

Cost-Benefit Evaluation of Mining Projects

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This paper describes the cost-benefit analysis (CBA) of mining projects. Following a general introduction, the central part discusses six contentious topics: the community of interest, valuing the environment, second-round effects, market modelling, estimating key mining data and treatment of risks. The penultimate section briefly discusses dealing with some special government requirements. The paper concludes that the CBA approach is systematic and comprehensive. Where uncertainty exists, the weights attributed to unquantified impacts should be conceived within a CBA framework rather than out of the subjective thoughts of decision makers.

Key Words Cost-benefit analysis, mining projects

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1. Introduction

The evaluation of mining projects is often contentious. However, as Kingston (2001) showed, cost-benefit analysis (CBA) is a general method of project evaluation. This paper shows how CBA can be applied to mining projects. The main examples are from coal mining but the evaluation process is general.

Sections 2 and 3 describe the cost-benefit approach and estimation methods for the major costs and benefits of mine projects respectively. Section 4 discusses six major issues in the evaluation process. Section 5 briefly describes economic responses to some political issues. There is a brief concluding section.

2 Basic Cost-Benefit Framework

Cost-benefit analysis estimates and compares the total benefits and costs of a project to the members of a specified community. To do this, a CBA:

- Lists all groups in the specified community affected by the project.
- Assesses all impacts compared to a counterfactual scenario.
- Values the effects on welfare in monetary terms.
- Aggregates these benefits and costs and estimates the net present value to the specified community.

Impacts are sometimes categorised as economic, social or environmental. However, the overall aim of CBA is to estimate net welfare effects. Allocating each impact to a category is not particularly helpful and indeed may be unhelpful as some impacts may be allocated to more than one category and encourage double counting.

CBA may be conducted at various geographical levels (international, national, state or regional).

Critically, the principles and methods of CBA are the same at any spatial level. However, impacts that

are transfers within one spatial level, such as the nation, may be benefits or costs at another spatial level, for example a regional level.

As shown in Figure 1, for most projects there are first-round effects, which may be direct or indirect effects, and second-round (follow-on) effects. The **direct** effects are the costs and revenues borne by, or accruing to, the parties involved in developing and operating the mining project and the taxes and royalties from the project. **Indirect** impacts relate to third parties. These include environmental and social impacts on third parties and impacts in related markets which may be complementary or substitute activities. Firms supplying a mine are complementary activities. Other coal mines may represent a substitute activity. In principle, all first-round impacts are included in a CBA, regardless of whether they are direct or indirect effects.

Second-round effects are defined here as flow-on impacts due to spending associated with first-round income gains. These effects are not usually included in a CBA. However, if costs are incurred at one spatial level (say state) and benefits accrue at another level (locally), second-round impacts may be material for a report on local effects. This contentious issue is discussed in Section 4.

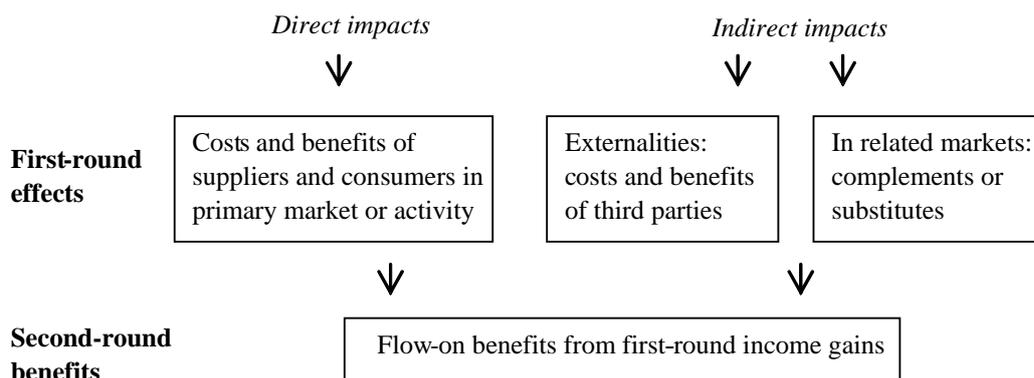


Figure 1 First and second-round effects of projects and policies

3 Estimating Costs and Benefits

As shown in Figure 2, the net public benefit (or cost) of a mining project equals the direct project benefit less any associated public expenditure and social or environmental impacts that are not internalised in mining company costs. There may also be other economic impacts on businesses, which may be positive or negative. Each category is discussed below.

