

**A Distinction between Benefit-Cost Analysis and Cost Benefit Analysis
Moral Reasoning and a Justification for Benefit Cost Analysis**

Keywords: cost-benefit analysis, benefit-cost analysis, law, potential compensation test, Pareto compensation test, net present value, Scitovsky reversals, Kaldor-Hicks criterion. JEL codes: A11, D30, D60, D63, H43

Abstract

Cost benefit analysis (CBA) has been vilified and supported in legal, philosophical and economic literature but misunderstood in those literatures. The vilification is often wrong or muddled. A proper statement, which I call benefit-cost analysis, BCA, suggests it is compatible with moral decision making.

I distinguish between BCA and CBA. CBA is the traditional approach of valuation, built on the potential compensation test (“PCT”) and the avoidance of distributional and other equity considerations. CBA is limited to analyzing only the fair market value of property. BCA recognizes rights and moral sentiments as values insofar as they reflect the willingness to pay (“WTP”) to obtain them or the willingness to accept (“WTA”) payment for surrendering them. BCA provides a more accurate measure of well-being than CBA, drops the PCT, and reflects moral sentiments in valuation, making it superior to CBA.. The major moral criticism of BCA is that values are determined by the WTP or WTA, which rest on wealth and income. But, wealth and income are values preserved by the legal system. Any system of valuation in a regime of law must begin with what is legal and end with what is legally possible. It is no legitimate criticism of BCA that it rests on law.

Acknowledgements

The collection of BCA cases was supported by a grant to me from the MacArthur Foundation. I thank Brittney Tubbs for research support, Ryan Bodansky for analysis of cases, Tyler Scott for

programming with regard to the consent justification, Amy Glaskova for some data analysis and Che Schirmer, Cyrus Forman Fred Sapp, Joe Cook, Tyler Davis, Richard Just, Mark Long, Nevena Lalic, David Layton, Paul Sampson, Jenny Boune and Kerry Krutilla for helpful suggestions, along with participants at the Research Colloquium at the Evans School, University of Washington, and participants at the Society for Environmental Law and Economics meeting, 2012.

Table of Contents

Abstract.....	1
Acknowledgements	1
Table of Contents.....	2
Discussion.....	3
I. Introduction	3
II. Foundations of Traditional Cost-Benefit Analysis	Error! Bookmark not defined.
III. Limitations and Deficiencies of the Potential Compensation Test (PCT) ...	Error! Bookmark not defined.
IV. Historical Foundations of Benefit-Cost Analysis	4.
... V. Benefit-Cost Analysis Defined.....	9.
An Example.....	9
Another Example.....	11
VI. The Current Move Towards BCA.....	12
Inclusion of Moral Sentiments: What A Survey of Benefit Cost Analyses Shows about Who Gains from Their Use – Qui Bono?.....	13
The Rejection of the PCT.....	19
VII. The Consent Justification for BCA	
VIII. Objections to BCA	
Objections Based on Hypothetical distributions (The PCT)	

Altruism and the Double Counting Objection	
Are the Consideration of Moral Sentiments Rendered Mute by the Availability of Supposedly Superior Alternatives?.....	26
VIII. Conclusion.....	29

Discussion

Introduction

As the law and economics movement travelled from its roots in the late 1950’s and early 1960’s, tension developed between economic views of economists and deontological views of lawyers and philosophers.¹ This led law and economic scholars to examine more carefully the foundations of their systems of values and in doing this the limitations of CBA became apparent.²

¹ See generally, e.g., *Symposium on Efficiency as a Legal Concern*, 8 HOFSTRA L. REV. 485 (1980); Ronald M. Dworkin, *Is Wealth a Value?*, 9 J. LEGAL STUD. 191 (1980); see generally ELIZABETH ANDERSON, *VALUE IN ETHICS AND ECONOMICS* (1993); Steven Kelman, *Cost-Benefit Analysis: An Ethical Critique*, REG., Jan.-Feb. 1981, at 33 (1981) in James V. DeLong et al., *Defending Cost-Benefit Analysis: Replies to Steven Kelman*, REG., Mar.-Apr. 1981, at 39 (1981); David A. Hoffman & Michael P. O’Shea, *Can Law and Economics be Both Practical and Principled?*, 53 ALA L. REV. 335 (2002)

² See Hoffman & O’Shea, *supra* note 1; A. MITCHELL POLINSKY, *INTRODUCTION TO LAW AND ECONOMICS* 5 (2d ed. 1989); RICHARD O. ZERBE, *ECONOMIC EFFICIENCY IN LAW AND ECONOMICS* 14-33 (2001) [hereinafter “*Economic Efficiency*”]; Richard O. Zerbe Jr., *Is Cost-Benefit Analysis Legal? Three Rules*, 17 J. OF POL’Y ANALYSIS & MGMT 419 (1998); Richard O. Zerbe Jr., *The Legal Foundation of Cost-Benefit Analysis*, 2 CHARLESTON L. REV. 93 (2007) [hereinafter “*Legal Foundation*”]; Richard O. Zerbe Jr., *Ethical Benefit Cost Analysis as Art and Science: Ten Rules for Benefit-Cost Analysis*, 12 U. PA. J. L. & SOC. CHANGE 73 (2008); Richard O. Zerbe Jr., *Trading Gains and Losses in Antitrust: Why Losses Should Count More than Gains – An Implication of Behavioral Economics for Antitrust Losses*, 60 ANTITRUST BULL. 150

In this process its strengths were also neglected by many scholars. There are numerous articles spanning many years of law and economics literature addressing questions on values and valuation.³ The time is ripe for a restatement that shows both CBA's strengths and weaknesses. This article does this in codifying CBA in the form of BCA that speaks to both deontological moral theory and economic thinking. It speaks to the issue raised by Michael P. O'Shea and David A. Hoffman who ask, "Can Law and Economics be Both Practical and Principled?"⁴, and suggests the answer is yes. Here I extend their answer.

Historical Foundations of Traditional Cost-Benefit Analysis

CBA as a practical tool was primarily introduced by engineers in France based on the work of Jules Dupuit and, by 1902 at the latest, was adopted by the United States by the Army Corp of Engineers ("Corps").⁵ Many Federal projects could only receive congressional authorization if they

(2014); Steven Shavell, *A Note on Efficiency vs. Distributional Equity in Legal Rulemaking: Should Distributional Equity Matter Given Optimal Income Taxation?*, 71 AM. ECON. REV. PAPERS & PROC. 414 (1981).

³ For a sampling see Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553 (2002); FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING (Reprt. ed. 2005); Lisa Heinzerling, *Markets for Arsenic*, 90 GEO. L.J. 2311 (2002); Lisa Heinzerling, *Regulatory Costs of Mythic Proportions*, 107 YALE L.J. 1981 (1998); Henry S. Richardson, *The Stupidity of the Cost-Benefit Standard*, 29 J. LEGAL STUD. 971, 984-85 (2000); MARK SAGOFF, THE ECONOMY OF THE EARTH: PHILOSOPHY, LAW, AND THE ENVIRONMENT 11 (Douglas MacClean ed., 1988). A notable exception is McGarity, who also examines actual studies of CBA. See Thomas O. McGarity, *The Expanded Debate over the Future of the Regulatory State*, 63 U. CHI. L. REV. 1463, 1516-17 (1996). See also Martha C. Nussbaum, *The Costs of Tragedy: Some Moral Limits of Cost-Benefit Analysis*, 29 J. LEGAL STUD. 1005, 1032 (2000) (counseling against CBA on the ground that the results reached may be subject to serious moral wrongdoing); Amartya Sen, *The Discipline of Cost-Benefit Analysis*, 29 J. LEGAL STUD. 931, 945-46 (2000) (explaining that CBA is limited because of signaling issues, such as distributional valuations and values of externalities and interdependencies); Alan Carlin, *The New Challenge to Cost-Benefit Analysis*, REG., Fall 2005, at 18 (2005) (criticizing Ackerman, Heinzerling and Massey's empirical analyses). This tension is well illustrated in the exchange between: Steven Kelman and several others. Kelman, *supra* note 1 (critiquing cost-benefit analysis), and DeLong et al., *supra* note 1; Lawrence H. Goulder, *Benefit-Cost Analysis, Individual Differences, and Third Parties*, 23 RES. L. & ECON. 67 (2007).

