

How Does Cost-Benefit Analysis Help Determine Public Value?*

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Paper Summary

“In theory, there is no difference between theory and practice. But in practice, there is.”

Yogi Berra

This paper reviews the role of cost-benefit analysis (CBA) in relation to creating public value. Our first task is to relate the two concepts. First, we outline the economic foundations of CBA as the practical method for determining the optimal provision of public goods and regulation of externalities. The textbook definition of CBA is “a policy assessment method that quantifies the value to a given agency of public policy impacts and consequences in monetary terms” with the goal being “to help effective social decision making through efficient allocation of society’s resources when markets fail” (Boardman et al., 2006, p. 23). We then relate this concept to public value theory, a theory which has developed seemingly independently of CBA. Based on the explanation by Alford and O’Flynn (2009, 173) of Moore’s theory of public value as requiring of a public sector organization that it be: (1) “aimed at creating something substantively valuable”; (2) “legitimate and politically sustainable”; and (3) be “operationally and administratively feasible (i.e. doable with the available organizational and external capabilities needed to produce it)”. Loosely, item (1) might be interpreted as “the public policy should have benefits” and item (3) might be understood as “it should not be too costly”. The political dimension (item (2)) is simply – but explicitly – missing from CBA. At least at this general level, the two constructs are conformable. We also address some of the critiques of CBA and argue that these “over-stylize” CBA as a rigid method for policy evaluation.

Our second task is to examine the direct objections to the use of CBA. We begin this by describing the extent of CBA as a policy evaluation tool. We provide evidence that CBA is implemented far too infrequently. It is required by the federal government for only a tiny percentage of policies; it can easily be ignored; and it can also relatively easily be subverted. Next, we consider the theoretical and practical objections to CBA. We argue that the theoretical objections are over-stated and almost never accompanied by a practical alternative. Nevertheless, we do note some practical objections, albeit ones that are rarely considered.

Our third task is to illustrate how CBA can be used to illustrate the policymaking process. We draw on practical examples that are intended to highlight the various ways in which policymaking is impaired either by a failure to use CBA or by an improper or incomplete use. These examples span the realm of policymaking, including military decisions, crime policy, education policy, mega-events, and environmental legislation. We document how even a basic application of CBA would improve public policymaking. Such improvement is, we argue, a sufficient justification for greater application of CBA.

Government agents have to articulate their policy decisions and CBA and public value theory both play a role. Difficult decisions have to be made, but there can be no acknowledgement that these decisions are difficult. Often, it is better to proceed as if there are no trade-offs and CBA, which has the trade-off in its name, is unsurprisingly not welcome. Nevertheless, the need for a rigorous, formalized method of evaluation – which does not preclude and indeed illuminates policymaker discretion – becomes even greater. CBA could, if practiced more often and to a higher standard, meet this need. We suspect that, given key trends, CBA will be used more often, regardless of the quality of such analyses. For economists, this raises the stakes for improving the practice of CBA.

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Cost-benefit analysis (CBA) is the method used by economists to evaluate public policies. It rests on almost universally-accepted economic theory (public goods and externalities) and can be applied across almost all domains of public policy. Yet it is rarely undertaken, in part, because there is considerable resistance on theoretical grounds. But the theory of CBA is not the ‘problem’. When CBA is undertaken, the gap between the theory and practice is enormous. The real concern is with the practice of CBA. Thus, it seems that CBA might be fruitfully related to public value theory, which incorporates both a methodological and a political framework.

The structure of this paper is as follows. First, we review the theory of CBA and relate this to the theory of public value: the two theories are compatible with each other, although the latter is more comprehensive in that it addresses the political nature of government in a way that CBA does not. We emphasize the importance of CBA – and by implication the importance of public value theory – for policymakers. We then describe the use of CBA across government agencies, finding this to be far less than might be justified. Next, we address the reasons for this lack of attention to CBA. Typically, CBA is rejected on theoretical grounds; we argue this rejection is overly applied. Rather, CBA might be rejected for practical reasons; we argue instead that these grounds are much less appreciated. To illustrate the practical role of CBA, we describe

a series of case studies where the practice of CBA falls far short of what is needed. We conclude with predictions as to the application of CBA in the future.

Cost-Benefit Analysis and Public Value: Theory

Despite its attention in public administration, the concept of public value is not a familiar one to economists. However, the concept is quite complementary to how economists understand what government should do. The economic theory behind this role for government is the theory of public goods and externalities.

Every economist accepts the basic theory of public goods and externalities. Public goods are defined as “goods that benefit all consumers but that the market either undersupplies or does not supply at all” and externalities are defined as “the effects of production and consumption decisions not directly reflected in the market” (Pindyck & Rubinfeld, 2009, p.645).

Disagreement arises over: the extent to which public goods and externalities exist; whether there is any possible remedy; and, if so, whether that remedy should be a regulatory one or involve public provision. Yet, there is little disagreement over the general principles for providing public goods or remedying externalities once the need to do so has been established. To determine the optimal amount of a public good, the provider must take into account the full social (private and external) costs and benefits of the good. This accounting is done with a cost-benefit analysis – indeed, this is often the strict definition of what cost-benefit analysis is. Similarly, the remedy for externalities is that private producers or consumers must be forced to make decisions based on their marginal social (private and external) costs and benefits. The enforcement mechanism is the

imposition of a Pigovian tax (or subsidy) that captures the external costs and benefits.¹ The optimal size of this tax, however, is determined using ‘shadow pricing’ methods developed within cost-benefit analysis.² Hence, cost-benefit analysis may be regarded as the fundamental economic approach to understanding and creating public value when markets fail.