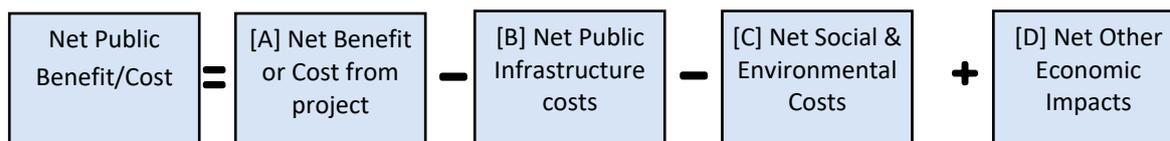


Figure 2 Estimating the costs and benefits of mining projects

Direct Net Benefit or Cost from Project

The direct value of the mining project mining (VMP) is given by:

$$\text{VMP} = \text{GMR} + \text{RV} - (\text{OCL} + \text{CI} + \text{OC} + \text{EMEC} + \text{RE}) \quad (1)$$

where GMR is gross mining revenue, RV is the residual value of the land and capital assets, OCL is the opportunity cost of the land in foregone uses, CI is capital investment, OC is operating costs, EME is environmental mitigation expenses and RE is rehabilitation expenses. To avoid double counting, any part of the current land price that reflects possible future mining profit should be excluded. All values are estimated over the project life and discounted to a present value.

Net Public Infrastructure Cost

The net public infrastructure cost is the cost of any related public expenditure (e.g. water, drainage, roads) not included in the mining company costs. Where these services provide a benefit to non-mine users, the costs attributed to the project should be pro-rated approximately with benefits to the mine project and other users.

The provision of social infrastructure associated with employment and population growth (such as housing, community services, schools and hospitals) should generally not be included as a cost of the project for two reasons. First, some services, such as housing, are generally self-financing and do not impose a cost on local communities. Second, schools and hospitals are needed generally to accommodate population growth. Therefore, any expense is generally transferred from one area to another. However, if there are exceptional expenses associated with a project due to above average costs of provision or specific location issues, they should be counted as a cost against such a development.

Valuing Social and Environmental Impacts

Potential social and environmental impacts include: water quality, air quality, carbon emissions, noise, vibration, loss of visual amenity, traffic congestion, impacts on biodiversity (flora and fauna), quality of open space, rural amenity and culture, and heritage.

Estimating environmental (or social) impacts involves three stages:

1. Estimating the physical impacts on the environment, e.g. impacts on water quality, after allowing for remediation works.
2. Estimating the net effects of these impacts on business, e.g. on agricultural productivity, and on households, e.g. on health.
3. Monetising these impacts.

Some impacts, such as effects on air quality, traffic congestion and noise, generally have quantifiable impacts on the environment. However, in some cases, as with the impacts of mining on water quality or biodiversity, the impacts may be less certain.

There are three main kinds of effects: on economic productivity, health and household amenity. For example, a change in water quality may have significant effects on agricultural productivity, population health and recreational amenity. Estimates of these impacts are generally feasible.

Third, these estimated effects are valued in a monetary unit. Estimates of impacts on business are usually straightforward. Likewise for health, there is substantial material on how to estimate the costs of health impacts borne by government (health care costs), business (loss of output) and households (lifestyle costs). See for example US Environmental Protection Agency (2010). The valuation of environmental amenity, such as loss of quality open space or biodiversity or a change from a rural/agricultural environment to a mixed rural/mining environment is more complex. Section 4 discusses valuation options.

