$1200 – 800 – 100)]
Taxes to Government (\$100)	
C= \$0	D=\$0
	None

Example 6.9: Where there are Market and Non-Market Non-Referent Group Net Benefits

A farmer invests \$400 in an irrigation project, including a new pump from an inter-state supplier on credit for \$200. He employs some local casual labour for \$100, and an inter-state irrigation consultant for \$150. The value of his output of fruit at domestic prices increases by \$800, but the project causes \$10 in lost output due to reduced water flow to downstream users. He repays the credit to the pump supplier with \$20 interest, and pays another \$30 in taxes. The opportunity cost of the local labour is \$50 and the opportunity cost of the inter-state consultant is \$100. The value of the farmer's increased output at world prices is \$750, which is the value at domestic prices less the tariff on imports of fruit. Assuming that all inter-state parties are non-referent group members, and that his additional output of fruit replaces imports, the calculation of net benefits is as follows:

Project net benefit $(A+B) = \$150$

Efficiency net benefit $(A+B+C+D) = \$190$

Referent Group net benefit $(A+C \text{ or } (A+B+C+D) - (B+D)) = \120

Non-referent Group net benefit $(B+D) = \$70$

Distribution of Efficiency Net Benefits

A= \$130	B=\$20
Profits to Farmer (\$800 – 400 – 100 – 150 – 20 – 30=\$100)	Interest to inter-state supplier (\$20)
Taxes to Government (\$30)	
C= -\$10	D=\$50
Rent to local labour (\$100 – 50=\$50)	Rent to inter-state consultant (\$150 – 100= \$50)
Losses to downstream users (-\$10)	
Loss of tariffs to government (\$750 – 800= -\$50)	

Lessons from the Examples

What these examples show is that a proposed project can have two sorts of effects: efficiency effects resulting from the reallocation of scarce resources; and distributional effects determined by property rights as well as market imperfections, government interventions and distortions. The efficiency benefit-cost analysis measures only the efficiency effects of a project, whereas the referent group benefit-cost account measures the distribution of benefits among the referent group (and non-referent group) members. Leaving aside non-marketed effects for the present, members of the referent group experience benefits and costs mainly through changes in the levels of tax/transfer payments or private rents (the difference between the private and social perspective on rent is examined later in the discussion of the case study in the Appendix to this Chapter).

A rent is a payment made to a factor of production in excess of the payment required to keep it in its current use: economic profit and wages in excess of opportunity cost are examples of rents. The net benefits of a project – the value of its output less its opportunity cost – are shared out in the form of changes in rents or taxes: the sum of the changes (whether positive or negative) in the levels of the various kinds of rent and taxes equals the net value of the project from an efficiency perspective. However, not all those affected by changes in levels of rent or taxes are members of the referent group and an important role of the Referent Group Benefit-Cost Account is to detail changes in the levels of these payments accruing to that group.

The term “transfer” is often used to refer to changes in the levels of rents or tax receipts: the reason is that these changes simply transfer the real net benefits of the project among various groups. While the changes in these receipts or payments are very real to those affected, from the point of view of the economy as a whole they are purely pecuniary: in other words, their sole function is to distribute the project’s marketed net benefits. No matter how complicated and involved the set of transfer payments is, the sum total of the net benefits to all the groups affected must equal the net benefits of the project as a whole.

Worked Example: Referent Group Analysis of National Fruit Growers’ (NFG) Project

In Chapter 5 it was found that NFG’s orchard project was unlikely to be considered worthwhile from an overall economic efficiency perspective. However, this does not necessarily mean that the project is not worthwhile from the perspective of the relevant Referent Group – the people of Black Valley where NFG’s orchard is located. Indeed, you now learn that NFG is not a locally owned company. It is based in another State across the Kingsland River, in Goldsville. It is expected that NFG will remit all its after-tax earnings there. Furthermore, the money borrowed for the project and NFG’s overdraft facility are both with the Goldwealth Bank based in Goldsville. As you are required to appraise this project from the perspective of the people of Black Valley, you would not include NFG or the Goldwealth Bank as part of the referent group.