The literature on CBA and public value has not co-evolved, so the relationship between the two concepts is subject to interpretation. But there is broad overlap. The textbook definition of CBA is “a policy assessment method that quantifies the value to a given agency of public policy impacts and consequences in monetary terms” with the goal being “to help effective social decision making through efficient allocation of society’s resources when markets fail” (Boardman et al., 2006, p.23; Adler & Posner, 2006). By comparison, Alford and O’Flynn (2009, 173) explain Moore’s theory of public value as requiring of a public sector organization that it be: (1) “aimed at creating something substantively valuable”; (2) “legitimate and politically sustainable”; and (3) be “operationally and administratively feasible (i.e. doable with the available organizational and external capabilities needed to produce it)”. Loosely, item (1) might be interpreted as “the public policy should have benefits” and item (3) might be understood as “it should not be too costly”. The political dimension (item (2)) is simply – but explicitly – missing from CBA. At least at this general level, the two constructs are conformable.

Bozeman (2002) has put forward a forceful critique of a link between public value and economic approaches based on two arguments. First, Bozeman (2002) objects to the equation of the two approaches on the premise that an economic approach is “less a reflection of public value

¹ It does not matter whether the Pigovian tax is enforced through regulation or private contracting. Both the regulators and private contractors need to estimate the size of the external costs.

² These methods include contingent valuation, hedonic pricing, travel cost method, cost of illness method, and defensive expenditures method. For a discussion of all these methods, see Boardman et al. (2006).

than of the private value of public things” (p. 146). However, we believe that this objection is overstated: economic approaches can and do use public valuations for public goods; and private valuation is not a necessary element of CBA. A substantial literature has developed on contingent valuation survey methods. Individuals are asked to value public goods based on their perception of the full value of these goods, including the value of non-use and existence value independent of their own private value of the good. There are questions about the validity of methods used to derive public values and economists typically use ‘revealed preferences’ (i.e. values based on behaviors) over ‘stated preferences’ (i.e. values based on declarations by individuals). But there is no objection to the use of such public values *per se*. Indeed, each CBA should (and certainly could) consider the legitimacy of using private prices to value public goods, just as one should consider the legitimacy of using public ‘prices’. Second, Bozeman (2002, 150), in developing a public-failure model, writes that “the key policy question becomes, if the market is efficient, is there nonetheless a failure to provide an essential public value?” To most economists, this question would suggest a semantic confusion: if a public value is not being provided, then the market is *ipso facto* allocatively inefficient. Again, there may be disagreement about what the public value should be but, if the market does not provide it, then that market is not efficient.³

Economic theory of public goods provision and public value theory are not identical: Alford and O’Flynn (2009, 174) draw three distinctions. One is that public value theory refers to all forms of market failure (including externalities and market power). As argued above, so do the shadow pricing methods in CBA. A second distinction is that public value focuses on “what

³ Certainly, it is not helpful to have two very distinct meanings of the term efficiency – allocative and technical – but economists are familiar with the distinction. (Terms such as the “efficient markets hypothesis” have very specific meanings, i.e. that a market processes all the information available).

has meaning for people, rather than what a public-sector decision-maker might presume is best for them". This distinction is similar to Bozeman's (2002) first objection above. Here too, CBA is not in conflict – if we can legitimately identify a collective valuation for a particular good – that valuation should be used to determine the optimal provision of that good. Alford and O'Flynn's (2009, 176) third distinction is between outputs (things that can be measured) and outcomes (things that cannot). Economic approaches, it is claimed, refer to the former and cannot address the latter. For example, CBA does not explicitly address issues of process or social order. To take an extreme example, owning African slaves in the U.S. might pass a national CBA test: slaves are very low cost workers. Two rebuttals are usually proposed. One is that a proper accounting of costs would lead to a rejection of this claim (e.g. if consumers refused to buy goods from a slave-owner or costs of enslavement were high); and critically some of these costs would be a function of the implications for social order – if enslavement of non-U.S. citizens was allowed, U.S. citizens might be enslaved abroad and this should be counted as a cost. The second rebuttal is that CBA does not exclude consideration of process or social order independently; it is neutral about them. Critically, CBA does not compel policymakers' decisions; it is intended to improve those decisions. If slave-owning does not exist and everyone agrees that slave-owning is wrong, then there is no reason to perform a CBA. However, if slave-owning does exist, a CBA might still be performed to see what the consequences of its abolition would be, *even as everyone agrees that it should be abolished*.⁴

Overall, unless one interprets economic approaches narrowly and defines CBA dogmatically, there is no glaring conflict between these theories and the theory of public value.

⁴ Our case study on the Iraq war makes this point.

More importantly, any terminological distinctions pale in comparison to the much larger problem: the use and practice of CBA.

The Use of Cost-Benefit Analysis

At the federal level, the role for CBA is identified under the Regulatory Right to Know Act. This Act requires the Office of Information and Regulatory Affairs (OIRA) within the Office of Management and Budget (OMB) to submit annually to Congress an “accounting statement and associated report” that includes estimates of the benefits and costs of Federal Rules. Executive Order 12866 (1993) included as objective 6 that “Each agency shall assess both the costs and the benefits of the intended regulation, and recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.”⁵ This assessment is applied to rules designated as major under 5. U.S.C. Chapter 8, and those meeting the threshold for analysis under the Unfunded Mandates Reform Act of 1996. This threshold – labeled ‘economic significance’ – is in practice any rule with an effect of over \$100 million. Thus, policymakers and theoreticians who object to CBA should be ‘comforted’ by the knowledge that unless the policy involves \$100 million of resource, there is no requirement to perform CBA.

