Using the Kaldor-Hicks Tableau Format For Cost-Benefit Analysis and Stakeholder Evaluation

Kerry Krutilla
Associate Professor
School of Public and Environmental Affairs
Indiana University
Bloomington Indiana 47405

Prepared for 2007 Conference on Benefit-Cost Analysis,
Seattle Washington, June 2007

Preliminary draft not for citation or quotation
Comments Welcome

Abstract

A Kaldor-Hicks Tableau offers a conceptually consistent and transparent accounting of a project's stakeholder impacts and measure of net benefits. The format can be used to help educate stakeholders and analysts, including those lacking formal economics training, about the structure and consequences of project proposals. In revealing the project's social production function, the format can also be used to improve the accuracy of the efficiency analysis through better assessment of stakeholder behavior. The comprehensive display format of the Kaldor-Hicks Tableau enables its extension to decision contexts beyond the conventional efficiency evaluation, including augmented efficiency analyses incorporating not-usually monetized public goods, the normative assessment of distributional effects, and applications in the field of Multi-Criteria Analysis.

1. Introduction

A Kaldor-Hicks Tableau (KHT) is a matrix format that comprehensively displays a project's economic and financial effects. Column titles in the KHT indicate stakeholder categories disaggregated at a selected level, while row titles represent the project's benefits, costs, and financial transfers -- again disaggregated at a chosen level. Within this matrix, the project's benefits and costs are distributed to the stakeholders who bear them, and between-stakeholder financial transfers are also recorded. A summation across rows gives the net stakeholder impacts as the boundary row at the bottom of the KHT, while a summation across columns yields a final column on the right-hand side of the tableau, displaying the conventional benefit-cost valuation. This matrix representation provides a fully-integrated and internally consistent view of all of the project's distributional effects, in the sense that all impact channels among stakeholders are shown, and boundary row and column sums yield the same figure for the project's total net benefits. The clarity and transparency of this format offers a "big picture" view of the project's economic and financial effects lacking in less-compete and/or less-integrated accounting formats.[1]

While it is difficult to generalize about a field as varied and extensive as cost-benefit analysis, in both its academic and practitioner literatures, it does not appear that the KHT format is now widely used. In fact, the format appears to represent a boundary point on a continuum for stakeholder representation, with the other boundary point being the "standard" cost-benefit analysis in which the project's outputs and inputs are identified, assigned economic values --with

[1] At the time I began using the KHT format as a heuristic aid in CBA classes, I was unaware of any application of the format in the CBA field, and so I coined the term "Kaldor-Hicks Tableau" as a label to refer to it. Since there does not appear to be nomenclature in the CBA field for the format otherwise, I have continued to use the KHT terminology. Indeed, the KHT label seems particularly suited to the context, since the KHT format is derived from the Kaldor-Hicks criterion itself, and is therefore naturally complementary to the standard efficiency measure used in CBA.

the help of shadow prices or valuation measures -- and then summed into an overall net-benefit measure. The standard CBA approach offers a pure efficiency analysis which in effect aggregates all stakeholders as "the public." However, one can find in the CBA literature modifications of the standard CBA approach that selectively add information. One variant, known as "revenue-expenditure" analysis, incorporates an appraisal of the project's effects on governmental revenues (Vining and Boardman, 2006). Disaggregating the revenue impact recognizes the importance of a project's fiscal impacts in a decision-making context in which governments face fiscal constraints.

The fully-integrated accounting of stakeholder impacts embodied in the KHT format seems to be considered in the CBA literature primarily in two contexts: for project appraisals in developing countries, and for social policy evaluation. For example, The World Bank Handbook of Investment Operations recommends essentially the KHT format for project appraisal (World Bank, 1996). The rationale is to better assess a project's sustainability, given that stakeholders can undermine the project's viability if they face the wrong incentives. There is a particular concern about the risk of decoupling the financial assessment of the project from its economic evaluation, in the sense that a project might pass the standard benefit-cost test but not be financially viable. Thus, there is an emphasis on stakeholder impact assessment, and integrating the financial appraisal of the project with its economic assessment (see Jenkins 1997, 1999).

A stakeholder accounting approach has also been suggested for the social policy field (Long et. al., 1981). In this context, the rationale is that social programs should improve both economic efficiency and the welfare of the target population – effectively, that the analysis should embody multiple goals. Thus, an accounting should be made of the impact of a project or program on the stakeholders that the program is designed to benefit, as well as on the rest of

society. In the Long et. al. study of the Job Corps program, impacts were computed both on the Job Corps participants themselves and on the rest of the population, with the sum of these two effects giving the project's total net benefits.

In a somewhat related, but distinct, vein, is the large normative literature on how to handle a project's effects on different income classes, e.g., Harberger (1984); Boardman et. al., **(**2006), Zerbe (1991, 1998). Although different income classes can be regarded as different stakeholders, and stakeholder analysis could be differentiated by income class (as in effect was done in the Job Corps assessment just discussed), the normative assessment of income distribution and the analysis of stakeholder impacts have proceeded largely independently.[2] In terms of actual empirical study, the assessment of income distribution in cost-benefit analysis appears most commonly conducted within a computable general equilibrium framework which disaggregates the welfare measure by income class e.g., Boyd et. al. (1995).

The central theme of this article is that the KHT format should be used more widely in conventional project appraisal contexts. The principal reasons are to improve the accuracy of the efficiency analysis itself, recognizing that impacts on stakeholders influence the social production function upon which a project is based, and to better educate stakeholders and analysts, including those without formal economics training, about the structure and consequences of project proposals. In particular, the KHT format could be used during the project design stage to simulate project alternatives to identify those which are politically feasible and offer the right kinds of incentives for stakeholder participation.

[2] The emphases of the two literatures differ. In the main, the CBA literature on income distribution focuses on the properties of social welfare functions, and on the comparison of transfer schemes to address distributional effects versus a system of distributional weights. In contrast, stakeholder impact analysis emphasizes the display of stakeholder effects, either for positive reasons (to assess project "sustainability") or for normative ones (to assess a project's impacts on low income or other impacted stakeholders of particular relevance to the decision-making).

The distributional accounting format of the KHT is also naturally suited to the consideration of broader goals than just economic efficiency, including augmented forms of the conventional efficiency analysis that incorporate not-usually monetized public goods, and the normative assessment of stakeholder effects, including those differentiated by income class. Since the KHT offers a simultaneous display of a project's net benefits and its impact on all stakeholders, the format is particularly well suited to the integrated assessment of both economic efficiency and a project's distributional consequences – however the latter are construed. The KHT format also offers the prospect for improving the conceptual foundation of a related form of decision analysis known as "Multi-Criteria Analysis" (MCA), or "Multi-Attribute Analysis" (MAA); see Dogson (2001).

These themes are further developed in the remainder of the article. The KHT format is introduced and specifically illustrated in Section 2. Section 3 then provides justifications for using the KHT format more extensively in the CBA field. Section 4 shows how the clarity and transparency of the format can be used to improve decision-making, while Sections 5 and 6 illustrate the utility of the KHT format for stakeholder analysis. Section 7 then discusses the format's application to analyses that go beyond the standard evaluation of economic efficiency. Section 8 concludes and offers recommendations.

2. The KHT Format

A KHT is nothing more than a display format. As such, it must explicitly or implicitly rest upon some sort of economic conception, or modeling framework. In this article, I will illustrate the KHT format using partial equilibrium models of the type which underlie the methods and principles of conventional project appraisals. The welfare interpretations can be taken to be consistent with the rule that an analysis of a primary market, plus the distorted

secondary markets the project impacts, are sufficient for a complete welfare characterization (Harberger 1971). In principle, however, it should also be possible to construct KHTs based on the outputs of computable general equilibrium models.

An application to the standard partial equilibrium analysis of commodity taxation is a convenient way to see the KHT format. Figure 1 shows the usual picture of the distorted equilibrium which results from the implementation of a tax (t) on the production of some good in some market. The corresponding conceptual KHT, referenced to the lettering in the figure, is illustrated as KHT1.[3] The bottom row, each entry of which is the summation of the cell entries in the column above, shows the net effects on the affected stakeholders, i.e., the conventional consumer surplus and producer surplus measures, and the tax revenue received by the public. Summing these net effects across columns yields the net-efficiency cost of the tax, -(C+D), in the rightmost bottom cell of the tableau. The net cost of the tax can also be generated by ignoring the financial transfers, which net to zero under the Kaldor-Hicks aggregation, and simply assessing the input-output valuation. That comparison is displayed as the right-most column in KHT1, which is derived by summing across the stakeholder columns to the left. Adding the value of the lost output (-C+D+E) to the resource savings gain (+E) again yields the tax policy's net cost, -(C+D).

A KHT not only generates net-benefit estimates in the two standard ways just described, but simultaneously provides a fiscal impact assessment -- tax receipts by the Government in the present case -- provided that the jurisdictional entities receiving revenues and/or providing the financing are explicitly represented. If they are represented, the impact of the project or policy on these "public" stakeholders will be displayed consistently with all others.

[3] This example borrows from Krutilla (2005).

The KHT always represents a particular degree of aggregation. Thus, any KHT can be further aggregated, or further disaggregated, to accentuate particularly relevant distinctions. In the context of commodity taxation, for example, one might be interested in comparing the total impact of the tax policy on the private sector, versus the revenues it raises for the public sector. Aggregating across private stakeholders (producers and consumers in this context) yields a second tableau, KHT2, illustrating the distinction.

We now employ the KHT format in a more traditional project appraisal context. KHT3 shows the conceptual KHT for a stylized regional development project. The baseline against which this project is being compared is a "no-build" alternative. As in any such KHT, the cell entries can be interpreted as representing annualized values or net present values.[4]

The regional development project indicated in KHT3 has two components. First, it will expand a road network in an economically-depressed region of a state. Secondly, it will construct and operate a vocational training campus in the same region, to provide technical training to students without traditional college aspirations and/or workers who have become unemployed.

B1 in the tableau represents the net-value of the roadway expansion to road users beyond collected toll charges, while B2 shows the net value for the group of students the campus trains beyond any financial or other costs they incur. Supply-side costs towards the bottom of the KHT are aggregated into two categories: displaced production from the diversion of factors to the project, the value loss of which is -C3, and the production costs of new production, including the time opportunity cost of newly-employed workers, the total of which is –C4.

