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DOI

[10.1093/acrefore/9780190228637.013.1007](https://doi.org/10.1093/acrefore/9780190228637.013.1007)

Publication date

2019

Document Version

Accepted author manuscript

Published in

Oxford Research Encyclopedia of Politics

Citation (APA)

Mouter, N. (2019). The Politics of Cost-Benefit Analysis. In *Oxford Research Encyclopedia of Politics*
<https://doi.org/10.1093/acrefore/9780190228637.013.1007>

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The Politics of Cost-Benefit Analysis

Niek Mouter

Summary

Cost-Benefit Analysis (CBA) is a widely used economic appraisal method which aims to support politicians in making decisions about projects and policies. Despite its widespread application, there is a lot of controversy among academics concerning the usefulness of CBA for political decision-making. The present paper surveys the literature on the intersection of political decision-making and CBA. Firstly, literature regarding the use of CBA in a political environment and the merits of the instrument in such a context is reviewed. Secondly, six ideological value judgments that inevitably need to be made when conducting a CBA are analyzed; 1) Which individuals have standing in a CBA? 2) Which preferences have standing in a CBA? 3) Which procedure is used to value impacts? 4) On which dimensions are standard numbers differentiated? 5) Which weight is assigned to preferences of individuals in the social welfare function? 6) Which approach is adopted to select the social discount rate? Finally, recommendations are provided concerning the way analysts should deal with these value judgments to improve the usefulness of CBA for democratic decision-making. It is argued that CBA is currently a problematic tool for democratic decision-making because, when applied in practice, the analysis is based on a specific set of politically loaded premises which fosters (damages) the interests of politicians (not) endorsing these premises. It is possible to overcome this problem through informing politicians about the extent to which switching value judgements leads to different CBA outcomes. The introduction of so-called normative

sensitivity analyses safeguards that politicians with different belief systems are equally equipped to use the results of a CBA to arrive at a well-founded evaluation of a government project.

Keywords

Cost-Benefit Analysis; Benefit-Cost Analysis; Politics; Decision-Making; Economic Evaluation; Appraisal; Value judgments; Ideology; Normative

Introduction

A key task of government officials is to make decisions regarding the allocation of scarce public resources. Cost-Benefit Analysis (CBA) is a widely used economic appraisal method which aims to support politicians in making decisions about projects and policies (e.g. Boardman et al., 2013). The theoretical foundations for CBA are provided by welfare economics which is a branch of economics that investigates the social desirability of alternative economic situations (e.g. Boadway and Bruce, 1984). In essence, a CBA is an overview of all the societal costs and benefits of a government project. These costs and benefits are, to the extent feasible, quantified and expressed in monetary terms, using the notion of people's private willingness to pay (e.g. Boadway, 2006; Van Wee, 2012). Finally, government projects are typically intertemporal in nature, so the benefits and costs occur over a number of periods (e.g. Boadway, 2006). Because people tend to prefer a present dollar over a future dollar – even after a correction for inflation – future impacts of the project are discounted and presented as so-called (net) present values (van Wee, 2012).

In virtually all western countries CBA is mandatory when national funding is asked for large transport projects (e.g. Anderson et al., 2018; Mackie et al., 2014), particularly in the United States, CBA is also widely applied in environmental, health and safety regulation (e.g. Arrow et al., 1996; Hahn and Tetlock, 2008) and the instrument is also adopted in other policy domains examples being energy, water management and sports (e.g. de Nooij, 2011, 2013; Dehnhardt, 2014; Persky, 2011). The tool is only rarely used in the evaluation process of social policies, such as education.

Although there is no conclusive empirical literature which explains the difference in application between different policy domains, the Dutch General CBA Guideline (Romijn and Renes, 2013)

addresses three potential reasons for the relatively wide application of CBA in the transport domain compared to other domains; 1) Economists often promote CBA as a decision-procedure for advancing economic efficiency. When economic efficiency is not a relevant consideration in a policy decision, the added value of conducting a CBA is relatively low. The Dutch Guideline mentions regulations regarding abortion and euthanasia as exemplary domains in which human dignity and moral values are more important than economic efficiency which explains the limited use of CBA in these cases. Moreover, a potential reason for the limited use of CBA in the evaluation of agricultural subsidies is that ‘food self-sufficiency’ and ‘food security’ are probably more important goals of these policies than economic efficiency (e.g. Clapp, 2017; Greer, 2005); 2) The added value of conducting a CBA is relatively low when it is not possible to quantitatively measure the relevant costs and benefits of a government policy and transfer these into monetary terms. The Dutch Guideline mentions ‘education’ as an exemplary domain which suffers from a lack of available empirical evidence regarding the quantification and monetization of policy impacts; 3) When a government policy does not require large upfront public investments, it is possible to explore the merits of a policy with a (small) no regret pilot study. When the pilot study is successful the policy can be rolled-out nationwide and when the pilot is unsuccessful only a little amount of public revenue is wasted. In such contexts, the added value of conducting an ex-ante CBA is relatively low. Instead, the added value of CBA is much higher in the decision-making process for infrastructure projects with large upfront costs as a lot of public revenue is wasted when the project turns out to be unsuccessful and it is relatively difficult to influence the success of the project after construction.

Despite its widespread application, there is a lot of controversy among academics concerning the usefulness of CBA for political decision-making. Sen (2000, p. 931) illustrates this

controversy within academia as follows: “the discipline of cost-benefit analysis – if discipline it is – has fearless champions as well as resolute detractors. It is, partly, a battle of giants, for there are heavyweight intellectuals on both sides.” Some scholars emphasize the benefits the institutionalization of CBA can bring to political decision-making (e.g. Mackie et al., 2014; Sunstein, 2000). On the other hand, several scholars argue that CBA is a problematic tool for democratic decision-making because, when applied in practice, the analysis is based on a specific set of politically loaded premises which fosters (damages) the interests of politicians (not) endorsing these premises (e.g. Ackerman and Heinzerling, 2004; Driesen, 2006; Kelman, 1981; Nyborg, 2014; Sagoff, 1988; Wildavsky, 1966).