The Referent Group consists of all project beneficiaries and losers other than those identified above. It will be assumed that the labour employed by NFG, the landowners who rent the land to NFG, and the fishers whose catches will be affected by the project all live in Black Valley. Thus, in summary, the Referent Group, in this example, consists of:

- i. the government who receives the taxes and duties and pays the subsidies;
- ii. the landowners who rent out their land to NFG;
- iii. the labour NFG employs who earn wages;
- iv. the downstream fishers who lose some income because of the run-off from the orchard.

The next step in the analysis of the NFG project is to calculate the total Referent Group net benefits. We can do this in two ways. We can simply subtract the net benefits to non-referent group members from the efficiency net benefit estimate; in the example this is done by subtracting the cash flows on NFG's equity after tax (Private Cash Flow) and on bank debt (see Figure 4.3 in Chapter 4) from the total Efficiency Cash Flow (Figure 5.14 in Chapter 5). However, this will provide us with only the aggregate Referent Group net benefit, which is insufficient if we want to know how part of the project's benefits and costs is distributed among the different sub-groups within the Referent Group. The alternative method is to calculate the benefits and costs to each of the four sub-groups identified above and to add these up. As a consistency check, the two methods should provide the same aggregate net benefit stream. This is demonstrated in Figure 6.2.

In Figure 6.2 row 4 derives the aggregate Referent Group cash flow as a residual by subtracting from the Efficiency Cash Flow the cash flows of the two non-referent groups: NFG and Goldwealth Bank. The rest of the spreadsheet derives the respective referent group benefits and costs from the key input data in Figure 5.13, where information on taxes, subsidies, duties, opportunity cost and external cost is provided. Note that rent to landowners is calculated by subtracting the opportunity cost (zero) from the amount paid, and similarly, rent to labour is found by subtracting labour's opportunity cost (20% of the wage) from the wage actually paid. Also note that import duties on imported machinery, vehicles and spare parts as part of fixed and working capital are included as revenues to government when the project is undertaken. Import duties forgone on the used equipment and working capital in year 20 are treated as a reduction in benefits to government.

What then is the bottom line? It might appear from the IRR (Cell C18) that the Referent Group does very well – the IRR is 66%. However care is required in interpreting this estimate; note also that the Referent Group NPVs are all *negative*! Why is this the case? The reason is that the signs of the Referent Group's cash flow are reversed in this instance as compared with those of a normal investment project; the cash flow begins with a positive sign in year 0 and thereafter is negative, with the exception of the last value. This corresponds to a situation of a loan from the borrower's perspective. In this case it is as if the Referent Group receives an initial cash inflow (loan) of \$51.4 thousand in year 0, and then makes a series of cash payments (loan repayments) starting off at \$40.7 thousand in year 1 and levelling off at \$9.5 thousand over the latter years. In this instance the cost of the "loan" is 66% per annum.

The only reason why the project is seen as being profitable from a private investor's standpoint (as was shown in Chapter 4) is because it is heavily subsidized and the costs

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T		
1	NFG Case Study: Referent Group Analysis Table																				
2	EFFICIENCY Net Benefits Group Cash Flow (NFG-Banks)																				
3	Year 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4	Net Present Value	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
5	Distribution by Group																				
6	Government	-0.6	-0.5	-0.4	-0.3	-0.2	-0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
7	Landowners	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8	Labour	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Downstream Fishers	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
10	Referent Group	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
11	Non-Referent Group	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	Net Present Value	-0.7	-0.5	-0.4	-0.3	-0.2	-0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
13	IRR	0%	18%	16%	14%	12%	10%	8%	6%	4%	2%	0%	-2%	-4%	-6%	-8%	-10%	-12%	-14%	-16%	-18%
14	Reaggregated Net Benefits	0%	18%	16%	14%	12%	10%	8%	6%	4%	2%	0%	-2%	-4%	-6%	-8%	-10%	-12%	-14%	-16%	-18%
15	Government	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1	-124.1
16	Landowners	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7
17	Labour	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
18	Downstream Fishers	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0	-76.0
19	Total Referent Group	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9
20	Non-Referent Group	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 6.2 NFG Case Study: Referent Group Analysis Table

imposed on the fishing industry are not borne by the investor, NFG. The people of Black Valley would be unlikely to support this project given the availability of loans at lower interest rates than 66% per annum.