[4] If some stakeholders face binding period constraints, an explicit period-by-period assessment may be necessary. An example would be the cases of a project supplier who could not accept a financial loss in any year. See Jenkins (1999).

The financial transfers associated with the project include toll charges collected from road users (-T1) and tuition fees collected from students in vocational training (-T2), which partially finance the project. Students also incur a larger income tax liability (-T3) that results from higher work productivity the training stimulates. The State Government also collects funds from taxpayers outside the state, -T4, which incur an opportunity cost of -C1 (assumed to be the deadweight loss of taxation). Taxpayers in the state but outside the project region also contribute (-T5) and there is again an opportunity cost associated with these public monies, -C2 (assumed in this case to be the forgone net benefits of a displaced project in the context of a capital budgeting exercise).[5] The state transfers the funds it collects from the multiple sources from which it receives them to contractors who actually build and operate the projects. These contractors pay wages to newly-employed factors (T6), and income taxes (T8). Newly-employed factors also lose welfare and/or pay income taxes (aggregated as T7). The state government only receives the fractions a, b, and c ($a \leq 0$, $b \leq 0$, $c \leq 0$) of the welfare savings and/or income tax receipts they receive. The federal government collects the fraction of tax payments and welfare savings the state does not receive, i.e., (1-a)T3, (1-b)T7, (1-c)T8.

As always, the right-hand side of the KHT shows the fundamental input-output valuation: the benefits of the project (B1+B2) and its production costs (C3+C4). Also indicated are the opportunity costs of the public finance (C1+C2). The bottom row of the KHT shows the net effects on the indicated stakeholders. These will sum to the fundamental economic evaluation (B1+B2-(C1+C2+C3+C4)), since the financial transfers exchanged among stakeholders cancel out in the summation. Within the KHT itself are indicated the benefit, cost, or transfer components that give rise to the net effects.

[5] C2 will be greater than zero if the displaced alternative yields an NPV greater than zero.

For illustrative purposes, KHT4 assigns numerical values to the benefits, costs, and transfers indicated in the conceptual KHT3, as well as values for a,b,c. (Note that the totals in the net columns may not sum at the single decimal place due to rounding error). KHT4 shows that all stakeholders within the project region at least don't lose, with within-the-project region net benefits totaling to 208.2.[6] The main losers are the out-of-region taxpayers, both in-state and out-of-state, who incur the financing charges and their associated opportunity costs (-70.0). The U.S. federal treasury is actually the largest gainer of any single stakeholder. Aggregating the U.S. treasury with "The Rest of the Country" in fact shows that this combined grouping gains on net.

KHT4 obviously produces detailed information about the project's structure, but it is reasonable to ask: is this level of detail helpful for the decision analysis? I will try to answer that question more fully in the following section, but for now notice that KHT4 could be largely derived from the data needed for the precise valuation of the project's input-output relationship itself, i.e., from the data generated in the course of a CBA of the usual type. First, the benefits estimated in a conventional CBA have to reflect an analysis of the economic behavior of the beneficiaries, whose level of output demand will reflect the charges and taxes they pay, as well as any non-monetized costs (like time given up). This information can be used to fill in all of the values under the beneficiary columns, and the corresponding financial transfers from the beneficiaries to the state and federal governments. On the supply-side, the transfer payments associated with input usage, including factor payments, taxes, and welfare payments, would have to be reckoned to determine shadow prices which measure resource opportunity costs. Thus, the only remaining category needed to flesh out the tableau is the level of state and federal funding.

[6] 208.2=88.0+70.0+50.0+0.2.

Since economic modeling, or sophisticated analysis otherwise, is not needed to determine a project's financing needs, it might seem that the financing category would be relatively easy to establish. In fact, assumptions about project financing often are not clear in the project deliberation stage, and therefore, often are not spelled out in the project analyses itself. Indeed, the specific rationale for the CBA often is to determine, *ex ante*, whether or not net benefits are positive and thus, whether the project merits funding. This methodology approach seems common, for example, in the social and health policy fields for the analyses of relatively small, generic projects or programs, like those to educate high school students about HIV (Wang et. al., 2000), to prevent childhood obesity (Wang et. al., 2003), or to provide treatment programs for substance abusers (French et. al., 2002). The decision issue for these kinds of demonstration projects is whether or not they show positive net benefits, and therefore, should be recommended for funding on a wider scale.

The source of financing can also be ambiguous *ex ante* for projects at the opposite end of the scale spectrum, e.g., large infrastructure or regional development projects. And the political support for such projects may itself reflect a strategic motive to elicit the financing, since political opposition against the "credible commitment" of already-begun construction may be relatively difficult to mount.[7] Thus, clarity about the project's financing may follow after-the-fact for the largest projects, as well as smallest ones – and presumably for those on the scale spectrum in between.

Ambiguity about infrastructure financing is nicely illustrated by the case of the Interstate 69 (I-69) highway project -- a proposed roadway extension through south central Indiana, which became nationally famous though a segment about it in April of 1998 on the NBC

[7] In particular given the public's level of knowledge about the normative implications of "sunk costs."

program "Fleecing of America."[8] The I-69 project has been the subject of a contentious, often bitter, political dispute since the early 1990s. This project's financing has always been unclear and unspecified in any of its numerous assessments, e.g., Cambridge Systematics (1996). It would seem that federal highway transportation trust funds implicitly would have had to have been the assumed funding default for most of the historical period of this project's consideration, although congressional members representing the region over the years have attempted, to date without any success, to obtain earmarks in federal highway bills.[9] However, since January 2005, when Mitch Daniels assumed the governorship and began to assertively formulate the state's transportation policy, the political debate about the project has ramified into a dispute about its financing. At issue is whether to convert some segments of I-69 into toll ways, or finance the project with other funds, such as part of the proceeds from a recent privatization of roadway in northern Indiana.[10] As of the time of the writing of this article, the funding picture for the I-69 project remains as cloudy as ever.

Lack of clarity about financing is no doubt an important reason why financing issues are often not considered within conventional cost-benefit analysis. But of course, an assessment of the project's financing is also not needed to determine a project's overall net benefits in the conventional way. If there are no financing opportunity costs, and the project's accounting domain is large enough to cover all financial transfers, and it is assumed that financing can ultimately be solicited to cover project costs, and that there will not be any stakeholder opposition or performance issues otherwise, then net benefits can be established simply by

[8] As the name of this program suggests, it focuses on exposing wasteful federal spending.

[9] See "Driving Forces: Business Interests Play Big Role in Political Decisions: The Case of Interstate Highway 69," by David Rogers, Staff Reporter, Wall Street Journal, May 22, 1998.

[10] See "I-69 could be a toll road after Connector plan is dropped," by Ron Hawkins, Reporter-Times.com, Tuesday, March 27, 2007.

monetizing input and output values.[11] Applying those assumptions to KHT3, the efficiency impact of the project could simply be determined by comparing the monetized value of time savings and educational benefits (B1+B2) against the project's resource costs (C3+C4).

It is a thesis of this article that the assumptions needed to ignore financing issues in project appraisal are too strong to be reasonable in many cases, and that funding requests could be better justified, in any event, by explicitly profiling the financing transfer as a conceptual category within an otherwise empirically specified KHT. The KHT format could also be used to show the consequence of alternative financing scenarios on stakeholders and net efficiency. For example, for small demonstration studies in the social or health policy area, showing funding agencies the impact of financing alternatives on stakeholders -- including program participants, the administrators implementing the program, the larger society experiencing the social benefits or losses, and not the least, on the funding agency itself -- would provide a more complete picture upon which to base a funding decision than the presentation of a "lump sum" figure for aggregated net benefits. Presumably, the funding agency would be particularly interested in an assessment of alternative financing scenarios which would have the effect of leveraging its own resources.

In the same vein, explicitly profiling financing alternatives within the KHT format for larger projects, like the infrastructure project described in KHT3, would serve the role of making salient the potential consequences, rather than leaving them implicit -- or hotly debated, as is now the case with the I-69 project, without any informational foundation. In this context, the financial impact on different jurisdictional levels is a crucial variable to assess (discussed in Sections 5 and 6).

[11] We might also add the assumption that distributional weighing is not used.

If it can be taken as a premise that the information for an accurately-specified KHT is essentially the same as the information required for the precise estimation of a project's net benefits using the standard approach -- with the exception of the financing, which can be handled by modeling alternative scenarios -- then the question is begged: why hide this information? Why not reveal it? One argument might be that so much information clutters the picture and actually obscures the relevant decision tradeoffs, e.g., the whole of KHT3 versus just the salient comparison (B1+B2)-(C3+C4). But there is not really a trade-off between more and less informational detail in the KHT, since the aggregated information is shown as the boundary row and column, while the associated structural picture is displayed within the tableau itself. And if the detail within the KHT itself is considered excessive, the KHT can be re-aggregated to show a more aggregate resolution of the project's effects. As an example, KHT5 and KHT6 show two other aggregation levels for the project displayed in KHT4. KHT5 aggregates the contractor and state columns in KHT4 into a single entity "State Government", and also aggregates the four transfer rows involving income tax and welfare payments into one row: "Net income tax/welfare". KHT 6 further aggregates the columns of KHT5 to emphasize the regional impact of the project.

If the purpose of the KHT is simply to provide a transparently-integrated picture of the project's effects, which aggregation level to choose becomes essentially an editorial issue. And as illustrated by KHT1 and KHT2, and KHT4, KHT5, and KHT6, more than one aggregation can be displayed to emphasis different aspects. However, the KHT can also be used for stakeholder analysis (discussed in Sections 5 and 6). In that case, the aggregation level must be more carefully chosen to represent all stakeholders with the potential to influence project outcomes.

We now turn to a more complete justification for using the KHT format more generally as an analytical tool in project appraisal.

3. Justification for the KHT Format

The display format of traditional cost-benefit analysis subsumes stakeholder impacts within an invisible background. Augmented versions of the standard CBA format may selectively add some of the missing information. For any representation less than a complete KHT, a question is begged. Could the left out stakeholder effects matter to the efficiency analysis?

Stakeholders represented in the KHT will see the project through the lens of his or her own column. Economists and professionally-competent CBA analysts are the only players involved in the decision-process who are likely to view the project through the lens of the net-effects column on the right-hand side of the tableau. In this sense, economists are the only analysts on the scene who will be advocating on behalf of economic efficiency.