⁴ Hoffman & O'Shea, *supra* note 1.

⁵ THEODORE M. PORTER, TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE 149 (1995).

had been approved by the Corps.⁶ The Corps' economic analyses limited debate in Congress over water projects so that pork barrel projects became rarer.⁷ Political influence and special interest legislation were not, of course, eliminated — the Corps tended to back down when political forces were overwhelming — but such projects were curtailed.⁸ There is no question that in early use of the CBA in the United States the results were beneficial for limiting unnecessary spending on projects.

The theoretical underpinnings of CBA were provided by British economists writing in the late 1930s.⁹ The modern form of CBA, developed by Nicholas Kaldor, was built on the foundation provided by Vilfredo Pareto.¹⁰ Pareto introduced a welfare criterion, the “Pareto optimum,” as a state of affairs in which no one can be made better off without making someone else worse off.¹¹ This became a foundational concept in welfare theory.¹² A change in the economy is said to represent a Pareto improvement if at least one person benefits as a result of the change and no person is made worse off.¹³ However, the Pareto criterion (often called Pareto Superiority) is considered not useful for practical purposes as it normally improvement also involves loss. It is the economic equivalent of unanimity in voting.¹⁴

⁶ *Id.* at 148-149. After 1902, water projects needed to be certified as beneficial by the board of engineers for rivers and harbors, established within the Corp. The Corp rejected about half of the proposed projects.

⁷ Porter, *supra* note 13, at 153.

⁸ *Id.*

⁹ Zerbe *Economic Efficiency*, *supra* note 2, at 4.

¹⁰ VILFREDO PARETO, 2 COURS D'ECONOMIE POLITIQUE (G.H. Bousquet & G. Busino eds., Lausanne, F. Rouge, 1896).

¹¹ In its strong form, Pareto efficiency states that state A is preferred to state B when state A is ranked higher than state B for one person and all other persons rank A at least as high as B. If the utility (well-being) of each individual is higher in state A, then state A is preferred according to the weak form of Pareto efficiency. *See* ROBIN F. BOADWAY & NEIL BRUCE, WELFARE ECONOMICS 62 (1984).

¹² *E.g.*, JAMES HENDERSON & DAVID QUANDT, MICROECONOMIC THEORY 254-252 (1958).

¹³ Pareto improvements are commonly referred to as Pareto superior moves. *See, e.g.*, Daniel W. Skubik, *Pareto and Kaldor-Hicks Evaluations of Distribution of Social Resources*,

¹⁴ IAIN S. MCLEAN, ALISTAIR MCMILLAN & L. BURT, THE THEORY OF COMMITTEES AND ELECTIONS BY DUNCAN BLACK AND COMMITTEE DECISIONS WITH COMPLEMENTARY VALUATION BY DUNCAN BLACK & R.A. NEWING (Duncan Black ed. 1998).

Kaldor used the Pareto criterion in a different way called the Potential Pareto test (PCT). He acknowledged, in response to criticism especially by Lionel Robbins,¹⁵ the inability of economists to establish a scientific basis for making interpersonal utility comparisons, but suggested that this difficulty could be made irrelevant.¹⁶ Kaldor proposed the (PCT) as a solution, stating:

“Only if the increase in total income is sufficient to compensate for such losses, and still leave something left over to the rest of the community, can the project be said to be ‘justified’ without resort to interpersonal comparisons of utility.”¹⁷

Kaldor further suggested that the moral issues be left to policy makers, not economists.¹⁸ This argument based on eschewing economists’ consideration of moral sentiments was taken to mean that economists should not consider the value of moral sentiments generally.¹⁹ Kaldor argued that policies leading to an increase in aggregate real income are always desirable because the *potential* exists to make everyone better off.²⁰ Consideration of moral sentiments was thus frivolous because

“the economist’s case for the policy is quite unaffected by the question of the comparability of individual satisfactions; since in all such cases it is *possible* to make everybody better off than before, or at any rate to make some people better off without making anybody worse off.”²¹

According to Kaldor, a project is desirable if the money measure of gains exceeds the money measure of losses.²² With regard to the *potential* compensation that could turn losers into winners in such situations, Kaldor notes that “whether *actual* compensation should take place is a political question on which the economist, qua economist, could hardly pronounce an opinion.”²³

¹⁵ Lionel Robbins, *Interpersonal Comparisons of Utility: A Comment*, 48 ECON. J. 635-640 (1938).

¹⁶ Nicholas Kaldor, *Welfare Propositions of Economics and Interpersonal Comparisons of Utility*, 49 ECON. J. 549, 551, n.1 (1939).

¹⁷ *Id.* at 550.

¹⁸ *Id.* at 549-50.

¹⁹ *Id.* at 551.

²⁰ *Id.* at 550.

²¹ *Id.* at 551.

²² *Id.* at 550.

²³ *Id.* at 551.

Sir John Hicks, perhaps the most prominent economist of the time, accepted the Kaldor approach and expanded the criterion to another measure of valuation.²⁴ This Kaldor Hicks, or KH, criterion avoids interpersonal utility comparisons by separating equity from efficiency.²⁵ KH claimed a separation of efficiency and distributional effects by using the change in aggregate gains as the measure of efficiency.²⁶ Kaldor proposed it was outside the purview of CBA for decision makers to address sentiments regarding equity.²⁷

Kaldor endorsed the procedure adopted by Pigou, which Kaldor describes as “dividing ‘welfare economics’ into two parts: the first relating to production, and the second to distribution.”²⁸ This separation of efficiency and equity has remained the common, though not universal, basis of normative economic analysis to this day.²⁹ The eagerness of economists to separate considerations of efficiency from those of distribution arose from a desire to put economics on a firm base as a policy instrument separate from moral judgments by economic

²⁴ Kaldor’s test is generally thought of as the sum of the compensations variations. Hicks developed a parallel test of the sum of the equivalent variations. J. R. Hicks, *The Foundations of Welfare Economics*, 49 *Econ. J.* 696 (1939). For an explication of compensating and equivalent variations see RICHARD O. ZERBE JR. & DWIGHT D. DIVELY, *BENEFIT-COST ANALYSIS IN THEORY AND PRACTICE* 75-84 (1994).

²⁵ KH or the PCT has been judged a failure with respect to its initial aims of avoiding value judgments. In their trenchant survey of post-1939 welfare economics, Chipman and Moore conclude that “judged in relation to its basic objective of enabling economists to make welfare prescriptions without having to make value judgments and, in particular, interpersonal comparisons of utility, the New Welfare Economics must be considered a failure.” John S. Chipman & James C. Moore, *The New Welfare Economics*, 19 *INT’L ECON. REV.* 547 (1978). On the KH failure to consider distributional effects. See, e.g., DAVID L. WEIMER & AIDAN R. VINING, *POLICY ANALYSIS: CONCEPTS AND PRACTICE*, 263-64 (2d ed. 1992) (noting that strict use of the Kaldor-Hicks test means that information on how benefits and costs are distributed among groups is ignored in decision making).

