COST-BENEFIT ANALYSIS FOR PROMOTING WELL-BEING IN A DEMOCRATIC SOCIETY

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ABSTRACT

This paper presents an approach to Cost-Benefit Analysis that helps communities find common ground in the choice of policies, regulations, programs and projects that advance collective well-being within a pluralistic democratic political context. The paper is presented in two parts. Part I critiques Cost-Benefit Analysis in its traditional form. The critique begins by testing the ethical and behavioural assumptions in which traditional Cost-Benefit Analysis is grounded. The analysis concludes that two assumptions, both foundational to how Cost-Benefit Analysis is practiced today, are weak as a basis for promoting consensus. The first is the utilitarian ethical assumption that the aggregation of individual preferences constitutes a basis for social choice. The second is the assumption of rationality – namely that individuals choose in ways that lead them to be better off by their own lights: economists have long recognized that fundamental axioms of rational choice, such as transitivity, break down in application to social groups. And behavioural research has shown important ways in which individuals make mistakes in reasoning that result in choices that fail to align their choices with their own values and beliefs, and attitudes toward risk.

Part II of the paper finds, that, employed as a means of conveying evidence and information in a discursive democratic procedure, the modalities of Cost-Benefit Analysis can, in combination with subjective probability as a mode of facilitation, provide a means by which to enable communities to find consensus. While Cost-Benefit Analysis can indeed serve as a powerful tool in the bureaucratic domain of public sector decision making, the

reformulation of Cost-Benefit Analysis presented here can enable citizens to participate directly in decision making.

To be sure, deliberative procedures are not warranted in all situations where Cost-Benefit Analysis as traditionally applied can be usefully employed. For many types of decision, Cost-Benefit Analysis conducted in a bureaucratic agency setting is sufficient and appropriate (as in situations where the role of CBA is to ensure and demonstrate economic reason and fairness in allocating limited program dollars among large numbers of competing claimants).[1] It is where community and stakeholder engagement are warranted that, employed as a means of conveying evidence and information in a discursive democratic procedure, Cost-Benefit Analysis can provide a means by which to enable communities to find consensus.

[1] An example is the TIGER Program in the United States wherein the federal Department of Transportation uses CBA to help allocate capital grants to infrastructure projects among hundreds of competing applications from state and local agencies. (TIGER stands for Transportation Investment Generating Economic Recovery).

1.0 Introduction

The technical apparatus of Cost-Benefit Analysis (CBA) has been worked out to the general satisfaction of those who teach and practice it. Moreover, CBA is enjoying something of a revival ("an old idea whose time has come") as budget-strapped public sector agencies employ it in the search for value in shaping programs, projects and regulations.

CBA studies can however stir up more controversy than consent. Fabled examples include the siting of a third London airport, the provision of accessible public facilities for people with disabilities, the Three Gorges Yangtze River Dam, and others. This is ironic in light of CBA's promise to reveal welfare-maximizing policies, programs, regulations and projects. Economists tend to rationalize the phenomenon by searching for the "political logic" that separates the reality of policy actions from policies indicated by CBA. The implication, that politics in a democratic society involves the systematic pursuit of something less than happy outcomes, is hardly sufficient to explain the adverse performance of this, one of the most prominent instrumental tools of rational policy analysis. This paper looks for answers in the theoretical foundations and related procedures and institutional roles of Cost-Benefit Analysis itself. The paper offers new and more general theoretical foundations and constructs upon them an operational procedure that redirects the technical apparatus of Cost-Benefit Analysis to the pursuit of welfare improving outcomes in the context of pluralistic democracy.

The paper is presented in two parts. Part I critiques the current CBA framework. It begins with a review and critique of the ethical, analytical and democratic assumptions that guide the practice of Cost-Benefit Analysis today. This is followed with an examination of the institutional roles and procedures of Cost-Benefit Analysis, followed thereafter by the related question of how Cost-Benefit Analysis is communicated to decision-makers, stakeholders and the general public.

Based on the findings of Part I, Part II of the paper offers a new operational approach to the conduct of Cost-Benefit Analysis. The new approach recasts the traditional procedures and institutional role of Cost-Benefit Analysis from that of a government-sponsored analytic instrument to a facilitated deliberative procedure for finding broadly based consensus. Evidence is presented of incipient progress in the use of the new procedure. The concluding section discusses barriers to widespread adoption of the procedure and how these might be overcome.

PART I. TRADITIONAL COST-BENEFIT ANALYSIS: A CRITIQUE

2.0 Ethical, Analytical and Democratic Foundations

The practice of Cost-Benefit Analysis is grounded in principles crafted by philosophers and economists during the course of the 18th, 19th and early 20th centuries. Small wonder then that the practice can run into problems in the third millennium. This section identifies where the practices of Cost-Benefit Analysis must be dug out of the old foundations and what it means to establish new ones.

2.1 Ethical Foundations

John Maynard Keynes once remarked that, "The government which sets the happiness of the governed before it serves a good purpose whatever the ideological theory from which it draws its inspiration". Keynes commends Edmund Burke (1729-1797) as the first utilitarian political philosopher – the first to espouse consistently the "greatest happiness" principle.[2] But it was Jeremy Bentham (1748-1832) who gave the term "utility" economic meaning. Bentham defined utility as "that property in any object whereby it tends to produce pleasure, good or happiness, or to prevent the happening of mischief, pain, evil or

[2] Robert Skidelsky, *John Maynard Keynes: The Economist as Savior, 1920-1937*, Penguin Books, 1992.

unhappiness to the party whose interest is considered".[3] For Bentham, the object of all government action must be the greatest utility for the greatest number. The greatest happiness principle of utilitarianism remains the core ethic of welfare economic theory as well as the theory's principal workhorse, Cost-Benefit Analysis.

The French economist Vilfredo Pareto (1848-1923) was first to inject scientific objectivity into the utilitarian ethical framework by defining what constitutes an "optimal improvement" in utility (economic welfare). The definition reduces to a "rule" which states that any social change is desirable which results in everyone being better off, or someone being better off and no one being worse off, than before the change. A "Pareto improvement" is actually a movement toward the more general case of a "Pareto Optimum", a resource allocation in which any further shift in resources would make someone worse off and no-one better off. Under the Pareto scheme, there are many resource allocations that might represent optimal improvements.

The Pareto rule is itself an ethical proposition, a value statement. In one respect the rule commands wide assent for it equates the term "*better off*" with "*in that position voluntarily chosen*." In other words, individual preferences are taken to indicate changes in wellbeing. A person is said to be better off when he or she voluntarily changes his or her position from one to another. On the other hand, many different distributions of economic resources may constitute a Pareto improvement, an ethical proposition of rather less practical appeal in

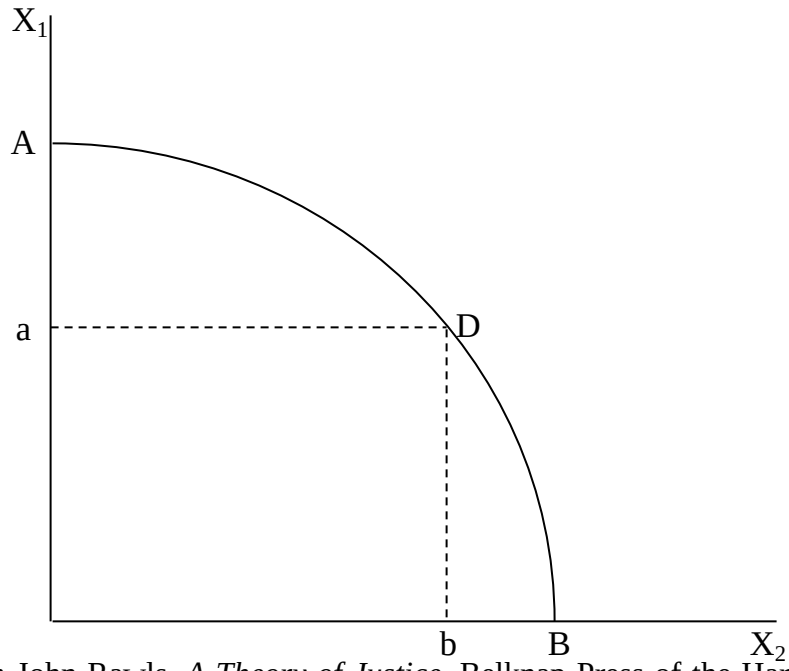
[3] Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation,* University College, London, 1781.

policy making. Consider Figure 1 in which a fixed stock of commodities is to be distributed between two people, X_1 and X_2. The point 0, the origin, represents the position before any resources are distributed. The line AB represents the points such that given X_1's gain at the corresponding level, there is no way to distribute the commodities so as to make X_2 better off than the point indicated by the curve. Consider the point D = (a,b). Holding X_1 at the level a, the best that can be done for X_2 is the level b. The points on the line AB are the Pareto efficient points. Each point on AB can be seen to satisfy Pareto's criterion for efficiency: There is no redistribution that makes either person better off without making the other worse off. Clearly, there are many Pareto efficient points, namely all the points on line AB. Neither the Pareto principle, nor the maximum happiness principle that is foundational to it, indicate one particular distribution of resources as the single-most efficient one.

Society has shifted ground in relation to pure utilitarianism: witness the emergence of belief systems such as environmental justice and acquired liberties that run counter to Pareto's ethical proposition of economic indifference to the distribution of resources, rights and obligations. Cost-Benefit Analysis, on the other hand, remains rooted in the utilitarian ideal. Notwithstanding a few clumsy attempts in the economics literature to permit such things as the introduction of numerical weights for different income distributional consequences, CBA makes no distinction, other than obvious common sense ones, between sources of economic satisfaction and sources of satisfaction grounded in concepts of justice, liberty, duty, obligation and due process. Under the Pareto principle it does not matter how the sum of satisfactions is distributed among individuals. The Pareto-optimal

distribution is that which yields maximum fulfillment to the greatest number. Under this rule, and under the rules of Cost-Benefit Analysis, society must allocate its means of satisfaction whatever these are – resources, rights, and duties – so as to achieve this maximum. In Cost-Benefit Analysis there is no reason in principle why the violation of the liberties of a few might not be made right by the greater good shared by many.

Figure 1: The Pareto Principle



Source: John Rawls, *A Theory of Justice*, Belknap Press of the Harvard University Press, 1971 (Revised Edition, 1991)

Of course the greatest sum of advantages is not actually attained in the way described above. As noted by Rawls, "the strictness of common sense precepts of justice is brought

to bear in limiting major injustice and insidiously injurious actions."[4] But the utilitarian believes that to affirm this "strictness of common sense precepts" as a first principle of welfare economics would be a mistake. Excepting constitutionally enshrined liberties, all is fair game in the process of securing the maximum satisfaction for the greatest number. Some economist's believe that this is as it should be – that matters of "social justice" are inherently political and as such are properly left to elected representatives to deal with. Elected representatives, on the other hand, feel underserved when Cost-Benefit Analysis studies leave them without systematic guidance on what might be the more pressing decision variables at-hand.