⁵ This order was reaffirmed in January 18 2011 under Executive Order 13563. Retrieved May 21 2012, from <http://www.whitehouse.gov/the-press-office/2011/01/18/improving-regulation-and-regulatory-review-executive-order>.

But the scope of CBA is far narrower. Leaving aside the notion that an economic evaluation of a \$99 million project is not deemed necessary, there are several ways in which this Executive Order is circumscribed.

First, government agencies are not bound to respond to a CBA if it conflicts with their legislative mandate. The two most significant exemptions here are for regulations regarding National Ambient Air Quality Standards – where public health concerns are the mandate – and the Endangered Species Act – where species preservation is the mandate.⁶

Second, independent agencies are not subject to the Executive Order. This exempts at least 33 agencies. It exempts agencies with very large influence over how the economy is structured, such as the Department of the Treasury, the Federal Reserve, the Securities and Exchange Commission, and the Patent and Trade Office.⁷ It exempts agencies with potentially enormous consequences for public value, such as the Defense Nuclear Facilities Safety Board, the Nuclear Waste Technical Review Board, and the Council on Environmental Quality. Lastly, it exempts agencies with significant – albeit somewhat disparate and amorphous – societal influence, such as the National Science Foundation, National Endowment for the Arts, the Social Security Administration, the Equal Employment Opportunity Commission, and the Farm Credit Association.

⁶ Strictly, the EPA is required to undertake a cost-benefit analysis but is not obliged to consider the findings from such an analysis.

⁷ In March 2012, OIRA performed two regulatory reviews for the Department of the Treasury. Neither was economically significant. Retrieved March 25 2012, from

http://www.reginfo.gov/public/jsp/EO/eoDashboard.jsp?agency_cd=1900&agency_nm=DOE&stage_cd=4&from_page=index.jsp&sub_index=0.

Finally, regulations may be devised strategically to avoid CBA. Rules may be implemented before a CBA has been completed. (It is hard to estimate the proportion of CBAs that are conducted *ex ante* rather than *ex post* but the majority of researcher-performed CBAs are in the latter category). Rules may be devised to avoid the designation “economically significant” or simply denied to be so. A particularly egregious example of the latter was the EPA’s new rules on New Source Review for power plants in 2003. These rules were declared to fall below the “economically significant” threshold based on anecdotal evidence from industry executives who were the obvious beneficiaries of the new rules (Chettiar, Livermore & Schwartz, 2009). This evasive technique was regularly employed during the Bush Administration from 2000-2008, with several Acts being exempt from review under the National Environmental Policy Act.⁸

Consequently, the proportion of rules that actually undergo CBA is very small. Of the 3773 rules published in the Federal Registrar in 2007-08, 277 were reviewed by OMB. Of these, 42 were identified as major rules for OMB but 21 were federal budget transfer programs (and so exempt). Of the remaining 21, 13 had a statement of costs and benefits. Overall, less than one half of one percent of rules was subject to CBA. Since 1990 only 7% of the 41,724 reviews performed by OIRA were deemed ‘economically significant’, i.e. above the \$100 million threshold. But even these figures overstate the implementation of CBA because most analyses that are conducted fall far short of a full CBA. In their review of 74 of regulatory impact analyses, Hahn and Tetlock (2008, Table 1) found that not every analysis estimated costs and not every analysis estimated benefits. In fact, only 12% of these analyses actually reported costs and benefits together to allow for the calculation of a benefit-cost ratio. Also suggestive is the review

⁸ These exemptions included the Health Forests Restorations Act of 2003 and the Energy Policy Act of 2005 (see Chettiar et al., 2009).

time: for reviews of rules that were not deemed economically significant, the average review time was 32 days; for reviews of rules that were deemed economically significant, the average review time was 44 days, i.e. only 12 days (one-third) longer.⁹

Of course, federal governments are not the only agencies providing public goods and regulating public “bads”: state and local government spending is approximately one-half the size of federal spending; and non-profit charitable agencies play an important role. Unfortunately, economic evaluation by these other agencies is not remotely as advanced as that of the federal government. In a comprehensive summary of regulatory review by state agencies across the U.S., Schwartz (2010) paints a very dismal picture.¹⁰ Schwartz (2010, p.8) finds that: “almost no states have balanced or meaningful processes to check the ongoing efficiency of existing regulations”; and “most states struggle to assess the basic costs of regulations – and completely forgo any rigorous analysis of benefits or alternative policy choices”. Few non-profit agencies have sufficient capacity to perform economic evaluations, including large international agencies such as the World Bank (Vawda, Mook, Gittinger, & Patrinos, 2001). Finally, the situation appears no better in Europe. Reviewing impact assessments in Europe, Hahn and Tetlock (2008, 72) concluded starkly that they “seldom estimated costs, almost never quantified costs to business, did not specify benefits, and virtually never compared the costs to the benefits”.¹¹

⁹ EO Review Count results, retrieved 3/25/12 from <http://www.reginfo.gov/public/do/eoCountsSearch?viewall=y>.

¹⁰ One exception is the Washington State Institute for Public Policy at <http://www.wsipp.wa.gov/default.asp>.