²⁶ Robbins, *supra* note 24.

²⁷ Kaldor, *supra* note 25, at 550. The KH approach produces outcomes that are equivalent to those produced by the assumption that the marginal utility of income is the same across all individuals—i.e., that each dollar of benefit or cost is treated the same regardless of who received it. This is of course an interpersonal comparison so that KH did not in fact avoid interpersonal comparisons. For an extended discussion of equity, efficiency, policy and distributional matters see RICHARD E. JUST, DARRELL HUETH & ANDREW SCHMITZ, *THE WELFARE ECONOMICS OF PUBLIC POLICY: A PRACTICAL APPROACH TO PROJECT AND POLICY EVALUATION* (2004).

²⁸ ARTHUR CECIL PIGOU, *THE ECONOMICS OF WELFARE* (2002).

²⁹ See ANTHONY E. BOARDMAN, DAVID H. GREENBERG, AIDAN R. VINING & DAVID L. WEIMER, *COST BENEFIT ANALYSIS: CONCEPTS AND PRACTICES* 30 (2d. ed. 2001).

analysts.³⁰ Kaldor suggests “the economist should not be concerned with ‘prescriptions’ at all . . . [f]or it is quite impossible to decide on economic grounds what particular pattern of income-distribution maximizes [sic] social welfare.”³¹ The more modern justification for the separation is that changes in the income distribution are usually better effected through macroeconomic policy rather than through individual projects.³²

Despite the inherent issues of CBA as a tool of valuation, its adoption by the Corps made it a common and practical tool for formal project valuation, and thrust it into the courtroom. The Administrative Procedure Act enabled federal courts to set aside agency action that is “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.”³³ Under this policy, courts continue to assess whether a proposed standard “is reasonable, practicable and appropriate.”³⁴ “‘Reasonableness’ has long been associated with the balancing of costs and benefits.”³⁵ For instance, the “reasonable” person in torts is considered one who takes precaution if the gravity of the injuries averted, or benefits, exceeds the precaution’s burden, or costs.³⁶ A reasonable person’s consideration includes all aspects of their circumstance though, not just the quantifiable elements, thus multiple courts have faulted CBA for its inability to recognize moral sentiments. Courts have resulted to using a “‘soft’ CBA,” something similar to BCA as defined here, to acknowledge intangible benefits and costs.³⁷ In the last century, many agencies have justified their actions to the courts based on CBA or BCA, making both CBA and the moral that are a part of BCA permanent considerations in the legal arena for a variety of cases.³⁸

³⁰ Kaldor, *supra* note 25, at 550.

³¹ *Id.* at 551. *See also* Pigou, *supra* note 37.

³² Shavell, *supra* note 2; Polinsky, *supra* note 2; Louis Kaplow & Steven Shavell, *Why the Legal System Is Less Efficient than the Income Tax in Redistributing Income*, 23 J. LEGAL STUD. 667 (1994).

³³ *See, e.g.*, 5 U.S.C. § 706(2)(A) (2012); *Citizens to Preserve Overton Park v. Volpe*, 401 U. S. 402, 414 (1971); *Bowman Transp., Inc. v. Ark.-Best Freight Sys., Inc.*, 419 U. S. 281, 284 (1974); *Motor Vehicle Mfrs. Ass’n v. State Farm Ins.*, 463 U.S. 29, 41 (1983).

³⁴ *Motor Veh. Mfrs. Ass’n*, 463 U.S. at 41.

³⁵ *Int’l Union, UAW v. OSHA*, 938 F.2d 1310, 1319 (D.C. Cir. 1991).

³⁶ *United States v. Carroll Towing Co.*, 159 F.2d 169, 173 (2d Cir. 1947); *Int’l Union*, 938 F.2d at 1319.

³⁷ *PlanetSpace Inc. v. United States*, 92 Fed. Cl. 520, 542 (2010).

³⁸ *See e.g.*, *City of Waukesha v. EPA*, 320 F.3d 228 (D.C. Cir. 2003).

Benefit Cost Analysis

BCA differs from CBA in three respects, (1) it accepts that moral sentiments are an economic good and that their value is the willingness to pay (WTP) for their realization, and (2) it rejects the potential Pareto test, (PCT) as the acceptance criteria for projects, (3) the test for acceptance of a project is simply a positive net present value, the NPV. The NPV is the present value of benefits minus the present value of costs. The present value is that present sum that will yield the actual stream of benefits or costs when invested at a given interest rate. I will show that in practice there has been a shift towards acceptance of these BCA requirements and differences.

An Example

Consider the following example. Suppose that six people are dying, but each of their lives could be prolonged by 5 years if they receive treatment. Five of these people are unable to work. The sixth is a highly productive inventor whose past medical inventions have been quite socially useful. Who should be treated? This is both a deontological and an BCA economic question.

A deontological approach, especially in the form of Kantian criteria, suggests that all six people are equally worthy and society has a duty to pay for all six to receive treatment.³⁹ In reality, however, the budget is constrained so that only one person can receive the life-extending treatment. Purely consequentialist, economic approaches suggest it is the productive inventor that should receive treatment due to the value they add to society – *ceteris paribus*.⁴⁰ The CBA evaluation would save the inventor. Now consider a BCA approach. Suppose there are moral sentiments, which indeed there would be, such that the person given treatment should be chosen by random process so that each has an equal chance of treatment?⁴¹ Or perhaps there are moral sentiments of society to the effect that the persons should be chosen on the basis of moral character.⁴² The

³⁹ See IMMANUEL KANT, *CRITIQUE OF PURE REASON* (Paul Guyer & Allen W. Wood eds., Cambridge ed. 1999), for an extreme form of a deontological approach.

⁴⁰ The tension between deontological and economic thinking is well illustrated in the sources cited *supra* notes 1 & 2.

⁴¹ This was the approved norm in necessity cases in the 18th and 19th centuries involving ship wrecks. See A.W. BRIAN SIMPSON, *CANNIBALISM AND THE COMMON LAW: THE STORY OF THE TRAGIC LAST VOYAGE OF THE MIGNONETTE AND THE STRANGE LEGAL PROCEEDINGS TO WHICH IT GAVE RISE* (1984).

⁴² Which was the criterion used in deciding use of the early kidney machines.

consequentialist, economic approach in the form of cost-benefit analysis, CBA, does not take into consideration these moral sentiments whereas BCA would in principle. Traditional CBA suggests the inventor should be saved based on the expected monetary value of the inventor's contributions, a benefit absent in the other candidates.⁴³ This is especially the case where CBA is taken to only represent market values of objects.

BCA, in contrast to CBA, considers the actual preferences of the general population as well as the social value of the expected inventions.⁴⁴ Society's preferences might involve supplying equal treatment to all, disregarding the budget constraint, or suggest a random person to receive treatment given the budget constraint. Society may also have a preference toward the individual who is seen as most deserving based for example such things as being well liked, active in charity, devoted in religion, and/or by demonstrating preferable personality traits.⁴⁵ BCA reflects society's

⁴³ These numbers would be adjusted for risk and uncertainty.

⁴⁴ The terms BCA and CBA have generally until recently been interchangeable, though a distinction is sometimes made. The Army Corps of Engineers now uses "benefit-cost" analysis. The professional society for BCA is The Society for Benefit-Cost Analysis. *See also*, Donald Kenkel, *Cost-of-Illness Approach*, in VALUING HEALTH FOR POLICY 42 (George Tolley et al. eds., 1994). A moral and fairness argument can of course be made towards preferences behind the veil of ignorance or some other Rawlsian like system.