2.2 Analytical Foundations

Bentham's ambition was a means of quantifying utility so as to obtain, through the measurement of peoples' satisfaction with things, the steps by which governments might secure the greatest happiness of the greatest number. He never achieved his "felicific calculus" but others, notably Cambridge University economist Alfred Marshall (1842-1924), took to the task. Based on Marshall, and the principles laid down by Pareto, the early 20th century Cambridge professor A.C. Pigou (1877-1959) recognized that market prices, in combination with Marshall's concept of "consumers' surplus," provide a practical framework within which to measure and aggregate individual preferences so as to evaluate the merits of social change – a numerical means by which to ascertain the nature of Pareto improvements. Consumers' surplus refers to the value ("benefit") obtained by consumers

[4] John Rawls, *A Theory of Justice*, Belknap Press of the Harvard University Press, 1971 (Revised Edition, 1991).

from prices that lie beneath the maximum they would be willing to pay for different goods and services. Although the notion of peoples' *willingness to pay* as an index of benefit has since been extended to non-marketed goods and services (through the contingent valuation framework), the consumers' surplus framework remains the conceptual and operational center of Cost-Benefit Analysis.

Theoretical refinement of the Pareto conditions for optimality was the stuff of much intellectual endeavor among 20th century economists. An enormously influential refinement arose in the form of the "compensation principle" which makes a distinction between actual and potential increases in welfare. Because satisfying the Pareto rule requires that no one is made worse off by a change in policy, changes satisfying it are rarely observed in the real world. Developed in the early part of the century by Nicolas Kaldor (1908-1986), John Hicks (1904-1989) and Tibor Scitovsky (1910-2002), the compensation principle states that a social change can be deemed a Pareto improvement if the value of total gains (benefits) is sufficient, through lump sum transfer payments, to compensate those who stand to lose and still leave society as a whole better off. This principle requires only that prospective gains in consumers' surplus are sufficient to create the potential for such compensation, not that it actually occur. This is not a denial of the importance of distributional effects. Rather, it argues that, in a democratic society, only elected representatives should decide whether compensation is appropriate in cases where overall welfare improvements would nevertheless leave some people worse off.

The Social Welfare Function. Doubting the ethical purity of the compensation principle, in the 1940s Professors Paul Samuelson and Abram Bergson reintroduced certain Benthemite ethical norms through the device of the "social welfare function." The following exchange is said to have taken place between a graduate student and Paul Samuelson. [5]

> *"What's wrong with the compensation principle, Sir?" the young graduate student asked with a tug of the forelock.*
>
> *"Compensation isn't paid," the great Samuelson replied.*
>
> *"Is that all?"*
>
> *"That's enough."*

Conceptually, the social welfare function incorporates fully the required information concerning the relative importance of conflicting aims, including the relative importance of separate individuals within the social group. The function orders all possible states of society and reveals the single best allocation accordingly. This replaces Pareto's concept of many equally valid optimal positions.

The Impossibility Theorem. Unfortunate ethical implications of the social welfare function were revealed however in the early 1950s when Harvard's Kenneth Arrow[6] published his famous "impossibility theorem." The impossibility theorem demonstrates that in trying to

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[5] See, Herbert Mohring, *Transportation Economics*, Ballenger, Cambridge, Massachusetts, 1976 (I suspect that the young graduate student was Herb Mohring himself).

[6] Kenneth Arrow, *Social Choice and Individual Values*, Wiley, 1951, 2nd Ed., 1963.

obtain an integrated social preference from diverse individual preferences, it is not possible to find even some mild-looking conditions that would satisfy elementary demands of reasonableness for public choice in a democratic society. Arrow had originally set out to prove that a social welfare function could satisfy, simultaneously, the following four conditions:

1. Provide the social ordering for every possible combination of individual preferences;

2. Allow the ranking of any two social states to depend on peoples' preference only over that pair of alternatives, with no dependence on how other, unrelated alternatives, are ranked. (Economists call this condition the "independence of irrelevant alternatives", or just "independence");

3. Permit no individual or group of individuals to prevail over the social ordering regardless of what others prefer (Arrow called this condition "non-dictatorship"); and,

4. Allow the group of all individuals, taken together, to prevail over the social ordering (namely the "Pareto principle" requiring that any change in the social ordering leave some individuals better off without leaving others worse off).[7]

[7] This condition can be weakened to require only that any change in the social ordering generate net gains that are large enough to compensate the "losers" while still leaving some individuals better off.

What Arrow ended up proving is that it is not feasible to have a social welfare function that satisfies, simultaneously, independence, the Pareto principle and non-dictatorship. Arrow reaches this conclusion by revealing the problems that arise in seeking to translate the logic of individual utility maximization to that of collective welfare maximization while still preserving the basic axioms of individual rationality. For example, the formulation of a social welfare function assumes the existence of "transitive preferences," which states that an individual who prefers x to y and y to w will, logically and rationally, prefer x to w. Consider three alternative road projects, one that offers increased speed, one increased safety, and one better air quality. If, at the margin, a person prefers the faster road to the safer one, and prefers the extra safety to the additional air quality, welfare theory hinges on the premise that he or she will prefer the extra speed to the improvement in air quality. Arrow shows that whereas transitivity holds for individuals, it can break down in the context of groups, such as a group of voters. Within such a group a majority might well vote for speed over safety, safety over environment and, yet, environment over speed. Since maximizing a social welfare function assumes the existence of collective transitivity, the key result of Arrow's work is the recognition that maximizing a social welfare function cannot be relied upon as a basis for rational choice without accepting that government might need to impose undue (non-democratic) authority in order to implement it.

2.3 Democratic Foundations

Arrow viewed his results not only as a flaw in the social welfare function, but in democracy itself. He viewed the breakdown of transitivity at the collective level as nothing less than an obstacle to rational choice in the context of democratic majority rule.

Taking issue with Arrow, in 1953 James Buchanan argued that the breakdown of transitivity at the collective level is not a fundamental problem but merely an artifact of the assumption of the social welfare function that the logic of individual choice is a "good thing" for social groups as well.

> *"Rationality or irrationality as an attribute of the social group implies the imputation to that group of an organic existence apart from that of its individual components. If the social group is so considered, questions may be raised relative to the wisdom or unwisdom of this organic being. But does not the very attempt to examine such rationality in terms of individual values introduce logical inconsistency at the outset? Can the rationality of the social organism be evaluated in accordance with any value ordering other than its own"?*[8]

Buchanan's argument is that different concepts of "rationality" apply to a whole society as distinct from a single individual. Whereas the impossibility theorem points to voting as a source of potentially inconsistent and thus "irrational" decisions, Buchanan argues that

[8] James M. Buchanan, *The Collected Works of James M. Buchanan, Volume 1, The Logical Foundations of Constitutional Liberty*, Liberty Fund, Indianapolis, 1999, p.116.

such "irrationality" is actually a desirable attribute of social choice. He explains that, in the historical and philosophical context, majority decision evolved as a means through which a social group makes collective choices among alternatives when consensus among the individuals comprising the group cannot be attained. Correctly speaking, majority decision must be viewed primarily as a device for breaking a stalemate, allowing for collective action. A decision reached through the approval of a majority with minority dissent has never been, and should never be, correctly interpreted as anything other than a provisional or experimental choice of the whole social group. As a tentative choice, the majority-determined policy is held to be preferred to inaction, but is not to be considered as irrevocable:

> *"The fact that such decisions may be formally inconsistent provides one of the most important safeguards against abuse through this form of voting process. If logical consistency were a required property of decision, majority rule would not prove acceptable, even as a means of reaching provisional choices at the margins of the social decision surface."*[9]

Buchanan's critique of Arrow, and of the Bergson-Samuelson social welfare function in general, gives rise to an alternative view of the institutional role of welfare economics and Cost-Benefit Analysis. Whereas the Bergson-Samuelson welfare function derives the optimal allocation of resources from an assessment of collective or "social" values, an approach inspired by Buchanan begins with the proposition that no social values exist apart

[9] Buchanan, ibid. p.118.

from individual values. Instead of revealing a social optimum, the role of economic analysis is to search for "social compromises" on particular issues. In this sense, a Cost-Benefit Analysis is to be viewed as merely hypotheses about individual values, hypotheses to be tested through the choice process itself. Actual values are revealed only through the political action of individuals, and consensus among individual members of the choosing group becomes the only possible affirmation of a "social" value and a welfare-improving change.

Thus, whereas the social welfare function approach represents a decision criterion independent of the choice process, the Buchanan-inspired alternative evaluates results only in terms of the choice process itself. A Cost-Benefit Analysis finding of a net gain in consumers' surplus is to be viewed as but an hypothesis, one that can be validated only through discussion, through a direct referendum or through the decision of an elected legislative body. If a majority rejects the change, the Cost-Benefit finding (of a welfare gain) is refuted. The finding of a welfare gain is equally refuted if *a minority dissents*; minority dissent is interpreted as the need for further options, including compensation provisions for damaged minorities. Only options that yield consensus without minority dissent can be regarded as welfare improvements.

A Buchanan-inspired approach thus views the practice of welfare economics as the use of Cost-Benefit Analysis to facilitate, not "inform," the decision process. The analysis must seek to evaluate relevant options with analytically derived assumptions about the values and preferences of individuals while all the time remaining open as to how values should be

modified based on discussion and consensus. The compensation principle is gone. In its place is the search for options or sufficient actual compensation to garner not merely majority rule, but consensus without minority dissent.

Gone as well is the Bergson-Samuelson social welfare function as a device for revealing the single best allocation of resources. It is replaced with the search for consensus through discussion. The discussion and consensus process is to be structured and informed with the apparatus of Cost-Benefit Analysis; but it is the decision process itself, not the conclusions drawn from third-party Cost-Benefit Analysis studies, that reveals welfare-improving policies.

Under a Buchanan-inspired framework, Cost-Benefit Analysis would thus be applied as a means of facilitating the search for consensus within a political process. The reality of course is that Cost-Benefit Analysis has not evolved as a facilitation tool. On the contrary, CBA's are almost always performed as third-party ("impartial observer") studies whose conclusions are framed as findings about the aggregate economic welfare effects of this or that policy option. While this approach is consistent with Pareto, Bergson and Samuelson, for Buchanan such "findings" exist outside the process of public discourse and thus say nothing meaningful about welfare.

The discussion above leads us to ask whether Buchanan's formulation of welfare implies fundamental change in the way we estimate welfare costs and benefits. The answer is most definitely "Yes." Whereas Cost-Benefit Analysis remains the analytical workhorse of

welfare economics, the Hicks-Kaldor compensating variation criterion for declaring a policy change welfare-positive or welfare-negative is irrelevant. In other words a finding that hypothetical transfers from gainers to losers would leave losers no worse off (while still generating overall net benefits) is no longer sufficient for declaring a change welfare-positive. The various ratios that one calculates to test the Hicks-Kaldor criterion thus become irrelevant.

The significance of empirically derived economic values is also different under Buchanan. With conventional Cost-Benefit Analysis, values (values of time, life, environment, amenity, and the like) are measured from historical data using either revealed or stated preference (contingent valuation) empirical methodologies. With Buchanan, the assumption is that values take shape during the process of discussing prospective change. In this context, empirically derived estimates from historical data are points of departure in a discursive process – important points of departure, but points of departure nonetheless.

