

TRANSPORT NOTES

TRANSPORT ECONOMICS, POLICY AND POVERTY THEMATIC GROUP



THE WORLD BANK, WASHINGTON, DC

Transport Note No. TRN-10

January 2005

Notes on the Economic Evaluation of Transport Projects

In response to many requests for help in the application of both conventional cost benefit analysis in transport and addressing of the newer topics of interest, we have prepared a series of Economic Evaluation Notes that provide guidance on some of issues that have proven more difficult to deal with.

*The **Economic Evaluation Notes** are arranged in three groups. The first group (TRN-6 to TRN-10) provides **criteria** for selection a particular evaluation technique or approach; the second (TRN-11 to TRN-17) addresses the selection of values of various **inputs** to the evaluation, and the third (TRN-18 to TRN-26) deals with specific **problematic issues** in economic evaluation. The Notes are preceded by a **Framework** (TRN-5), that provides the context within which we use economic evaluation in the transport sector.*

The main text of most of the Notes was prepared for the Transport and Urban Development Department (TUDTR) of the World Bank by Peter Mackie, John Nellthorp and James Laird, at the Institute for Transport Studies (ITS), University of Leeds, UK (The draft text of Note 21 was prepared for ITS by I.T. Transport Ltd). TUDTR staff have made a few changes to the draft Notes as prepared by ITS. Funding was provided from the Transport and Rural Infrastructure Services Partnership (TRISP) between the Department of International Development (DFID) of the Government of the United Kingdom and the World Bank.

The Notes will be revised periodically and we welcome comments on what changes become necessary. Suggestions for additional Notes or for changes or additions to existing Notes should be sent to rcarruthers@worldbank.org

RELATIONSHIP BETWEEN FINANCIAL AND ECONOMIC EVALUATIONS FOR DIFFERENT TYPES OF PROJECT

INTRODUCTION

Appraisal can be undertaken from different perspectives, depending on the objectives of the commissioning body. The key choices are:

- Business case – requires a commercial perspective;
- Appraisal for Government – usually considers both
 - social perspective, and
 - fiscal perspective.

A **commercial or financial appraisal** focuses on the gains and losses to one organisation, typically a firm or an agency of government. It is philosophically different from a social appraisal and yields different results, yet it should always be possible to reconcile a financial appraisal with the economic one for the same project. The common elements shared by both types of appraisal (including the demand forecasts and assumptions about pricing, taxation and economic background) provide the links between the two.

Social appraisal is the broadest and can be used to show how the (narrower) appraisals for business, government and citizens aggregate up to the social level. An alternative, rather old-fashioned, approach to social appraisal is to disregard some costs and benefits on the grounds that they are 'transfers' between one group and another. This saves one or two calculations, but makes it impossible to identify the effect on each group – business, government, and so on. For example, revenue is a transfer from buyers to sellers in transport markets, so the tolls on a new tolled highway are both a loss to users and a gain to the highway operator. The crude solution is simply to cancel the users' loss with the operator's gain, so removing both from the cost-benefit calculus. In a more complete economic analysis – often reported using a spreadsheet presentation – the costs and benefits to each group and the links between them can be clearly shown [1].

The **fiscal perspective** focuses on the project's impacts on government expenditure and receipts. It can be thought of as a commercial appraisal from the perspective of Government. This is covered more depth in *Note #3 'Fiscal Impacts'*.

FINANCIAL APPRAISAL

The items in a financial appraisal are money flows to and from the organisation concerned. In contrast to the social cost-benefit analysis described in the *Framework*, external costs and benefits are omitted. The principle of 'comprehensiveness' does not apply; it is replaced by a commercial focus on matters which concern the organisation itself, and not the wider world. Table 1 illustrates, using an urban rail project.

Table 1. Rehabilitation of an Urban Rail Service: Items in Commercial and Social Appraisals

Item	Commercial appraisal, \$	Social appraisal, \$
Investment Cost	-80,000,000	-80,000,000
Operating Cost	-1,450,000 p.a.	-1,450,000 p.a.
Fares (users)	-4,300,000 p.a.	-4,300,000 p.a.
Revenue (operators)	4,300,000 p.a.	4,300,000 p.a.
Time savings		2,560,000 p.a.
Road decongestion		620,000 p.a.
Government tax revenue		-320,000 p.a.
TOTAL per annum	-1,450,000 p.a.	1,410,000 p.a.

As usual in project appraisal, future costs and benefits will be discounted at a constant compound rate. Whereas the social appraisal uses a *social discount rate* (based on social opportunity cost or social time preference rates), commercial appraisal uses the prevailing market rate of interest to reflect the pure financial cost of the investment. Therefore the Present Values of the streams of costs and benefits indicated in Table 1 will differ not only because the commercial appraisal omits some items, but because the discount rate applied will (in almost every case) be higher in the commercial appraisal.