⁴⁵ An approach somewhat of this kind was taken by the University of Washington Medical School when there were limited kidney dialysis machines available in the early days of machine use. The Seattle Artificial Kidney Center at Swedish Hospital faced a serious problem: there weren't enough machines or trained personnel to serve all the people who needed dialysis. Physicians did not want the responsibility of choosing which few patients would use the machines. The hospital formed the Admissions and Policy Committee to decide which patients would get dialysis. The committee was composed of seven volunteers from the community—a lawyer, a minister, a housewife, a state government official, a labor leader, a banker, and a surgeon—and two physicians. The Admissions and Policy Committee used several criteria to determine who would receive dialysis: 1. Only people who would benefit medically from dialysis (as determined by a physician) were eligible. 2. Only adults—no children—were eligible. The committee's argument was that more children would benefit if their parents or guardians who needed dialysis received it. Most adults supported multiple children. 3. Only residents of the State of Washington were eligible. Residents paid state taxes, and state taxes paid for treatment. 4. *Only individuals who were "valuable to society when their lives were examined holistically" were eligible.* That is, the committee used applicants' "social worth" or "value to society" as a criterion. Committee members used several factors to determine social worth: income, sex, marital status, net worth, nature of occupation, extent of education, church attendance, number of dependents (more dependents gave applicants a better chance of being chosen), and potential for rehabilitation. The factors helped the committee determine the probable loss to society if an applicant died, including the loss of economic support to dependent children who would then need state financial assistance. This is taken redacted from

preference of these sentiments when determining who should receive treatment, as well as any social value of the expected inventions. In short, BCA is capable of taking into account both consequentialist and deontological approaches to the extent they are a part of the culture and the society.⁴⁶

Another Example

Consider a proposal to locate a municipal incinerator using an economic approach. CBA would place it in the least costly location, which would inevitably be a neighborhood with low property values; this is usually a neighborhood of poorer inhabitants. This outcome is financially sensible, but offensive to elements of the larger society. Under BCA, society's sentiments are taken into account. If society is offended by the municipal incinerator being placed in a neighborhood of poorer inhabitants, BCA would suggest the location proposal be rejected. Alternatively, if society prefers the incinerator be placed in these neighborhoods so that the wealthier portion of society is not exposed to it – often referred to as “not in my backyard” or NIMBYs – then BCA would reach the same conclusion as CBA and approve the project. In this case objection to the weight of preferences given by CBA and BCA to income and wealth might be made. But those making the objection have already had their objection counted by BCA. On what grounds should their preferences be given special treatment? At this point we reach the limitations of BCA. To incorporate moral sentiments is not the same as answering moral questions. The most BCA can claim, and what it does and should claim, is that its purpose is to provide information, to inform a discussion. How far then does this limitation go in practice? To provide an answer I survey case data.

The Move Towards BCA

NAT'L INST. HEALTH, Historical Case 3—Allocating Dialysis Machines, *in* EXPLORING BIOETHICS (2009), https://science.education.nih.gov/supplements/nih9/bioethics/guide/pdf/Master_3-3.pdf. CBA would consider only who would pay the most for the service.

⁴⁶ For examples in which distributional effects are considered *see* David B. Schorr, *Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights*, 32 *ECOLOGY L.Q.* 3, 7 (2005); Richard O. Zerbe Jr. & C. Leigh Anderson, *Culture and Fairness in the Development of Institutions in the California Gold Fields*, 61 *J. ECON. HIST.* 114, 115-116 (2001); Richard O. Zerbe & Sunny Knott, *An Economic Justification for a Price Standard in Merger Policy: The Merger of Superior Propane and ICG Propane*, *in* ANTITRUST LAW AND ECONOMICS 409 (John B. Kirkwood ed., 2004).

When the formation of the Society for Benefit-Cost Analysis was completed in 2006, a vote was taken as whether or not to give the Society its current name or the name Society for Cost Benefit Analysis.⁴⁷ The vote, led by Jack Knetsch, was in favor of the former title which remains the title today. Similarly, the Corp of Engineers has used the term benefit-cost analysis as the primary term at least since 2007,⁴⁸ and FEMA has used the term at least since 2009.⁴⁹ When existence value cases began to reach the courts after 1976, it became apparent that traditional CBA was not appropriate.⁵⁰ Existence values are in the moral sentiments showing the WTP for something to exist that one will not use and thus beyond traditional CBA. Courts began to pay more attention to less tangible values and to moral sentiments generally, and the recognition of moral sentiments as economic goods has also made its way into the economic literature, sometimes reluctantly and with rearguard action.⁵¹ Up until this time the term cost-benefit analysis, which was the historical term, has been and is the most used term.⁵² A survey of actual cases shows that the inclusion of moral sentiments is underway in both economics and law.

⁴⁷ With support of the University of Washington and its School of Public Affairs, I formed the first meeting in 2006 and was present for the discussion of this issue. David Weimer had suggested I undertake this task.

⁴⁸ See SUSAN E. DURDEN & JIM FREDERICKS, U.S. ARMY CORPS OF ENGRS., IWR Rpt. 09-R-3, ECONOMICS PRIMER (2009), http://www.iwr.usace.army.mil/Portals/70/docs/iwrreports/iwrreport_09-R-3.pdf. The primary basis for economic analyses within the Corps of Engineers dates back to a classic piece of legislation, the Flood Control Act of 1936, ch. 688 49 Stat. 1570.

⁴⁹ See FEMA, *Understanding the FEMA Economic Analysis*, in ENGINEERING PRINCIPLES AND PRACTICES FOR RETROFITTING FLOOD-PRONE RESIDENTIAL STRUCTURES, at B-1, FEMA P-259 (3d ed. 2012), http://www.fema.gov/media-library-data/20130726-1506-20490-2593/fema259_complete_rev.pdf.

⁵⁰ The U.S. Supreme Court repeatedly has accepted that “environmental well-being” and “esthetic” interests are “cognizable interest[s] for purposed of standing.” See, e.g., *Sierra Club v. Morton*, 405 U.S. 727, 734 (1972); *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 562–63 (1992); *Ohio v. U.S. Dep’t of the Interior*, 880 F.2d 432 (D.C. Cir. 1989) (one of the first cases to use the term existence value).

⁵¹ See generally *supra* note 1.

⁵² The decision criteria for BCA is the net present value rule, NPV. The NPV recommends acceptance of all projects for which the NPV is positive. The present value is the value that could be invested today at some rate (r) that could produce the cash flow corresponding to the projects benefits and costs. The NPV is the discounted value of benefits minus costs.

Inclusion of Moral Sentiments: What A Survey of Benefit Cost Analyses Shows about Who Gains from Their Use – Qui Bono?

Virtually all of the criticisms of CBA made in the legal literature have been shown to be eliminated by BCA. Of course BCA has limitations⁵³ The major limitation is that BCA (and CBA) will favor the rich as BCA attempts to mimic a price system where there is not one. A price system is itself regressive; those with more money can buy more so that this regressivity is of course carried forward in BCA calculations. How could be otherwise if the enormous advantages of a price system are to be preserved? How important is this limitation? To a large extent this is an empirical question so that we ask to what extent are the rich favored as an actual result of the use of BCA?