The components that make up the net effects that stakeholders experience can fall into two categories. First are effects over which stakeholders have no voluntary control. One common class of this kind of effect are the financing liabilities stakeholders will incur upon a project's implementation, and the associated opportunity costs (e.g., T4, T5, C1, and C2 in KHT3). A second kind of involuntary effect is the level of public good a stakeholder receives, which will be the same for everyone regardless of anyone's particular valuation. In this context, some individuals will invariably wish to have more of the good at the price at which it is being offered, while others will prefer less. This discrepancy among user valuations is even more acute for large capital projects, like the I-69 project discussed above. The decision to go-ahead with

such a project will satisfy the project's proponents while leaving the project's opponents entirely unsatisfied. And visa versa.

The second class of effects are those over which stakeholders have influence through their own economic behavior. On the demand side, the level of consumption of a private-type output is under the control of stakeholders, who will base their consumption level on the price of the output and/or its non-monetized costs. Similarly on the supply-side, the behavior of input suppliers will reflect their responses to the economic incentives they face.

Whether of the involuntary or voluntary type, there are only special cases where stakeholder effects are not potentially consequential. Consider the special case of only one stakeholder who benefits (or loses), with all of the other stakeholders unaffected, in which case, the net effect on this one stakeholder is the entire economic effect, and the net efficiency perspective of the CBA analyst will dovetail with that of the one impacted stakeholder. A particular example of this situation is sometimes cited in the CBA literature – the case of a project producer who sells output in a perfectly-competitive, undistorted market, while buying inputs from a perfectly-competitive, undistorted market. KHT7 depicts this situation. In this KHT, B refers to the WTP of the beneficiaries of the project's output, R refers to the expenditure/revenue paid/received for the output, E is the expenditure/revenue for the input, and C denotes the cost of the output's production. In this market context, there will be no surplus from the sale of the output, so B=R, nor will there be any rents on inputs, implying that E=C. Thus, R-E, the financial appraisal of the project supplier will equal B-C, the economic assessment of the project analyst, with none of the other stakeholders affected, on net. This situation is usually cited as an atypical benchmark for judging the distinction between financial appraisal and cost-benefit analysis, since it is not likely that R-E=B-C will be anything other than

zero in the particular market context in which the condition is likely to hold (undistorted, competitive markets), and thus, that there would be any reason for government intervention, in the form of a project, in this kind of market context. In short, the symmetry between the project supplier's analytical frame of reference and that of the economic analyst is likely to diverge under precisely the conditions that public projects are likely to have any prospect for improving market allocations.

A more "general" special case is that of a Pareto improvement whereby the project causes more than one stakeholder to benefit without anyone losing. In this case, the economic efficiency frame of reference – being the sum of stakeholder net effects -- will depart from that of any individual stakeholder, but the essential conclusion of all stakeholders, and the efficiency-oriented analyst, will be the same. Everybody will view the project in a favorable light. Thus, in this context, there is limited potential for conflict between the perspectives of individual stakeholders and the economic efficiency frame-of-reference.[12]

However, the Kaldor-Hicks criterion is the commonly-used efficiency standard precisely because Pareto outcomes are thought to be more exceptional than general, along with the added assumption that the exchange of side-payments is not usual. Given the default in the literature that the existence of uncompensated losers is in effect the general case, it does not seem logically consistent to assume that impacts on stakeholders can be taken to be presumptively irrelevant to the analysis. And since economists are the economic efficiency advocates, they in particular should be concerned about the potential for impacted stakeholders to undermine efficient decision outcomes.

[12] There could still be some argumentation over how to distribute surpluses, but this potential issue seems less significant than how to deal with situations in which some stakeholders lose absolutely.

For stakeholders facing involuntarily-imposed project effects, political action for or against the project – or the level of output the project provides -- is the only recourse to attempt to influence outcomes. In this case, efficiency-minded analysts should worry about the possibility of a non-congruence between the outcomes of a political process, which will aggregate the net-effects distribution through a political mechanism, and the economic efficiency objective, produced by summing the net effects using the Kaldor-Hicks criterion.

There is a large political science literature about the ways in which the political process is likely, or not likely, to produce outcomes consistent with economic efficiency (again assuming that side payments are not exchanged); see, for example Coughlin (1981) and Shepsle and Weingast (1984). As a generalization, however, there is no reason to think that the aggregation of net benefits through a political process, or any other non-economic decision process, will be consistent with economic efficiency. Thus, involuntarily-imposed stakeholder effects have the potential to undermine economically-efficient outcomes as, for example, when negatively-affected stakeholders try to block a project which is economically efficient, or positively-impacted stakeholders lobby for a project which imposes efficiency costs.

Notwithstanding, perhaps it still might be argued that focusing on the conventional net-benefit analysis is the economically efficient thing for economists to do, given their professional comparative advantage, with the assessment of the project's possible political ramifications delegated to political scientists only in the event that the efficiency analysis reveals positive net benefits. Implicitly, this is the approach of the traditional CBA. But the logical counter argument would be: why waste the resources to conduct a net-benefit analysis in the first instance if the project will ultimately prove to be politically infeasible? Why not conduct the political analysis first, and bother with the net-benefit estimation only if the project is politically feasible? In fact,

however, the two assessments cannot be divorced -- they must be conducted simultaneously, given the impact of stakeholder behavior on economic efficiency itself. And since economists also have a comparative advantage in assembling KHTs, it's my view that they should get into the game of stakeholder analysis with the information they have to offer. In particular, integrating the analysis through the KHT format would have the important advantage of enabling a complete comparison of project design alternatives. A considered assessment of the way project design parameters could be used to meliorate political disincentives during the project design stage would seem more likely to lead to a suite of politically-feasible project alternatives to consider than the traditional practice of ignoring stakeholder impacts entirely.

Turning to the class of effects over which stakeholders have some voluntary control the questions arise: what level of stakeholder participation will result from different incentive structures? To what degree will disincentives dampen the participation of stakeholders on whom the project depends? Economists traditionally have had much to say about stakeholder impacts of this type; indeed, any supply or demand curve estimation is a "stakeholder" analysis in the sense of showing how stakeholder activity levels respond to different prices. However, the impact of a project's financing on stakeholder behavior is not generally considered in the standard analysis since, as discussed earlier, financing considerations often are not included as part of the standard analysis.

Although I have been arguing that the efficiency analysis and the assessment of stakeholder effects should be integrated, a particular justification for why the recommended stakeholder analysis should be embodied explicitly within the KHT format has not been offered. One reason would be that constructing a KHT itself is an economical and accurate way to generate the stakeholder net effects. On the other hand, if the information is available to estimate

the stakeholder net effects in some other way, a KHT could be derived from the same information. In short, constructing a KHT should not impose an incremental cost relative to any other mode of stakeholder analysis that embodies the same level of information, while at the same time, offering the benefits of clarity and transparency about the structural components of the stakeholder net effects.

The utility of the KHT format for the diverse purposes to which it is suited will be more fully demonstrated in the sections which follow. But before embarking on that discussion, I want to offer an essential qualification. The arguments I have used to justify the KHT format have obviously been theoretical and abstracted from particular contexts. And the examples have been selective: an infrastructure project and, at the opposite end of the scale spectrum, small project cases in the social/health policy fields. It is a reasonable to ask whether the contextual detail left out matters to the essential conclusion, and more particularly, whether there are some classes of projects or project contexts for which the traditional net-benefit evaluation makes more sense than a KHT.

Obviously, it would not be reasonable to assert that all of the theoretical justifications cited for using the KHT format will always hold for all projects independently of the empirical reality of their particular context, or will hold with equal strength across all project contexts, or that the KHT format should always be used. My more limited claim is that the utility of the KHT format is far too overlooked in the CBA field, and its more widespread use would improve the informational foundation for project decision making. In particular, I believe the KHT format should be the default for project appraisal, rather than the exception. That conclusion rests on the assumption that at least one of the several justifications cited for using the KHT format is likely to hold in the general case (though again, not necessarily in all cases). On the other hand, to

argue that the traditional CBA approach should be regarded as the default "best practice", the following conditions should be assumed to generally hold: (1) the project is politically acceptable to all influential constituencies; (2) the incentives facing all stakeholders are consistent with their assumed levels of participation; and (3) the transparency the KHT format offers is not useful, or relevant, for the particular context. While reasonable people can and will differ, I believe that the argument for a KHT default rests on a less strong assumption than the combined set of assumptions required to continue to justify the traditional practice of ignoring stakeholder effects.

In the sections which follow, I will continue to illustrate the utility of the KHT format with selective examples, primarily drawing on the reference example of the infrastructure project described in KHT3. The purpose is to illustrate the kinds of uses to which the KHT format can be put, not to suggest that the illustrated application will always be relevant. A more nuanced appraisal of the utility of the KHT format for different classes of projects and analytic contexts will have to await future research.

4. Using Kaldor-Hicks Tableaus for Transparency and Stakeholder Education

The integrated structure of the KHT format offers a big picture, transparent view lacking in less comprehensive and/or less explicit representations of stakeholder effects. This view can be useful for educating stakeholders, as well as practitioner-analysts, whom themselves may exhibit analytical frames-of-reference that depart in various ways from the economic efficiency standard (see Boardman et. al., 1993). Conceptual Kaldor-Hicks Tableaus (like those illustrated in KHT1, KHT2, KHT3) provide useful intuition about the structure of policies or projects and can always be produced even if the information is not available for empirical specification. Fully-specified KHTs (such as KHT4, KHT5, KHT6) show the magnitude of the project's key

components and their interrelationships in a way which is conceptually consistent, easy to view, and easy to comprehend.

Insight can also be derived from partially-specified, hybrid KHTs. As suggested before, describing the funding transfer as a conceptual category within a KHT could provide useful information to funding agencies -- or to other decision makers. To illustrate the way in which the KHT format could be used to reflect uncertainty about the availability of federal financing within the context of a regional development project, for example, KHT8 shows a modification of KHT4. Beyond revealing the complete structure of the project and stakeholder effects on all parties except for the "State Government" and "Rest of the Country", the partially-specified KHT8 displays the degree of revenue shortfall that must be made up by some means (-58.4); allows the deduction that making up the revenue shortfall, either via state or federal financing, is still likely to yield a project with positive net benefits, because it does not seem plausible that the opportunity cost of the financing, -C1, is going to be 3.6 times higher (211.2/58.4) than the revenue required to finance the project; and finally, suggests that if the finance is entirely provided by federal sources, the "Rest of Country" is still likely to gain, unless the deadweight loss of the finance is 2.25 times higher (131.5/58.4) than the revenues required, which does not seem empirically plausible. Admittedly, deductions with more than one missing value in the KHT will not necessarily be definitive. But portraying the partially-specified KHT can offer useful insight to the decision analyst about the nature of the tradeoffs, even if conclusions are not definitive (further discussed in Section 7).