¹¹ Canada is in the vanguard of economic evaluation. Its evaluation coverage (the percent of federal government spending that is subject to evaluation) was 16% in 2009-10 (Treasury Board of Canada, 2011, Table 3).

Emphatically, CBA is a “custom more honored in the breach than the observance”.

Policymakers with concerns about the use of CBA may rest easy.

Critiques and Reasons for Neglect of CBA

This lack of use of CBA makes debate about the value of CBA somewhat moot.

However, it may be that the absence of CBA reflects its weakness as a method for evaluating public policy. We divide these weaknesses into theoretical and practical, emphasizing that the latter is the real concern.

Theoretical critiques

Fundamentally, the biggest reason for neglect of CBA is that it is not viewed as legitimate (Richardson, 2000; Frank, 2000; Sandel, 2009). As noted above this argument is substantially overstated.¹²

First, no economist is arguing for a CBA of every individual decision. As forcefully argued by Posner (2000), the criterion for using CBA is: does it improve decision-making? Of course, an economist would argue that the scope of decisions under which CBA would improve decision-making is large. But I suspect that many non-economists would agree that a \$99 million federal policy – or any large-scale state government policy or any World Bank intervention – would merit an economic evaluation of some form.

¹² Strictly, Sandel (2009) writes “our hesitation points to something of moral importance – the idea that it is not possible to measure and compare all values and goods on a single scale” (p. 46). This leaves open the possibility that *some* values and goods might be measured on a single scale. Therefore, the question becomes: Are too many public decisions being valued this way or too few?

Second, categorical imperatives assume away the important role of the policymaker. It is not enough to say that slavery is wrong or education is a human right. Policymakers have to implement policies that ensure and maintain the abolition of slavery and that provide students with schooling. Yet, both these imperatives require resources and those resources, once allocated, cannot be used for an alternative purpose. If an entire society is agreed that the Asian tiger should not be allowed to become extinct, there is no reason for a CBA, unless one realizes that the cost of preservation is such that it not possible to save the Asian elephant from extinction.

Third, many of the supposed illegitimacies can be incorporated into policy-making independently from CBA. The over-arching critique is that ‘one cannot measure values using prices’. This critique comes in many forms. First, CBA reflects the existing pattern of wealth such that prices of goods do not reflect their value and CBA calculations will be unfair. For example, a polio vaccine research program should not be funded but a seat-belt subsidy for Rolls Royce owners should be: the latter have a higher willingness to pay for life-saving policies. Second, no weight is placed on the morality of values used in CBA: it does not matter whether the beneficiaries are saints or sinners; and it does not matter if due process has not been followed. Third, some things cannot be priced (such as due process). Fourth, there is a saliency mismatch: CBA counts only what it can see. Finally, preferences cannot be aggregated using money because it does not correspond to utility or satisfaction.¹³

¹³ To take another example, one might be concerned about people performing a cost-benefit analysis before agreeing to marry ones’ spouse. That said, there is plenty of evidence on the role that family resources play in divorce rates and marital discord.

But, the method of CBA is not prescriptive on these issues. If the analyst believes that public valuations better capture willingness to pay or opportunity cost, then these public values should be used. The literature on contingent valuation and passive use – individuals valuing things that they will never use – is substantial and growing. Similarly, the analyst can choose to exclude benefits that accrue to sinners and disproportionately weight those that accrue to saints; there is a sizeable literature on differential valuation of voluntary risks (driving a Rolls Royce) versus involuntary risks (contracting polio). There may be some debate about the precise weights to use, but this debate is helpful in illustrating the trade-offs policymakers face. When there are benefits that cannot be measured, such as due process, CBA is still helpful: it clarifies what due process is really ‘worth’ to society when a policy is found to have costs that exceed its benefits. In other cases, CBA may be useful in persuading those with no strong moral opinions. A person who is not bothered about a particular policy may be persuaded simply by an argument that the policy will not increase their taxes.

The final – and ultimate – version of this critique is that one should not use aggregations of private values but instead use those of the community or collective. This criticism seems to be separate from the fifth one above. Unfortunately, how these community or collective values are to be determined is left unspecified. If they are the whims of a politician or bureaucrat, one might argue in favor of aggregations of private values. If they reflect the enlightened views of benevolent dictator, one might inquire into what information and rules this dictator used to make his or her benevolent decisions.

Moreover, CBA does not compel a decision. Policymakers must still make decisions. If these policymakers choose to over-ride the findings from a CBA and that choice can be justified or rationalized, then the policy process has been improved. Not only is policymaking more

transparent, but the legitimacy of the policymaker has been affirmed. If a community knows that to save the Siberian tiger from extinction will cost \$200 million, but goes ahead anyway, this is not a critique of CBA. Moreover, if policymakers choose to over-ride the findings from a CBA on the grounds of political expedience or because of special interest lobbying or for legitimate reasons, then the policymaking process has also been improved: the CBA provides the electorate with information as to the policymakers' integrity or sense. Indeed, Levin (1999) has argued that this is one of the main reasons policymakers do not value CBA: it makes clear when policies have been subverted to satisfy the policymakers' self-interest.