My research hypotheses are (1) that the use of BCA or CBA is not in fact generally biased towards the rich, (2) that moral sentiments are sometimes considered, and (3) that non-quantifiable values are considered in some cases. These arose out of my experience with a number of actual CBAs. To obtain a better idea of the beneficiaries in the actual use of CBA or BCA, I conducted a survey of BCA projects available from the internet between 1990 and 2010. These included all CBA's available on the internet conducted or contracted by the Federal Government and those conducted by think tanks and state governments, whether directly or by hired consultants. Those projects whose costs were measured per-unit (i.e. per hectare, per vaccine, etc.) were excluded from analysis of costs, as a lack of a common denominator makes meaningful comparison between them impossible. The total data set is around 370 cases. The data by CBA type are as follows:

Figure One: Data by Project Type

Environmental	51	15%
Transportation	26	8%
Social (Crime, Tax, Alcohol, Security)	89	26%
Homeland Security	3	1%

⁵³ See Zerbe supra note 1..

poor and that find negative net benefits are not statistically significantly different from those whose target social economic group is middle class or mixed ($p = 0.29$ ($N = 76$) vs. $p = 0.26$ ($N = 143$)). In addition, the proportion of social projects that resulted in positive net benefits was higher than that of infrastructure and technology projects (77% vs. 60% ($p = 0.038$; $N = 125, 40$)).⁵⁵

The figure below, shows the count of projects that fall under each socioeconomic group. These classifications are subjective. This is determined by considering the beneficiaries of these projects. To bring some more objectivity to the classification I had three different graduate students and myself rank the projects by income class. There were only trivial disagreements and these were included in the unclear call. There are 41 projects whose beneficiaries that fall under “Upper-Middle Class & Above,” but net benefits are not reported for any of these projects. I have no explanation for this. Note, however, that the number of these projects is not large. In the graph below, there are 5 different categories for whether net benefits were found.

Figure Two: Beneficiaries by Income Class

Income Class	Positive Net Benefits	No Positive Net Benefits	Mixed Benefits	Unclear	Information Not Available	Total
Rich: Upper Middle Class & Above	0	0	0	0	41	41
Middle Class	6	1	1	0	0	8
Poor	53	2	21	1	1	78

Infrastructure and technology projects had a lower average SDR than transportation projects, finance and trade or international development, and health and safety projects (4.37% vs. 5.29% ($p = 0.0031$; $N = 29, 34$), 5.79 ($p = 0.0111$; $N = 9$), and 5.44% ($p = 0.0075$; $N = 59$), respectively). I assume that such projects affect all in roughly equal measure.

⁵⁵ For many or most of these projects the income class assigned to beneficiaries is at least partly subjective based on reading the CBA studies.

Mixed by income Class	96	4	31	3	3	137
Unclear	75	4	18	2	1	100
Total						364

This gives the following results out of 364 cases.

Figure Three: Beneficiaries of Proposed Projects by Income Group

Income Class	Percentage of Total
Rich	11%
Middle class	2%
Poor	21%
Mixed income	38%
Unclear	27%

As only 11% of projects clearly favor the rich (upper middle class and above) and 21% favor the poor, it seems that by this measure the actual use of CBA or BCA does not favor the rich. Of course with so many cases having effects on mixed or unclear incomes, one cannot say unequivocally that the rich are not favored, and I do not say this. This evidence does suggest, however, that it may be appropriate to shift the burden of proof to those who claim that in practice CBA or BCA favor the rich.

The second hypothesis is that there is some attention paid to moral sentiments. The survey showed that 5.6% of analyses in which the results could be determined (88.8% of cases) involved attention to moral sentiments. This is a small number but shows that such attention exists even without considering cases with existence values in which moral sentiments are always invoked.

The third hypothesis is that some attention is paid to apparently non-quantifiable benefits and costs. This is shown by the following table. In 4% of the CBAs non-quantifiable or non-quantified benefits and costs are substantially considered and in 40% they are mentioned.

Table Four: Treatment of Non-Quantified Benefits or Costs

	Benefit and Costs that Cannot be Quantified are Substantially Considered	Benefits and Costs that Cannot be Quantified are Mentioned	Total
Percentage of 324 Cases	4%	40%	44%

These results suggest the possibility that the poor are the more likely beneficiaries of BCA and that some, but not a great deal, of consideration is given to moral sentiments even aside from existence values, which explicitly consider moral sentiments, and that non-quantifiable benefits and costs are sometimes considered and often mentioned. It is not unlikely that these conclusions would hold for the universe of BCA studies, though this universe cannot easily be wholly determined.

When existence values are considered, the percentage of cases in which moral sentiments are considered by BCA's and by the courts is much larger.⁵⁶ An existence value is the WTP for existence of a project or good net of costs. The Federal Court of Appeals has defined an existence value as “the dollar amount an individual is willing to pay although he or she does not plan to use the resource, either at present or in the future.”⁵⁷ The Court stated,⁵⁸

[W]e instruct DOI that its decision to limit the role of non-consumptive values, such as option and existence values, in the calculation of use values rests on an erroneous construction of the statute... Option and existence values may represent “passive” use, but they nonetheless reflect utility derived by humans from a resource and thus, *prima*

⁵⁶ For an example, see Brian Vander Naald & Trudy Ann Cameron, *Willingness to Pay for Other Species' Well-Being*, 70 ECOLOGICAL ECON. 1325 (2011).

⁵⁷ *Ohio v. U.S. Dep't of Interior*, 880 F.2d 432, 476 n.73 (D.C. Cir. 1989).

⁵⁸ *Id.* See also 51 Fed. Reg. 27,692, 27,721; *Minn. Pub. Interest Research Group v. Butz*, 401 F. Supp. 1276 (D. Minn. 1975) *aff'd* 498 F.2d 1314 (8th Cir. 1974).

facie, ought to be included in a damage assessment.

More than two thousand contingent valuation studies have been completed in recent years, a significant number of which have been directed towards determining existence value.⁵⁹ Such values embody a type of moral sentiment reflecting a WTP to maintain the existence of some good a person will never actually use.

BCA, as the primary theoretical concept for practical economic valuation of projects, reduces the tension between economic and deontological thinking, potentially expands the realm to which economic thinking can be applied and potentially increases accuracy of its results. BCA as a foundational concept is superior to CBA for the following reasons: (1) BCA compares actual choices, not hypothetical ones where CBA considers hypothetical ones. (2) BCA presents a clear conclusion and is not subject to Scitovsky reversals; (3) BCA is consistent with the standard sum of the CV's measure of welfare changes; (4) BCA recognizes that the realization of moral sentiments should be treated as any other good for which there is a WTP; (6) BCA does not rely on the potential compensation test which in practice is both elusive and burdened;⁶⁰ (7) BCA is not subject to deontological and other criticisms at least to the same degree as CBA., and (8) BCA is supported by an actual Pareto justification. The BCA justification for a valuation measure rests ultimately on what people want and BCA better reflects what people want than CBA.

The Rejection of the PCT

In practice the acceptance test for a project is a positive NPV. In the above mentioned survey of 370 BCA or CBA analyses, all use the NPV criteria, or the related benefit-cost ratio as the criterial for acceptance. Not one of the cases uses the PCT, and for good reason. The test is impractical. What is required for the PCT test is a complex comparison of hypothetical distributional considerations that would be difficult. To be sure the assumption is that projects that pass the NPV test will also pass the PCT. This is, however, not always true as Robin Boadway and Neil Bruce have shown.⁶¹

⁵⁹ David A. Dana, *Existence Value and Federal Preservation Regulation*, 28 HARV. ENVTL. L. REV. 343 (2004).