More fundamentally still, Buchanan's concept of welfare economics can be viewed as a realignment of economic analysis with the realities of modern democratic governance. Traditional Cost-Benefit Analysis is seen as an analytic exercise within a larger frame in which elected officials allocate resources with technical advice from third-party experts (such as economists). As such, traditional Cost-Benefit Analysis is part of the early 20th century model of governance (called "republicanism" by political scientists) whereby government institutions exist to program the government in the interest of society. Politics

is seen as a framework for serving the interests of society with technical advice from third-party experts acting through bureaucratic institutions.

What then takes the place of the republican paradigm? Some insist that Buchanan's critique demands a Libertarian solution. Others disagree, arguing instead that "discursive democracy" (or "discourse theory") is the appropriate framework within which to exercise Buchanan principles. Libertarians, Sugden for example,[10] argue that the primary role of government is to maintain a framework of rules and procedures within which individuals are left free to pursue their own rationally-conceived ends within a framework of constitutionally protected liberties, rights and freedoms. Decision-support analysis of any sort is largely irrelevant in this formulation.[11] Yet researchers, most notably Kahneman and Tversky, demonstrate that individuals are "hard-wired" with certain mental heuristics that lead to biased forms of reasoning, especially in matters of complexity; rationally-conceived ends are not, it turns out, so rationally conceived at all. In fact, such biases can have the effect of prompting people to make choices that are inconsistent with *their own* beliefs, values and preferences. The procedures of Cost-Benefit Analysis can provide a

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[10] Robert Sugden. The *Political Economy of Public Choice*, Oxford: Martin Robertson, 1981 (and) *Welfare, Resources, and Capabilities*: 'A Review of Inequality Reexamined' by Amartya Sen, *Journal of Economic Literature*, December 1993.

[10] Nobel Prize winner Amartya Sen opposes the "consequence-independent" character of the libertarian view, arguing that the possibility of having unacceptable consequences has to be addressed by any principally procedural system.

means by which people can be guided around these internal imperfections.[12] Discourse theory, and the discursive democratic governance model it has spawned, is a middle ground between the third-party remoteness of republican governance and the laissez faire paradigm of libertarianism; it is in this institutional middle-ground in which Cost-Benefit Analysis can be practiced according to Buchananesque ideals.

[12] Cass Sunstein, "Cognition and Cost-Benefit Analysis," *The Journal of Legal Studies"* Vol 29 (2), 2000.

3.0 Institutional Roles and Procedures of Cost-Benefit Analysis

The ethical and democratic foundations in which the procedures of Cost-Benefit Analysis were originally grounded have shifted over the last 50 years. Thus, whereas the technical procedures of Cost-Benefit Analysis generate little controversy among academics and practitioners, citizens and decision-makers might regard the product as unhelpful or wrong or irrelevant. For example, Cost-Benefit Analysis in the 1970s and 80s of alternatives for making public transportation physically accessible to people with disabilities found that separate "paratransit services" would be economically superior to adapting regular bus and rail facilities for those who cannot use stairs, a finding that was widely condemned, particularly by those who regarded access to mainstream public facilities a human right.[13] Whereas Cost-Benefit Analysis recognizes the existence of obvious liberties and duties (due process of law and natural rights, for example), it draws no fundamental distinction between "the good," "the right," and "the fair" in seeking out welfare maximizing solutions and opportunities. Such things as acquired rights and environmental justice are viewed as "non-economic" or "political" factors to be introduced into decision-making outside the context of Cost-Benefit Analysis.[14] Welfare maximizing solutions are discovered in

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[13] Congressional Budget Office, Urban Transportation for Handicapped Persons: Alternative Federal Approaches, Budget Issue Paper for Fiscal Year 1981, November 1979,

[14] The concept of environmental justice is not to be confused with that of environmental resources. Environmental resources do indeed occasion willingness-to-pay values in Cost-Benefit Analysis. Viewed through a neo-classical microeconomic lens, economic justice might equate to the notion of option or existence value as distinct from use value.

studies, outside the choice process itself. The analysis is conducted as a research exercise within a larger context in which decisions about the allocation of resources and the character of fairness, rights and duties are taken by elected or appointed officials who receive advice on the "efficiency dimension" from third-party experts (economists). Experts treat resource values (human life, property, environment, time savings, etc.) as data to be drawn from the empirical analysis of consumer behavior; the decision-making process itself is not regarded as a source of information about resource values.

When decisions veer from the steps recommended in Cost-Benefit Studies, economists tend to look for the "political logic" that might explain the divergence from the economically correct course of action.[15] Does the maximization of welfare (happiness) really exist only within the province of economics, not that of politics? Or, has modern society's view of what constitutes the basis for happiness gone beyond the assumptions of classical utilitarianism. Can the technical apparatus of Cost-Benefit Analysis be made to serve a productive purpose if the procedures of Cost-Benefit Analysis were aligned with modern ethical and democratic realities? Two frameworks for repositioning the procedures of Cost-Benefit Analysis are examined next.

[15] See for example, Arnold M. Howitt and Alan Altshuler, *The Politics of Controlling Auto Air Pollution* (in) Essays Transportation Economics and Policy: A Handbook in Honor of John R. Meyer, Jose Gomes-Ibanez, William Tye and Clifford Winston, Editors.

3.1 Theories of Justice and The Veil of Ignorance

One approach to reconciling the public "good" with public "rights" is offered by philosopher John Rawls (1921-2003) in his hugely influential book, *A Theory of Justice*.[16] Using a framework he calls "justice as fairness," Rawls begins by establishing a basic rule within which members of society can establish a social contract. The rule is that discussants have to find consensus from behind a "veil of ignorance" – a state in which no one knows which social role or economic position they might end up occupying. The idea is that if you don't know whether you will end up rich or poor, male or female, boss or worker, you will shape your thinking to adopting principles of justice between each group. Rawls then gives two principles to guide the resource allocation:

- Principle I: Each person is to have an equal right to the most extensive scheme of equal basic liberties compatible with a similar scheme of liberties for others.

- Principle II: Social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage, and (b) attached to positions and offices open to all.

Unlike Pareto, Rawls does not assume all resources to be tradable. The two principles imply that resources deemed (through a deliberative process) to bear on the realization of natural or acquired rights are to be distributed equally unless an unequal distribution of

[16] op. cit. Rawls.

such resources is to everyone's advantage. Diminution of rights protected by the first principle cannot be compensated for by greater social and economic advantages. Rawls defines "to everyone's advantage" as an allocation under which some are better off and none worse off.[17] Principle II is the decision rule governing the extent of inequality in the allocation of resources. Rawls suggests that the Pareto principle, and its operational manifestation in Cost-Benefit Analysis, is probably as good a means as any for operationalizing Principle II.

Although Rawl's concept of a just and fair society cannot be taken literally as basis for organizing North American societies, [18] its influence since publication in 1971 cannot be ignored. The Clean Air Acts of the United States and Canada, and the Americans with Disabilities Act, are examples of utility maximization constrained by lines in the sand regarding acquired rights and freedoms (the right of urban dwellers to clean air, of wheelchair users to accessible toilets, and so on).

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[17] *A Theory of Justice,* Revised Edition, p.54.

[18] The philosopher Simon Blackburn observes that Rawl's framework most closely resembles the social democratic countries of Scandinavia with their substantial welfare floors. Blackburn notes that Rawls is actually more left than them, since even after a welfare floor has been established, those least well off can make claims to further redistribution of resources if such redistribution would not, by dampening incentives to work, shrink the overall endowment of economic resources available to everyone. See Simon Blackburn, *Being Good: A Short Introduction to Ethics,* 2001, p.127.

Most important in what Rawls provides is a formal requirement that public policies emerge from institutional procedures erected to facilitate the search for common points of view. In this respect, Rawls adds to an important vein of modern American political thought called discourse theory.

3.2 Discourse Theory and Discursive Democracy

Discourse theory, and the principles of discursive democracy to which it gives rise, refers to the institutionalization of the procedures and conditions of communication as a basis for collective will-formation[19] through consensus.[20] Discourse theory suggests similar procedures to Rawls' theory of justice, but is less normative and more practical in application. Discourse theory posits that collective will-formation does not draw its force from a previous convergence of communally shared ethical convictions. Rather, it is the procedures of deliberation, and the release of peoples' *communicative* instinct to allow better arguments to come into play, that precipitate the formulation of values as a basis for collective, welfare-maximizing consensus and policy making.

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[19] "Will-formation," is a term coined by Jurgen Habermas for the will to achieve particular ends through collective discourse. Will-formation is thus not decision-making, but rather a basis for decision making.

[20] John S. Dryzek, *Discursive Democracy: Politics, Policy, and Political Science,* Cambridge University Press, 1990, p24

Discourse theory replaces traditional concepts of rationality (i.e., the maximization of a social welfare function) with the concept of "communicative rationality." Rooted in the interaction of social life, communicative rationality is seen as a property of *subjective* discourse, not individual or social maximization. The idea of communicative rationality, as its proponents are quick to point out, has a respectable heritage. Indeed, Aristotle is seen as a key player in the lineage. Kant (who advanced the idea of "Reason" as the basis for collective agreement) and Rousseau (the social contract) also figure prominently. Each sought justification of values and principles in "the formal conditions of consensus formation."[21] Contemporary heirs to this Aristotelian theme include Arendt, Gadamer, MacIntyre, Habermas and Dryzek. The common aim of these philosophers is to resurrect authentic and reasonable public discourse. To paraphrase Dryzek, such discourse has been eroded over the centuries by theories of rationality manifested in hierarchy, administration, and technocracy, by attempts to locate objectivist solid ground, and more recently, by postmodern relativism.

It is through the mechanisms of discursive democracy that Cost-Benefit Analysis can best be re-grounded. Applied as a mode of facilitation, Cost-Benefit Analysis offers a means of liberating "the communicative instinct" while helping individuals avoid the mental heuristics that give rise to unintended reasoning biases. As a mode of facilitation, Cost-Benefit Analysis can be stripped of the presumption that it reveals welfare maximizing solutions: instead, it becomes a means of enabling the citizenry or its elected

[21] Jurgen Habermas, *Communication and the Evolution of Society,* Beacon, Boston 1979 (as cited in Dryzek, ibid, p.14).

representatives to determine for themselves what does and does not constitute welfare-improving change.

A facilitation, or "communitarian" role for Cost-Benefit Analysis aligns it with important advances in our understanding of the way peoples' values and beliefs actually form. Contrary to the assumption in classical utilitarian theory of stable values and preferences, it appears that people often do not have well-established values, and that preferences are actually constructed – not merely revealed – during discussion.[22] In Cost-Benefit Analysis as conventionally practiced, prices and values are obtained through empirical investigation and treated as "data," namely information that is not capable of being altered through the decision-making process itself. As shown earlier, Buchanan would dispute this approach, arguing that individual values can and do change in the process of discussion and decision-making. Nobel Prize winning economist and philosopher Amartya Sen writes that the practical reach of Cost-Benefit Analysis is considerably reduced by its tendency to ignore value formation through social interactions. According to Sen, many of the more exacting problems of the contemporary world – varying from famine prevention to global warming, actually *call for* value formation through public discussion.[23] As commonly practiced today, value measurement emphasizes the quest for empirical accuracy. The utilization of

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[22] Daniel Kahneman and Amos Tversky, *Choices, Values and Frames,* Cambridge University Press, 2000, p.618.