Finally, the criticisms of CBA are almost never accompanied by a credible alternative. Simply finding policies that are effective is not sufficient.¹⁴ The standard alternative is to identify personal freedoms, desires, and rights and then work to meet those goals (see work by Nussbaum and the WHOQOL). However, this alternative is too vague, too narrow, and incomplete. The vacuity arises because this approach does not specify to what extent these rights should be satisfied. For example, when is the elimination of hunger satisfied? This approach is too narrow because it does not cover many policy decisions. For example, what personal desires and rights are satisfied by the decision to build a road instead of a bridge? Even in cases where personal desires and rights are involved, such as abortion legislation, what mechanism is to be

¹⁴ CBAs of interventions to reduce crime illustrate why looking just for effective programs is misleading. Marsh, Chalfin and Roman (2008) reviewed 106 interventions intended to reduce crime where there was information on costs and benefits. In 74 studies crime fell and the benefits exceeded the costs; and in 3 studies crime rose and the costs exceeded the benefits. But in 7 studies crime rose, but because the intervention significantly reduced costs, the benefits exceeded the costs; and in 22 studies, crime fell but the intervention was so costly that it was not worth it. So, in approximately one-quarter of studies, a determination based on CBA would differ from one based on the change in crime.

used to aggregate the preferences of the mother over others? Finally, specifying rights is incomplete. Satisfying these rights requires resources (eliminating hunger requires food and eliminating abortion requires prosecution of non-compliers) and all resources are scarce. Thus, unless all freedoms, desires, and rights are satisfied – in which case the policymaking process is redundant – a choice has to be made as to which one can be satisfied first.

Practical Challenges to CBA

Ironically, denigrators of CBA might have more ‘success’ if they focused on the practice of CBA than theory. Certainly, there is scope for considerable error in using inaccurate prices (e.g. valuing a life-saving device at \$500,000 per life saved) or in failing to count an important benefit from a policy. Unavoidably, there are going to be forecast errors in *ex ante* CBAs. There are also potentially more complicated errors from double-counting impacts across primary and secondary markets (see the discussion in Boardman et al., 2006). However, these are less of an issue than some key practical questions that CBA researchers face.

First, there is a practical concern over which method to use to calculate the benefits of a policy. The two general classes of method are contingent valuation and revealed preference. The former is typically sensitive to several potential biases. These include: hypothetical bias; non-commitment bias; ordering effect; and embedding effects. Researchers have also found significant differences in results according to the type of question used in contingent valuation, the payment period over which willingness to pay is calculated, and the whether the benefits are expressed as willingness to pay or willingness to accept a loss. There is no easy way to evaluate these differences in results, not least because they may yield different results from revealed preference methods (e.g. on the value of noise).

Second, there are distributional issues for any policy. In theory, it does not matter who the winners and losers are, as long as the former gain more than the latter lose. In politics, it does matter. Some groups are (somehow) considered more deserving than others. However, there is no clear guidance on how to weight the more deserving groups.

Third, the choice of the discount rate matters. Moore et al. (2004) provided an important clarification on how to choose the discount rate, but the actual number can vary for several plausible reasons. For example, Moore et al. (2004) propose a discount rate of 3.5% for the first 50 years of a policy. But this choice is based on a set of quite restrictive assumptions.¹⁵ In fact, no U.S. government agencies use this rate: they use different rates, with the Office of Management and Budget using a much higher 7% discount rate.¹⁶

Finally, there is the challenge of how to measure the change in risk associated with a project. If a community is risk-averse, then a policy such as a hydroelectric dam that reduces risk (e.g. from flooding) will have a value beyond the benefits of electricity generation. At issue is how to measure this reduction in uncertainty. It requires information about how the community values reductions in risk and this information is very hard to collect (and so almost never is).

Thus, policymakers should be much less concerned about the theoretical legitimacy of a CBA. If it does not improve decision-making, it can be neglected or ignored. Rather,

¹⁵ It assumes zero crowding out of capital and the extent of this crowding out cannot be prescribed *ex ante*. (Uncertainty over the discount rate further implies that the discount rate should be lower). One solution is to calculate the internal rate of return to a policy. But this rate does not give as much information as the net present value difference between the costs and benefits of a policy.

¹⁶ The Congressional Budget Office uses the U.S. Treasury borrowing rate (~2%) and the General Accounting Office uses the average nominal yield on Treasury debt maturing between one year and the life of the project, minus the rate of inflation.

policymakers should be much more concerned about how to interpret a CBA in light of the practical decisions made by the analyst with respect to the method used to calculate benefits; distributional weights; the choice of the discount rate; and the value of risk reduction. Of course, only someone trained in CBA and willing to take the method seriously can understand the implications of these choices. The case studies below illustrate this dilemma.

Policymaking in Practice and the Role of CBA

Case studies of policymaking in light of CBA illustrate the many challenges. These illustrations show that, indeed, economic analysis is not easy to perform. Importantly, these examples do not deal with the practical challenges listed above. The deficiencies considered in these case studies are far more basic: they highlight how policymaking is distorted by incomplete, weak, or manipulated economic analysis. Nevertheless, the case studies also show that CBA uniquely illuminates some important aspects of the policy-making process, albeit not in a good light.¹⁷

The importance of getting the costs right: The Iraq war

Most military decisions are presumably to be determined based on military strategy. However, the Bush Administration made a number of bold assertions that the Iraq war (2003–2011) would not be a costly campaign. These assertions, including one of a total taxpayer cost of

¹⁷ These case studies are chosen to be ‘big picture’ illustrations. Thus, we do not dwell on the CBA of New York’s Second Avenue Subway which was performed over a decade before the final plans for the subway were completed and included no estimate of dislocation costs to residents living on the path of the subway during the 5-10 years of construction.

the Iraq war of \$1.7 billion, are documented by Stiglitz and Bilmes (2007, 10-15).¹⁸ Stiglitz and Bilmes then go on to document that conservatively the costs of the Iraq war were \$3 trillion, of which \$1.7 trillion were budgetary (materiel, veterans care, and debt interest). This estimate did not count any costs imposed on the Iraqi people (including lives lost) or U.S. allies. The Bush administration estimates did not even come close to the cost of military care for war veterans. Almost certainly, there would have been more opposition to the war from fiscal conservatives had this information been made available *ex ante*.