⁶¹ Robin Boadway and Neil Bruce, *WELFARE ECONOMICS*, Cambridge, MA: Basis Blackwell (1984)

The Consent Justification for BCA

The economic and moral justification for the use of the NPV is that its use will tend to lead to gains for all affected.⁶² That is the justification is basically the Pareto criteria. It appears that over a sufficient number of projects (that is probably not a large number) that satisfy the NPV criterion, all affected will tend to gain, even if there is a substantial error in the BCA's and even if, there is a bias in projects favoring the rich.⁶³ In order to examine how an application of the BCA might play out in real life, we implement a simulation of the results of using BCA in a world with a number of projects for which there are net gains. In order to do so, we make several fundamental assumptions, primarily for simplicity or due to a lack of empirical data that might be used in lieu of these simplifying assumptions. Several of these assumptions are relaxed later to tease out the empirical implications and to analyze how robust they are. The full model with assumptions is available upon request.

For each project in a given simulation, the model calculates individual net benefit as a function of individual costs (taxes) and individual benefits (assigned via the project “winner” parameter and sampling function). Then as each additional project “occurs,” the model tracks the individual’s overall net benefit as the cumulative sum of project-specific net benefits. The simulation outcome of interest is the proportion of individuals in the entire population who have positive net benefits after the “conclusion” of all projects in the simulation; this proportion reflects the number of people who are better off given the specified portfolio of projects. This simulation is then repeated 1,000 times,⁶⁴ with different values for population size, project benefits, the “winners” parameter, and number of projects. The mean benefit for each project is used for all beneficiaries and the costs of the project vary according to mean taxes paid by each group of people so that the rich pay more to the extent they pay more in taxes.

We find that approximately 90% of the population receiving positive *net* benefits as the

⁶² Francis Ysidro Edgeworth, *Mathematical Psychics: An Essay on the Application of Mathematics to the Moral Sciences*. No. 10. C. London, Kegan Paul & Company, 1881.

⁶³ Tyler Scott & Richard Zerbe, 2015, “A Portfolio Approach to Benefit-Cost Analysis”, working paper 2016.

⁶⁴ Some runs were made with 10,000 trials but this took too long to run and we tested for differences in using 1,000 and 10,000 trials and found none.

number of projects gets larger. The losers are the richer part of the population as they are bearing the larger cost burden. It is striking that this 90% figure is reached at a low number of projects (~20), and then does not materially increase further as the number of projects goes to 100.⁶⁵

In order to examine the robustness of our model to potential error in benefit-cost analyses, we rework the cost function, this time randomly generating project costs along a shifted uniform distribution with a designated error rate. That is, we vary the mean of the cost distribution systematically, such that there is between a 1% and 40% chance that a given project actually produces negative net benefits. In reality, a 1% error rate in identifying worthy projects is likely a bit low, while a 40% rate is presumably an extreme over-estimate. Again the results reach the 90% winner level quickly. When costs are allocated uniformly, the ceiling of individuals who have positive net benefits after a portfolio of projects rises (quickly) to 100%. This speaks to the role that cost allocation (in this case, via the federal income tax bracket) plays in these simulations.

What about errors in BCA's? One particularly significant issue for any benefit-cost decision rule is that benefit-cost decision making is inherently an *ex ante* process. In other words, projects are selected because *estimated* benefits exceed *estimated* costs, with no guarantee that this predicted result will be borne out. Given the complexity of most policy decisions and the inherent uncertainty of complex systems, there is simply no way to avoid the possibility that a project for which expected net benefits are positive might instead actually result in negative net benefits.

Our initial model assumes that project benefits and costs are known with certainty, and that no project with negative net benefits are selected. Of course, in reality BCAs only estimate net benefits and a lot can go wrong as a project unfolds over multiple years. We assume that the magnitude of potential errors is in keeping with the magnitude of project estimates, so the error rate is reflected in terms of the potential for a benefit-cost ratio that is less than one. Figure 2 demonstrates simulation results given a 97.5%, 95%, 90%, 75%, and 60% accuracy rate, respectively (with accuracy rate representing the probability that actual project benefits exceed project costs for project that show an expected positive net benefits). Figure 2 below demonstrates that even when we assume only a 60% accuracy rate (that is, a 60% probability that a selected

⁶⁵ As a proof of concept, we see the proportion of people for whom the portfolio of projects provides net benefits does not vary according to population size (top right) or magnitude of project benefits (bottom right); given the way in which costs and benefits are apportioned, we expect this to be the case.

project has benefits that exceed project costs), in most cases at least 75% of the population garners positive net benefits at the end of the simulation.

Figure Five: Frequency of Net Winners by BCA Accuracy Rate
Frequency of Net Winners by BCA Accuracy Rate

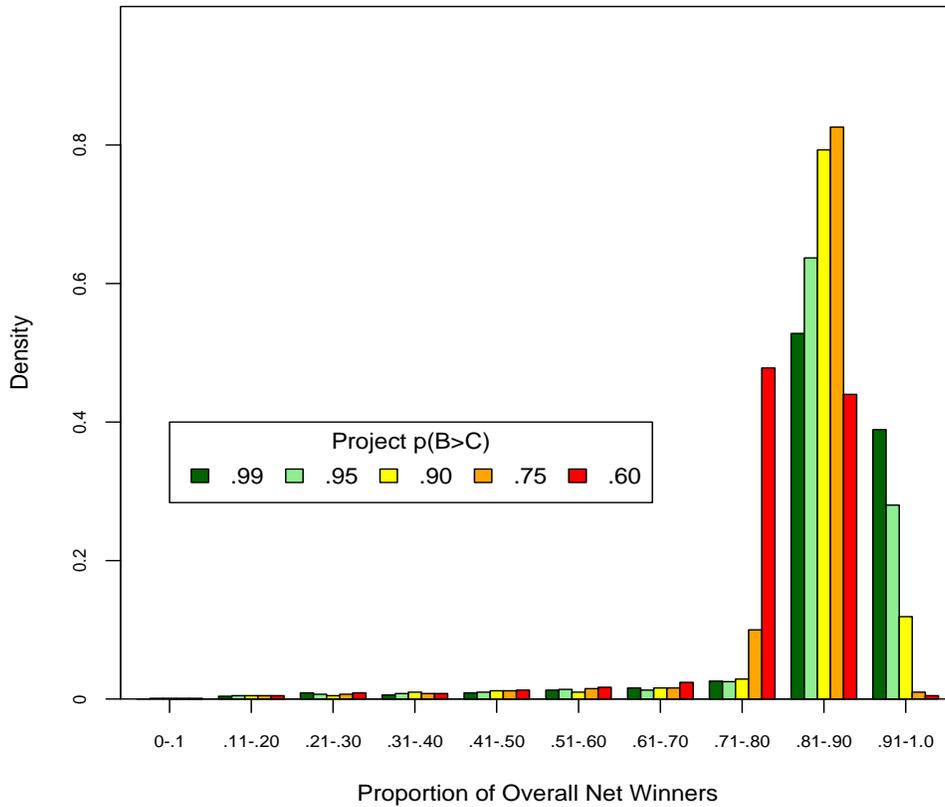


Figure 2: Density of Simulation Net Overall Winners by Accuracy Rate

Figure 2 plots the relative frequency of the probability of net overall winners (after the entire portfolio of projects) for different levels of error in the BCA. We can see that most observations find that at least 80% of the population end up as net winners, and even at a 60% BCA accuracy rate, almost all simulations result in at least 70% of the population coming out as net winners.