[23] Amartya Sen, *The Possibility of Social Choice,* Lecture Delivered in Stockholm, Sweden on December 8, 1998 on the Occasion of Receipt of the Nobel Prize in Economic Sciences.

structured discussion through which such valuations can be altered, validated and legitimized is alien to Cost-Benefit Analysis as traditionally practiced.

Procedurally, the above means that the third-party estimation of benefits and costs should be only a starting point for policy formulation and discussion. With Buchanan, a policy change can only be declared a welfare gain when a consensus of the citizenry (or some legitimately conceived representative group) agrees that such is the case. In short, Cost-Benefit Analysis should be viewed as a means of organizing and facilitating a public discourse on resources, values, liberties and justice, and the likelihood of welfare gains in relation to prospective alternatives for change.

4.0 The Communication of Cost-Benefit Analysis

By convention, Cost-Benefit Analysis studies communicate through the language of *forecasts*. Quantity forecasts and forecasts of economic value are used to populate the essential equation for benefits (B) or costs (C) which, for exposition, we can state generally as $\mathbf{B_{it}}$ **or** $\mathbf{C_{it}} = \mathbf{(q_{it})\ (v_{it})}$, where q_{it} denotes the quantity of the i^{th} resource to be produced or consumed by a prospective project in future year t, and v_{it} the unit economic value of the i^{th} resource that time. If the project in question were a prospective new road and the i^{th} resource were travel time, q_{it} would be the quantity of travel time saving forecast for travelers in year t; and v_{it} would be the economic value of unit of travel time in year t (expressed in dollars per minute). B_{it} would thus represent a forecast of the economic benefit of the road attached to time saving in year t. If the i^{th} resource were asphalt, q_{it} would be the forecast quantity of asphalt to be consumed in constructing the road during year t, v_{it} the forecast unit price of asphalt in that year, and C_{it} the forecast economic cost associated with the consumption of asphalt in year t.

The communication problem is a problem of trust. More so than in the past people are aware of the inherent uncertainty in forecasts and tend to be skeptical about projections that are not transparent about the risk of error. As to values, it is counterintuitive for people to imagine their values being quantified in the absence of discourse and reflection. Against these realities Cost-Benefit Analysis studies presume the suspension of disbelief. Forecasts of costs and benefits that extend decades into the future are portrayed as the basis for decision. Economic values, measured from past behavior and contingent valuation studies, are treated as ‘data.’ Studies fuel mistrust by either presenting as certain that which is not,

and by employing faux experiments to reflect uncertainty. Consider the common *"what-if?"* experiment in which studies pose hypothetical questions and use models to evaluate associated outcomes. While sensitivity analysis can play a useful analytic role, the "what-ifs" themselves are almost always arbitrary, leaving no reason to assign the associated forecasts particular weight. Variants of the "what-if" experiment include the familiar "best-case/worst-case" and "high case/low case" scenarios. To construct a worst case, analysts suppose that all projections will deviate from the central expectation *in the same direction*. In reality, the likelihood that all forecast assumptions will err simultaneously in one direction is as remote as everything turning out exactly as expected. Another conventional but flawed procedure is "sensitivity analysis" wherein forecast assumptions are varied one or two variables at a time. Needless to say, life does not veer from expectations one or two variables at a time.

4.1 Communication through Probability

While people do not believe forecasts, they are anxious to know how scientific evidence and expert beliefs might bear on possible outcomes. Meteorologists learned this long ago. The now ubiquitous "probability of precipitation" (PoP) combines reasoned information about uncertainty in order to present a statement of risk. *"The chance of rain tomorrow is 20 percent"* is not perceived as a professional cop-out: on the contrary, people have always known the forecast to be uncertain. Information as to *how* uncertain enables reasoned decision-making, and for that decision-makers are grateful.

PoP combines two kinds of probability, objective and subjective. Objective probability reflects the kind of statistical analysis with which most people are at least vaguely familiar, the "frequentist" procedures for gauging random error and dispersion in observed data, surveys, instrument readings and models. Subjective probability (the "Bayesian" method) accounts for the opinions and beliefs of experts. Before any models are run, different meteorologists will have different opinions about the implications for tomorrow of weather patterns being observed today. Regardless of how well-specified a model might be, no single weather analysis can provide absolute, definitive conclusions: even after a given model is calibrated and run, some diversity of expert opinion will persist. Before issuing a hurricane evacuation advisory, analysts apply the subjective method ("Bayesian updating") to incorporate the range of expert beliefs into the final statement of risk. Consumers do the same, comparing the wording of advisories from different sources before making up their own minds.

4.2 Subjective Probability and Elicitation

Bayesian updating involves the elicitation of probability beliefs using a range of protocols designed to help experts avoid the mental heuristics discussed earlier while revealing a coherent set of personal probabilities. "Coherent" in this context means that the results conform to the axioms of probability (one cannot hold the belief that an outcome is 30 percent likely without also holding the belief that its converse is 70 percent unlikely). The premise is not that experts carry well-formed probability-based judgments around in their heads: they do not. Rather, elicitation has evolved into a synthesis of social psychology,

statistical discipline and group facilitation designed to enable experts to give context-sensitive quantitative expression to their well-informed but qualitatively held beliefs.

In addition to meteorology, applications of subjective probability are common in the military, finance and medicine. A revealing 1995 application of Bayesian updating was reported in 1995 by the Journal of the American Medical Association (JAMA).[24] Ten years of clinical random trials with two thrombolytic drug strategies for myocardial infarction (two "clot-buster" drugs designed to arrest heart attacks) were updated on the basis of expert beliefs among practicing cardiologists, paramedics and other practitioners. Frequentist evidence from the trials, which indicated one drug to be more effective than the other, was sharply revised in forging a basis for guiding medical practice. As stated in JAMA, "*The subjectivity of prior beliefs in the Bayesian approach is not a liability, but rather explicitly allows different opinions to be formally expressed and evaluated*."[25]

Perhaps it goes without saying that shifting Cost-Benefit Analysis to the probabilistic mode would enhance its usefulness. What is less than self-evident is that the elicitation protocols of subjective probability (Bayesian updating) present a means by which decision-makers and stakeholders can participate, inform or even take a central role in the analysis process. Those whose values we seek to quantify are the very "experts" we need to engage in the

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[24] James M. Brophy and Lawrence Joseph, *Placing Clinical Trials in Context Using Bayesian Analysis: GUSTO Revisited by Reverend Bayes*, Journal of the American Medical Association, March 15, 1995, Vol 273, No. 11.

[25] Ibid, p.871.

process of updating evidence from revealed preference studies, contingent valuations and other frequentist examinations of economic and social behavior. In short, probability – both objective and subjective – is a powerful operational means by which Cost-Benefit Analysis can be recast from a “study” to a procedural framework for reasoned deliberation and decision by discussion.

PART II: TOWARDS A NEW COST BENEFIT ANALYSIS

5.0 New Foundations for Cost-Benefit Analysis

Whereas the technical apparatus of Cost-Benefit Analysis rests comfortably enough on its theoretical foundations in microeconomics, those foundations are, and always have been, partial, too narrow to support the promise of Cost-Benefit Analysis as a materially useful guide to responsible governance. A general theory of Cost-Benefit Analysis must be an integration of discourse theory, welfare economics and probability. As in a child's braid, each of the three component strands is itself an organized collection of many strands. As we have seen, discourse theory represents a synthesis of moral philosophy, ethics, political science, institutional analysis, and the facilitation of various levels of consensus. Welfare economics encompasses numerous elements of microeconomics, including the tools of rational analysis and the quantitative expression of value. Probability (or, as Bernoulli first called it in the 17th century, "political arithmetic") combines the mathematics of uncertainty and risk with social psychology and the elicitation of subjective values. Despite the discrete and overlapping attributes of its many strands, a braid, properly constructed, holds tight as a single entity: the entity is Cost-Benefit Analysis as a discursive social institution.

5.1 Cost-Benefit Analysis as a Discursive Social Institution

I begin with Dryzek's expression of a formal discursive process:

> "*A discursive design is a social institution around which the expectations of a number of actors converge. It therefore has a place in their conscious awareness as a site for communicative interaction among them. Individuals should*

> *participate as citizens, not as representatives of the state or any other corporate and hierarchical body. No concerned individuals should be excluded and an educative mechanism should promote the competent participation of persons with a material interest in the issues at hand who might otherwise be left out. The focus of deliberations should include, but not be limited to, the individual or collective needs and interests of the individuals involved. Thus the institution is oriented to the generation and coordination of actions situated within a particular problem context. Within the discursive design, there should be no hierarchy or formal rules, though debate may be governed by informal canons of free discourse. A decision rule of consensus should obtain. A neutral third party should initiate, lubricate and oversee discussions among interested parties."*[26]

Under the discursive design for Cost-Benefit Analysis proposed here, the educative mechanism is an integration of, (i) the rational frame and evidence-based apparatus of CBA, and (ii) the Bayesian protocols of subjective probability. The role of the educative mechanism extends beyond that of enabling the competent participation of persons who might otherwise be left out, to that of facilitating the process of multi-party value formation through policy-specific deliberation. Importantly, the traditional decision rule of Cost-Benefit Analysis – that of maximizing utility (i.e., net benefits), is replaced with *consensus* as the basis for judging whether policy constitutes a welfare improvement.

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[26] John S. Dryzek, *Discursive Democracy: Politics, Policy, and Political Science,* Cambridge University Press, 1990, p.43.

The neutral third-party is the economist. The economist departs from the traditional application of Cost-Benefit Analysis in three ways. First, he or she acts, as stated, as third-party facilitator of a discursive process. Second, the decision rule, the rule for welfare maximization, is not Hicks-Kaldor but rather consensus (as given by Dryzek above and by Buchanan and Sen earlier in the paper). In place of the Hicks-Kaldor test for hypothetical compensation, participants examine options and sub-options, including alternative compensation and mitigation schemes, until consensus emerges. Third, forecasts are replaced by probability, namely probabilistic expressions of the bearing of evidence, judgments and beliefs on the costs, value, benefits, justice and net benefits of alternatives. Participants inform such probability statements through the third party application of Bayesian elicitation protocols.

Would people participate in a discursive institution like that outlined above? Two lines of evidence indicate they would. First, case studies of incipient discursive procedures reported by Dryzek and others indicate that people do participate, though for various reasons and motivations. One reason might be a stalemate in other areas of decision, such as the courts. Another might be a genuine desire for improved communications with protagonists. A third reason is naked self-interest wherein people see more to gain from participation than from abstention. This third calculus [self-interest] reportedly tends to dominate, "As one might expect in a world of ubiquitous strategic pursuit of self-interest."[27] Such pursuit is of course anathema to communicative rationality. Hence, as Dryzek observes, rationalized interaction immediately confronts the need to transcend the

[27] Ibid. p.44.

motivations that attract the participants. This requirement explains why the rational procedures of Cost-Benefit Analysis and a neutral third party are necessary – to ease participants over hurdles leading to an unfamiliar kind of interaction.