The present paper discusses the literature on the intersection of political decision-making and CBA. The fact that CBA is widely applied in the ex-ante evaluation of transport projects explains that a relatively large amount of scientific literature is available which reviews the intersection of CBA and transport decision-making. Hence, the majority of the literature in this paper will revolve around the politics of CBA in a transport context. The first part of this paper reviews literature regarding the use of CBA in a political environment and the merits of the instrument in such a context. Subsequently, three categories of ideological value judgments that inevitably need to be made when conducting a CBA are analyzed. Finally, recommendations are provided concerning the way analysts should deal with these value judgment to improve the usefulness of CBA for democratic decision-making.

The use of Cost-Benefit Analysis in a political environment

Economists often promote CBA as a decision-procedure for advancing welfare (e.g. Viscusi, 2000). On their view, a primary goal of public policy is to promote economic efficiency, and CBA is admirably well-suited to that goal (Sunstein, 2000). Several researchers tried to uncover the extent to which CBA actually impacts decision-making by investigating the statistical

relation between the results of CBA studies and political decisions on investments in transport infrastructure using quantitative analyses (e.g. Annema et al., 2017; Eliasson and Lundberg, 2012; Eliasson et al., 2015; Fridstrøm and Elvik, 1997; Nellthorp and Mackie, 2000; Odeck, 1996, 2010). The broad picture is that these studies show that there is no significant statistical relation between the monetized effect estimations in CBA studies and political decisions. Although the results of a CBA do not seem to substantially impact decision-making in a political environment, there is clear evidence that the institutionalization of CBA affects the planning and decision-making process within the bureaucracy (e.g. Eliasson and Lundberg, 2012; Hahn and Tetlock, 2008; Mackie et al., 2014). For instance, Eliasson and Lundberg (2012) quantitatively establish that rankings of the Swedish Transport Administration were affected by CBA results.

Furthermore, several studies have analyzed how politicians use CBA in the context of transport investment decisions by interviewing Norwegian politicians (Nyborg, 1998; Sager and Ravlum, 2005; Sager and Sørensen, 2011) and Dutch politicians (Mouter, 2017a). These qualitative studies conclude that CBA is at best one of the factors that influences politicians' judgments. Nyborg (1998) concludes that most interviewed Norwegian politicians found the CBA useful as a screening device to pick projects requiring closer political attention, but few seemed to actually use it to rank projects. Mouter (2017a) observes that none of the interviewed Dutch politicians stated that they solely base their judgment on the results of CBA studies. The majority of the interviewed politicians was also not able to mention a case in which a CBA changed their viewpoint about a project's desirability from positive to negative or vice versa. Mouter (2017a) concludes that when politicians use CBA in forming their standpoint, it is most likely that the results affect their viewpoint about the desirability of different alternatives of a specific transport project. Especially when a politician supports a project, but does not have a

strong preference for one of the alternatives, there is a chance that the CBA affects the desirability judgment of the politician regarding this particular decision. Hahn (2009) and Hahn and Tetlock (2008) studying the influence of CBA on regulatory decision-making in the United States conclude that also in this context there is little compelling evidence that CBA has had a large overall impact. Turner (2007) and Gowen et al. (2016) find that ecosystem valuation only seems to play a minor role in decision-making in the United Kingdom and the United States. Dehnhardt (2014) also concluded that the actual influence of CBA on water policies in Germany has been limited.

One of the key observations of Mouter (2017a) is that politicians mention several barriers that hamper the use of CBA when forming their opinion. A first important barrier experienced by Dutch Members of Parliament (MPs) is that they receive the CBA only weeks before the debate in which decisions are made regarding a transport project which is too late to (substantially) influence their viewpoint. MPs mention two reasons why a CBA which is published very close to a debate will have at best a marginal impact on their decisions (Mouter 2017a). Firstly, they need time to verify the CBA's quality and impartiality. Secondly, they have to coordinate their viewpoints with members of their political party and sometimes also with other politicians. An interviewed MP in the Mouter (2017a) study argued that 5 weeks before the debate, the MPs of her party who are part of the 'infrastructure committee' already try to reach a consensus (with each other and also with MPs from other political parties) and make a proposal which will be discussed within their political party 3 weeks prior to the debate. In case the political party ratifies this proposal the probability is low that positions are reconsidered when a CBA is published within 3 weeks before the debate. A second important barrier which limits the use of CBA by politicians is that they don't have enough trust in CBA's impartiality. Several interviewed MPs even argue that they would prefer to abandon the CBA rather than have a state of affairs in which CBAs are produced in line with the political preferences of an executive to

rationalize her decisions (Mouter 2017b). Hence, to improve the usefulness of CBA in decision-making it is recommended to ensure that politicians receive a CBA long enough before a political debate to enable them to ask a confidante to verify the study which increases their trust in the results and to discuss with other politicians whether the results should lead to a reconsideration of a viewpoint (Mouter, 2017ab).

A third barrier is that politicians contest CBA's normative premises such as the assumption implicit in CBA that an equally large weight is attached to everybody's utility changes. Some of these politicians note that, as a result of the discrepancy between the premises of CBA and their belief system, projects which coincide with their own belief system score relatively poorly in CBAs. This finding echoes the observation of Nyborg (1998) that some Norwegian politicians disregarded CBAs, since the normative judgments in CBA methodology contradicted their belief systems as well as the conclusion of Dehnhardt (2013) that rejection of value judgments implicit in CBA is one of the reasons for the low impact of CBAs in decisions on German water projects and policies.

Both Nyborg (1998) and Mouter (2017) also discuss a fourth barrier which hampers the impact of CBA results on political decisions which concerns the affluency of a country and/or the abundance of public funds. Top-level civil servants interviewed in the Mouter (2017a) study argue that when there is plenty of money, politicians care less about a project's social profitability. More specifically, one civil servant interviewed stated that CBA plays a larger role when budgets are under pressure because it is necessary to make sharp choices. According to this civil servant there is more room to 'play a little bit with the money' when there is enough money. Nyborg (1998) observed that economic efficiency was less important in a Norwegian context as the budget restriction did not bind too tightly. She observed that when Norwegian

politicians were asked which projects they were against, several of them could not remember any and when politicians were asked which kind of projects were put up against each other, many of them reacted to this question by looking a bit puzzled, as if the thought of having to put two projects up against each other was quite unfamiliar.