Summarized results are shown below:

Figure Six: Effect of Error Rate on Net Benefit

Accuracy Rate	99%	95%	90%	75%	60%
Mean overall proportion of individuals who end up with positive net benefits	.87	.87	.86	.83	.78

The conclusion then must be that BCA has its justification in consent. Note that under BCA if the use of BCA means that the rich gain more than the poor, those moral sentiments against this result must in fact be counted as costs for the use of BCA so that gains to the poor should already include their objections to projects that increase or wealth inequality.

Objections to BCA

Objections Based on Hypothetical distributions (The PCT)

The objections to CBA are largely eliminated by the use of BCA as I have shown elsewhere.⁶⁶ Most of the objections are about missing values, but BCA counts these. An objection made in both the legal and economics literature is that CBA is inconsistent in that it can give ambiguous answers to a decision choice as a consequence of what is called, The Scitovsky Paradox. The paradox is that it is possible using the PCT test to find that a project passes the test but that the project reversal also passes the test. The Scitovsky paradox does not, however, arise with BCA as the paradox is wholly a consequence of the potential compensation criteria, the PCT, which is not the test for BCA. The BCA test is simply the presence of a positive net present value, which is referred to as the net present value, NPV

A similar dismissal may be made of Bakers cogent criticism of CBA. C. Edwin. Baker argued that the PCT test is not useful in most legal cases,⁶⁷ even though a considerable body of literature holds that CBA is a mainstay of common law in the sense that judges use its reasoning in making new law.⁶⁸ Baker considers the use of the PCT in the context of a hypothetical legal

⁶⁶ Zerbe, supra note 1

⁶⁷ C. Edwin Baker, *Starting Points in Economic Analysis of Law*, 8 HOFSTRA L. REV. 939 (1980). See also Matthew D. Alder & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L.J. 165 (1999).

⁶⁸ Benefit-cost analysis is widely used in practical economics, law and policy analysis. In the decade of 2001-2010 the term cost-benefit or benefit cost was cited in (at least) 635 federal cases and in 298 state cases. The growth rate for mention in cases is quite high and probably will hit a total of about 2000 by the end of the decade (from a search of the LexisNexis Academic data base).

case where the sum of the expectations of the parties exceeds the value of the property right in question. In such a case, Baker points out that the PCT cannot be satisfied so that CBA reasoning is not useful in reaching a legal solution.⁶⁹ For example, suppose that Ronald and Richard contest the ownership of a piece of land, both believing that they own it. The land is purely commercial as its value is not determined by emotional or moral sentiments and is worth \$100,000. Ronald is confident he owns the land with a probability of 80%, which is the psychological value Ronald has toward the land. His putative value is thus \$80,000. Richard believes he owns it with a probability of 70%, so his putative value is \$70,000. If Ronald wins the land dispute, he gains a value of \$20,000 and Richard loses \$70,000. If Richard wins he gains \$30,000, but Ronald loses \$80,000. Selling the property does not gain a sufficient sum to compensate the two psychological owners as their joint valuation of their share exceeds the value of the property. To whom should the property go?

Since hypothetical compensation is not possible, the PCT and thus CBA is, as Baker points out, mute. Should the land then go unassigned by the court? Of course not. The BCA assignment is clear: the right should be assigned to maximize the NPV. The BCA comparison is between assigning the right and not assigning any right. Thus under BCA, an analytic decision is available for the true comparison is the value of assigning rights and not assigning them. Thus, Baker's problem disappears under BCA but exists under CBA.

There remain, however, technical objections raised by economists and others based on the possibility of double counting when including moral sentiments as values. These are either incorrect or arise from misinterpretations of the economics. I show this in what follows.

Altruism and the Double Counting Objection

Although courts have recognized moral sentiments, economists have objected to counting them at least in the form of what is called non-paternalistic altruism⁷⁰. They raise two objections: (1) that to count the values represented by non-paternalistic altruism is to double count and (2) that to include non-paternalistic moral sentiments can lead to projects that fail to pass the PCT.⁷¹

⁶⁹ Baker, *supra* note 67, at 165.

⁷⁰ Non-paternalistic altruism arises when what one wishes for the objects of altruism values is what they wish for themselves.

⁷¹ Kenneth E. McConnell, *Does Altruism Undermine Existence Value?*, 32 J. ENVTL. ECON. MGMT. 22 (1997); Peter Diamond & J. Hausman, *On Contingent Valuation Measurement of*

The second criticism is wrong in all but trivial cases and is vitiated by BCA as has been shown elsewhere and in any case could not apply to BCA as it does not use the PCT.⁷²

The first objection is also incorrect. The criticism centers on the potential for altruists to simply make cash transfers instead of supporting projects.⁷³ The claim is that to include existence value when it arises as non-paternalistic altruism specifically is to double count.⁷⁴ The argument first is that if the project is desirable without counting altruistic benefits, then the inclusion is not needed. This is untrue as projects are to be compared to other projects. A project that fails to count moral sentiments may be replaced by another for which no such sentiments exist and which would be inferior to the first projects where moral sentiments counted. The essential criticism is that if the project is not desirable without altruistic benefits, their inclusion cannot make it desirable. This is just incorrect. Kenneth McConnell, for example, considers projects in which the non-altruistic benefits to users are less than the costs of the project, and states that “the project will never pay, no matter what the sharing arrangement.”⁷⁵ Instead cash payments are preferable.

This is incorrect as transfers are in fact quite costly. The use of costless transfers as in the CBA justification illustrates the damage we have inflicted on ourselves by the assumption of costless transfers embedded in CBA but not in the PCT.⁷⁶ In fact, regardless of whether or not direct transfer is superior, it will never be the case that counting moral sentiments generally results

Nonuse Values, in CONTINGENT VALUATION: A CRITICAL ASSESSMENT [page number where paper starts] (Jerry Hausman ed., 1993). See also T. Bergstrom, *When Is a Man's Life Worth More than His Human Capital*, in THE VALUE OF LIFE AND SAFETY (M.W. Jones Lee ed., 1982).

⁷² Richard O. Zerbe Jr., Yoram Bauman & Aaron Finkle, *An Aggregate Measure for Benefit-Cost Analysis*, 58 ECOLOGICAL ECON. 449, 453-55, (2006).

⁷³*Id.* at 452-453.

⁷⁴ The Diamond and Hausman (1993, 1994) claim is a bit more general, but McConnell, *supra* note 106, at 23, shows that the claim is properly limited to only non-paternalistic altruism.

⁷⁵ McConnell, *supra* note 71

⁷⁶ For example, suppose that the benefits are \$100 and the costs are \$110 without including the value of altruism. Suppose that the beneficiaries are the users who will gain \$100 in value. The altruists would bear the \$110 costs of the project. The altruistic value is an additional \$20. The value of the project would then be \$10 (100+20-110), which is positive. However, the project should, however, not be undertaken as a cash transfer would be better. The altruistic can transfer \$120 to the users as cash, which results in a net value of \$20 [(110+20-110)] a better result than the project. Thus it is held that it is unnecessary to count non-paternalistic moral sentiments as part of project benefits, and that to do so leads to double counting. Since direct transfer to users of an amount equal to the costs of the project, C, it is cheaper than the project while creating equivalent moral sentiments, so that adding benefit to the project representing moral sentiments will distort the choice.

in double counting nor will it be the case that counting non-paternalistic altruistic benefits specially results in double counting.