The second line of evidence regarding participation stems from the author's experience with discursive Cost-Benefit Analysis procedures. It is observed that the procedures of Cost-Benefit Analysis to facilitate in a discursive process, combined with probabilistic elicitation, can lead people both to participate and to transcend self-interest as an original motivation. Transcendence arises in a number of ways. One dynamic is the appeal to what Habermas calls the communitarian instinct – an instinct liberated by the propensity of free but rationally framed discourse to allow better arguments to come into play. This seems to be reinforced by the pedagogical and yet non-authoritarian (non-hierarchical) nature of the process. Another dynamic is the appeal to self-interest itself. It appears that the transparency of multi-stakeholder discussion in a free but rationally framed, evidence-based and probabilistically reasoned discourse helps defuse the force of single-issue strategic behavior. Compromise itself becomes a mode of strategic self-interest: participants are moved to find consensus on *what* to do even though they might well disagree on *why* to do it.

5.2 Elements of an Operational Framework

While every matter of public policy has a unique profile of issues, Cost-Benefit Analysis as a "site for communicative interaction" needs sufficient subject matter and procedural structure in order to create a sense of place in the social consciousness.

5.3 Subject Matter

Five subjects delineate the discursive design represented in Figure 2. While the study process of traditional Cost-Benefit Analysis needs to be stripped away, the underlying work breakdown structure helps, in part, define the appropriate subjects for a discursive process, namely (i) the problem; (ii) alternative courses of action; (iii) pertinent scientific theory and evidence; (iv) the bearing of theory and evidence on the quantification and valuation of costs, benefits and net benefits of alternatives; and (v) consequences, justice and reasons. "Consequences" pertains to the net benefits of alternative policy actions. Whereas the subject matter of traditional Cost-Benefit Analysis ends with an assessment of consequences, discourse theory recognizes that people do not invoke the formal calculus of costs and benefits as the language of actual decision-making. For most people, it is the informal, non-quantitative language of *reasons* for and against this or that course of action that guides decisions. Among such reasons might be "in-consequentialist" considerations of fairness, justice, right and wrong, alongside which consequence-oriented evidence (costs and benefits) adds critical perspective in the search for consensus. But to succeed in that search, the discourse must relax the formal language of Cost-Benefit Analysis.

5.4 Procedures

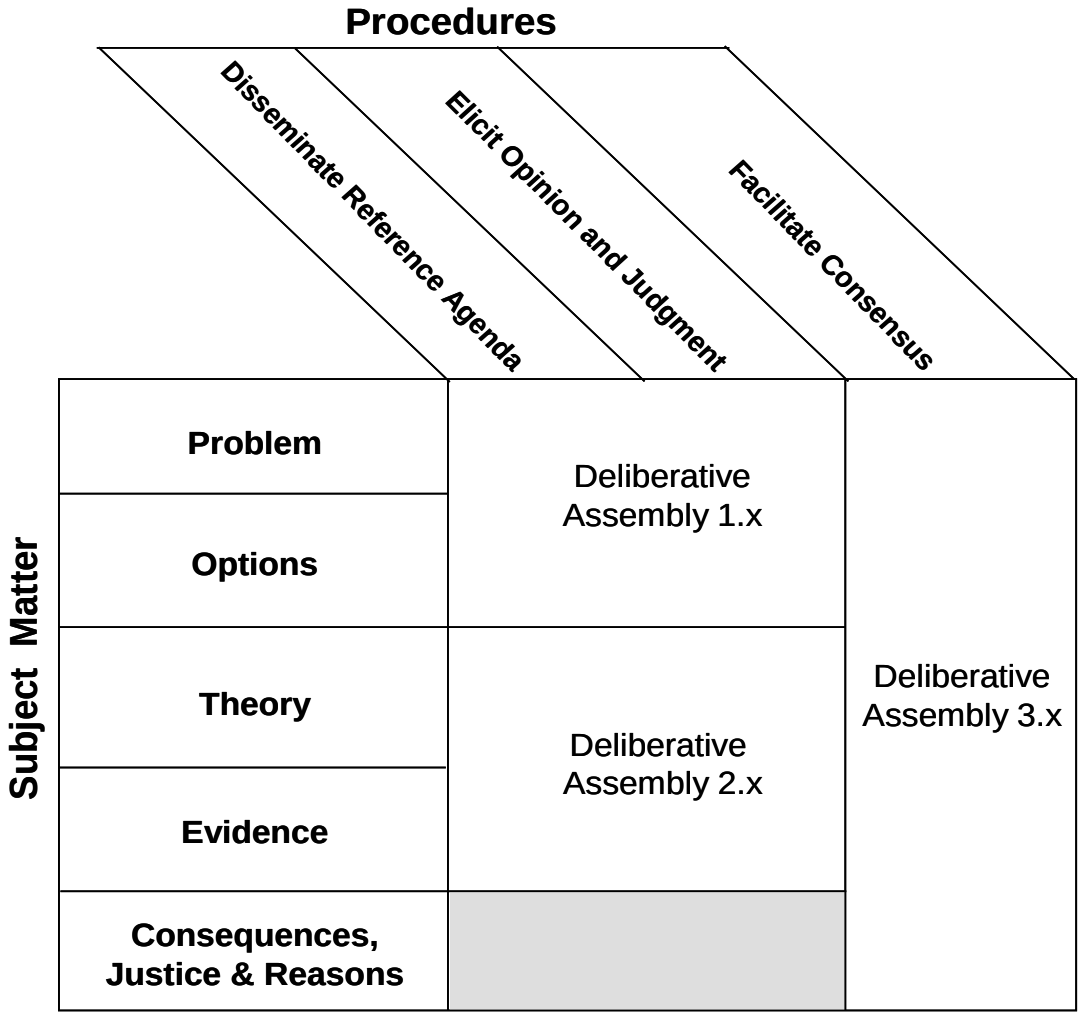
Figure 2 depicts the procedures that animate deliberation in relation to each subject. These are, (i) distribution of the Reference Brief; (ii) the elicitation of scientific and evidentiary consensus; and (iii) the deliberation of consequences, reasons and choices.

The Reference Brief. Prepared and disseminated in advance of deliberation, the Reference Briefing provides detailed but accessible information in relation to each of the four subjects. The Reference Book lays down a foundation for deliberation. The material in it is characterized as entirely preliminary. It is not a report. It is an agenda.

The Reference Brief contains four sections. Section 1 identifies the assumptions and beliefs that give rise to the perception of a problem, issue or opportunity. Alternative ways of expressing the problem, or lack thereof, are articulated in relation to the foundational assumptions and beliefs of each. If the "problem" at-hand were traffic congestion, for example, the corresponding assumption of free roads would be explained (for were roads to be tolled there might be less congestion). Section 2 of the Reference Brief follows with a preliminary scoping of alternative courses of action and combinations thereof, including that of no action and the widest possible range of options (build more roads, build toll roads, attach tolls to existing roads, invest in more public transit, discourage urban sprawl, and so on).

Section 3 of the Reference Brief gives participants access to state-of-the-art scientific information. Cost-Benefit Analysis is employed as the organizing framework. Presented in two parts, Part A identifies the effects, both positive and negative, of each alternative. All effects are listed – market and non-market, internal and external. While effects are listed in recognizable units of measurement, Part A also explains the economic logic whereby (i) positive effects translate into economic benefits and negative effects into economic costs; and (ii) willingness to pay can signal the economic value of any given effect (a foundation for deliberating values later on). The *time-value* of economic benefits and costs is also explained (a foundation for deliberating discount rates later on). Explained as well is the issue of "double counting" whereby a single economic benefit or cost manifests in more than one measurable form (such as time savings from a new rail line arising as both greater worker productivity and increased land value). Part B of Section 3 explains the state-of-the-art understanding of cause-and-effect relationships that connect policy actions to each of the effects identified in Part A. This aim is to make models accessible to lay persons. The format given in Figure 3 has been found effective in facilitating understanding and deliberation and in eliciting opinion on model structure and logic. Figure 3 is a highly simplified illustration of the format that would typically depict many variables, parent and infant models and coefficients ("connective tissue"). Regardless of how elaborate the presentation, however, the format permits the facilitator to educate and, through elicitation, enrich the cause-and-effect logic in response to insights generated during deliberation.

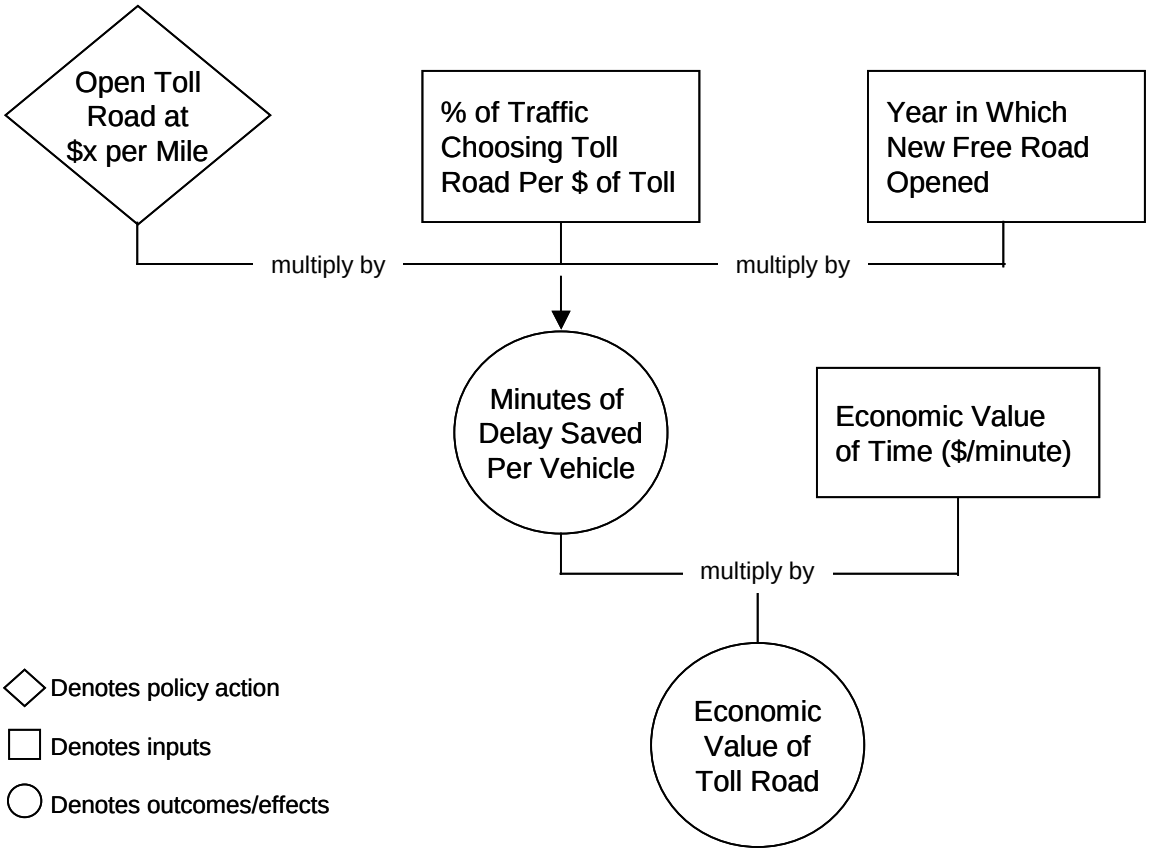
Figure 2: Cost-Benefit Analysis as a Discursive Institution



Section 4 of the Reference Brief gives the participant access to state-of-the-art empirical evidence – the data that, when used to populate the models depicted in Section 3, generate estimates of costs and benefits. The presentation of evidence in Section 4 is governed by two rules. First, only data regarding model <u>inputs</u> are presented (causal variables and coefficients, collectively called "assumptive evidence), *not* the costs and benefits that follow from solving the models accordingly. Deliberation over assumptive evidence must precede meaningful deliberation of consequences (see Figure 3). If the models are

"solved" too early in the discursive process, participants are prone to examine estimated costs and benefits first, rather than the assumptions underpinning the estimates. This risks the promotion of strategic behavior, behavior that is sharply diluted if "bottom lines" are allowed to emerge later in the deliberative process, after fulsome deliberation of the theory and evidence has occurred. While participants could, in theory, try solving the models and "reverse engineering" their comments accordingly, the complexity of such an exercise makes it most unlikely.