Another argument that has been raised in the literature for explaining why politicians hardly use CBA results for ranking projects concerns politicians' lack of understanding of the methodology (e.g. Annema et al., 2017). However, both the studies of Nyborg and Mouter (2017a) do not provide confirming evidence for this potential explanation. Nyborg (1998) argues that she could not identify any respondents who had clearly misunderstood major features of the method. Moreover, she observes that a few respondents demonstrated a considerable insight, including one politician that was highly positive about the method and one politician that was highly skeptical. Nyborg (1998) argues did not see any indications that the most skeptical politicians had a poorer understanding than the others.

A common finding in studies aim to uncover politicians' perceptions regarding CBA is that although politicians do not consider CBA as a normative decision rule in any case (Dehnhardt, 2013), they have a very positive attitude towards the institutionalization of CBA in a planning process (Dehnhardt, 2013, Mouter, 2017b). This positive attitude is caused by various positive features of CBA. First of all, apart from promoting welfare, scholars position CBA as an antidote to overcome cognitive limitations and biases from causing policy-makers to neglect vital aspects of proposed policies (e.g. Mackie et al., 2014; Sunstein, 2000). This is also known as 'the cognitive argument for CBA' (Christiansen, 2018). Mackie et al. (2014) observe that politicians may face hundreds of projects, and it is simply not possible to completely process all these options. In such situations, humans are bound to use simple heuristics (e.g. Kahneman,

2011) and appraisal tools such as CBA make it easier for politicians to structure information and remember and consider all or most aspects of a suggested project. Sunstein (2000) contends that a virtue of CBA is that it tends to overcome people's tendency to focus on parts of a problem, by requiring them to look globally at the consequences of apparently isolated actions. Dutch politicians recognize this virtue by arguing that CBA provides a structured list of all the positive and negative effects of a project which can prevent them from forgetting to consider an important consequence for citizens in the decision-making process (Mouter, 2017b). Moreover, politicians perceive that this structured list of pros and cons can serve as a building block for forming an opinion regarding a transport project and it can result in better informed political debates (Dehnhardt, 2013; Mouter, 2017b). Although the 'cognitive argument for CBA' is endorsed in academia and practice, various scholars emphasize that CBA is a means to overcome cognitive limitations, but not the only means (e.g. Christiansen, 2018; Nyborg, 2014). For instance, Nyborg (2014) argues that cost-impact analysis – which presents factual arguments for and against a policy option – might overcome the same cognitive limitations as CBA.

Another virtue of CBA is that the sharpness of political debates and the underpinning of political decisions are enhanced (Mouter, 2017b). That is, politicians have found a need to argue in a more precise way about why they want a project despite a negative CBA, or why they don't want a project despite a positive CBA. Dutch politicians argue that without a CBA, quite frequently, the necessity of a government project is underpinned in a very general way (Mouter, 2017b). The result of a very negative CBA is that these general arguments will be contested in political debates by politicians opposing the project. Politicians also use CBA opportunistically to 'kill' the political debate when the results support their opinion (Mouter, 2017a; Nyborg, 1998; Sager and Ravlum, 2005). In these occasions, politicians portray CBA as a method that

produces a ‘holy verdict’, which makes further political discussion obsolete. Various Dutch politicians assert that the use of CBA to ‘kill the political debate’ is a negative characteristic of the way that CBA is currently used (Mouter, 2017b). A related problem is that the political debate is often killed, based on the final indicator of a CBA (i.e. the net present value or the benefit-cost ratio). Effects which are not translated into monetary terms are generally not included in this final indicator (Mouter et al., 2015). As a result of the narrow focus of the political debate on the final indicator the non-monetized effects easily disappear out of sight.

The literature also identifies that politicians use CBA to make themselves and their decisions look more rational which is also called: ‘symbolic use’ (e.g. Mouter, 2017a; Sager and Ravlum, 2005; Sager and Sørensen, 2011). Sager and Ravlum (2005) explain that the institutionalization of CBA has symbolic value for politicians, since the search for and processing of information may itself send out signals that will enhance the status of the political body. Sager and Sørensen (2011) observe that the main function of CBA – and analytic planning input in general – is to legitimize the Norwegian Transport Plan and the political process related to it. Politicians must be able to show the public that the output of expert analysis was available to them when they made their decisions, so it can be credibly stated – should the need arise – that expert advice was considered as part of the policy-making (Sager and Sørensen, 2011). One politician interviewed in the study of Mouter (2017a) states that she emphasized in the public that she favored decisions in line with CBAs to improve her reputation. This politician stated that Dutch citizens like technocratic politicians which was an incentive for her to emphasize that she supported the use of CBAs. One civil servant interviewed for the same study explains that the executive she served used CBA a means for depoliticizing the political debate. CBA was used as a ‘rational argument’ to support the – in her words – ‘irrational wishes of the executive’. The civil servant explained that she pursued to produce a set of rational arguments which supports

all of the executive's preferred decisions in a consistent way which makes it difficult for the political opposition to challenge the consistency of the executive's decisions during a debate. The civil servant argues that inconsistencies in argumentation can force an executive into revealing her real (irrational) argument for (not) supporting a project, which is an unwelcome situation since, in general, rational arguments are more convincing than emotional arguments.