An important use of the KHT format is to reveal a project's revenue impacts. Viewing the "State Government" column in KHT4 shows that the project is fully financed, while the net-impact on the federal treasury is positive. It is useful to show the revenue effects on affected

governmental entities, whatever they are, due to the general importance of financing constraints. Indeed, the "State Government" could be further disaggregated into various departments to show the inter-departmental impacts of the project.

Another use of the KHT format is to help educate stakeholders and analysts about the distinction between financial transfers and economic variables. This is an objective, in fact, which is reflected in the 2003 iteration of OMB guidelines for regulatory impact analysis (OMB 2003). Table 1 shows the suggested format recommended in the OMB guidelines, while Table 2 applies my interpretation of this format to the project described in KHT4. The OMB format clearly distinguishes transfers from economic variables. But Table 2 does not map out the financial transfers with the clarity of KHT4, e.g., does not display stakeholder impacts. And since the detail in Table 2 is exactly the information needed to develop KHT4, it would be a small step in the next iteration of the OMB guidelines to include a recommendation that the project information in regulatory impact analyses be displayed in the KHT format.

To illustrate how the KHT format might be useful in distinguishing financial transfers from economic effects, consider the common confusion in practitioner-produced CBAs influenced by the economic development literature (see Courant, 1994) or by what Boardman et. al., (1993) label the "spender" perspective[13] in which regional income is treated as a benefit. KHT9 shows the net benefits of a regional development project that better fits the empirical reality of many than KHT4. To justify such a project, practioner-produced analyses often add the regional income of 1050 to the project's net benefits, properly computed, yielding the

[13] According to Boardman et.al., the "spender" frame of reference is the view brought to the analysis by government officials in agencies that have a constituency-support orientation, such as federal or state departments of transportation, agriculture, housing/urban development, education, health and human services, etc. Defining benefits as B, costs as C, and project financing charges as E, the spender view is characterized by considering E, which also represents factor income falling on constituents, as a benefit, making the accounting metric essentially: (B+E)-C. Adopting the default assumption that the financing charges just cover the project's costs (E=C), the spender's accounting effectively becomes: (B+C)-C=>B. It is hard to see how any project would not pass this test!

counterfactual figure 911.5 for the project's net benefits evaluated from the "national" accounting perspective. The display format of the KHT would seem to make that kind of accounting more difficult. Presumably, it would be harder to argue that that regional income is a benefit, in an absolute sense, and easier to see its essential property as a transfer payment, if stakeholders could see that the payment represents a loss in like amount to the state and ultimately, represents a loss to users, and out-of-region taxpayers, as well as to observe the way the payment is expensed within the region itself to cover the project's costs.

Another attractive feature of the KHT display format is to be able to show conceptually-consistent accounting results for different accounting stances. That flexibility is useful for several reasons. First, the appropriate accounting domain for a project's effects has the character of a philosophic issue (See Howe 1986), involving assumptions about jurisdictional "standing" (See Zerbe, 1998). Showing multiple accounting stances allows a project's economic effects to viewed at several scales (as in KHT6) without having to make value judgments about which regions should count in the analysis. This approach is the geographic equivalent of the distributional accounting perspective in which the project's effects on different income classes are simply displayed to the decision maker, rather than being handled normatively within the analysis itself, e.g., through distributional weighting.

It is important to mention two additional issues associated with the accounting stance, which are positive in nature. First, if the accounting stance is not explicitly stated, and it often is not in conventional CBA, a question is begged about what the accounting stance (implicitly) is and whether its specification is internally consistent. If the accounting domain is not clearly specified, it becomes hard to interpret the effects of financial transfers, since those that pass across an accounting boundary impose a financial loss or gain to the accounting unit, while those

within the accounting unit cancel (under the usual assumptions). Ambiguous accounting boundaries do not seem uncommon in CBAs involving regional development components (counting regional income as a benefit in the overall state accounting, as in the example above, is an example). The possible inconsistency of accounting domain specifications within a CBA raises the same kinds of issues about interpretability and information content that result when a project's baseline is not well-specified.

Even if the accounting perspective is at the national level, as it seems implicitly to be in many CBAs, there is always the question: how will jurisdictions at different levels respond to a project's effects? I will argue in the next two sections that jurisdictional stakeholders are as likely, if not more likely, than other stakeholders to exert influence on a project through political pressure or decisions about project participation, and should always be represented in a complete stakeholder analysis. Once jurisdictions are represented as stakeholders within the KHT format, it becomes an easy matter to compare net benefits for alternative accounting domain perspectives.

In sum, clarity about the project's accounting stance, and the implications of different accounting stances for the analysis, are key benefits the KHT format offers.

5. Using Kaldor-Hicks Tableaus to Assess Political Feasibility

"Political behavior" is the only recourse for stakeholders affected by the kinds of project-related effects they cannot voluntarily control through own economic actions. The importance of assessing the way political factors influence project outcomes, and the need to better integrate political factors into project analysis -- or, more generally, into policy analysis -- seems to be gaining momentum in an academic field referred to as "stakeholder analysis" e.g., Lindahl and

Soderqvist (2004); Wieble (2007).[14] A group at the World Bank is also developing models for stakeholder analysis with the objective to assess the degree to which stakeholders can block political reform proposals (Marquette and Scott, 2005). The methodologies employed in these studies seem quite eclectic, involving perspectives from political science, law, and sociology. To what degree might the distributional accounting format of the KHT tableau complement the developing approaches in the field of stakeholder analysis to help assess political constraints on project implementation?

First, it would seem that some aspects of stakeholder behavior are motivated by factors that are not strictly driven by economic impacts of the conventional sort and thus, about which the economic assessment would need to be adjusted to be useful for stakeholder analysis. The offended sense of entitlement stakeholders feel when they are subjected to project effects which are against their wishes and beyond their control comes to mind in this respect. The intensity with which smokers oppose indoor smoking, for example, or smokers support it, seems likely to go beyond the actual consumption value of smoke-free air, or smoke-filled lungs. To accurately assess stakeholder incentives, in this kind of situation, the consumption values would have to be adjusted to reflect the monetary value of the "sense of entitlement" the stakeholders feel about their rights to air space.[15]

But of course, more conventionally-defined economic and financial impacts will also motivate stakeholder behavior. Among others, the financing requirements associated with project proposals (or financial side effects otherwise) raise the prospect of political activity by affected juristidictions. Particularly at the local and state levels, jurisdictions are often faced with fiscal

[14] Known in earlier literature as "political feasibility analysis", e.g., Webber (1986).

[15] The smoker's valuation would also need to reflect the endowment effect associated with the liberty to use the air space for smoking in the status quo before a smoking regulation is passed (See Knetsch 1989).

constraints due to balanced-budget requirements, and the effects of inter-jurisdictional tax competition. Thus, they are likely to be acutely aware of a proposed project's fiscal impact. And since jurisdictions are generally better informed and resourced, and more politically powerful, than the individuals they represent, financial and economic impacts on jurisdictions would appear to be an important variable to represent in a stakeholder analysis.

The KHT is a relevant format for providing a stakeholder analysis of the economic and financial variables that could induce stakeholder political activity. In that role, a KHT would have to be dissagregated carefully to reveal the stakeholders who matter to the political outcome, and the number of stakeholders in each impacted class would have to be established, to generate per capita effects that show the degree to which the project's effects are concentrated or diffused. That variable will obviously affect the degree to which individual stakeholders have an economic incentive to politically mobilize.[16] A KHT modified in this way could be used as the payoff matrix in a game theoretic model, in which the political power and information sets of stakeholders were also added.

Beyond formal modeling, the KHT format would seem to have two basic uses in stakeholder analysis. The first would be to better inform stakeholders and decision-makers with the objective to encourage the acceptance of economically efficient projects, and to help block inefficient projects. For example, KHT3 and KHT4 could be used to undercut the argument by negatively-impacted individuals in the "Rest of the State" that the project funds would yield higher returns in their part of the state, because the KHT format shows that benefits in the project

[16] A related issue is the need to make selective aggregation choices to assure that represented stakeholders are mutually exclusive. Stakeholders affected by a project in more than one way might otherwise show up in a KHT playing more than one role; for example, as a project beneficiary, and also as a taxpayer aggregated along with other tax payers who help finance the project. That boundary fuzziness is not a problem for many purposes, but is likely to reduce the precision of the analysis of stakeholders' economic incentives for political mobilization.

region are covering both the project's financing charge (-T5 in KHT3) and the assumed net-benefit loss (-C2 in KHT3) of the displaced projects the funds would have otherwise funded in the state outside the region. The positive impact on the national treasury, and overall (aggregated) positive net benefit for the rest of the country outside the state (from the treasury receipts) could be used in the national legislative body to support federal funding.

On the other hand using KHT9, the net negative effect on the nation outside the state could be used as an argument to attempt to block federal funding for the represented project. Showing that the regional welfare the project "produces" actually derive to a significant degree from out-of-region transfers could also be cited to help diminish the project's support.

The second major use of the KHT in stakeholder analysis would be to simulate the effects of alternative project design proposals to search for politically acceptable project permutations. The particularly powerful aspect of the KHT for this purpose is that the format would display the complete economic and financial consequences of project design alternatives on all stakeholders. As an example, KHT10 shows another project design alternative for the project shown in KHT4 in which user fees are raised to provide all of the the project's within-state financing. This project alternative is "Pareto Optimal" from the state perspective (at the level of aggregation shown) in the sense that state taxpayers now do not loose and the beneficiaries still experience net gains, though by less than before (compare KHT4 and KHT10). Conceivably, this kind of project redesign might be more politically acceptable than the original. But there is a price to pay in economic efficiency – compare the net benefits in KHT4 and KHT10 – because the higher user fees will reduce the demand for project outputs. Repeated simulations of this type could be used to systematically explore tradeoffs among stakeholder effects and the project's overall economic efficiency.