Other First-Round Economic Impacts

Other first-round economic impacts may include:

- Mining worker surpluses.
- Economic surpluses of suppliers of plant, equipment and materials to the mining project.
- Losses of economic surpluses of competitive mining operations.
- Losses of economic surpluses associated with the displaced base case activity.
- Changes in economic surpluses due to changes in visitors.

Mine workers who would otherwise be unemployed, working part-time or even working in other sectors may gain higher wages than they would without the project. The real welfare benefit (surplus) for the worker is the difference between the wage in the mining project and the minimum wage that he or she would accept for working in the project. This is known as the reservation wage and it reflects both employment opportunity costs and occupational preference.

Alternatively, the estimated 'reservation wage' rather than the actual wage may be adopted as the real cost of mine workers. Under this approach, any worker surplus is included in the direct project surplus. If there is a worker surplus, it does not matter whether this is accounted for as part of the project surplus or separately.

Likewise, where markets are not fully competitive, suppliers to a mining project may achieve higher surpluses reflecting the difference between the prices received for the supplies and the marginal costs of production. As BAEconomics (2014a) points out, the information for this type of analysis generally does not exist, mining businesses often have many suppliers and would not know either their margins or the party to whom any such surpluses might accrue. Thus, if proponents of mining projects claim these indirect economic benefits, the relevant margins need to be substantiated.¹

On the other hand, in some circumstances a new coal project may reduce the net income of another coal mine (or mines) by reducing either quantity they sell or the price received. This is less likely in the world (export) market than in the local market.

Also, firms that supplied the forgone land use activity, for example with inputs to a livestock business, may lose some business and associated economic surplus. Again, validation would be required.

Finally, a change from an existing use, say agriculture, to mining may affect visitors to the area. Thus firms supplying tourism-related services may lose net income. However, this may be a short-run impact as investment in facilities will adjust to new tourism levels and tourism firms will not carry

¹ To allow for all production effects it would be necessary also to include surpluses of firms that supply goods to firms that are supplying equipment, materials and so on to the mine project (see Section 4).

excess capacity in the long run. On the other hand, some businesses, including accommodation businesses, may *gain* surplus as a result of extra mining workers.

Overall, the first-round economic effects in related markets are usually small relative to direct project returns. They arise when prices exceed marginal costs for new output. Changes in prices (without quantity changes) are gains to some people and losses to others—i.e. they are transfers between communities. However, where local effects are reported, transfer effects may need to be identified.

4 Some Special Issues

In this section we discuss six contentious topics: the community of interest, valuing the environment, second-round effects, market modelling, estimating key mining data and treatment of risks and uncertainty.

The community of interest

The selection of the community of interest is a policy matter, but it also has economic consequences. In state-based decisions, the state is usually the main community of reference (see NSW Treasury, 2007). However, a regional or local assessment is also often called for. Here we discuss three related issues: the definition of a region or local area, the estimation of impacts on a specified community and the implications of specifying sub-national areas of interest.

Defining the boundaries of a local area of interest is always arbitrary. Of more interest here is the treatment of migration. How should a CBA account for workers who migrate into (or out of) the area of interest? The common process in CBA is to consider effects relative to the present state of the world. This would be the businesses and households in the local area in the (without-project) Base

Case. In this case, immigrants to the area would not count but workers leaving it would count. Of course, this reflects a value judgment rather than a technical decision.

The major difficulty in determining the impacts on a specific community relate to ownership of, and returns to, capital. A mining surplus may accrue to various parties including: existing and new landowners, the Commonwealth via company taxation, the state via royalties and payroll tax, shareholders, mining employees via higher wages, and suppliers of goods and services to the mining business. Also, some Commonwealth revenue may be recycled back to the state.

If the state is the community of interest, returns to entities outside the state should be excluded from the CBA. This is complicated when a company has complex structures and shareholder registers. Also, shareholders often include superannuation and investment funds where the beneficiaries are unclear. Related difficulties arise with identifying sources of supplies for a mining project.