As addressed, Eliasson and Lundberg (2012) quantitatively establish that recommendations of Swedish civil servants are affected by CBA results. Moreover, qualitative studies identify that civil servants use CBAs to optimize infrastructure projects in the early phases of the planning process (e.g. Eliasson and Lundberg, 2012; Hahn and Tetlock, 2008; Mouter et al., 2013). Civil servants from the Dutch Ministry of Transport also use a negative CBA as an argument in discussions with civil servants from lower tier governments to clarify that it would be better not to have any high expectations about receiving a national contribution for the project because of the poor CBA score (Mouter, 2017b). Hence, in this process, many projects are terminated before they even reach national executives. Some politicians interviewed in the same study argue that CBA can serve as a countervailing power against projects which are purely pursued to foster the prestige of a politician, to do justice to the emotions of a certain part of society or to other soft elements. Mackie et al. (2014) and Hahn and Tetlock (2008) also observe that the very existence of appraisal can act as a filter to prevent many weak projects proceeding very far through the planning process.

Ideological assumptions underlying Cost-Benefit Analysis

In the previous section it was discussed that politicians can assign relatively low value to the results of CBA studies when the normative assumptions of the methodology do not align with their belief system. In that case, CBA fosters the interests of politicians endorsing its premises and damages the stakes of politicians having belief systems that do not coincide with the

adopted ideological premises (e.g. Bromley, 1990; Nyborg, 2014). The literature refers to normative judgments when surveying claims about how individuals ought to live, what we value and judgments about whether a situation is desirable or undesirable (Beckerman, 2011). The correctness of a normative judgment cannot be tested through looking at the available empirical evidence because such judgments are value-based. Hence, a normative judgment is the opposite of a positive (or descriptive) judgment which refers to factual statements that attempts to describe reality. Positive statements are value-free and do not contain any indication of how a situation should or ought to be (Bromley, 1990). Because positive assumptions are fact-based, they can be tested, amended or rejected by referring to available empirical evidence. To illustrate, the statement: “public expenditures will increase when the government decides to increase investment in transport infrastructure” is a positive statement because the correctness of this statement can be verified through monitoring public expenditure. On the other hand, the statement: “Governments should be responsible for transport investments” is a normative statement as there is no way to prove or reject this statement exclusively using empirical evidence. A characteristic of a normative judgment is that individuals may disagree on its correctness resulting from a variance between individuals regarding the ways they define what is considered to be appropriate or valuable. Such disagreement can only be resolved through debate and not through impartial scrutiny (Sen, 2010), but it is also conceivable that the disagreement persists because participants in a debate cannot factually prove that their standpoint is correct or that the opponent’s view is incorrect. Nyborg (2014) states that it makes little sense to assume full agreement among politicians operating in a democratic system regarding the normative and political value judgments in a CBA.

In this section we identify six normative judgments that inevitably have to be made when conducting a CBA. We group them into three categories ‘standing’, ‘valuation’ and ‘aggregation’. For reasons of readability, we assume that the CBA analyst makes these

judgments. In reality, various actors can be in charge of making such decisions (e.g. developer of CBA Guidelines, top-level civil servant or elected official).

In this section, we focus on the value judgments that have to be made after a policy maker decided that it is desirable to investigate societal costs and benefits of a government project using a CBA. Hence, we do not discuss (philosophical) arguments that reject CBA altogether. One example is the critique of Kantian philosophers that CBAs should have limited normative value as government projects are only evaluated based on their positive and negative consequences (e.g. Sagoff, 1988). For instance, Sagoff (1988) asserts that recommendations are to be judged on the basis of individuals' reasons rather than their wants or preferences and he criticizes CBA for not counting the reasons people give for their views regarding the consequences of policy options.

Normative judgments regarding standing of individuals and preferences

The first normative decision analysts need to make when conducting a CBA concerns the individuals and preferences that are (not) included in the analysis which is also known as the question of 'standing'.

Which individuals have standing in a CBA?

Baum (2009) notes that there are several areas where who should have standing is ambiguous or controversial, including animals and foreigners. In each case, whether to grant standing is a matter of dispute and thus subject to the value judgments of the analyst (Baum, 2009). CBA generally adopts a welfarist approach to social evaluation which means that the preferences of individual citizens form the basis of a CBA (Sen, 1979). This implies that consequences for animals, and nature in general, only count when humans value them. The fact that animals in itself have no value in the CBA is criticized by utilitarian philosophers who argue that animal suffering demands equal consideration in a welfare analysis (e.g. Singer, 2002). To ignore

animal suffering is to arbitrarily discriminate against two equal sources of utility simply because one comes from an animal (Lusk and Norwood, 2011).

Foreigners or non-citizens are another group of individuals for which formal standing in CBA is ambiguous (Rowell and Wexler, 2014). Rowell and Wexler (2014) argue that U.S institutions use multiple approaches to value foreign lives (ranging from valuing foreign lives equally to not at all) in an unreasoned and non-transparent way. Posner and Sunstein (2017) observe that a possible view is that agencies of the United States government should focus only on Americans because any government owes its sole democratic responsibility to its own citizens. This view aligns with the default in CBA which involves excluding residents of other countries affected by a government policy (Posner and Sunstein, 2005). Whittington and MacRae (1986) observe that the usual assumption in CBA is that all persons within a country's national boundaries are to be counted, provided that they have at least some rights of citizenship. Cosmopolitans contest this postulation by arguing that governments should treat foreigners and residents in the same way in a CBA because it is unethical to discriminatorily allocate resources as between domestic and foreign persons (Singer, 1972). Cosmopolitans, for instance, emphasize that the welfare effects of a government policy do not magically cease at political borders (Rowell and Wexler, 2014). Posner and Sunstein (2017) take a middle position by arguing that a CBA should include people who live outside of a state's political boundaries in a derivative fashion. They argue that the impacts for foreigners should be included to the extent that Americans care about this which can be elicited with willingness to pay methods. In their view, some kind of empirical analysis would be necessary to test whether the citizens' willingness to pay for benefits of foreigners is large or small. Rowell and Wexler (2014) also recommend this as the default valuation method for policymakers as it fits consistently with the valuation practices widely used within the U.S. regulatory system, which routinely relies on

willingness to pay to determine how many resources should be allocated towards regulatory goods and to prevent harms.

Which preferences have standing in a CBA?