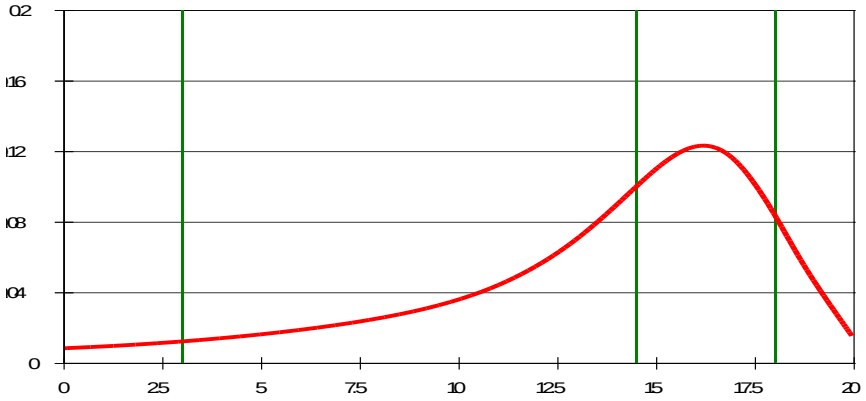
Figure 3: Depicting an Evidentiary Model



The second rule governing the presentation of evidence in Section 4 of the Reference Brief is that quantitative evidence be portrayed probabilistically. As shown in Figure 4, three numerical attributes of a probability distribution are given for each variable, the median (50^{th} percentile) estimate, and the 10 percent probable estimates both above and below the median. These quantities are drawn from the statistical properties of relevant and available market analysis, contingent valuation studies, formal meta-analysis of the evidentiary record and other legitimate sources of empirical information. The corresponding shape of the probability range is also portrayed. As shown in the Figure 4, the distribution could be skewed rather than "normal" (bell-shaped). While few participants will grasp statistical subtleties prior to facilitated deliberation, most comprehend the idea of a range and of the risk of error being even or uneven in relation to some central estimate: Indeed, these mirror ways of thinking in the everyday decisions of daily life. As well, people appreciate from the start that the evidentiary segment of the discursive process is not to be governed by single best-guess values or convenient but arbitrary concepts of risk.

Figure 4: Depicting Evidence Probabilistically -- Value of Time in dollars per hour

Median	10% probability of being this low	10% probability of being this high
$14.50	$3.00	$18.00

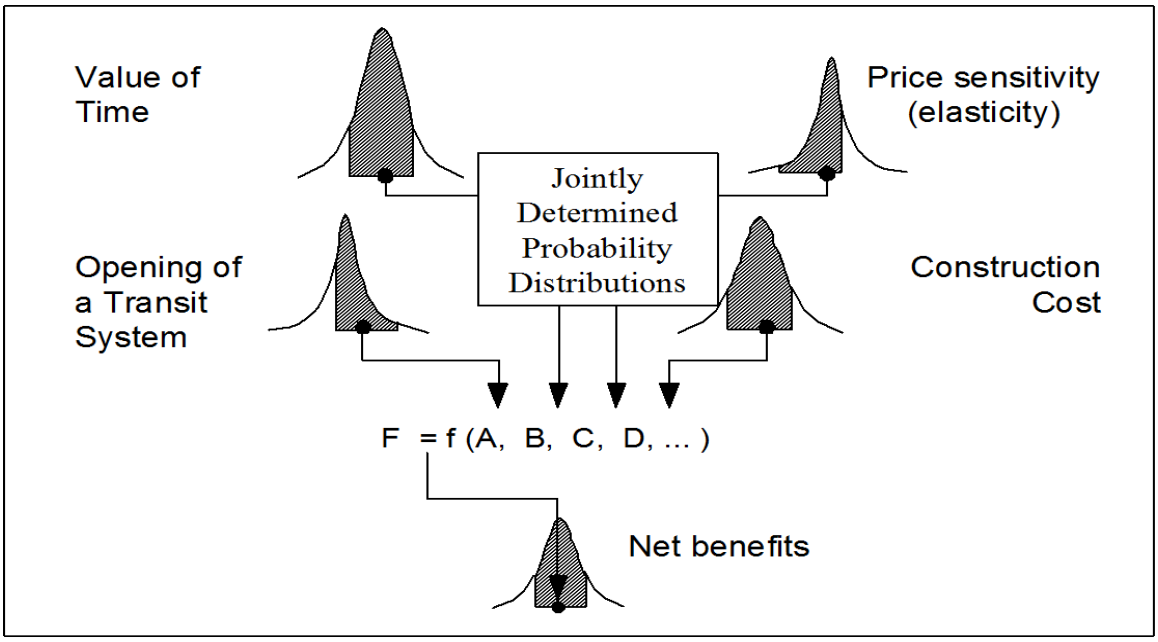


Scientific and Evidentiary Elicitation. With the Reference Brief complete and disseminated to all parties, the deliberative element of the process can begin. The process involves three facilitated Deliberative Assemblies organized, as shown in Figure 2, in relation to subject matter. The first Deliberative Assembly is dedicated to seeking preliminary consensus on the way, or different ways, in which the problem at-hand is to be articulated, and on the range of associated policy alternatives. The second Deliberative Assembly is devoted to science and assumptive evidence, the goal being preliminary technical consensus on the categories of negative and positive policy effects (costs and benefits); the nature of cause-and-effect relationships through which policies create costs and benefits; and the assumptive evidence with which quantitative expression is to be assigned to the models so as to estimate, probabilistically, the order of costs and benefits.

Under the rubric of "preliminary" consensus, the definition of alternatives, the logic of cause-and-effect relationships and the assignment of probabilities to assumptive evidence remain open to further deliberation during the third Deliberative Assembly.

Facilitation, Evidentiary Consensus and Collective Will. The third Deliberative Assembly begins with the search for technical consensus on a quantitative expression of consequences – an evidentiary consensus. Using a computer simulation procedure to populate the cost and benefit models with the probabilistic evidence developed by consensus in Deliberative Assembly 2 reveals a preliminary ordering of alternatives in relation to net benefits. A graphical representation of the computer simulation process is given in Figure 5.

Figure 5: Combining Probabilities With Computer Simulation



The ordering of alternatives could well be different at different levels of probability. In Figure 6, Alternative "B" outranks Alternative "A" at the 80 percent probability level. Alternative "A" rises to first place if one were willing to accept only a 20 percent probability level of achieving that outcome. Such situations can arise when known technologies or policies are pitted against new or developmental ones: Whereas a new or developmental approach might be associated with significant failure risk (as assessed during evidentiary review in Deliberative Assembly 2), its consequences for society (its net benefits) might be materially greater than that of conventional methods were it to succeed. Stakeholders are encouraged to test alternative probabilistic assumptions to help gain consensus. Idiosyncratic and strategic behavior is self-limiting since the group will resist requests to test ideas well outside the ranges discussed in Deliberative Assembly 2. Having said this, the desire to revisit the probabilistic ranges assigned to social values should be expected and encouraged. It is only through deliberation that such values take shape.

Deliberative Assembly 3 shifts the discourse from the search for evidentiary consensus to the search for collective will with regard to policy choice. Four questions are posed:

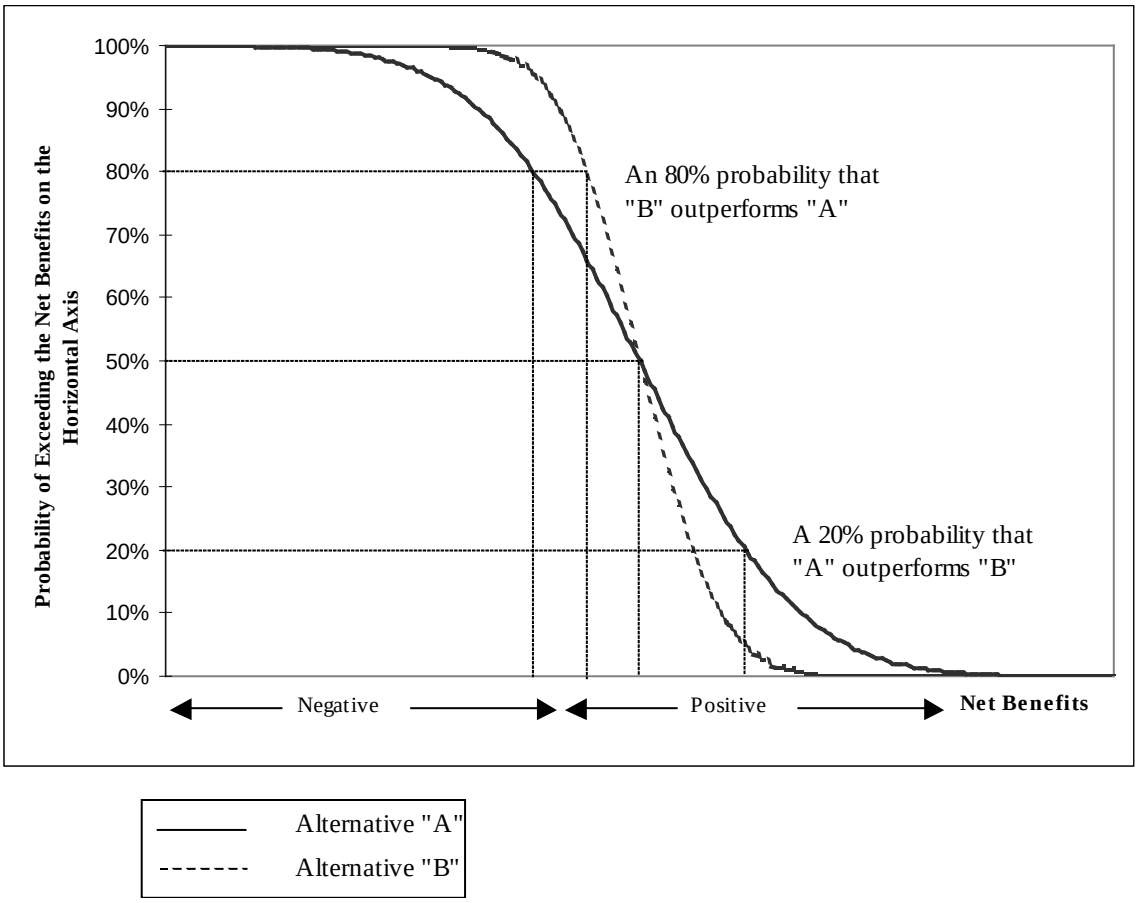
1. *Is the evidence regarding consequences (benefits, costs and net benefits) a sufficient basis for a collective will to adopt one of the alternatives? If not:*

2. *Are there matters of justice that, by consensus (using the "veil of ignorance" test and other discursive devices) override the implications of consequences and give rise to collective will in relation to another of the alternatives?*

3. *Are there reasons or beliefs that, by consensus, override the implications of consequences and give rise to collective will in relation to another of the alternatives?*

4. *Are there other alternatives that, brought into the picture, would bring about the necessary and sufficient conditions for collective will?*

Figure 6: The Bearing of Evidence on Consequences



As indicated earlier, once a quantitative sense of consequences has been established, opening the discussion to the broader language of justice and qualitative reasoning aligns the discussion with everyday language of social life. The difference from the informal discourse however is that deliberations are, (i) rigorously versed in evidence and its bearing on probable and improbable consequences; and, yet (ii) not bound to an ethical framework tied exclusively to consequentialist-based choice (namely, the neo-classical utilitarian framework of traditional Cost-Benefit Analysis).