We can use a simple thought-experiment to consider the value of CBA even in this context where decisions are supposedly ‘non-economic’. The Iraq war was declared on March 19 2003. Although that date was not arbitrary, it could have probably been postponed by one week. This postponement would have saved society interest payments on the \$3 trillion amount by one week. Assuming perfect capital markets and an interest rate of 5%, this postponement would have been worth at least \$120 million in present value terms on March 19 2003. In theory, society should have been willing to pay at least this amount for a Department of Defense economist who could have successfully argued for a delay of the invasion by one week.

The importance of specifying the benefits: White-collar crime

To do CBA it is necessary to specify the benefits from a policy. One way to frame the policy discussion away from regulation, therefore, is to argue that there are no benefits. This is the case for regulation on white-collar crime.

¹⁸ The estimate of \$1.7 billion was made by the Administrator of the U.S. Agency for International Development Andrew Natsios. President Bush’s chief economic adviser Larry Lindsey was heavily criticized for his cost estimate of \$200 billion in costs, even as this too was embarrassingly low.

There are almost no economic analyses of regulations to reduce white-collar crime. In part this is because these regulations would be hard to devise. But inertia on this topic may also reflect the textbook view of white-collar crime as merely transferring money. As stated by Anderson (1997, 619) in his calculation of the aggregate burden imposed by criminal activity, “the transfer component of thefts... should not be considered to cause a net loss to society”. In other words, a white-collar criminal who loots a pension fund is not causing any economic damage. Instead, he or she is simply transferring the money in the pension fund from those who have paid into the fund to his or her own bank account. Most non-economists – and many economists – would find this assumption untenable.

The importance of getting the costs and benefits right: Mega-events

The economic rationale for mega-events such as the Olympics or the World Cup and the associated policy decisions regarding stadia siting has been widely acknowledged to be weak. However, the persistence of cities in vying for mega-events is partly a consequence of the poor quality of the CBAs performed. Each bidding city can find an economic evaluation (or “economist”) which makes the case look attractive.

Many of these evaluations are flawed. Mega-event CBAs have large errors on both the cost and benefit side. On the cost side, the estimates are systematically understated. The size of the mis-estimate is enormous. For example, the estimate at the time of the bid for the London 2012 Olympics was for a gross public cost of £4.04 billion; four years later in 2007, this estimate was revised to £9.33 billion (NAO, 2007, Table 2).¹⁹ The cost estimate was off by 140%. These understatements are not prediction error: they reflect a failure to perform a full costing exercise

¹⁹ Since this date, the London Olympic Committee has been proud to announce that it has stayed “on budget”.

and to subject that exercise to sensitivity based on likely sources of error. A full costing exercise would recognize that contracts of such large scale cannot be costed out using prevailing wage rates for construction workers, for example, and that amortization of capital assets such as stadia is critical. A common error is to over-estimate private sector contributions: for the 2012 London Olympics, this over-estimate was by a factor of five (NAO, 2007, Table 2). Another common source of error is that the proposal is changed after the cost estimate is conducted – and not to reduce the scale of the event. These sensitivities are well-documented, not least because of the errors in prior mega-event costing exercises, e.g. Montreal in 1976 (for an excellent discussion of errors in costs analyses, see Harrington, Morgenstern, & Nelson, 2000).

On the benefit side, there are also errors and, again, these are not forecast errors. Some of these are gratuitous and no longer common in the literature – such as counting the wages paid to construction workers as a benefit of the games.²⁰ Others include: failure to model switched expenditure by residents (e.g. fewer trips to museums); tax exemption for Olympic committees; and crowding out of other tourists. But of course the most salient issue is the benefit that is not counted: the value of ‘public spirit’ associated with hosting a world event. This benefit is typically cited as an important justification for hosting a mega-event. Yet, as of 2010, there were almost no studies as to what this public spirit was worth for any mega-event.²¹ It seems highly unlikely that it is worth the £5 billion error in the cost accounting for the London Olympics. Policymakers clearly felt no obligation to provide an estimate of the value of this public spirit. Indeed, it is not obvious that public spirit will be enhanced: events at both the Munich and Atlanta Olympics probably adversely affected those cities’ reputations.

²⁰ Although this practice was applied in an economic analysis of the new Yankee Stadium built in 2009.

²¹ One study has been published recently. Otherwise, the only remotely pertinent reference was to Pittsburgh’s willingness to pay to prevent the relocation of the Pittsburgh Penguins hockey team.