Consider a project in which the benefits to users are B_u , and the costs are wholly borne by altruists and are designated C_a . For a CBA project the net benefits are:

$$CBA = NB = (B_u - C_a). \quad (1)$$

For the same project when altruistic benefits, A , are considered, the NB under BCA will be:

$$BCA = NB = (B_u - C_a) + A \quad (2)$$

To reject the project without counting the altruistic benefits A , can lead to rejection of a superior project. The BCA yields greater and more accurate measured net benefits than the CBA calculation by the amount A . Suppose for example the direct costs of a project are \$110 while the benefits to users are only \$100. If altruistic benefits are \$20, the project is worthwhile with net benefits of \$10. The fact that ordinary net benefits are negative does not mean the project is not worthwhile under BCA.

$$CBA = -\$10 = (\$100 - \$110)$$

$$BCA = \$10 = (\$100 - \$110) + \$20$$

It is never the case that counting altruistic benefits results in double counting. Altruistic sentiments as in existence values are valuable only to the extent to which they are superior to alternative projects. Double counting does not arise. When direct transfer is superior, there is no existence value for the project as there is no net WTP for the project when transfer is superior. That is one does not pay more for something when it is cheaper elsewhere. That is, when direct transfer is superior there are no farther moral sentiments to consider.

Direct transfer may or may not be superior. The larger the transfer costs, the greater the existence value. Let the cost of transferring funds be ϕ . In order to allocate by direct transfer the costs will be $B_u\phi/(1-\phi)$. This is zero only when ϕ is zero. There is no double counting. If for example $\phi = 0.4$, the benefits to users would need to be less than 60% of the costs of the project for direct payment to be superior. That is, to give benefits of \$100 to users about \$143 would need to be transferred to give $(100+20-142) = -\$42$, whereas the project gives a net benefit of \$10. If benefits to users were 90% of costs, the project would be superior for any transfer cost greater than 10% ($\phi = 0.1$). It is necessary to count altruistic values or altruistic existence value to know if benefits exceed costs and how projects compare.

Are the Consideration of Moral Sentiments Rendered Mute by the Availability of Superior Alternatives?

The modern reason, mainly articulated by Shavell, for ignoring distributional issues as a class of moral sentiments in a BCA setting is that it is more efficient to handle distributional changes through tax policy than through BCA.⁷⁷ The argument is that, with tax and subsidy adjustments, any desirable level of redistribution can be achieved so that there is no need for equity considerations in choosing legal rules or evaluating government projects.⁷⁸ That is, what is called optimal tax policy concerns achieving maximum social welfare most efficiently. In the context of achieving a desired income and/or wealth distribution an optimal tax policy is one that achieves the objective at least cost. To assume that tax policy will achieve the desired level of equity, requires that the costs of changing tax policy are not too large and that changes in tax policy are towards optimal tax policy.⁷⁹ Given these assumptions the case for considering distributional effects in BCA fails. If broad changes in tax policy are the most efficient approach, then the value of moral sentiments regarding the particular results of projects will be zero as one will not pay more for the same, cheaper good. Alas in the real world the optimal tax policy assumptions do not hold. The fact is that it is expensive to change tax policy and hard to change it in an optimal direction. There are significant administrative and political costs in tax adjustments.⁸⁰ This means that distributional changes as part of BCA considered as part of particular projects, are desirable. Moreover, when government projects affect particular disparate or local groups, it would be inefficient to craft tax policy to handle these types of situations.

The belief that distributional issues need not be considered in BCA because of the superiority of macroeconomic tax policy for distributional purposes depends on the availability of

⁷⁷ See Polinsky, *supra* note 2; Shavell, *supra* note 2.

⁷⁸ See Polinsky, *supra* note 2; Shavell, *supra* note 2.

⁷⁹ See N. Gregory Mankiw, Matthew Weinzierl & Danny Yagan, *Optimal Taxation in Theory and Practice*, 23 J. ECON. PERSPECTIVES 147 (2009).

⁸⁰ For difficulties in even calculating optimal tax policy see Brian C. Murray et al. *Tax Interaction Effects, Environmental Regulation, and "Rule of Thumb" Adjustments to Social Cost*, 30 ENVTL. & RESOURCE ECON. 73 (2005); Jang-Ting Guo and Alan Krause note that it is well known that the features of nonlinear income tax systems derived from optimal tax models such as those by Mirrlees or by Mirrless style models typically differ substantially from actual practice. This could be they note because actual tax systems are simply far from optimal. Jang-Ting Guo & Alan Krause, *Changing Social Preferences and Optimal Redistributive Taxation* (working paper, June 6, 2016), <http://faculty.ucr.edu/~guojt/Social.pdf>.

an optimal tax policy.⁸¹ It does not appear to be very available. It is at least doubtful that falling tax rates for the wealthy which we observe are a part of optimal tax policy.⁸² IRS data shows the following for those personal filings with the top 400 filers with the largest adjusted gross income.⁸³ Perhaps the wealthy are buying down their tax rates? The results shown in the Table 1 below do not lend confidence to the proposition that optimal tax policy will prevail.

Figure Seven: Taxes Paid for Top 400

Tax Year	Percentage of Tax Payers in the Top 400 Payers Paying less than 25% of gross Adjusted Income in Taxes	Percentage of Tax Payers in the Top 400 Payers Paying less than 10% of gross Adjusted Income in Taxes
1992	24%	2%
1997	57%	3%
2002	60%	3%
2007	82%	6%
2012	86%	8%
2013*	60%*	3%*

Calculated from <https://www.irs.gov/pub/irs-soi/13intop400.pdf>

⁸¹ Or at least a tax policy that expresses social distributional preferences.

⁸² The relationship between social preferences and inequality remains somewhat unclear. The evidence does suggest, however, that as inequality within countries grows, the preferences for redistribution increases. For the United States, particular emphasis is placed on the explosion in executive pay and deepening within-establishment inequality. For an analysis see William R. Kerr, *Income Inequality and Social Preferences for Redistribution and Compensation Differentials* (Nat'l Bureau of Econ. Research, Working Paper No. 17701), (considering a cross sectional analysis which includes the U. S.).

⁸³ I.R.S., THE 400 INDIVIDUAL INCOME TAX RETURNS REPORTING THE LARGEST ADJUSTED GROSS INCOMES EACH YEAR, 1992-2013, <https://www.irs.gov/pub/irs-soi/13intop400.pdf>.

*The effects of Obama tax changes are apparent in the 2013 results.

By and large, optimal tax policy suggests flat or declining marginal tax rates, coupled with lump sum redistributions, presumably from richer to poorer. One way to redistribute is through public projects that benefit the less well off.⁸⁴ A macroeconomic policy would not be the efficient policy in such cases. Justice is particular as well as general. That is, it applies to small as well as large injustices. These considerations (the costs of the tax system and the potentially greater influence of the rich) open the door to use of equity considerations in BCA.

Conclusion

Benefit-Cost analysis as compared with cost -benefit analysis as defined here is a more coherent and acceptable version of cost benefit analysis. BCA avoids the complications of a justification based on hypothetical, costless transfers, provides a wider set of values, and a valuation approach consistent with moral considerations. As with any normative proposal BCA has limitations and its use makes clearer these limitations. BCA should be adopted as the professional standard.

⁸⁴ We should consider the use of tax money to provide public projects that benefit the poor on a project by project basis. Consider public projects such as the location of a municipal incinerator or other environmental hazard from which those of different income classes are expected to gain use, but whose use also imposes local environmental harm. The most efficient location for such “not in my backyard” projects, or NIMBYs, will always be in poorer neighborhoods. Recognizing there will also be moral harm on the part of residents who otherwise benefit but are unexposed to the pollution, there will be moral sentiments to compensate those that are harmed. This is most efficiently done by the provision of a public good that benefits the poorer residents such as a library, a swimming pool, or spending on education. BCA would take into account this more complete and realistic picture, where CBA only analyzes product values.