When the analysts has taken a stance regarding the objects who have standing in the analysis, the next judgment concerns the type of preferences that are included in the analysis. Already for decades the appropriateness of including altruistic preferences is discussed in the literature. There are scholars who advocate to delete altruistic preferences entirely from a welfare analysis (e.g. Diamond and Hausman, 1994; Milgrom, 1993), authors who content that paternalistic altruistic preferences should be included in a welfare analysis, but non-paternalistic preferences should be excluded (e.g. Jones-Lee, 1991, 1992; Jacobsson et al., 2007; McConnell, 1997) and there are authors who advocate the inclusion of all types of altruistic preferences in a CBA (e.g. Posner and Sunstein, 2017). Posner and Sunstein (2017) claim, from a welfarist standpoint, that a CBA of a regulation designed to reduce the incidence of prison rape should include the willingness to pay of (unimprisoned) Americans to eliminate a case of prison rape. Moreover, they argue that for the same reason the value of moral commitments (e.g. dignity and freedom of choice) should be included in a CBA in case individuals are willing to pay to honour these commitments.

It is important to emphasize that the nature of the normative judgments regarding the inclusion of individuals' altruistic and moral preferences in a CBA differs from the judgments that need to be made regarding the objects that have standing in a CBA. In the case of altruistic preferences, the need to make a value judgment emerges from theoretical disagreement among scholars concerning the extent to which the inclusion of such preferences ensures that a CBA provides accurate predictions of a project's welfare effect. This implies that, at present, value

judgments regarding the inclusion of altruistic and moral preferences are inevitable, but it is conceivable that these value judgments can be avoided when theoretical developments in the literature result in converging views among academics. In the case of standing, further research cannot resolve ethical conflict regarding the inclusion of foreigners and animals in a CBA. This remains to be an intrinsic normative question.

Normative judgments regarding valuation

After the identification and quantification of impacts of a government project analysts have to make a value judgment regarding the procedure they adopt to value these impacts.

Which valuation procedure is used to value impacts?

The default approach is to express the impacts in monetary terms, using the notion of people's private willingness to pay (e.g. Boadway, 2006; Van Wee, 2012). Posner and Sunstein (2017) argue that private willingness to pay (WTP) is the best available measure to value impacts of government policies. For instance, regarding the valuation of risk reductions they state the following (Posner and Sunstein, 2017. Page 21): "If the government is eliminating statistical risks, it should ask how much people care about doing so, and currently, private willingness to pay is the best way to answer that question." Analysts use a range of methods to elicit individuals' private WTP for impacts of government projects. Typically, they derive estimates from market behaviour – for example, through calculating the value of reduced mortality risk by deriving risk premiums from labour market choices (e.g. Viscusi, 1998). In case private WTP cannot be inferred from real market behaviour, analysts ask hypothetical questions in contingent valuation studies or stated choice experiments to derive the amount of money that individuals are willing to pay from their after tax income (e.g. Hensher et al., 2009). For instance, individuals are asked how much they are willing to pay to avoid having their child be subjected to a mortality risk of 1/100,000 (Posner and Sunstein, 2017).

This private WTP valuation procedure has been criticized in the academic literature for failing to consider that private choices may not fully reflect citizens' preferences over public goods and means (Mouter et al., 2017a). One central criticism is that the ways in which individuals balance their own after-tax incomes against the attributes of public projects may be a poor proxy for how the same individuals believe that their governments should trade-off public means and effects of such projects (e.g. Ackerman and Heinzerling, 2004; Hauer, 1994; Kelman, 1981; Sagoff, 1988). These scholars acknowledge that the amount of money individuals are willing to pay from their after tax income in (hypothetical) markets provides crucial information for the evaluation of consumer goods. However, the scholars contest that private WTP should guide public priorities. For instance, Alphonse et al. (2014) state that individuals' WTP for consumer goods provides valuable decision support for marketers and producers, but studies investigating WTP through observing people's behavior in real (or hypothetical) markets are unlikely to reflect how people want public policies to change. One reason why private WTP may not be a good proxy for the valuation of public goods is that individuals' private preferences can be distorted through a classic public-good problem (e.g. Hesterman et al., 2018; Lusk and Norwood, 2011; Sen, 1995, 2000). That is, people may not be willing to contribute individually because the impact of their individual contribution is negligible, but people may be willing to contribute when the whole community is forced to contribute through a new law or a government project because the impact of this coordinated contribution can be substantial (Lusk and Norwood, 2011; Sen, 1995). Another argument why preferences can differ is that people's preferences over public goods are more reflective. For instance, Sunstein (2005, p.335) states: "willingness to pay is sometimes an inappropriate basis for environmental policy. Human beings are citizens, not merely consumers, and their consumption choices, as measured by willingness to pay, might be trumped by their reflective judgments as citizens." Ackerman and Heinzerling (2004) make a similar argument when contesting the decision of the US

Government against banning cellphone use in the car based on calculations that people who are talking while driving are willing to pay a lot to talk on the phone more than many people who face deadly risks are willing to pay to avoid the risk of being killed. In their view, the consumer values for talking while driving cannot legitimize that some US citizens will end up in the morgue because they are hit by other US citizens distracted by their cellphone while driving a car: “using private market behavior as a standard for public policy overlooks the possibility that people will have different preferences when they take on different roles” (Ackerman and Heinzerling, 2004, p. 191). Dehnhardt (2014) also finds that German politicians reject the idea that individual willingness to pay is a socially relevant measure of gains and losses.