6. Using Kaldor-Hicks Tableaus to Assess Project Performance

The KHT format could also be used during the project design stage to assist an evaluation of stakeholder participation incentives. The conventional demand analysis of a project's output could be integrated within the KHT format to not only provide an assessment of the economic effect on the stakeholder who will consume the output, but also to show the comprehensive ramifications of varying output demand scenarios on all other stakeholders. Trade-offs associated with the effect of alternative output pricing or tax charges could be systematically simulated with respect to stakeholder participation levels, stakeholder net benefits, and overall project efficiency.

Since the aggregation level of the standard efficiency analysis subsumes impacts on critical stakeholders -- defined here as stakeholders who can voluntarily choose the degree of their participation in a project depending on the economic incentives they face – there is always some risk that the assumed participation levels upon which the analysis is based are not valid. A couple of contexts would seem to be potential candidates for this kind of problem. Demonstrations projects in the health or social policy area often reflect a particular pattern of incentives, for example, the time participants spend in education activities, the compensation level for project administrators, the payment levels to participants for follow up assessments, etc. The recommendation that such a program be expanded based on a positive net-benefit assessment, a common occurrence in this literature, does not seem credible without an explicit recognition of the incentive structure built into the program. Indeed, the lack of detail about the incentives facing critical stakeholders raises another kind of "external validity" issue -- if the project is implemented with a different incentive structure in another context, will the net

benefits still be positive? Thus, there are positive reasons to display stakeholder effects for this kind of project, as well as the normative one raised in Long et. al. (1981).

The conventional practice of leaving the assumptions about project financing implicit also raises questions about whether input suppliers will have the incentives to respond as assumed, and/or whether the suppliers of finance will have an incentive to participate in the project. In the latter respect, the participation of jurisdictional stakeholders is particularly crucial. As representative agents on behalf of their constituent principals, jurisdictions should only be expected to contribute resources to the project if the net benefit for constituents are positive, and/or the jurisdictional financial effects are otherwise positive.

Just as in the analysis of the incentives stakeholders face for political action, the level of stakeholder representation must be carefully chosen in the analysis of the incentives they face for project participation. Take, for example, the representation of "Project Suppliers" and the "State Government" in KHT4. The impact on "Project Suppliers is nearly zero, and by construction the project's impact on the "State Government" is also zero Any time the impact on stakeholders is zero, it is possible to aggregate those stakeholders away seemingly without loss of much information (as in going from KHT4 to KHT5). But notwithstanding this fact, it is probably not reasonable to eliminate these stakeholders from the tableau, since they can influence the viability of the project. It is thus significant that the net effects of the project they experience are non-negative, and it is useful to reveal that information. Moreover, because an accurate reading of the incentives facing critical stakeholders is so important to understanding their behavior and accurately describing the project, a sensitivity analysis or Monte Carlo simulation should be conducted in the project design stage to develop a range of estimated stakeholder effects. It would be reassuring if non-negative effects on critical stakeholders showed up for a reasonable

range of assumptions (for sensitivity analyses) or with a high degree of probability (in Monte Carlo simulations).

If a stakeholder analysis shows that a critical stakeholder experiences negative net effects, the project could be redesigned to avoid the problem. KHT11 shows a project permutation in which the project's financing is not sufficient to cover the suppliers' costs (-60), suggesting that the project is not financially viable. Ignoring this effect on the project supplier, the conventional efficiency analysis would yield a net-benefit estimate of 215. The correct net-benefit estimate is zero, since the project displayed in KHT11 is not functional. Altering the design by raising user fees and taxes on the rest of the state, the "project" described in KHT11 can be converted to that shown in KHT4. This change has both efficiency and distributional consequences, but the baseline for judging those consequences should be zero, since again, the effect illustrated in KHT11 could not be expected to materialize.

An issue to consider about assumed stakeholder participation is the standard practice in the CBA literature of basing the analysis on a single discount rate. This approach does not seem reasonable at the theoretical level, since non-governmental stakeholders, in particular, face quantity rationing in credit markets. Nor is the assumption borne out in empirical assessments. Using a survey-based field experiment in Denmark, Harrison et. al. (2002) showed that the discount rate was roughly normally distributed in the population with a mean of 28.15%. There were significant differences between the lowest income class in the study (32.92%) and the richest class (22.51%), less educated (30.98%) and more educated individuals (20.9%), and unskilled (31.43%) and skilled workers (25.73%). In another study, Warner and Pleeter (2001) examined the decisions of military personnel subject to force reductions over the choice between a lump sum separation payment or an alternative annuity option. Implicit discount rates of

officers varied between 10% and 19%, while those of enlisted personnel ranged between 35% and 54% (with the ranges in both cases a function of the statistical specification).

Following the usual practice, the KHTs in this article implicitly maintain the counterfactual one-discount-rate assumption. There would be a number of consequences of relaxing this assumption, including the fact that the present value of transfer payments exchanged between different stakeholders, like wage payments from the project supplier to newly-employed production factors, would not necessarily sum to zero. But it does seem reasonable to adjust the KHT format to reflect the possibility of different discount rates for different stakeholders, as a way to better assess their incentives to participate and thus, to improve the overall efficiency analysis. That adjustment to the standard analysis would have significant implications for the net-benefit assessment, as well as for the assessment of the effects on the different stakeholders themselves.

7. Beyond Conventional Efficiency Analysis

To this point, the focus on the KHT format has been on its potential to improve the efficiency analysis though better clarity and transparency, and a more explicit reckoning of stakeholder effects with the potential to impact a project's political acceptability and/or its performance. However, the display format of the KHT is ideally suited to more broadly-construed forms of analysis than the conventional economic efficiency evaluation. In this section, I consider three such applications: augmented efficiency analysis that incorporates not-usually-monetized public goods; the normative assessment of distributional effects; and extensions to improve Multi-Criteria Analysis.

Augmented Efficiency Analysis

One possibility would be to augment the standard efficiency analysis to incorporate not-typically monetized public goods related to "warm glow", as it is referred to in the valuation literature (see Portney, 1994; Hanemann 1994). "Warm glow" seems to have several manifestations. One is the "civic pride" associated with hosting athletic events, like the Olympic games, or maintaining a local sports team. Judging from the fact that the public continues to support the construction of sports stadiums in the face of conventional economic analysis that show net-losses otherwise, the associated "civic pride" must have economic value, which could be reflected in an augmented analysis.[17] Another kind of warm glow seems to flow from group empathy or shared public values. Employment would appear to generate "warm glow", given that the employment level is an important issue to voters. Mortgage interest deductions for homeowners are widely supported politically, notwithstanding the negative efficiency effect they impose on the economy. Another warm glow category is what Zerbe (2004) identifies as "moral sentiments." In this case, stakeholders seem to derive economic value from basically altruistic acts. A striking example is illustrated by individuals who are willing to invest their retirement savings in "social choice' accounts. To support their moral beliefs, such investors are willing to pay the forgone rate-of-return difference between a "socially-responsible" portfolio and the higher level achievable with a less restrictive investment standard, effectively volunteering to lower their living standard during retirement. Related to such "moral sentiments" or perhaps the "group empathy" sentiment referred to above is a category of public good Harberger refers to as "basic needs" externalities. This is the feeling of concern that better-off citizens have about the "basic needs" of the poorest segments of the population, and could be manifest as a willingness

[17] See Rosenthraub (1999) for an assessment of the conventionally-measured economic effects of new stadium construction.

to pay, in charitable donations or tax dollars, to support the improvement of a broad range of services for the poor, including child nutrition, preschool education, day care, and family health (Harberger 1984).[18]

These kinds of public goods can be reflected within the KHT format. KHT12 modifies KHT9 to allow for the fact that the residents of "Rest of State" might derive "warm glow" from the regional development of the particularly undeveloped, low income region of the state in which the project is sited. This value would have to be monetized, and how to do so credibly is the subject of a large discussion (Hanemann, 1994). However, beyond the usual rules required for the accurate elicitation of valuations in CV studies, the KHT format itself might be useful for assisting the valuation of this class of public goods. As part of the survey, the respondents could be shown the tableau with all values filled in but that of the unmonetized public good.[19] Having the project's effects fully explained could be helpful for a respondent's valuation, with the issue being whether the value of the public good to "Rest-of-State" residents would be large enough to exceed their tax liability by enough to make the project's NPV positive. The value for warm glow indicated in KHT12 reflects the particular outcome where the magnitude of the "warm glow" valuation is large enough to tip the project accounting into the positive range. Note that the incorporation of "warm glow" into the accounting framework in this way has the advantage of preserving the conceptual orientation of the conventional CBA accounting, and is consistent

[18] In addition to such kinds of public goods, there might also be "public bads" that could be reflected in the analysis. For example, just as one could expect political candidates to tout their policy stances on behalf of high employment, one could also expect, with few exceptions, that they will avoid pledges to decriminalize drug use, or prostitution. The "cool glow" associated with the latter activities qualify them as "public bads," the negative value of which tips the balance toward maintaining their criminalization, notwithstanding the associated enforcement costs.

[19] The aggregation level would have to be carefully chosen in this case to not overwhelm the respondent with information.

with Zerbe's modified KHM criterion (Zerbe 2004) and the Harbeger approach to basic needs externalities (Harberger 1984).

Normative Assessment of Distributional Effects

The KHT display format seems particularly well-suited to the normative assessment of distributional effects. The income level of different classes of stakeholders could be noted and reckoned in the decision-making. If there was sufficient variation within groups of stakeholders, the stakeholders could be further disaggregated by income class or, alternatively, the tableau could be re-aggregated to show the project's effects by income class. The format would be conducive to whatever methodology approach is adopted for addressing distributional effects, most obviously, simply displaying the distributional information, and letting the decision maker decide. However, the KHT format is also well suited to incorporating basic needs externalities – consistent with the procedure followed above to incorporate into the analysis the "warm glow" associated with regional development.

The KHT format could be adapted to an explicit system of distributional weighting. This method would have the result of fundamentally changing the usual picture, since transfers among parties subject to distributional weights will not sum to zero.

However distributional issues are handled within the KHT format, the format would allow project alternatives to be explicitly compared by their stakeholder/income class impacts, as well as their net efficiency effect. That additional information could be useful to the decision-making and conceivably, decisive in the choice among project alternatives.