The importance of measuring benefits (not just impacts) and costs

Much has been written about the low quality of CBA in education (Levin and McEwan, 2002; Levin, 1999). In a review of over 1,300 relevant academic papers in education on cost-effectiveness, Clune (2002) divided them on a quality scale as follows: 56%, 'rhetorical'; 27%, 'minimal'; 15% 'substantial'; and 2% 'plausible'. As an indicator of the low quality of the research, Clune's (2002) definition of 'substantial' was 'attempt to mount data on cost and effectiveness but with serious flaws'.²²

Education research has not improved considerably since Clune's (2002) review. There is no strong research on the economic value of achievement or test scores, for example, despite substantial policy attention to raising test scores and reducing achievement gaps (e.g. No Child Left Behind). There is a growing literature on the economic benefits of high school graduation (Belfield and Levin, 2007; Rumberger, 2011), but the costs of effective interventions are rarely reported. Economic evaluations of small-scale reforms also fall far short of CBA. For example, the U.S. Department of Education's Institute for Education Sciences summarizes research findings through its What Works Clearinghouse (WWC).²³ The WWC performs a lengthy and complete review of research using a detailed protocol for evaluating and interpreting the evidence. For comparability, the research findings are reported used a standardized outcome, such as effect size gains in achievement. However, the WWC pays little attention to the costs of the interventions that are included in the research summaries.²⁴ For example, in 2007 the WWC reviewed all available research on reforms to math curricula. The review identified four curricula

²² 'Rhetorical' was defined as 'cost-effectiveness claims with no data on either costs or effects'.

²³ At <http://ies.ed.gov/ncee/wwc/>.

²⁴ Research on cost-effectiveness to be integrated with some WWC reviews is being conducted as of April 2012.

that satisfied its methodological standards and so reported the effect size gains for each. These four curriculum reforms exhibited the following range of implementation: they lasted between one year and three years; they required either no teacher training or up to one week of teacher training; and they required between zero additional hours of instruction up to 49 additional hours.

The importance of specifying the external costs: The social cost of carbon

The social cost of carbon (SCC) is perhaps the most important price on the planet. The SCC is the estimate of the economic damages of an incremental increase in carbon emissions each year. Failure to accurately calculate this price will impose potentially enormous social burdens on current and future generations. Yet, the SCC is extremely difficult to estimate: it requires modeling of an enormous proportion of global economic activity in relation to global environmental change; and is often predicted across centuries. In February 2010, in a collaborative effort across 12 departments, the U.S. Government published a “Technical Support Document” to calculate the SCC. Using a 3% discount rate, the SCC was estimated at \$21 in 2010, rising to \$26.3 by 2020 (in 2007 dollars). This document might therefore provide a consensus as to the SCC to be used in cost-benefit analyses of policies that involve significant changes in carbon emissions.

Three cases illustrate why such a consensus is desperately needed. One is the opposition of the Bush Administration to the Kyoto Protocol. In a letter opposing the Protocol in March 2001, President Bush asserted that the Protocol “would cause serious harm to the U.S. economy”. As Nordhaus (2007, 686) concludes, “This policy... was undertaken with no discernible economic analysis”. A second case, documented by Chettiar et al. (2009), involves

the setting of CAFE standards by the National Highway Traffic Safety Administration (NHTSA). Under the Bush Administration, NHTSA argued that because the SCC could only be measured imprecisely it was better to assume that its actual value was zero. After a November 2007 U.S. Court of Appeals ruling, the NHTSA was forced to estimate the SCC. Its May 2008 estimate excluded: global effects of climate change; any economic activity not in the U.S. (e.g. mining in Canada to meet U.S. demand for energy); and any non-carbon emissions. But the final and most recent case is perhaps the most manipulative. In their CBA of offshore drilling in the Arctic National Wildlife Reserve, Hahn and Passell (2010) use a social cost of carbon of \$0.91 per ton. This is far below any reasonable estimate, and of course substantially influences the size of the net benefits from drilling. The authors' justification is that U.S. citizens should only care about greenhouse gas damage felt by U.S. citizens. As the U.S. is only 320 million (5%) of the earth's 7 billion population any aggregate social cost of carbon should be reduced by 95%. This disingenuous (even ludicrous) assumption makes a mockery of efforts to identify and apply a social cost of carbon as part of a cost-benefit analysis.

The importance of specifying the external costs: The senior death discount

Another external cost which has attracted considerable controversy is the value of life. Environmental policymakers must decide which polluted sites to clean-up first and this involves balancing the costs of pollution on mortality rates across different groups in society. One balancing act which has attracted the most attention (far disproportionate to its practical application) is whether to value the mortality of seniors at less than that for children. This is the so-called 'senior death discount'.

One can think of plenty of reasons why a society might perceive a senior's life to be worth less than a child's. The three most obvious being that risks children face are often involuntary, that senior citizens have already had a 'fair innings', and that children themselves have not had children. Indeed, the consensus from most studies is that the value of a statistical life is higher for children (Viscusi, 2010). (Other countries (Canada and members of the European Union) do have 'senior death discounts'). Critically, by not addressing this issue, we are not avoiding the balancing act; we are asserting that policies that affect the lives of children are weighed the same as policies that affect the lives of seniors. Of course, seniors might disagree with society's decision but this is not a reason to reject that decision.²⁵

The importance of understanding the fiscal implications

Typically, CBA is performed from the social perspective, i.e. the costs and benefits are totaled across all entities with standing regardless of whether these are government agencies or private individuals. However, it may be that a policy that passes a CBA test from the social perspective does not do so from a fiscal (government/taxpayer) perspective. This has led some economists to call for 'multiple-account' CBA where it is explicit who the winners and losers are (Schaffer, 2009). Several examples highlight the value of understanding the fiscal implications.