Two valuation approaches are developed in response to the criticism on the private WTP valuation procedure. The first one is the collective WTP procedure (e.g. Nyborg, 2000). In such experiments, respondents are asked in a referendum-style experiment whether they vote for a specific earmarked tax increase for a government project resulting in a certain impact or set of impacts. Respondents are told that the government will implement the earmarked tax in case the majority of the voters supports it. Nyborg (2000, pp. 311) notes that the valuation question in such experiments can be interpreted as follows: “What is the maximum amount I find it right for everybody to pay, in order to ensure this government project?” A second valuation approach which is developed to ameliorate critique regarding private WTP is the willingness to allocate public budget approach (Mouter et al., 2017a). The essence of this approach is that preferences of individuals regarding impacts of government projects could be elicited in a context in which individuals make choices when faced with effects accruing from alternative allocations of government budget (e.g. Mouter et al., 2017a). This approach departs from the postulation in standard CBA that an individual’s preferences are restricted by WTP in (hypothetical) markets which is often referred to as ‘consumer sovereignty’ (e.g. Sugden, 2007). Welfare economics

normally assumes that individuals' utility of both consumption goods and effects of government projects can be inferred from choices individuals make within their personal budget constraint (Fuguitt and Wilcox, 1999). However, the willingness to allocate public budget approach postulates that utility of government projects financed through public means can be elicited through investigating individual's preferences regarding the allocation of the government's budget (Mouter et al., 2017a).

Mouter et al. (2017a) investigated the extent to which the selection of one of the three valuation approaches can affect the results of a CBA study through conducting two experiments in which individuals were asked to trade-off travel time and accident risk in a private WTP context, one experiment in which individuals trade-off these attributes in a referendum style experiment and two experiments in which individuals completed choice tasks in a willingness to allocate public budget context. They find that preferences differ substantially in these three contexts. In the willingness to allocate public budget context individuals assigned substantially more value to accident risk than travel time, as compared to those who were asked to make choices in a private or collective WTP context.

Which valuation procedure enables better economic evaluation of government policies is a normative question. It is conceivable that politicians who view the government as an institution which facilitates the market economy through rectifying market imperfections would opt for the private WTP approach, whereas politicians who believe that it is possible that the government has different goals and responsibilities than private individuals might opt for the willingness to allocate public budget approach.

On which dimensions are standard numbers differentiated?

In practice, analysts do not undertake a new study to value impacts of a government project. Instead they use standard numbers prescribed by a government agency, such as the \$9 million to value a statistical life in the United States (Posner and Sunstein, 2017). A value judgment that needs to be made involves the extent to which standard numbers such as the value of travel time savings and the value of statistical life should be differentiated among different groups in the population (e.g. income groups and regions). More specifically, when empirical evidence reveals that high income groups have a higher willingness to pay for a reduction of mortality risk than low income groups the question arises whether one should use different values for these income groups ('differentiate') or a uniform value ('not differentiate'). Various scholars (e.g. Posner and Sunstein, 2005; Sugden, 1999; Sunstein, 2004) argue that standard numbers should be differentiated as much as practically possible because using uniform values can result in serious welfare losses. For instance, Sunstein (2004, p. 405) states: "if wealthy people show a higher WTP than poor people, then a uniform WTP based on a population-wide median will ensure insufficient protection of wealthy people and excessive protection of poor people in a way that might well prove harmful to both groups". Sunstein (2004) argues, for instance, that the government does poor people no good and some harm if she forces poor people to pay \$100 for the elimination of statistical risks for which they are only willing to pay \$60. Sunstein (2004, p. 401) asserts that differentiation of the value of statistical life can also be justified on the grounds of personal autonomy: "on this view, people should be sovereign over their own lives, and government should respect personal choices about how to use limited resources. When people decline to devote more than \$60 to the elimination of a 1/100,000 risk, it is because they would prefer to spend the money in a way that seems to them more desirable. If regulators do not use people's actual judgments, then they are insulting their dignity."

On the other hand, various authors state that it is very well possible that politicians decide that a standard number should not be differentiated for political or ethical reasons, despite empirical evidence (Ackerman and Heinzerling, 2004; Flügel, 2014; van Wee, 2012). Generally, standard numbers such as the value of statistical life and the value of travel time savings are not differentiated between income groups (e.g. Mouter, 2015; Posner and Sunstein, 2017; van Wee, 2012). One argument against differentiation of such standard numbers between income groups is that rich people would have more influence over the outcomes of a CBA than poor people because they are generally willing to pay more money for an impact of a government project than poor people (van Wee, 2012). Analysts generally decide against the differentiation of standard numbers among income groups because this would not align with democratic principles (e.g. Nyborg, 2014; van Wee, 2012). The UK Guideline for CBA for transport projects clearly advises against the differentiation of the VTT between income groups on ethical grounds (Department for Transport, 2018): “if values of time for appraisal are based on individuals’ willingness to pay (behavioral values) which are related to income, then investment decisions will be biased towards those measures which benefit travelers with high incomes. Investment would be concentrated into high-income areas or modes, and the interests of those on lower incomes, who may already suffer from relatively lower mobility and accessibility, will be given less weight. For this reason, the first source of variability is controlled for by the use of unitary values, which should normally be adopted in transport appraisal.”

Mouter (2015) investigated the extent to which value judgments played a role in the decision regarding (not) differentiating one specific standard number – the value of travel time savings (VTT) – in the CBA practices of the United Kingdom, Norway, Sweden, the Netherlands and Denmark by studying the country’s appraisal Guidelines and interviewing CBA-experts. He concluded that despite empirical evidence that the VTT differs between regions, all else being

equal (Abrantes and Wardman, 2011; Börjesson and Eliasson, 2014) the VTT is not differentiated between regions. Several experts interviewed believe that using uniform values is undesirable, since it leads to wasting money on projects in regions where the real VTT is much lower than the unitary VTT used in 21st century CBAs (Mouter, 2015). However, the majority of the consulted CBA experts and several CBA Guidelines consider a non-differentiation of the VTT between regions desirable underpinning their arguments by stating that politicians will not accept (or even undermine) CBA when the VTT varies between regions. For instance, three experts from the United Kingdom argued that equity considerations are the paramount reason for using uniform values between regions. The experts state that the decision against differentiation is based on the idea that people are equal. The study which is used to identify the VTT in Denmark (Fosgerau et al., 2007) outlines that the steering group of this study has taken the view that differentiating the VTT is likely to cause policy makers to reject the results. The steering group argued that CBA will be considered most relevant by policy makers if the analysis treats everybody equally.