Improving MCA Analysis

Yet another application of the KHT format would be improve the conceptual foundation of Multi-Criteria Analysis (MCA).[20] MCA is often suggested as the default alternative to CBA when it is not possible to monetize project effects, either partially or fully (Boadman and Vining, 2006; Dogson et. al., 2001; Gamper et. al., 2006). An early step in MCA is to develop a set of project alternatives (options), and a series of attributes or criteria against which to compare them. For example, in an assessment of a decision about constructing a snow avalanche barrier, three types of barriers were considered as alternatives, and the criteria used to compare them were direct financial cost, biodiversity loss, number of people affected, and degree of subsidization required from the national level (Gamper et. al., 2006). An MCA approach to considering inland waterway infrastructure in Europe identified "core" criteria across the region as investment costs, operation and maintenance costs, transit costs, traffic safety, environmental impact, spatial and regional effects, and non-traffic related impacts (ESCS et. al., 1996). Criteria/attributes are generated by a mix of expert opinion and stakeholder-generated assessment (Dogson et. al., 2001).

Once criteria/attributes are identified they are given a numerical scoring by various means to indicate scale differences among them, and then numerical weights are assigned to each attribute/criterion to indicate the relative weight it should have in the decision-making. The weighted-scores for each attribute/criterion are then summed into an overall index number to indicate a numerical ranking of each option.[21]

[20] Also called "Multi-Attribute Analysis" (MAA).

[21]This discussion abstracts from complexities in how the scores and weights are generated, and various ways they might be aggregated. See Dogson et. al.(2001).

It would seem that there are number of potential methodology issues associated with MCA. The main problem I see is in the way the criteria/attributes are identified, which is seemingly without any conceptual framework. The criteria/attributes seem to be largely ad hoc assemblages consisting of outputs (e.g., environmental impacts, safety), inputs (level of employment), financial transfers (e.g., level of national subsidization), values of inputs (costs), etc. It does not seem logical that the inability to monetize project effects should *ipso facto* mean the abandonment of a conceptual framework for discussing them. Indeed, I would suggest a thought experiment to assess the conceptual consistency of the attributes/criteria identified in a MCA: if they could be monetized and summed, would the result have any interpretable meaning?

The key to passing this conceptual-consistency standard would involve two steps. First, it should be recognized that all project effects will ultimately impact stakeholders; hence, attributes/criteria should always be defined as stakeholder effects. Once this step is taken, a conceptual KHT, like KHT3, should be developed for each option to generate a consistent and complete conceptual framework for assessing the net effects stakeholders will experience. Not only would the summation of the net effects so defined give the usual CBA measure of net benefits, but the summation process could not be criticized on the grounds raised in the MCA literature that different criteria/attributes may not exhibit "mutual independence of preferences." See Dogson et. al. (2001). In the usual case, the assumption that well-defined stakeholders are viewing reality from the perspective of their own column in the KHT -- independently of how other stakeholders are regarding their particular columns – does not seem particularly strong. Even in the non-traditional case where some stakeholders exhibit "warm glow" about the welfare of other stakeholders, it seems reasonable to assume that the implicit social welfare function

linking stakeholder net-effects could be regarded as separable (in stakeholder net-effects). In short, the usual assumption implicit in the aggregation standard embodied in the Kaldor-Hicks criterion seems reasonable to maintain.

Once the initial step is taken of generating a conceptually accurate picture of stakeholder effects, there are several possibilities:

(1) All outputs, inputs, and financial transfers are monetizable; in which case, the analysis is a complete KHT-based CBA.

(2) All outputs, inputs, and financial transfers are monetizable, and stakeholder effects are assigned distributional weights. In which case, the analysis is a distributionally-weighted CBA.

(3) Only some outputs, inputs, and financial transfers are monetized. In this case, the analyst should at least consider attempting relatively ad hoc, back-of-the-envelope valuation procedures, with sensitivity analysis or Monte Carlo simulation used to assess uncertainties, before turning to the MCA approach. For it does not seem likely that the MCA approach would necessarily generate scores and distributional weights that are any more credible than (relatively) ad hoc economic valuations, and the MCA approach would lack the payoff of converting the analysis into an interpretable CBA. As an example of the approach I am suggesting, consider KHT13, which is derived from KHT9. It reflects the case that the monetary value for regional warm glow is unknown (labeled Y), and that there are unmonetized social benefits to regional development (crime reduction, lower social service burdens) labeled x1, x2, x3, x4, and x5, which fall on all within-region residents (including the added group “other regional residents”). To deal with this situation, one approach would be to use “benefit transfers”; for example, estimates of the per capita social benefits associated with the scale of development the project will induce, which would then be applied to the number of stakeholders in each category (giving monetary

valuations for the x entries in KHT13). Once that step is undertaken, an analyst might divide the residual Y valued needed for the project to break even by the number of residents outside the region, and consider whether the resulting per capita WTP figure "seems reasonable" in magnitude as a warm glow valuation. Or KHT13 could simply be presented to "decision makers" and "the public" with the values left unmonetized, as information to inform the process.

(4) In the limiting case for which monetary information is comprehensively lacking, the recommendation would be to generate a conceptual KHT, and have the analysts and stakeholders who would normally be generating scores and weights in the usual MCA context focus on doing so for the net-stakeholder effects at the bottom of the tableau. At least this process would (a) assure that everyone really understood the project's structure and (b) help assure that the linear summation of weighted scores would be credible. In short, the final option is to conduct a MCA, but have the analysis focused on a conceptually-consistent definition of attributes/criteria as stakeholder net effects.

8. Conclusions and Recommendations

I have argued that the transparent display format of the KHT offers a number of advantages in the role of a decision-making aid, and should be used more widely in the field of cost-benefit analysis. A central theme has been that the big picture view of the KHT could be used as an educational device to better inform decision-makers and stakeholders, including those lacking formal economics training, with the goal to inject clarity into the discourse about project decision making. In this context, an important advantage of the KHT is to make explicit assumptions about a project's accounting domain, and to offer a fiscal impact assessment and the two alternative ways of measuring economic efficiency within a transparent and conceptually-

consistent framework. The principles behind KHT construction are also basic enough that those without formal economics training should, with some guidance, be able to learn them.

A conceptual KHT can always be produced for any project, and provides a rigorous framework for identifying the structure of the social production function upon which the project is based. The incremental cost of empirically specifying the tableau should be relatively low, at least measured against the effort required for the often sophisticated modeling and analysis needed to conventionally estimate benefits and costs. Having a KHT as the target output for empirical specification should also encourage the degree of stakeholder analysis needed to assure the project's benefits and costs are accurately depicted. Thus, the format has the potential to improve the quality of the efficiency analysis, as well as to offer a transparent accounting of stakeholder effects which could be considered further in a normative assessment of the project's distributional impact.

Further research and/or actual CBA applications are obviously needed to better define the application contexts in which the KHT format could be particularly relevant. However, some presumptive conclusions can be drawn about the utility of the format. For infrastructure projects, regional development projects, or regulatory policies or programs large enough to be subject to a Regulatory Impact Analysis (RIA), a KHT should always be empirically specified -- to reduce the risk of double counting, to assure that politically-influential stakeholders are represented, and to make an assessment of the significance of cross-jurisdictional financing implications. On the other hand, KHTs should also be used for small-scale projects in the areas of social and health policy, to assure that participation incentives are accurately reflected in the efficiency analysis, and to enable a normative assessment of distributional issues, since the beneficiaries of such projects generally have low incomes. Between these scale extremes -- and for small projects in

areas other than social or health policy -- presumptive conclusions are harder to draw. Better assessment in this area obviously deserves further attention.

There are a number of other areas were additional research and/or application is also needed. The utility of the KHT format for simulation in the project design phase was mentioned, and I offered some rather simple examples. Applying and extending the KHT format for simulation would be useful. Particularly interesting would be to link a KHT to forecasting models of project supply and demand, or to different financing scenarios, to observe stakeholder impacts under alternative scenarios. Such modeling could also offer insights for the field of stakeholder impact analysis, which, with the notable exception of Jenkins (1999), seems to have been largely developed by non-economists. This is a field where outreach and exchange among disciplines could lead to improvements in the state of the art.

Another venue for additional research would be the extension of the principles of KHT construction into the realm of computable general equilibrium (CGE) modeling. Of course, CGE models offer the state-of-the art in terms of efficiency measurement and the display of distributional effects. But CGEs are a black-box to all but the specialists. Could CGEs be constructed from a stakeholder perspective that would display project effects in ways that non-specialists could comprehend? That would be an interesting question to answer.

Similarly, further exploration of the way the KHT format could be extended to the field of Multi-Criteria Analysis would also be worth undertaking. As in the case of stakeholder impact analysis, cross-disciplinary exchange could pay dividends in this area.

The KHT format is really a rather simple idea but one with a potentially large reach. I believe it offers the promise of expanding the concept of “project appraisal” and improving the standard practice of CBA. It also has the potential to yield useful information in project decision

contexts that go beyond the conventional efficiency evaluation, including the normative assessment of distributional consequences, stakeholder impact analysis, and MCA.

Figure 1: Kaldor-Hicks Tableau of Commodity Tax

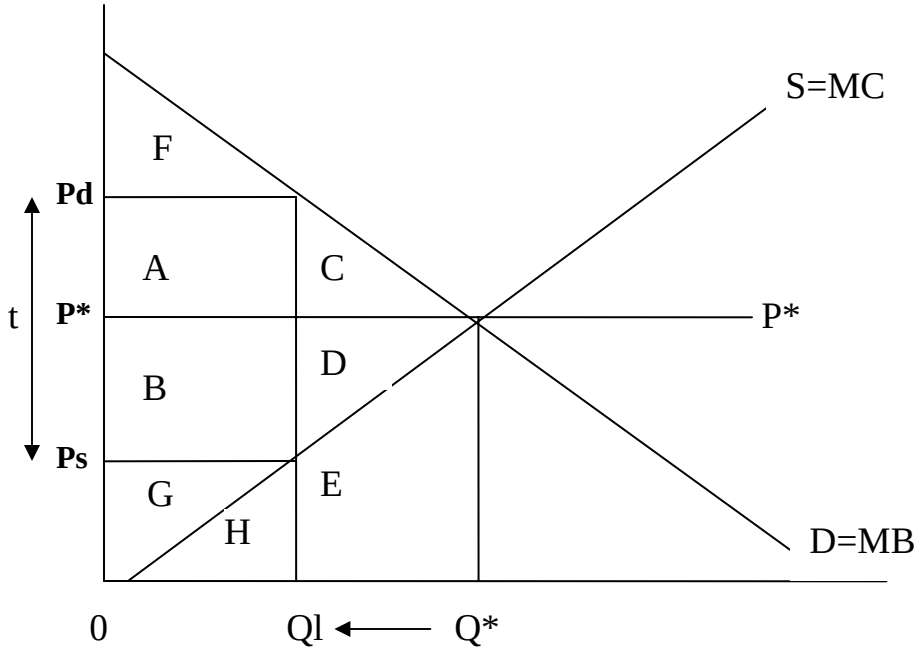

Table 1:
OMB#: **Agency/Program Office**
Rule Title:
RIN# **Date:**

Category	*Primary Estimate*	*Minimum Estimate*	*Maximum Estimate*	*Source Citation (RIA, preamble, etc.)*
BENEFITS				
monetized benefits				
Annualized quantified, but unmonetized, benefits				
(unquantified) benefits				
COSTS				
Annualized monetized costs				
Annualized quantified, but unmonetized, costs				
Qualitative (unquantified) costs				
TRANSFERS				
Annualized monetized transfers: "on-budget"				
From whom to whom?				
Annualized monetized transfers: "off-budget"				
From whom to whom?				