The problem also arises with related market impacts where local firms have non-local ownership. The NSW Planning Advisory Commission (PAC, 2014a) refused Anglo American's application to expand mining at South Drayton (also Hunter Valley) largely because of its alleged economic impact on two world class horse stud farms: Coolmore which has a substantial Irish ownership and Woodland owned largely by Middle Eastern interests.

Clearly, estimating local, or even state, impacts is a considerable task especially for returns to capital. There is a strong case for starting from a global perspective and working down to lower geographical levels as far as is practical.

Turning to policy implications, it has long been established that protecting local businesses (for example by giving them preference in state government contracts) is contrary to national and state interests. Similar arguments apply to approving development applications (DAs) on a state basis. NSW would reject DAs with a significant return to Victorian households and Victoria would reject DAs with a significant return to NSW households and households in both states would be worse off as a result.

Moreover adopting a state criterion, development approvals would depend on both the net benefits of the project and the amount of non-state ownership. Mines with local state ownership would be given preference over mines with foreign ownership. This could lead to complicated regulations. For example, governments would have to stop a foreign-owned mine selling the property to an Australian company for the purposes of gaining development approval and then buying it back after mining development was approved!

Valuing the Environment

Valuing the environment is especially controversial. Examples include the NSW Planning Advisory Commission (PAC, 2014b) rejection of minor expansion of the Coalpac mines in Lithgow (NSW) and the Land and Environment Court (LEC, 2012) decision to refuse the Warkworth Expansion Project in Singleton (NSW). In both cases biodiversity losses were cited as the critical factor. Carbon emissions are another major issue.

As we have observed, many environmental impacts, such as air, noise and traffic congestion, can be estimated quite accurately and there are generally accepted levels of air, noise and water pollution for community health and amenity. Nevertheless several issues arise especially for biodiversity impacts.

A major issue is whether (defensive) expenditure to meet government standards for environmental variables like air quality is an adequate measure of the cost. BAEconomics (2014a) argues that if the standards are met, there are no significant adverse residual effects. However, standards may not be met at all times and all places. Also households have different reactions to air pollution and noise and vulnerable households may suffer even when environmental standards are met.

As a starting point, defensive expenditures to meet required standards provide a fair measure of most environmental costs. However, any residual costs should be recognised and if possible costed. If it is not possible to quantify all effects, some qualitative treatment and judgement may be needed.

With regard to carbon emissions, common practice is to include the global costs of carbon emissions that occur due to mining even though nearly all the costs are borne outside Australia. This may be justified as an obligation to the global community. But the costs of carbon emissions in the transport and end use of the coal are not normally included in project evaluation because the surpluses associated with transporting and burning coal are not counted.

Turning to **biodiversity**, there are issues of quantification and monetisation of the effects. In the case of the Coalpac (Lithgow NSW) mine, the major parties (the proponent Energy Australia, the NSW Office for Environment and Heritage, and the PAC) disagreed significantly on the impact of blasting on the pagoda landform, the existence of various endangered species in the area, the value of the local state forest and the adequacy of the proposed biodiversity offset.

The most common approach to valuing biodiversity is to equate it with the sum of defensive expenditures, including offset and rehabilitation expenses, for example BAEconomics (2014b). In some cases these expenditures would be sufficient to avoid net losses. However, critics contend that

biodiversity offsets often do not fully compensate losses of biodiversity, especially where there is a “unique” ecosystem (Campbell, 2014).

In the case of the Warkworth mine (NSW), Gillespie Economics (2009) undertook a choice modelling study to estimate what the NSW community would be willing to pay to preserve some 800 ha from the proposed mining expansion and estimated that the total value of the ecological impacts was \$328m. They employed scenarios and price anchors derived from focus groups and the results were published in a peer reviewed journal (Gillespie and Bennett, 2012). However, the Land and Environment Court (2012) considered that (i) the scenarios provided in the survey were misleading because they did not identify the nature of the endangered ecological communities and (ii) the questions were based on low price anchors, thus invalidating the responses. Further, in its view the community of interest was national, not just NSW, which meant that the CBA study undervalued the ecological impacts.