The left hand bottom corner of the spreadsheet shows the distribution of the project's net benefits among the Referent Group stakeholders (and the non-Referent Group). At a discount rate of 10% we see that the two major losers are: the government (\$124.1 thousand); and the downstream fishers (\$76 thousand). The gainers are: the landowners (\$21.7 thousand); and labour (\$34.7 thousand). If each dollar's worth of gains or losses to each stakeholder group is valued equally, the losses clearly outweigh the gains and the government will not support the project: NFG will not qualify for the subsidies. If the government does support it, the implication is that it values the interests of the gainers much more highly than the interests of the losers. The important question of the distribution of a project's gains and losses is dealt with in Chapter 11.

To summarize the results of the whole analysis it is useful to return to the multiple-account framework introduced in Chapter 1, and developed further in this Chapter, showing how any project's efficiency net benefits can be allocated among the four categories as shown in Figure 6.3. Note from Figure 6.3 that the direct tax flow is captured in the measure of project

A (+\$92.6) Government (Direct taxes)	B (+\$7.8) +\$196.4 NFG -\$188.6 Bank
C (-\$236.3) -\$216.7 Govt. (Ind. taxes) -\$76 Downstream fishers +\$21.7 Landowners +\$34.7 Labour	D (\$0) None

Figure 6.3 Distribution of Efficiency Net Benefits (\$ thousands, @ 10% discount rate)

net benefit (A+B), but that some of the indirect tax and subsidy flows relating to inputs are not. The reason for this is that project net benefit is calculated on the basis of market prices which are gross of indirect taxes and subsidies on inputs, i.e. the price to the firm is the market price. This is why input tax and subsidy flows appear under Category C in Figure 6.3.

In this example there are no output taxes or subsidies. Since the project analysis is based on market prices, which are gross of output tax or net of subsidy, the price to the firm is lower or higher than the market price of output, depending on whether an output tax or subsidy is being considered. In this case the output tax or subsidy flows would not be included in Category B but would be included in the project analysis summarized by Categories A and B. Hence they would have to be included in Category A in Figure 6.3 in the same way as direct taxes.

To recap:

- Category A shows the Referent Group net benefits that are captured by market prices
- Category B shows the Non-Referent Group net benefits captured by market prices
- Category C shows the Referent Group net benefits that are *not* captured by market prices
- Category D shows the Non-Referent Group net benefits that are *not* captured by market prices
- Categories A+B+C+D = Aggregate Efficiency Net Benefits (-\$135.9 NPV at 10% discount rate) as calculated in Chapter 5, Figure 5.14
- Categories A+B = Project Net Benefits (market prices) (+\$100.4) as calculated in Chapter 4, Figure 4.2
- Categories A+C = Referent Group Net Benefits (-\$143.7) as calculated in Chapter 6, Figure 6.2

APPENDIX TO CHAPTER 6: Referent Group Net Benefits in the ICP Case Study

Let us now turn to the analysis of the referent group net benefits in the case study. The first step is to enumerate those groups likely to be affected. Following the procedure outlined above, we first calculate the total referent group net benefit by subtracting the flows of funds on ICP's equity and the foreign credit to derive the cash flow for Total Referent Group as shown in the top row of the spreadsheet in Figure A6.1.

We then need to identify and quantify the various components of the referent group net benefit, beginning with tax flows: government will be affected through changes in various kinds of tax revenues (business income taxes and tariffs in this case). We then consider inputs or outputs which have been shadow-priced: labour will be affected through provision of jobs for people who would otherwise be unemployed; public utilities will be affected through sale of extra power at a price exceeding production cost; and the domestic insurance sector is affected by charging in excess of cost for an insurance policy. Finally, we examine financial flows: domestic financial institutions will be affected through provision of a loan.