Policy on smoking is a particularly interesting case. Imagine a policymaker faced with an anti-smoking lobby group, what economic information would be useful to him or her? A full treatment of this question is given in the excellent book by Sloan, Ostermann, Picone, Conover, and Taylor (2004). First, the marginal net external cost of smoking is currently not very high:

²⁵ In fact, the hidden reason that seniors opposed this decision was because their advocacy groups suspected that it would lead to a general downgrade in the political power of seniors, which in turn would make it easier to reduce the state's pension and health obligations.

over the lifetime of a 24-year-old regular smoker, the present value net external cost is only \$6,200 (Sloan et al., 2004, Table 11.3). Smokers now bear almost all the costs of smoking themselves: the benefits they get in public health care are offset by the social security and private pension payments they are entitled to but never claim. Second, the fiscal implications of smoking are slightly positive; the taxes on smoking cover any additional claim on public resources made by smokers. Reducing the rate of smoking would likely cost the Treasury money. Finally, the two groups that are biggest losers from having a large population of smokers are perhaps surprising: they are the spouses of smokers who incur higher mortality costs (Sloan et al., 2004, Table 11.2); and participants in life insurance markets. The latter lose out because historically these markets have not perfectly priced life insurance policies across smokers and non-smokers; premiums paid by the latter have subsidized those of the former.²⁶ This is useful information that can only be gleaned from performing a CBA.

Another case is the London Congestion charge. This charge for driving within Central London was introduced in 2003 and has been very successful. Leape (2006) makes a persuasive case that the charge passes a cost-benefit test: the value in saved time for commuters justifies the costs of operating the system. However, the reduction in car traffic was such that it reduced government taxes from gas, a good that is heavily taxed in the U.K.

A final example is that of the class size reform in education. Unquestionably, the results from a randomized controlled trial – Project STAR in Tennessee – demonstrated that reducing class size would yield significant and persistent improvements in elementary school students' reading and math (Finn and Achilles, 1999). Since then, there has been a loud and constant claim

²⁶ This appears to be the largest benefit for smokers and is worth \$7,700, i.e. more than the net external cost (Sloan et al., Table 11.1).

that class sizes should be reduced. But, these advocates neglected to consider the costs of reducing class size and these costs are extremely high.²⁷ Thus, full implementation of Project STAR has not proved remotely feasible. Of course, this has not prevented states from implementing class size reduction policies even as they have failed to allocate adequate resources for them; the most notable example of this being the California Class Size Reduction reform of the early 2000s (Bohrnstedt and Stecher, 2002).²⁸

Conclusion

Our case studies highlight the gap between theory and practice. By focusing on the theoretical insensitivity of CBA (putting prices on public goods), and failing to recognize its practical manipulability, those who believe that public value can be created have lost out. In environmental policy, an area where CBA has the greatest applicability, under the Bush administration CBA became a tool used by those who do not want regulation, not a tool to decide the optimal amount of regulation (Revesz and Livermore, 2008). A similar dynamic occurs in education policy – by failing to calculate the full benefits of education, pro-government groups are not able to make as forceful a case for investments in schooling. State governments have almost no capacity to make an economic argument for investments in state infrastructure. Our other cases suggest a more general cynicism in the lack of rigorous CBA: where policymakers

²⁷ The experiment itself cost \$12 million to implement. Based on a review of several estimates, Belfield (2005) estimated that the per student spending would have to increase by approximately 50% to implement Project STAR.

²⁸ Universal pre-school in Florida is another example.

wish to implement policies that serve their expediencies, they simply focus on the elements of CBA that lend their case the most credence.

Yet the case studies also illustrate the value of CBA in making clear what is known, what is not known, and what needs to be known. For example, if the ‘civic spirit’ of hosting a mega-event is very large, then these events are justifiable. But the extent of civic spirit cannot be presumed, it must be established. As another example, if smokers are already fully compensating society for smoking, then the policy questions change. Society is not losing out. The losers are the smokers themselves and their families, against which policymakers should consider freedom of choice to smoke.

The government agent faces a dilemma. Difficult decisions have to be made, but there can be no acknowledgement that these decisions are difficult: they have to look easy so that they will gain political support. Recognizing that there are arguments in favor and arguments against a policy, but that the pros outweigh the cons, is too risky. It gives political ammunition to obstructionists who will only mention the cons and argue that the policymaker acknowledges those, while never mentioning the pros. It is better to proceed as if there are no trade-offs. CBA, which has the trade-off in its name, is unsurprisingly not welcome. However, we have reached potentially even more of a stale-male: as discussed in the context of work by the GAO in the 2000s, Shipman (2012) basically concludes that all evaluation decisions are regarded as partisan. If so, the need for a rigorous, formalized method of evaluation – which does not preclude and indeed illuminates policymaker discretion – becomes even more necessary and this method must

be able to reconcile both sides of a policy argument: CBA could, if practiced more often and to a higher standard, meet this need.²⁹

Indeed, it is likely that CBA will play a greater role in policymaking. First, CBA can yield a lot of valuable information even before it provides guidance on the net benefits of public investments. *Ex ante*, it can tell us who will gain and who will lose from a given policy. Second, there is growing consensus on shadow prices such that CBAs are becoming more standardized such that policies can be more easily compared. The practical challenges referred to in Section 4 are being addressed. Third, the health care crisis in combination with the aging population will force tough decisions on policymakers: allocating resources to prolong life will become more fraught. Finally, and by far the most importantly, climate change has raised the stakes on how we should value the planet's public resources. In helping to articulate and derive shadow prices for carbon and other greenhouse gases, CBA can play a vital role. Preservation of the planet's sustainable resource for future generations might be regarded as the ultimate way to create public value.

²⁹ These standards are being codified, e.g. on the discount rate (Moore et al., 2004) and the value of a statistical life (Mrozek and Taylor, 2004).

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