Category	*Effects*	*Source Citation (RIA, preamble, etc.)*
Effects on State, local, and/or tribal governments		
Effects on small businesses		
Effects on wages		
Effects on growth		

Source: Office of Management and Budget. Circular A-4. September 17, 2003

Table 2: Applying OMB Guidelines to Base Case Regional Development Project

BENEFITS	
Net Value of Time Savings	**438.0**
Net Educational Benefits	**400.0**
TRANSFER PAYMENTS	
User Charges	**350.0 from road users to the state government** **250.0 from student beneficiaries to the state government**
Income Tax	**40.0 from student beneficiaries to the state government** **40.0 from student beneficiaries to the U.S. Treasury** **66.5 from project suppliers to the state government** **66.5 from project suppliers to the U.S. Treasury**
Federal Financing	**58.3 from outside the state to the state government**
State Financing	**58.3 from the state outside the project region to the state government**
Project Financing (Construction and Operational Costs Aggregated)	**848.2 from the state government to project suppliers**
Factor Payments (Associated with New Factor Supply)	**300.0 from project suppliers to newly-employed production factors**
Welfare and/or Income Tax	**25.0 from newly-employed production factors to the state government** **25.0 from newly-employed production factors to the U.S. Treasury**
COSTS	
Productivity Loss From Displacing Production Factors from outside the Region	**415.0**
Production Cost Associated with New Factor Supply within Project Region	**200.0**

KHT1

	Consumers	Producers	Government	Net
Benefit (Q*-Q1)	-(C+D+E)			-(C+D+E)
Cost (Q*-Q1)		+E		+E
Transfers				
Revenue/ Expenditure (Q*-Q1)	(D+E)	-(D+E)		0
Tax Payments (0-Q1)	-A	-B	(A+B)	0
Net	-(A+C)	-(B+D)	(A+B)	-(C+D)

KHT2: Commodity Tax Tableau Re-aggregated

	"Private"	"Public"	Net
Benefits (Q*-Q1)	-(C+D+E)		-(C+D+E)
Cost (Q*-Q1)	+E		+E
Tax Payments (0-Q1)	-(A+B)	(A+B)	0
Net	-(A+B+C+D)	(A+B)	+(C+D)

KHT3, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS									
Net Value of Time Savings	**B1**								**B1**
Net Educational Benefits		**B2**							**B2**
TRANSFER PAYMENTS									
User Charges	**-T1**	**-T2**				**T1+T2**			**0**
Income Tax		**-T3**				**aT3**		**(1-a)T3**	**0**
Federal Financing						**T4**	**-T4-C1**		**-C1**
State Financing					**-T5-C2**	**T5**			**-C2**
Project Financing (Construction and Operational Costs Aggregated)				**T1+T2+aT3 +bT7+cT8+T4 +T5**		**-(T1+T2+aT3 +bT7+cT8 +T4+T5)**			**0**
Factor Payments (Associated with New Factor Supply)			**T6**	**-T6**					**0**
Welfare and/or Income Tax			**-T7**			**bT7**		**(1-b)T7**	**0**
Income Tax				**-T8**		**cT8**		**(1-c)T8**	**0**
COSTS									
Productivity Loss From Displacing Production Factors from Outside the Region				**-C3**					**-C3**
Production Cost Associated with New Factor Supply within Project Region			**-C4**						**-C4**
NET	**B1-T1**	**B2-T2-T3**	**T6-T7-C4**	**(T1+T2+aT3 +bT7)+T4+T5 - (T6+ (1-cT8) +C3)**	**-T5-C2**	**0**	**-T4-C1**	**(1-a)T3 +(1-b)T7 +(1-c)T8**	**B1+B2 -(C1+C2) -(C3+C4)**

KHT4, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS									
Net Value of Time Savings	**438**								**438**
Net Educational Benefits		**400**							**400**
TRANSFER PAYMENTS									
User Charges	**-350.0**	**-250.0**				**600.0**			**0.0**
Income Tax		**-80.0**				**40.0**		**40.0**	**0.0**
Federal Financing						**58.3**	**-70.0**		**-11.7**
State Financing					**-70.0**	**58.3**			**-11.7**
Project Financing (Construction and Operational Costs Aggregated)				**848.2**		**-848.2**			**0.0**
Factor Payments (Associated with New Factor Supply)			**300.0**	**-300.0**					**0.0**
Welfare and/or Income Tax			**-50.0**			**25.0**		**25.0**	**0.0**
Income Tax				**-133.0**		**66.5**		**66.5**	**0.0**
COSTS									
Productivity Loss From Displacing Production Factors from Outside the Region				**-415.0**					**-415.0**
Production Cost Associated with New Factor Supply within Project Region			**-200.0**						**-200.0**
NET	**88.0**	**70.0**	**50.0**	**0.2**	**-70.0**	**0.0**	**-70.0**	**131.5**	**199.7**

KHT5	Road User	Student Beneficiaries	New Employed Factors	State Government	Rest of State	Rest of Country	Net
BENEFITS							
Net Value of Time Savings	438						**438**
Net Educational Benefits		400					**400**
TRANSFERS							
User Charges	-350	-250		600			**0**
Federal Financing				58.4		-70	**-11.7**
State Financing				58.4	-70		**-11.7**
Net Income Tax/Welfare		-80	-50	-1.5		131.5	**0**
Factor Payments			300	-300			**0**
COSTS							
Productivity Loss				-415.2			**-415.2**
Production Cost			-200				**-200**
NET	**88**	**70**	**50**	**0**	**-70**	**61.5**	**199.5**

KHT6	Project Region	State Outside Region	Rest of the Country	Net
BENEFITS				
Net Value of Time Savings	438			**438**
Net Educational Benefits	400			**400**
TRANSFERS				
User Charges	-600	600		**0**
Federal Financing		58.4	-70	**-11.7**
State Financing		-11.7		**-11.7**
Net Income Tax/Welfare	-130	-1.5	131.5	**0**
Factor Payments	300	-300		**0**
COSTS				
Productivity Loss		-415.2		**-415.2**
Production Cost	-200			**-200**
NET	**208.0**	**-70.1**	**61.5**	**199.5**

KHT7	Buyer	Project Producer	Input Supplier	Net
Benefit	B			B
Transfer1	-R	R		0
Transfer 2		-E	E	-C
Cost			-OC	
Net	B-R=0	R-E= (probably zero)	E-OC=0	B-C=R-E= (probably zero)

KHT8	Road User	Student Beneficiaries	New Employed Factors	State Government	Rest of State	Rest of Country	Net
BENEFITS							
Net Value of Time Savings	438						**438**
Net Educational Benefits		400					**400**
TRANSFERS							
User Charges	-350	-250		600			**0**
Federal Financing				R		-(R+C1)	**-C1**
State Financing				58.4	-70		**-11.7**
Net Income Tax/Welfare		-80	-50	-1.5		131.5	**0**
Factor Payments			300	-300			**0**
COSTS							
Productivity Loss				-415.2			**-415.2**
Production Cost			-200				**-200**
NET	**88**	**70**	**50**	**R-58.4**	**-70**	**131.5-(R1+C1)**	**211.2-C1**

KHT9, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS									
Net Value of Time Savings	**400.0**								**400.0**
Net Educational Benefits		**325.0**							**325.0**
TRANSFER PAYMENTS									
User Charges	**-350.0**	**-250.0**				**600.0**			**0.0**
Income Tax		**-65.0**				**32.5**		**32.5**	**0.0**
Federal Financing						**259.2**	**-311.0**		**-51.8**
State Financing					**-70.0**	**58.3**			**-11.7**
Project Financing (Construction and Operational Costs Aggregated)				**1050.0**		**-1050.0**			**0.0**
Factor Payments (Associated with New Factor Supply)			**300.0**	**-300.0**					**0.0**
Welfare and/or Income Tax			**-50.0**			**25.0**		**25.0**	**0.0**
Income Tax				**-150.0**		**75.0**		**75.0**	**0.0**
COSTS									
Productivity Loss From Displacing Production Factors from Outside the Region				**-600.0**					**-600.0**
Production Cost Associated with New Factor Supply within Project Region			**-200.0**						**-200.0**
NET	**50.0**	**10.0**	**50.0**	**0.0**	**-70.0**	**0.0**	**-311.0**	**132.5**	**-138.5**

KHT10, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS									
Net Value of Time Savings	**430.0**								**430.0**
Net Educational Benefits		**390.0**							**390.0**
TRANSFER PAYMENTS									
User Charges	**-380.0**	**-279.5**				**659.5**			**0.0**
Income Tax		**-78.0**				**39.0**		**39.0**	**0.0**
Federal Financing						**58.3**	**-70.0**		**-11.7**
State Financing						**0.0**			**0.0**
Project Financing (Construction and Operational Costs Aggregated)				**848.3**		**-848.3**			**0.0**
Factor Payments (Associated with New Factor Supply)			**300.0**	**-300.0**					**0.0**
Welfare and/or Income Tax			**-50.0**			**25.0**		**25.0**	**0.0**
Income Tax				**-133.0**		**66.5**		**66.5**	**0.0**
COSTS									
Productivity Loss From Displacing Production Factors from Outside the Region				**-415.0**					**-415.0**
Production Cost Associated with New Factor Supply within Project Region			**-200.0**						**-200.0**
NET	**50.0**	**32.5**	**50.0**	**0.3**	**0.0**	**0.0**	**-70.0**	**130.5**	**193.3**