Another complication is whether public areas should be valued based on what people are willingness-to-pay (WTP) to avoid a change or on willingness-to-accept (WTA) valuations, i.e. the minimum amounts that individuals will accept in compensation for loss of a good. WTA values are often much higher than WTP values (Abelson, 2012). At the heart of many emotional debates is the belief that people are losing public property rights. In Woody Guthrie’s famous song: “This land is your land”. In this case the appropriate metric is WTA values rather than WTP values. However, it is hard to elicit accurate WTA values because respondents are not budget constrained.

In summary, where possible, valuations should be based on evidence rather than on the subjective personal judgements of decision makers. Defensive expenditures to maintain the status quo are often a reliable measure of the costs. However, this assumes that losses are fully offset. Another approach is a stated preference study to estimate public willingness-to-pay to preserve biodiversity

and all associated green attributes (rural ambience, visual amenity, etc.). Both Baker and Ruting (2014) and Gillespie and Bennett (2015) provide some support for the use of stated preference surveys. However, BAEconomics (2014a) points out that there may be public scepticism about the results. Also, the application of estimated WTP values presumes no prior rights to the areas of concern. If there are prior rights, WTA values for the loss of public space may be more appropriate.

Whatever valuation method is adopted, it is often useful to compare the valuations with those found in other areas (see Boardman et al., 2011). However benefit transfers need to be treated cautiously for highly differentiated biodiversity areas,

First and second-round effects

Unfortunately there is much confusion about first and second-round effects. In this paper, the primary and related market effects are included as first-round (direct and indirect) effects. Second-round effects are flow-on income effects (if any) from first round income changes.²

These concepts may be related to the multipliers in input-output (I-O) modelling. Type 1 multipliers reflect business to business transactions. Type 1A multipliers show the increase in output in response to an initial increase in demand + output required to meet this demand. Type 1B multipliers include 1A + induced effects of extra output from other industries. Both multipliers show changes in gross (not net) output and assume no supply constraint.

By contrast, the approach in this paper includes estimated increases in net economic surpluses from 1A type transactions, i.e. surpluses of firms supplying the mining project. It does not include any surplus for firms supplying goods and services to firms that are in turn supplying the mining project

² Second-round effects are sometimes said to include “indirect” and “induced” effects. Indirect effects are (as in this paper) the result of business to business transactions arising from the direct effects. Induced effects are the results of increased expenditure arising from first-round income effects (household to business activity).

(output related to Type 1B transactions). In most cases additional net income from Type 1B effects would be small and can be ignored. Exceptions may occur where a project is a large part of a local economy.

Type 2A multipliers include consumption induced effects. Thus they include benefits arising from expenditure as a result of round-one increases in output. The difference between the Type 2A and Type 1B multiplier drives what we call second-round benefits in this paper. Again the multiplier drives gross output assuming no opportunity cost and is not a measure of welfare gain.

It is generally not appropriate to include these second-round benefits in a CBA study. First, there is generally limited non-structural unemployment. Second, aggregate demand at national or state level is usually independent of project expenditure. It follows that, if there are second-round effects at state or national level, they are generally transfers between areas. Expenditure on project *X* means less expenditure on project *Y*. Accordingly second-round multipliers are generally not allowed for in state or national projects.

However, if a project is assessed at the local level, second-round income effects may be significant, albeit that they confer benefits to one local area at the expense of another one. In this case, the increase in total local income (ΔTLY) may be modelled simply as the product of the increase in local incomes (ΔLY) due to first-round income surpluses and a multiplier (M):

$$\Delta TLY = \Delta LY \times M$$

where $M = 1 / (1 - MPCL)$

$MPCL$ = the marginal propensity to consume locally produced goods.

The lower is $MPCL$, the lower is the multiplier. $MPCL$ falls with leakages: income tax, savings (including mortgage repayments) and expenditure on imported goods (in local areas most goods are

imported). Thus the *MPCL* in a small local area can be as low as \$10 in \$100 or 0.1. Further, if workers attach a value to leisure, the net welfare benefit will be lower than the extra gross income

Second-round effects may also occur nationally or at state level with foreign capital. The assumption here is that the capital would not be spent in Australia in the “without project” case. On the other hand, if the capital is foreign, the returns to the owners would not count in a national or sub-national CBA.