5.5 Will Collective Will Emerge?

Will collective will emerge from the procedures outlined above? With unrestricted deliberation it might. It might not if there exists, as some scholars believe, a plurality of ultimate values. But allusion to either of these extremes is really to miss the point of the question if by collective will we mean a common point of view rooted in the common beliefs about morals, ethics and the weight of evidence regarding alternative courses of action. Legitimate and actionable collective agreement can arise from less stringent requirements. Agreements about "*what* to do" can accompany disagreement about "*why* to do it:" Agreement to adopt measure "B" can reflect *Person One's* moral belief system and *Person Two's* grudging, even temporary deference to evidence. Agreements thus cobbled together are legitimate as long as they emerge from a truly discursive process, one free of bureaucratic manipulation and authoritarian power, and one in which people are confident of being taken seriously.

The likelihood of finding a collective will, as framed above, gains force from the simultaneous reflection on formal consequences (through Cost-Benefit Analysis) and informal reasons. The literature in experimental social psychology is replete with the finding that the axioms of rational choice, which are often violated in non-transparent situations, are generally satisfied when their application is transparent. Researchers like Shafir[28] and others report that when the elaboration of evidence within a rational frame (i.e., Cost-Benefit Analysis) indicates the superiority of a particular course of action, people will often embrace such evidence as a compelling reason for choosing that course accordingly.

[28] Eldar Shafir, Itamar Simonson, and Amon Tversky, *Reason-Based Choice,* Cognition, 49, 11-36, Elsevier 1993 (as reprinted in, *Choices, Values, and Frames,* ed. Daniel Kahneman and Amos Tversky, Cambridge Press, 2000, p.597.

5.6 Participation in the Discursive Process

Although I have stipulated that the discursive process is to be open to all, this principle does not, obviously, provide a basis for operational advice. Notwithstanding the Internet, the practical barriers to universal participation in all decisions impose limits on group size. This does not, however, constitute a flaw in the theory of discursive democracy. Theorists such as Dahl demonstrate that communicatively rationalized discourse allows individuals to attend selectively in relation to aspects of a decision, or interactions between aspects of a decision, that concern them. Further economy can be achieved when individuals free themselves from participation to the extent that they agree to common ends, or principles. Statistical representation is also legitimate whereby a subset of a concerned group participates through a cross-section of delegates constituted so as to ensure that all perspectives to an issue area are represented. Deliberative Assemblies are supplemented with subject matter experts and can be selected by lot or through informal mechanisms whereby communities of interest agree to a delegation by common consent. Delegates can also rotate to help broaden the base of participation, although the scope for rotation can be impractical when matters under deliberation are especially complex.

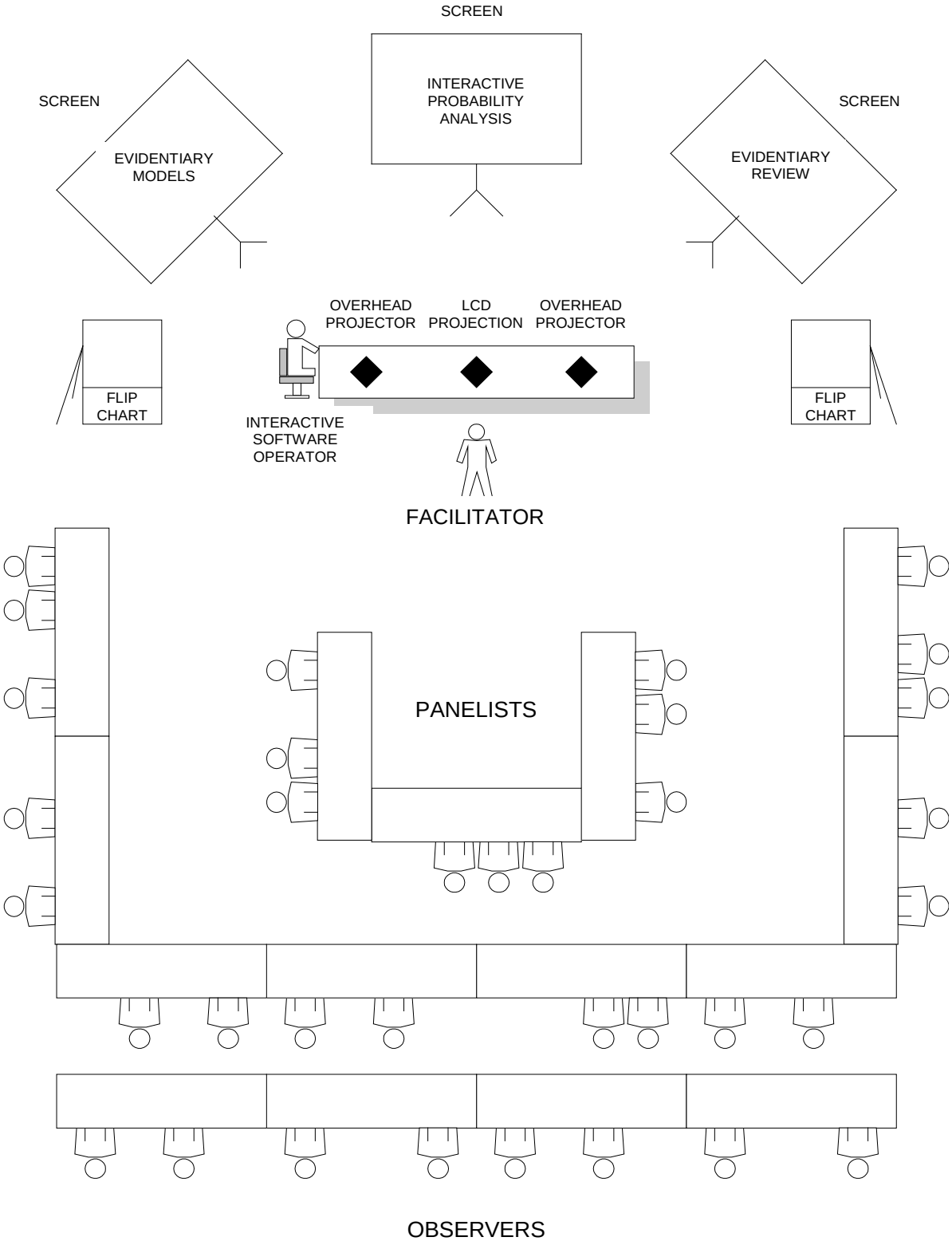
6.0 Case Study of Cost-Benefit Analysis as a Discursive Procedure

By the early 1990s the issue of severe airport congestion at Vancouver International Airport had already been front-page news for 20 years, a cause célèbre in which communities of interest were sharply divided along lines marked by environmental justice, economic development and airport commercial viability. The Canadian federal government, airport management and business interests favored construction of a second main runway. Residents located in the airport's noise belt (5,300 homes and two hospitals) argued for a traffic management strategy and no physical expansion, or for the construction of second airport about an hour's drive south of the city (near the Canada-U.S. border town of Abbortsford, British Columbia). Environmental interests favoured no expansion.

Cost-Benefit Analysis as discursive procedure was applied in the early 1990s[29] on the basis subject-specific Deliberative Assemblies pertaining to (i) alternative policy actions; (ii) noise and the environment; (iii) airport capacity and traffic management; (iv) aviation demand, delay and pricing; (v) airport construction and operating costs; (vi) aircraft technology and operating costs; and (vii) aviation safety. Selected to be representative of the relevant communities of interest, Deliberative Assemblies numbered between 15 and 25 participants: the Deliberative Assemblies were supplemented with subject-matter experts (their number being included in the 15-25 range). However, as illustrated in Figure 7, there were no restrictions on who could attend.

[29] This section draws on material that first appeared in, David Lewis, *The Future of Forecasting,* Transportation Research Board, TRNews, April 1995

Figure 7: Delegate Panel and General Participation in a Discursive Process



Aircraft noise was by far the most contentious issue, an issue that had neutralized three major commissions of inquiry over the prior two decades. The evidentiary model pertaining specifically to the social costs of noise that emerged from the discursive process was a consensus among expert environmental economists, experts in acoustical science and resident delegates. Residents gained comfort in the comprehensive range of prospective noise costs recognized in the model, including property depreciation, changes in householder annoyance and enjoyment values (television, barbeques, etc.), and moving costs for those who elect to move due to additional noise. The power of Cost-Benefit Analysis to give evidentiary expression to a vast range of values that matter to stakeholders surprised, informed and satisfied proponents on all sides. Stakeholders showed themselves willing, moreover, to concede to flawed logic (such as double counting), a result I believe of the non-authoritarian yet intellectually disciplined milieu in which discursive facilitation takes place. For example, contrary to initially held stakeholder beliefs, the consensus model allowed that those who willingly and knowingly elect to buy homes that come on the market at reduced prices due to airport noise must be treated as *beneficiaries* of noise.

In populating the evidentiary probabilities, a great deal of deliberation centered on scientific evidence regarding the decibel level of different aircraft; psychological investigations of the householder disturbance levels implied in any given decibel exposure; aviation industry data pertaining to the mix of different aircraft in the traffic stream going forward, including the rate of introduction of quieter engine technology; real estate evidence regarding the impact of decibel exposure on property values; contingent valuation studies of the nature and monetary-equivalent expression of householders'

annoyance and enjoyment values; and market information about the propensity of householders to move house due to noise. Selective and strategic use of such information and misinformation (by all parties, including government) had characterized and corrupted debate over the three commissions of inquiry between 1965 and 1985. Under the discursive design, however, frequentist and Bayesian elicitation led to a legitimate evidentiary consensus. Shown graphically in Figure 8a, the consensus probability that the noise costs of second main runway would exceed at least $30 million[30] ($6,000 per household) exceed 99.9 percent – a near certainty. The consensus likelihood of cost consequences exceeding $85 million ($17,000) was less than one percent.