Mouter (2015) also asked 19 Dutch politicians to reflect on the desirability of differentiating VTT between regions. It was found that the majority of the politicians supported differentiation. Politicians, amongst others, state that differentiation fosters the purity and impartiality of CBA. One politician states that the added value of CBA evaporates when unitary values are used. On the other hand, two politicians clearly argued against a differentiation of the VTT between regions. These politicians revealed an egalitarian worldview arguing that everyone has the same right to arrive early at home. Hence, the non-differentiation of the VTT between regions lines up with the preferences of these two politicians, but contrasts the value judgments of the majority of the politicians supporting a differentiation.

Normative judgments regarding aggregation

A final category of value judgments concerns the aggregation of individuals' preferences.

Which weight is assigned to preferences of individuals in the social welfare function?

A first decision concerns the weighting of the preferences of different individuals (for impacts of the government project) when establishing the social welfare effect of the project. Economists use a social welfare function as a formal representation of the value judgments regarding the emphasis society should place on the interests of different citizens (Nyborg, 2014). In essence, the question is whether the social welfare function is utilitarian (an equally large weight is attached to everybody's utility changes regardless of their current situation) or non-utilitarian (utility changes of citizens receive a different weight when determining the social welfare effect of a government project). The common approach in practice is to postulate a utilitarian social welfare function (e.g. Nyborg, 2014; Romijn and Renes, 2013). Contrastingly, in theoretical economics it is well-established that social welfare functions are heterogeneous because politicians can have divergent conceptions of the 'good society' (e.g. Adler, 2012; Bergson, 1938; Harsanyi, 1955). For instance, Harsanyi (1955, p.309) notes: "everybody will have a social welfare function on his own, different from that of everybody else, except to the extent to which different individuals' value judgments happen to coincide with one another." Nyborg (2014) emphasizes that defining the social welfare function is a purely normative judgment, which must itself be based on ethical and/or political values.

The fact that CBA generally postulates a utilitarian social welfare function is often criticized in the academic literature for ignoring distributive justice considerations that are important for political decision-making (e.g. Martens, 2016). Studies investigating political decision-making regarding transport projects established that politicians particularly regard 'spatial equality' of transport investments as a key consideration in their decisions involving the allocation of

investments in a national transport program for infrastructure investments (e.g. Fridstrøm and Elvik, 1997; Mouter, 2017a, Sager, 2016). For instance, Dutch politicians perceive that transport projects in densely populated areas perform better in CBAs than projects in sparsely populated areas as a result of the normative assumption in conventional CBAs that equal weight should be assigned to the utility effects of every individual in a society (Mouter, 2017a). Hence, they perceive that CBA results would guide investments to densely populated areas. Politicians, however, argue that it is fair to balance transport investments across the country to some extent, because all over the country Dutch citizens pay taxes which makes it justifiable to improve citizens' mobility all over the country (Mouter, 2017a). More formally, politicians assign a higher (lower) weight to benefits of transport investments in regions which receive relatively less (much) benefits from the national transport investment program in their social welfare function. Mouter et al. (2017b) empirically investigated Dutch citizens' preferences for the spatial distribution of benefits accruing from a transport investment plan. They found that a vast majority of citizens has a strong preference for spatial equality, particularly when the investment plan pursued the reduction of travel time. Hence, postulating a strictly utilitarian social welfare function in the context of the evaluation of transport investments does not line up with the preferences of citizens. Mouter et al. (2017b) argue that this might be an explanation for the fact that many researchers did not find a significant statistical relation between the final indicator of CBA studies and political decisions on transport investments (e.g. Annema et al. 2017; Eliasson et al. 2015; Odeck, 2010) because it is conceivable that politicians who want to do justice to the preference of citizens for an equal distribution of transport benefits across regions will assign limited or no value to the results of applied CBA, since the final indicator is insensitive to the distribution of welfare in society.

Which approach is adopted to select the social discount rate?

Because government projects are typically intertemporal in nature analysts need to make a decision about the rate at which future impacts of the government project should be discounted. The social discount rate determines the extent to which future well-being should count relative to current well-being, in the social welfare function (e.g. Stern, 2008). Heal and Millner (2014, p. 3695) argue that the choice of the social discount rate represents a primitive ethical judgment as it captures how much one cares about the welfare of future generations: “as such, it is a parameter that is unique to each person; much like the moral legitimacy of the death penalty or abortion rights, it is the kind of thing reasonable people may reasonably disagree about”. A crucial ethical decision concerning the selection of the social discount rate is whether the parameter is established based on real-world behaviour of people today (the descriptive approach) or fundamental ethical views (the prescriptive approach). Hence, following the descriptive approach the social discount rate is based on empirical observations. It is common practice to set the social discount rate to be equal to some measure of the real rate of return on investment in the private sector (e.g. Baum, 2009). Prescriptivists claim that the social discount rate should be based on value judgments instead of empirical observations (e.g., Stern, 2008; Wildavsky, 1966). Stern (2008) argues that the rate at which the well-being of future generations should be traded off against the well-being of present generations is a normative question rather than an empirical question. For instance, various scholars argue from a normative perspective that one component of the social discount rate – the pure rate of time preference – should be zero. For instance, Ramsey (1928, p. 543) states: “it is assumed that we do not discount later enjoyments in comparison with earlier ones, a practice which is ethically indefensible and arises merely from the weakness of the imagination”. Various descriptive scholars contest the prescriptive approach by arguing that selecting a social discount rate that is (substantially) lower than the market interest rate would leave future generations worse off,