Each of these sub-groups should be represented by a sub-section in Part 5 of the spreadsheet analysis as shown in Figure A6.1. For example, in the government sub-section we enter rows representing each category of input or output which has consequences for government tariff revenue: for example, forgone tariff revenue as a result of import replacement, and additional tariff revenues as a result of imports of various kinds of capital goods and raw materials; and we also enter a row reporting changes in business income tax revenues. We also need a row representing domestic labour and one representing the electricity utility. In the financial institutions sub-section we need a row representing the domestic bank and another row representing the domestic insurance company. As the various categories of referent group net benefits are calculated, it can be seen that what is recorded as a cost in one part of the benefit-cost analysis can appear as a benefit in another. For example, the wage bill is a cost to the firm, but a portion of the wage bill is a net benefit to domestic labour; taxes and tariffs are costs to the firm but benefits to the government; and the power bill is a cost to the firm, but a portion of it is a net benefit to the domestic utility. The loan received from the domestic bank is a benefit to the firm but a cost to the bank, and the interest and loan repayments are costs to the firm but benefits to the bank.

We now proceed to fill in the rows we have provided for the various referent group benefits and costs over the life of the project. As in the case of Parts 2 to 4 (Figures A4.2, A4.3 and A5.1) of the spreadsheet, all entries are cell addresses taken from the data reported in Part 1 (Figure A4.1). Tariff revenues obtained when the project imports an input, or forgone when the project output replaces an import, are entered in their various categories. Business tax revenues forgone when project costs are written off against other company income, or obtained when the project makes a profit are entered for each year. Similarly, half of the firm's power bill is entered as a benefit as it represents extra profit for the electricity utility. The amounts advanced by the domestic bank are entered as costs, and the interest and principal repayments are entered as benefits. Finally, the amount paid to the domestic insurance company is entered as a benefit.

The merits of treating the full amount of the insurance premium as a referent group benefit can be debated: we are treating the payment as if it were a straight transfer but of

ignoring any non-monetary net benefits such as improved living conditions). From a social or economy-wide point of view, if the value of the worker's marginal product is zero in the subsistence activity, the rent generated by the move from subsistence activity to participation in the labour market is measured by the whole of the worker's wage in the city. The reason for this is that there is no cost to the economy, in the form of reduced output, as a result of a worker leaving the subsistence activity. In summary, while the worker's private net benefit is the difference between her remuneration in the two activities, the social or economy-wide net benefit is the value of the additional output in the market activity.

How would this difference between private and social rents show up in the referent group analysis? We have already assigned the difference between the wage and the value of what the workers would have taken home as the result of subsistence agriculture as a net benefit to unskilled workers on the project. If withdrawing these workers from subsistence activities has no effect on the value of total output of such activities, the remaining subsistence workers experience an increase in the quantity and value of the produce they take home: in effect the "subsistence cake" is divided among fewer participants and each gets a slightly larger share. If subsistence workers are part of the referent group then we would need to add a new row in the spreadsheet to record the value of this net benefit.

Assuming that the total value of subsistence output has not changed as a result of some workers quitting subsistence activity to work on the project, the amount of the transfer to subsistence workers is measured by the share of subsistence output which would have been received by the workers who left to participate in the ICP project. When we add this amount to referent group net benefits, it turns out that, while the wage bill is a cost to the firm, it is a net benefit to the referent group, some of which goes to workers employed on the project, and the balance to those who remain in subsistence activity. In the efficiency analysis the zero opportunity cost of a marginal amount of subsistence labour would be recognized by shadow-pricing the labour at zero, thereby increasing the efficiency net benefits by the amount paid to unskilled labour, as compared with the situation in which project labour is diverted from market activity.

Once the various rows representing referent sub-group benefits and costs have been filled in, the rows can be aggregated to give a summary statement of the net benefits to the referent group as a whole. The row representing this aggregate value should be identical in every year to the Total Referent Group net benefits we obtained in the top row of Figure A6.1 by subtracting non-referent group net benefits from the efficiency net benefits of the project. If an error has occurred it can usually be readily identified: if the two net benefit streams are different in each and every year then a whole category of net benefits may have been omitted or an inappropriate shadow-price adopted. On the other hand if the difference is in one year only there may be some problem with costing capital or with some other irregular payment or receipt. In their first attempt at the case study the authors noted a discrepancy in the last year of the project: they forgot to allow for the import-replacing effect on tariff revenues of running down inventory, thereby replacing some annual imports of materials and spare parts.