KHT11, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS									
Net Value of Time Savings	**450.0**								**450.0**
Net Educational Benefits		**400.0**							**400.0**
TRANSFER PAYMENTS									
User Charges	**-300.0**	**-250.0**				**550.0**			**0.0**
Income Tax		**-80.0**				**40.0**		**40.0**	**0.0**
Federal Financing						**50.0**	**-60.0**		**-10.0**
State Financing					**-60.0**	**50.0**			**-10.0**
Project Financing (Construction and Operational Costs Aggregated)				**775.0**		**-775.0**			**0.0**
Factor Payments (Associated with New Factor Supply)			**300.0**	**-300.0**					**0.0**
Welfare and/or Income Tax			**-50.0**			**25.0**		**25.0**	**0.0**
Income Tax				**-120.0**		**60.0**		**60.0**	**0.0**
COSTS									
Productivity Loss From Displacing Production Factors from Outside the Region				**-415.0**					**-415.0**
Production Cost Associated with New Factor Supply within Project Region			**-200.0**						**-200.0**
NET	**150.0**	**70.0**	**50.0**	**-60.0**	**-60.0**	**0.0**	**-60.0**	**125.0**	**215.0**

KHT12, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS									
Net Value of Time Savings	**400.0**								**400.0**
Net Educational Benefits		**325.0**							**325.0**
“Warm Glow” Regional Development					**140.0**				**140.0**
TRANSFER PAYMENTS									
User Charges	**-350.0**	**-250.0**				**600.0**			**0.0**
Income Tax		**-66.0**				**33.0**		**33.0**	**0.0**
Federal Financing						**259.2**	**-311.0**		**-51.8**
State Financing					**-70.0**	**58.3**			**-11.7**
Project Financing (Construction and Operational Costs Aggregated)				**1050.5**		**-1050.5**			**0.0**
Factor Payments (Associated with New Factor Supply)			**300.0**	**-300.0**					**0.0**
Welfare and/or Income Tax			**-50.0**			**25.0**		**25.0**	**0.0**
Income Tax				**-150.0**		**75.0**		**75.0**	**0.0**
COSTS									
Productivity Loss From Displacing Production Factors from Outside the Region				**-600.0**					**-600.0**
Production Cost Associated with New Factor Supply within Project Region			**-200.0**						**-200.0**
NET	**50.0**	**9.0**	**50.0**	**0.5**	**70.0**	**0.0**	**-311.0**	**133.0**	**1.5**

KHT13, Regional Development Project	Road Users (Within Region)	Student Beneficiaries (Within Region)	Newly-Employed Production Factors (Within Region)	Project Suppliers (Aggregated)	Other Regional Residents	"Rest of the State" (Outside Region)	"State Government" (Departments Aggregated)	"Rest of the Country" (Outside State)	U.S Treasury	NET
BENEFITS										
Net Value of Time Savings	**400.0**									**400.0**
Net Educational Benefits		**325.0**								**325.0**
Warm Glow Regional Development						**Y**				**Y**
Social Benefits	x_1	x_2	x_3	x_4	x_5					$\sum_{i=1}^{n} xi$
TRANSFER PAYMENTS										
User Charges	**-350.0**	**-250.0**					**600.0**			**0.0**
Income Tax		**-65.0**					**32.5**		**32.5**	**0.0**
Federal Financing							**259.2**	**-311.0**		**-51.8**
State Financing						**-70.0**	**58.3**			**-11.7**
Project Financing (Construction and Operational Costs Aggregated)				**1050.0**			**-1050.0**			**0.0**
Factor Payments (Associated with New Factor Supply)			**300.0**	**-300.0**						**0.0**
Welfare and/or Income Tax			**-50.0**				**25.0**		**25.0**	**0.0**
Income Tax				**-150.0**			**75.0**		**75.0**	**0.0**
COSTS										
Productivity Loss (Displacement)				**-600.0**						**-600.0**
Production Cost (Supply Expansion)			**-200.0**							**-200.0**
NET	x_1**+50**	x_2**+10**	x_3**+50**	x_4	x_5	**Y-70**	**0.0**	**-311.0**	**132.5**	$Y+\sum_{i=1}^{n} x\,i-138.5$

References

Boardman, A., D. Greenbert, A. Vining, and D. Weimer. *Cost-Benefit Analysis: Concepts and Practice, 3rd Edition*, pp 488-506. *(*Upper Saddler River*, N.J:* Pearson, Prentice Hall, 2006*).*

Boardman, A., A. Vining, and W. Waters. Costs and benefits through bureaucratic lenses: Example of a highway project, *Journal of Policy Analysis and Management* 12: 532-555, 1993.

Boyd, R.G., K. Krutilla, and W. K. Viscusi. Energy taxation as a policy instrument to reduce CO_2 emissions; A net benefit analysis, *Journal of Environmental Economics and Management* 29: 1-24, 1995.

Cambridge Systematics, Inc. *Report: Economic Impacts of the Southwest Indiana Highway Corridor. P*repared for the Indiana Department of Transportation, 1996.

Coughlin, P. Electoral outcomes with probabilistic voting and nash social welfare maxima, *Journal of Public Economics* 15: 113-121, 1981.

Courant, P. How would you know a good economic development policy if you tripped over one? Hint: Don't just count jobs, *National Tax Journal* 47: 863-881, 1994.

Dogson, J., M Spackmann, A Pearman, and L. Philips. *Multi-Criteria Analysis: A Manual.* Office of the Deputy Primer Minister, Creating Sustainable Communities, 2001.

ECSC-EC-EAEC. *Cost-Benefit and Multi-Criteria Analysis For Inland Waterways Infrastructure*. Report prepared by Plance Consulting-GMBH in cooperation with NEA Transportonderzoek en –opleiding, 1996.

French, M., K McCollister, J. Acciola, J. Durell, and R. I. Stephens. Benefit-cost analysis of addiction treatment in Arkansas: Specialty and standard residential programs for pregnant and parenting women, *Substance Abuse* 23: 31-51, 2002.

Gamper, C.D., M. Thoni, and H. Week-Hannemann. A conceptual approach to the use of Cost Benefit and Multi-Criteria Analysis in natural hazard management, *Natural Hazards Earth System Science* 6: 293-302, 2006.

Hanemann, W. Valuing the environment through contingent valuation, *The Journal of Economic Perspectives* 8: 19-43, 1994.

Harberger, A. C. Three basic postulates for applied welfare economics: An interpretive essay, *Journal of Economic Literature* 9: 785-797, 1971.

_____ Basic needs versus distributional weights in social cost-benefit analysis, *Economic Development and Cultural Change* 32: 455-474, 1984.

Harrison, G., I. Morten, and M. Williams. Estimating individual discount rates in Denmark: A field experiment, *The American Economic Review* 92: 1606-1617, 2002.

Howe, C.W. Project benefits and costs from national and regional viewpoints: Methodological issues and case study of the Colorado-Big Thompson Project, *Natural Resources Journal* 26: 77-93, 1986.

Jenkins, G. Project analysis and the World Bank, *The American Economic Review* 87: 38-42, 1997.

_____ Evaluation of stakeholder impacts in cost-benefit analysis, *Impact Assessment and Project Appraisal* 17: 87-96, 1999.

Knetsch, J.L. The endowment effect and evidence of nonreversible indifference curves, The American Economic Review 79: 1277-1284, 1989.

Krutilla, K. Using the Kaldor-Hicks Tableau format for cost-benefit analysis and policy evaluation, *Journal of Policy Analysis and Management* 24: 864-875, 2005.

Lindahl, T. and T. Soderqvist. Building catchment-based environmental programme: A stakeholder analysis of wetland creation in Scania, Sweden, *Regional Environmental Change Journa*l 4: 132-144, 2004.

Long, D. and C.D. Maller, C.V.D. Thornton, Evaluating the benefits and costs of the jobs corps, *Journal of Policy Analysis and Management* 1: 55-76, 1981.

Marquette, H, and Z. Scott, Getting to grips with politics: Political analysis at the World Bank and DfID, Paper presented at the *IDD Seminar Series*, International Development Department, University of Birmingham, October 2005.

OMB (Office of Management and Budget), Circular A-4: *Regulatory Analysis.* Washington D.C., September 17, 2003.

Portney, P. The contingent valuation debate: Why economists should care, *The Journal of Economic Perspectives* 8: 3-17, 1994.

Rosenthraub, M.S. *Major League Losers: The Real Cost of Sports and Who's Paying for it.(*New York, NY: Basic Books, 1999*)*

Shepsle K. A., and B. R. Weingast. Political solutions to market problems, *American Political Science Review* 78, 418-434, 1984.

Vining, A. and A. Boardman, Metachoice in policy analysis, *Journal of Comparative Policy Analysis* 8: 77-87, 2006.

Wang, L., Y. M. Davis, L Robin, J. Collins, K. Coyle, E. Baumer, Economic evaluation of Safer Choices: a school-based human immunodeficiency virus, other sexually transmitted diseases, and pregnancy prevention program, *Archives of Pediatrics and Adolescent Medicine* 154, 1017-1024, 2000.

Wang, L., Q. Yang, R. Lowry, and H. Wechsler, Economic analysis of a school-based obesity prevention program, *Obesity Research* 11, 1313-1323, 2003.

Warner, J.T. and S. Pleeter, The personal discount rate: Evidence from military downsizing programs, *American Economic Review 91:33-53, 2001*.

Webber, D. J. Analyzing political feasibility: political scientists' unique contribution to policy analysis, *Policy Studies Journal* 14: 545-564 (1986).

Weibel, C.M. An advocacy coalition framework approach to stakeholder analysis: Understanding the political context of California marine protected area policy, *Journal of Public Administration Research and Theory* 17:95-117, 2007.

World Bank, *The World Bank Handbook of Investment Operations*, pp. 105-225. (Washington D.C.: The World Bank, 1996).

Zerbe, R.O., Comment: Does benefit cost analysis stand alone? Rights and standing, *Journal of Policy Analysis and Management* 10: 96-105 (1991).

_____ Is cost-benefit analysis legal? Three rules, *Journal of Policy Analysis and Management* 17:419-456 (1998)

_____ Should moral sentiments be incorporated into benefit-cost analysis? An example of long-term discounting, *Policy Sciences 37*: 305-318, 2004.