Commercial appraisal also adopts different approaches to risk. Whereas the social appraisal should usually be accompanied by a sensitivity analysis covering the key parameters and – for major projects – a quantitative risk assessment (see *Note No.2*), commercial appraisal may take an even more risk averse approach. There are good reasons for this. A commercial investor may be subject to destabilising actions in the capital market if their major investments do not perform, and small-to-medium sized businesses do not have the same risk-pooling capability as a government [2]. Consequently, commercial investors may build in larger contingencies for risk and may want to adopt a much shorter planning horizon than the government, 5-15 years typically. These will load the dice further against investment projects.

Commercial investors will be particularly sensitive to the competitive environment. If there is a risk that the response of other transport suppliers to the project will be an aggressive one, then this could threaten the revenue stream of the project and will be a major issue in commercial appraisal. An example is the introduction of premium bus services, where the competitive response of incumbent minibus services providers is crucial. Or the response of bus operators to a new metro line. Or the response of road freight operators to the opening of a new rail freight connection to a facility where a lot of freight traffic is generated.

Finally, we noted in the *Framework* that it is standard practice to adjust cost and benefit items to a resource cost basis when conducting a social appraisal. In a commercial appraisal, the measures of costs and revenues are based on unadjusted accounting data, because the appraiser is not concerned with money flows 'as if' some ideal set of prices prevailed, rather with prices as they are.

THE LINKS BETWEEN FINANCIAL AND ECONOMIC APPRAISALS

The really important common threads between financial and economic appraisals are: the demand forecasts, assumptions about pricing, taxation and the economic regulatory environment.

It makes no difference whether a demand forecast is going to be used to predict operators’ profits or net social benefits, its value to the appraiser lies in its accuracy as a predictor of future conditions. This means that the business case for a new transport investment and the social appraisal of it are always going to be based on the same foundations – a common set of demand forecasts.

Pricing assumptions are also vital (*see Note No.18*) and should be common between the commercial and social appraisal for a particular project. It may be that the pricing policy is worked out in greater detail for a commercial appraisal, because revenue makes up a large part of the benefits, but there should be no inconsistency with the social appraisal’s pricing assumptions. Taxation policy, and assumptions about the regulatory environment and general economic climate, are similarly shared. It will be relatively easy for the reviewer of any appraisal to ascertain whether this consistency exists, so it is worthwhile establishing it right from the start of the appraisal process.

PRESENTING FINANCIAL APPRAISALS

The reporting tables set up for transport appraisals (*see Framework*) allow the analyst to report the economic impact on transport operators, fiscal impact on Government, and the impacts on transport users and other citizens. Together, these sum to a social appraisal.

The financial appraisal will have distinct results, for the reasons described in Section 2. However, the reporting can follow the same pattern. Table 2 illustrates.

Table 2. Financial Appraisal Results

	\$
Private sector provider	
Revenues	127,000,000
Operating & maintenance costs	-34,120,000
Investment costs	-55,100,000
Grant/subsidy	2,100,000
NET BENEFIT	39,880,000

FINANCIAL VS ECONOMIC EVALUATIONS FOR DIFFERENT TYPES OF PROJECTS

Whether the financial appraisal results for a project accord with the economic appraisal results depends partly on the extent to which the benefits of the project will be captured by the operator as revenue (or by the government as taxation) rather than by the users in the form of consumer surplus. Whether the benefits **can** be so captured is a slightly different question. Transport pricing is not always designed to maximise yields – as *Note No. 18* suggests.

A classic public sector urban road infrastructure project, for example, may be politically and administratively difficult to collect revenue from. A financial appraisal on behalf of the Government is likely to look extremely weak even allowing for some stimulus to vehicle use and fuel tax revenue. By contrast, a social appraisal, picking up the gains in consumer surplus, can give a very positive result.

An airport project may be much better able to reflect the full set of benefits even in the financial appraisal because the pricing method for landing and take-off rights at airports is in some cases rather more sophisticated, taking into account the time of day and the willingness-to-pay of users on different types of flight.

ENDNOTES

[1] Furthermore, careful economic analysis shows that when measured in terms of welfare – as they should be in a social appraisal – these ‘transfers’ do not all cancel out. This is because the user disbenefits are subject to the ‘rule of a half’ whereas the operator revenues are not.

FURTHER READING

[2] Pearce DW and Nash CA (1981), *The Social Appraisal of Projects: A Text in Cost-Benefit Analysis*. London: Macmillan.

[3] UK Department for Transport (2000), *Guidance on Methodology for Multi-Modal Studies*. London: DfT. <http://www.dft.gov.uk/itwp/mms/index.htm>. See Volume 2: Chapter 6 and Annex F.