Market Modelling

The market modelling approach will depend on the scope of the CBA. Thus, the CBA may have to account for effects in related complementary or substitute markets and occasionally for benefits from flow-on expenditure.

The partial equilibrium approach to estimating related market effects is to model each market separately taking into account any major interactions. Realistically, the modelling may make crude assumptions about prices and marginal costs in relevant related markets. However, for most CBA studies of a mine project and related markets, this approach is sufficient, transparent and cost-effective.

General equilibrium I-O models have well-known weaknesses (Australian Bureau of Statistics, 2011). They assume no supply constraints, a fixed input structure for each industry and, related to this, fixed (average) ratios for intermediate inputs and production. At the economic margin, most goods are likely to be imported especially in local areas. Therefore, applications of I-O models provide significantly upwardly biased results. This makes them unsuited to measuring *net* income gains and more especially net welfare gains. Moreover, the relevant data are rarely readily available.

Computer general equilibrium (CGE) modelling is a more sophisticated approach. A CGE model may contain several hundred market sectors or only a few. The behavioural equations that govern the model allow producers to substitute among inputs and consumers to substitute among final goods as the prices of commodities and factors shift. The model allows for supply constraints. However, the data requirements are several times more onerous for CGE models than for I-O models. Many assumptions, such as migration, are exogenous inputs to the model rather than outputs of the modelling process. Generally, CGE models are larger than necessary, complex, not transparent and not cost-effective for mining evaluations. And fundamentally they do not measure net welfare gains.

Estimates of key inputs to the CBA

Estimates of key inputs to the CBA are often critical. For example, the Australia Institute (2014) review of the BAEconomics (2014b) study for the Warkworth coal mine claimed that the coal price of A\$100/tonne was too high and operating costs of \$70.50/tonne too low and concluded that the project would lose money and not pay any royalties.

If the plan is to export the mineral, say coal, the value is the forecast FOB export price less transport costs to port. Typically, the coal price should be input in today's prices. However, any rise or fall in the export coal price in real terms needs to be accounted for in the CBA. Given uncertainties about coal prices, it may be most convenient either to adopt a constant medium-term price (in today's dollar values) or a real price that moves up or down at a constant rate. On the other hand, if the coal is consumed locally, the value is the opportunity cost of supplying the coal from an alternative source.

Operating costs of coal production also vary, notably with the strip ratio of waste to coal, and is generally lower for mine expansions than for new mines. However, few CBAs report operating costs

or net profit per tonne on the grounds that this is confidential information. Instead they report an aggregate figure like the present value of operating costs over 30 years.

Another key variable is the labour surplus of mine workers, i.e. any difference between the after-tax gross wage received and their after-tax reservation wage. For Warkworth, BAEconomics (2014b) assumed that without the project 30% of workforce (employees and contractors) would leave workforce or move interstate, 30% would be reemployed within a year and 40% within two years. These assumptions were best estimates, not based on field research on wages in different sectors and workers' occupational preferences.

As Economists-at-Large (2013) noted, there is often a lack of transparency about the key assumptions and their derivation. Many CBA reports describe methodology and some assumptions. But they give only aggregate economic results and limited details on critical data inputs (DeLoitte Access Economics, 2014). Even given confidentiality concerns, it would seem possible to improve transparency.

It is sometimes proposed that a government agency should provide default values for key mining inputs. However, any such default values would have to embrace a range to allow for variations in mineral quality and location, mining conditions and employment opportunities. In practice, decision making bodies would still need to consider evidence-based project specific estimates.