Once the net benefit stream to the referent group has been calculated, a summary figure is normally obtained by calculating a net present value (NPV), or, sometimes but infrequently, an internal rate of return (IRR). The net benefits to sub-groups within the referent group can

also be summarized in this way, although it should be noted that for some groups, such as domestic labour, there may be no project costs and hence no IRR to be computed. The NPV is the appropriate measure at this level of disaggregation, and it has the advantage of corresponding to the notional sums specified under the potential Pareto improvement criterion to be taken from beneficiaries or paid to those who bear the costs in order to maintain pre-existing levels of economic welfare.

We have now completed the basic benefit-cost analysis of the ICP Case Study. Figure A6.2 assembles Tables 1–5, which were derived in Chapters 4–6, in the form of a single spreadsheet. As discussed below this spreadsheet can be used for various types of sensitivity analysis. It will also serve as a basis for comparison when we consider more advanced topics in Chapters 7–10. At the end of each of these Chapters an amended version of Figure A6.2 incorporating an additional feature of a benefit-cost analysis will be presented to illustrate how some advanced concepts are accounted for in practical analysis. In each case the reader will be invited to compare the amended Figure with the base case described by Figure A6.2.

The Discount Rate

In calculating net present values a range of discount rates, incorporating the domestic government bond rate, should be used. Since no attempt was made in the case study to inflate benefits or costs, a real rate of interest is required and the use of a single real rate of interest involves the implicit assumption that all prices change at the general rate of inflation. We use a range of discount rates in the analysis for two reasons: first, as to be discussed in Chapter 10, there may be valid arguments why the market rate of interest should be replaced by a shadow (or social) discount rate, and we may not know at this stage what that rate should be; and, second, we want to see how sensitive the NPV is to the choice of discount rate (if it is very sensitive this compounds the difficulty posed by the uncertainty about the appropriate discount rate). Sensitivity of the NPV to the values of other key variables, such as the exchange rate, can also be ascertained at this stage. Because of the way we have constructed the spreadsheet, with all entries in Parts 2 to 5 being composed of cell addresses in Part 1, all we have to do is to change the value of a variable, such as the exchange rate, in Part 1 to have the spreadsheet recalculate the NPV.

Comparing Alternative Scenarios

In addition to seeing how sensitive the project NPV is to the choice of discount rate and other key variables, we want to see how sensitive it is to the project design. This is part of the benefit-cost analyst's pro-active role in helping to design the best project from the client's point of view. We have just completed the analysis of the basic project, but in discussions with the client we asked a whole series of questions: what about varying the location of the project; what about varying the tax regime – offering various types of concessions to make the project more attractive to the foreign firm. We can take the base case analysis just completed and edit

it to analyse the project NPV and the referent group benefits under various alternative scenarios. For example, suppose that the firm was allowed to import raw materials free of import duty: we change the raw materials tariff rate in its cell entry in Part 1 to zero, save the spreadsheet as a new file, and we now have a complete set of results under this scenario. Suppose that the government insisted that the firm locate in a depressed area; this would involve additional costs which can be entered in Part 1 and edited into Parts 2 to 5 to give a set of results under this scenario, and so on.

It would also be possible to develop the basic analysis to determine the effects on the firm and the referent group of various ownership structures for the project. For example, the domestic government may acquire equity in the project, either by purchasing it or simply by being given it in return for allowing the project to proceed. The project might be developed as a joint venture with members of the referent group contributing both equity capital and management expertise, or the domestic government might acquire all of the equity in the project and obtain the foreign firm's expertise under a management contract.