Noise was of course one of many prospective consequences of the various alternatives explored during the nine-month process. Others included the capital expense of airport construction; the added maintenance outlays a new runway or a new airport would require; the influence of airport construction and operations on wetlands, and air and water quality; passenger delay; aircraft operating costs; aviation safety; and the implications of efficient airport operations for economic development, who (in Vancouver and elsewhere) would benefit from it, and how. The overall evidentiary consensus that emerged is displayed graphically in Figure 8b. The probability of positive net benefits from a second airport near Abbortsford was found to be greater than zero, albeit barely so (about five percent); the odds of costs exceeding benefits by as much as $1 billion came in at 40 percent. As to a second runway at Vancouver's main airport, the weight of consensus evidence pointed to better than 99.9 percent odds of at least $1.1 billion in positive net benefits. The odds came

[30] Costs are expressed as present-day values over 20-year life cycle.

in at 80 percent that benefits would exceed costs by $3 billion, and 20 percent that net benefits would exceed $4 billion.

Figure 8a: Consequences of Costs of Noise with a Second Runway at Vancouver International Airport

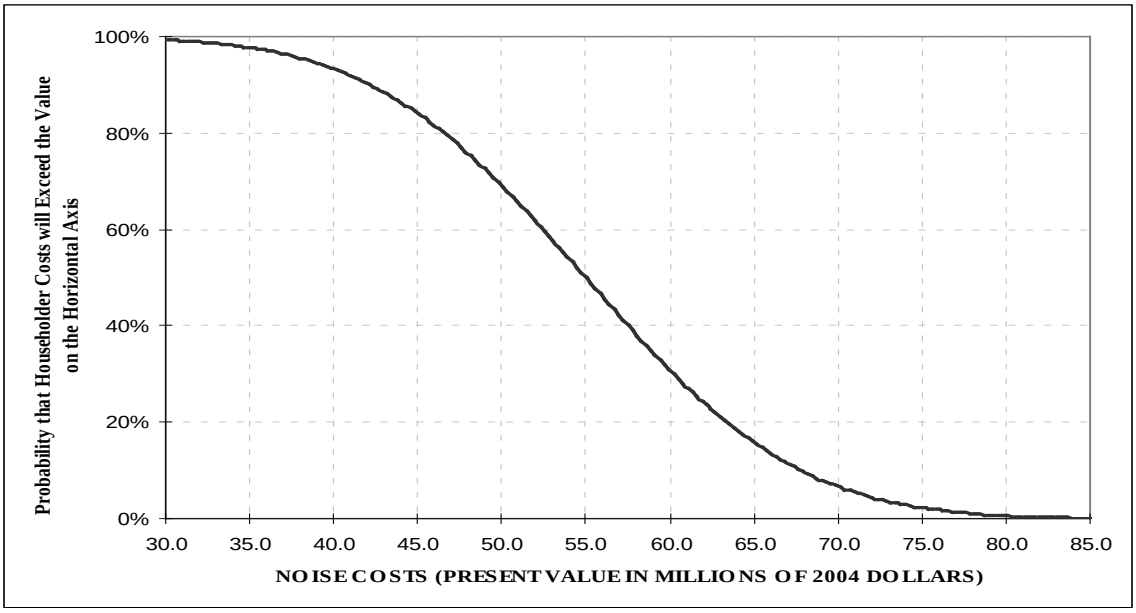
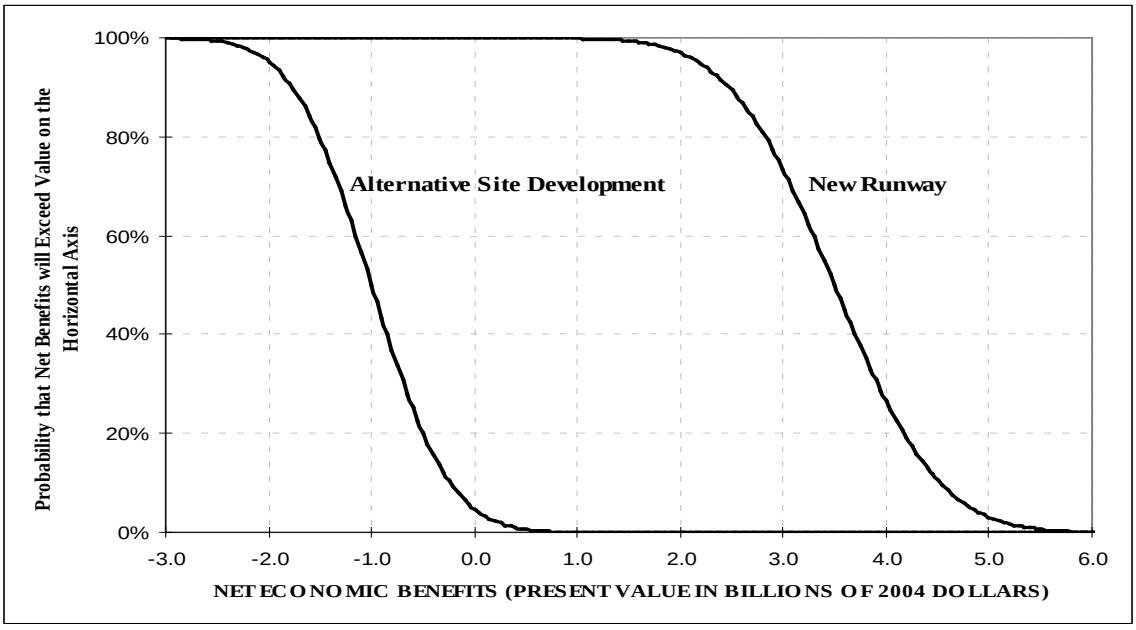


Figure 8b: Net Economic and Social Consequences of Airport Development Alternatives for Vancouver



Although the evidentiary consensus as to consequences was not a sufficient basis for realizing a collective will to adopt a particular approach, it was a necessary condition for such. Before examining the approach around which collective will amassed, let us pause to consider why the evidentiary consensus was possible, and why it mattered. Evidentiary consensus was possible for three principal reasons. First, there was no hierarchy, power structure or bureaucratic involvement in the discursive process. Participants knew that the government funded the process, but the communities of interest decided who would acted as third party and they themselves managed the process of ensuring against barriers to participation. There were no presentations from government experts and no "official explanations" of previously conceived (behind closed door) findings about the problem or its solution. Second, all alternatives were fair game. Third, other than in relation to strict matters of fact, participants were never deemed "right or "wrong." Evidence was examined probabilistically. A participant's beliefs pertaining to matters of science, quantities, or values will have been deemed more likely or less likely than another's but never categorically wrong or right. In the end, no one was asked to suspend disbelief in forecasts for the convenience of an analytic process.

The existence of an evidentiary consensus mattered in the search for a collective will because it shifted the focus of debate from one of strategic expert-versus-expert debate over facts and forecasts to the question of "what to do." The veil of ignorance question - whether freedom from additional noise costs ought to occasion the status of an acquired right (and thereby end consideration of a second main runway), failed to occasion material support from participants, including noise interests. The veil of ignorance test failed in the

minds of some as a matter of principle. It failed for others because the probability of sizeable noise costs was found to be extremely low in comparison with the probable significance of the economic development gains attached to a second runway. Agreement also emerged as well that the sizeable risk of huge economic losses attaching to a second airport meant that this alternative had to be rejected.

The emergence of a collective will was further motivated by trust at the evidentiary level. Over the prior three commissions of inquiry, government officials had consistently "taken a position" on airport noise, namely that new engine technologies and traffic control strategies would guarantee zero increase in residential exposure to noise. Questions of bias and trust were removed by denying government an authority role in the discursive process and by addressing the evidentiary question at the granular level and, of course, transparently. The evidentiary consensus in a high probability that a second runway would generate *some* noise costs defused the "your expert" versus "my expert" debate that had characterized the three commissions. Instead, deliberation shifted to mitigation and compensation measures by which to stem costs and injustice for those in the noise belt and to the probability level at which noise cost estimates should be accepted as a basis for sizing a compensation fund. Such measures surfaced in the form of restricted flight paths for departures from the second runway; time-of-day curfews; and a program of financial compensation payments geared to 75 percent probable annoyance and nuisance values.

Movement toward the realization of a collective will gathered force from the role of evidentiary consensus and the veil of ignorance test in altering the strategic calculations of

noise-affected interest groups. As an evidentiary consensus emerged, the voice of elected representatives became less confused and equivocal than at any time over the prior two decades. This was apparent on television and radio, in the print media and on the stump. For noise-interests, an emboldened elective class diminished the strategic potency of all-out opposition to airport development on the basis of "expert v. expert" argumentation. The potency of absolute opposition was further diluted by the failure of "absolute limits" (to noise exposure) to find collective support through the veil of ignorance test of social justice. As indicated above, the veil test was itself influenced by the evidentiary consensus. Compromise in the form of mitigation and compensation thus emerged as a mode of self-interest.

Finally, progress toward evidentiary consensus led to erosion in certain cognitive biases that are known to create barriers to conflict resolution. One such barrier, called "loss aversion" by psychologists, refers to peoples' "asymmetric evaluation" of positive and negative outcomes: in the absence of convincing evidence to the contrary, negative possibilities loom larger in peoples' minds than positive ones.[31] Loss aversion bias tends to favor those defending a status quo because of their probable willingness to pay a higher price and run higher risks if they are facing losses than if they are seeking to make gains. By placing losses and gains and associated probabilities in an evidence-based frame, and achieving consensus within that frame, some previously zealous defenders of the status quo

[31] Daniel Kahneman and Amos Tversky, *Conflict Resolution: A Cognitive Perspective*, as published in, Kenneth J. Arrow et al., editors, *Barriers to Conflict Resolution*, The Stanford Center on Conflict Resolution, W.W. Norton & Co. Inc. 1995.

were seen to moderate their willingness to defend it absolutely. Their loss aversion bias toward runway construction was diminished by the evidentiary reality of small risk-adjusted noise costs relative to the size of the risk-adjusted economic benefits in which they too would share.

7.0 Conclusion

Resting on the principles of discourse theory, probability and risk analysis, this paper offers a framework through which Cost-Benefit Analysis can serve as the educative mechanism in a deliberative democratic procedure.

To be sure, deliberative procedures, which can be costly and time-consuming to execute, are not warranted in all situations where Cost-Benefit Analysis might be usefully employed. For many types of decision, Cost-Benefit Analysis conducted in a bureaucratic agency setting is sufficient and appropriate (as in situations where the role of CBA is to ensure and demonstrate economic reason and fairness in allocating limited program dollars among a large number of competing claimants).[32] It is where community and stakeholder engagement are warranted that, employed as a means of conveying evidence and information in a discursive democratic procedure, Cost-Benefit Analysis can (in combination with subjective probability as a mode of facilitation) provide a means by which to enable communities to overcome NIMBYISM and find consensus on welfare-improving initiatives.

[32] An example is the TIGER Program in the United States wherein the federal Department of Transportation uses CBA to help allocate capital grants to infrastructure projects among hundreds of competing applications from state and local agencies. (TIGER stands for Transportation Investment Generating Economic Recovery).

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