Treatment of risk and uncertainty

There are many aspects to risks. These include risks where variance can be plausibly estimated, risks where there is little knowledge, possibilities of high or irreversible damages, and risks where implementation does not meet approval conditions. Moreover, while a government agency may be risk neutral with respect to public expenditure on the basis of risk spreading and pooling principles

as advocated by Arrow and Lind (1970), local communities may be risk averse about particular projects.

In this environment, the common CBA approach to uncertainty has three aspects. First, where plausible, to estimate likely variances and their impact on the expected outcome by use of sensitivity tests. Again, where plausible, probabilities should be attached to these variations. Second, if there is a high level of uncertainty about some variables, to seek additional information prior to a decision. This may be particularly important when long term damage is a possibility, for example through possible loss of an aquifer. Third, risk management conditions should be built into the mining approval along with appropriate deterrents for failures to meet conditions.

Ideally, Monte Carlo simulations of full probability outcomes (based on random selections from the distributions of the independent variables) would be run for major mining projects. This is rarely feasible. However, unless mine proponents can provide convincing indications of likely ranges and probabilities for mine projects, government may adopt risk-averse conjectures of future impacts and outcomes.

5 Special Government Requirements

Often governments have special interests and hence information requirements. Typically these may include impacts on employment, royalties, some specific environmental or social impacts, or local effects.

What should be stressed here is that any impacts that affect the productivity of business or the welfare of households are included in CBA studies. Employment benefits and royalties, social and environmental impacts are **all** included in CBA studies. Separate reports on these impacts are unnecessary, encourage double counting and may create confusion.

An issue which often creates difficulty is the “social and economic impacts in the locality”. Apart from the issue of defining the locality, there are two other difficult matters. These are (i) the definition of local economic benefits and (ii) the treatment of local environmental and social effects.

A local economic study is sometimes referred to as an Economic Impact Analysis (EIA). An EIA describes the “economic” impacts of a project at a specified spatial level. However there is no agreed definition of an EIA. An EIA may be an estimate of:

1. The value of gross output (or revenue) produced in an area that includes the contribution of imports.
2. The value added produced in an area (gross state, regional or local product), which includes returns to capital and income accruing to foreigners / non-locals.
3. The increase in income accruing to entities in the specified area.
4. The increase in local labour income.
5. The employment impact measured by persons employed rather than by income metrics.

Of these measures, option (3) is probably the most meaningful but harder to estimate than (2) which is more commonly estimated. In principle, the income gains in (3) should be captured in a state CBA. As discussed above, a CBA may not capture second and third-order inter-firm transactions (1B multiplier effects). However, in a CBA opportunity costs are netted off to provide an estimate of the net welfare gain. Also transfers associated with second-round gains are usually excluded from national or state CBAs.

Turning to social and environmental impacts, again a CBA at a national or state level should pick up any local effects. Importing an alternative methodology creates unnecessary confusion. Overall

there is a serious risk that the multiplicity of requirements and criteria creates a confusing guide for the evaluation of major projects.

6 Conclusions

Mining often involves a complex mixture of public and private interests and therefore requires a comprehensive form of evaluation. CBA provides this. CBA assesses the economic, social and environmental impacts based on well-developed, objective and democratic principles of valuation, and provides transparent and testable results that are open to empirical validation. It can be applied at any spatial level.

The commonly argued limitations of CBA are data availability, the difficulty of valuing non-market goods especially biodiversity, project scope and uncertainty. This paper has discussed all these issues and acknowledges difficulties in each area. However, these limitations are also relevant for all other evaluation approaches.

Critically CBA is evidence based. Community weighting of impacts is derived from observations of behaviour or from stated preference surveys. The weights are testable and not based on the subjective opinions of individual decision makers. CBA can also show how impacts are distributed to different groups thus providing the basis for an assessment of distributional effects.

Unquantified impacts should be discussed in the CBA report. However these impacts should be viewed in the context of the quantified net public benefit or cost. If there is an estimated net public benefit, do these factors offset this benefit? Certainly this requires some judgement as to the relative importance of these factors. But as far as possible the weights attributed to the unquantified impacts

should be conceived within a CBA framework rather than out of the subjective thoughts of the decision making parties.

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