While it is very easy to generate results for a range of scenarios identified to be of interest to the client, it is not so easy to present the results in a readily digestible way. There is a danger in swamping the client with detail so that the wood cannot be seen for the trees! While Chapter 14 discusses in detail the presentation of the results of a benefit-cost analysis, we consider some issues relevant to the case study here.

A useful way to proceed is to think in terms of trade-offs. Some scenarios will be more advantageous to the firm – those involving tax and tariff concessions, for example – and some will be more advantageous to the referent group – location of the plant in a depressed area, for example. A *Summary Table* can be prepared which shows how the net benefits to the various parties change as we move from one scenario to another. For example, scenarios could be ranked in descending order of referent group net benefits; this may correspond loosely to ascending order of foreign firm benefits. Project feasibility is established by some cut-off value for the net benefits of the private agent (the individual, the firm, the farm or whatever); scenarios ranked lower than this will simply not occur. This establishes the feasible set of scenarios from among which the client can elect to choose the project design offering the highest aggregate referent group net benefits, or perhaps the preferred distribution of net benefits among referent group members. While it is useful to think in terms of trade-offs – one group getting more at the expense of another group – there are “win-win” situations where the additional net benefits of a more efficient project can be shared to the benefit of all groups.

Where there are trade-offs among referent group members, the distribution of net benefits among stakeholder groups could be a criterion for comparing and ranking alternatives. This might be the case where the government is committed to raising the economic welfare of disadvantaged groups such as residents of deprived regions, or particular socio-economic classes. The disaggregated referent group analysis provides important information for assessing the distributional implications of the project. The issue of distribution objectives and how these can be incorporated explicitly into benefit-cost analysis is discussed further in Chapter 11.

Further Reading

The further reading suggested for Chapter 5 is also relevant for Chapter 6. The term “referent group” does not appear to be used much in contemporary studies of benefit-cost analysis. An early use of this term in discussion of the principles of benefit-cost analysis occurs in V. W. Loose (ed.), *Guidelines for Benefit-Cost Analysis* (British Columbia Environment and Land Use Secretariat, 1977).

Exercises

1. A local firm hires \$150 of unskilled labour at the minimum wage and constructs a walking track, for which it is paid \$180 by the State Government. The firm incurs no other cost, apart from the wage bill, in constructing the track. The government is to charge a fee to users of the track, and the present value of the fees paid is estimated to be \$100. Consumers place a net present value (net of the fees and any other costs incurred) of \$50 on the track’s services. The labour employed to construct the track would otherwise be unemployed, and the value of its non-market activity is estimated to be \$50.
 - (i) calculate the net benefit of the project to each member of the referent group:
 - (a) the firm
 - (b) consumers
 - (c) labour
 - (d) the government;
 - (ii) using the appropriate shadow-price of labour, calculate the efficiency net benefit of the project.

2. The State Government hires a computer programmer from another State for a month at a cost of \$30,000, which is \$10,000 more than she could earn during that period in her home State. The State Government also pays \$1000 for accommodation in a rent-controlled apartment with a market value of \$1200. The programmer edits some programs and saves the State Government \$40,000. Assuming the referent group consists of residents of the State:
 - (i) calculate the net benefit to the referent group
 - (ii) using the appropriate shadow-prices, calculate the net benefit of the project according to an efficiency benefit-cost analysis.

3. A foreign firm is considering a project which has, at market prices, a present value of benefits of \$200 and a present value of input costs of \$130. If the project goes ahead, tax with a present value of \$50 will be paid to the host country, domestic labour which would otherwise be unemployed will be paid wages with a present value of \$50 for working on the project (the wage bill is included in the input costs referred to above), and pollution caused by the project will reduce the value of output elsewhere in the host country’s

economy by \$10. Assuming that the owners of the foreign firm are not part of the referent group, and that the opportunity cost of unemployed labour is 50% of the market wage, what are the net present values generated by:

- (i) the project benefit-cost analysis;
 - (ii) the private benefit-cost analysis;
 - (iii) the efficiency benefit-cost analysis;
 - (iv) the referent group benefit-cost analysis?
4. For the ICP Case Study prepare a summary table of net benefits (discounted at 8%) in the same format as Figure 6.3.