because a low rate diverts financial resources from better use, creating an inefficient allocation of funds (Azar, 2007; Nordhaus, 2007). Moreover, descriptivists criticize prescriptive approach supporters, charging them of elitism (e.g., Anthoff et al., 2009). They argue that prescriptivists impose their discounting views on society, even if society does not agree with these views (Baum, 2009). Conversely, the descriptive approach is often justified on grounds that it uses a description of how society discounts instead of having analysts impose their own discounting views on society (Baum, 2009). Baum (2009) notes, however, that while the descriptive approach to discounting can claim to discount according to a description of how society discounts, the approach cannot claim to have avoided injecting its values into the analysis. First of all, analysts need to make a value judgment when choosing whether public discount rates or private discount rates are relevant when determining the social discount rate. Various authors (e.g. Ackerman and Heinzerling, 2004; Stern, 2008) state that individuals may not discount impacts that accumulate for themselves (private discount rates) in the same fashion as impacts that accrue for others, or society as a whole (public discount rates). Stern (2008) asserts that in imperfect economies (suffering from, amongst others, externalities and missing markets), the social value of a unit of private consumption/investment may be different from the social value of a unit of public investment. Ackerman and Heinzerling (2004, p. 191) make a similar claim, arguing that using private market behaviour as a standard for public policy overlooks the possibility that people will have different preferences when they take on different roles: “the future seems to matter more to American citizens than to American consumers, even though they are, of course, the same people. For example, Americans are notoriously bad at saving money on their own, apparently expressing a disinterest in the future. But Social Security is arguably the most popular entitlement program in the United States. The tension between Americans’ personal saving habits and their enthusiasm for Social Security implies a sharp divergence between the temporal preferences of people as consumers and citizens”. Howard

(2013) finds empirical evidence for the claim that individuals do indeed discount personal impacts differently than social impacts. He concludes that individuals discount social payments at a lower rate than personal payments. Mouter (2018) concludes that in the transport appraisal guidelines of the Netherlands, the United Kingdom, Norway, Sweden and Denmark a descriptive approach is adopted in the sense that an attempt is made to fully substantiate the discount rate in the actual behaviour of individuals. Prescriptive arguments to derive the social discount rate from fundamental ethical views are sometimes discussed in these guidelines, but these types of arguments did not seem to play a role in the final underpinning of discounting policies.

Improving the usefulness of CBA for democratic decision-making

A first recommendation concerning the way analysts should deal with the inevitable value judgments implicit in CBA to improve the usefulness of the instrument for democratic decision-making aims at improving the transparency of the ideological choices upon which a CBA is constructed. Wildavsky (1966) states that the implicit value judgments in CBA should be made explicit and subject to analysis. The previous section indicates that the value judgments are currently not communicated in a transparent way. Mouter (2018) concludes that value judgments regarding the selection of a social discount rate are currently not – or poorly – communicated in transport appraisal guidelines of five European countries and Mouter (2015) established that normative decisions regarding the differentiation of the value of travel time savings between regions are not made explicit in these guidelines. The main problem resulting from this poor communication is that it is difficult for politicians to decide whether they agree with the reasonableness of the value judgments and from asking for a recalculation of the CBA based on a set of normative judgments which better coincide with their own belief system. Nyborg (2014) asserts that in a democracy, elected politicians should be tasked to make ethical decisions and this should not be the task of economists or civil servants. However, when the

normative decisions implicit in CBA do not materialize on paper, it is very difficult for politicians to be aware of the fact that it is even possible to ground a CBA study in different value judgments. Furthermore, Dutch politicians claim that increasing the awareness and recognition of the normative judgments underlying CBA diminishes the probability that politicians will kill the political debate using CBA (Mouter, 2017b). With respect to transparency, Mouter (2017b) observes that politicians, on the one hand, would prefer that all calculations in the CBA are done in an impartial way and, on the other hand, they want the inherent partiality of the method to be recognized by making it explicitly clear which value judgments are made. Hence, the ideal situation seems to be that politicians can trust that analysts executed the calculations in an impartial way, while being aware of the value judgments implicit in the CBA (Mouter, 2017b). A concrete way to make the normative judgments transparent is to include an oversight in a CBA report. Table 1 provides a proposal for such an oversight. Mouter (2018) argues that to assist politicians in weighing up the multiple answers to a normative question, it is useful to thoroughly underpin the arguments supporting each judgment.

Table 1 Proposal for oversight of normative judgments in CBA reports

Normative question	Answer to this question	Alternative answers
Which individuals have standing in a CBA?	Humans who are a member of a society are the only ones who have standing in a CBA. Foreigners and animals are only valued when citizens value them.	1) Foreigners and animals also have standing in a CBA. 2) Impacts on foreigners and animals are excluded from the analysis. Even if citizens value these impacts.
Which preferences have standing in a CBA?	Adopting welfarism, all preferences of individuals are included in the CBA.	1) Non-paternalistic altruistic preferences are excluded from the CBA. 2) All altruistic preferences are excluded from the CBA.

Which valuation procedure is used to value impacts?	Preferences are valued using private willingness to pay.	1) Preferences are valued using collective willingness to pay. 2) Preferences are valued using willingness to allocate public budget.
On which dimensions are standard numbers differentiated?	Standard numbers such as the Value of Time and the Value of Statistical Life are not differentiated.	Standard numbers are differentiated as much as practically possible.
Which weight is assigned to preferences of individuals in the social welfare function?	An equally large weight is attached to everybody's utility changes regardless of their current situation.	Utility changes of citizens receive a different weight when determining the social welfare effect of a government project.
Which approach is adopted to select the social discount rate?	The social discount rate is selected based on real-world market behavior of individuals.	1) The social discount rate is selected based on public discount rates (how do individuals think that the government should discount intertemporal impacts of public investments?). 2) The social discount rate is selected based on fundamental ethical views.

Apart from improving transparency regarding ideological judgments in CBA, scholars argue that a CBA report can serve politicians who disagree with the value judgments through providing supplementary information (e.g. van Wee, 2012). For instance, politicians can be provided with information about the impacts of the government project for foreigners to equip them to take this into account as well. Moreover, politicians can be provided with information regarding the spatial distribution of transport benefits accruing from an investment program to better enable them to consider both the aggregate benefits of the investment program and the distribution of benefits across regions in their decisions (Mouter et al., 2017b).

Various scholars argue that improving transparency of value judgments does not resolve the problem that a CBA is still based on a specific set of politically loaded premises which fosters (damages) the interests of politicians (not) endorsing these premises (e.g. Ackerman and Heinzerling, 2004; Nyborg, 2014). From the previous section it follows that, in current practice, CBA studies frequently adopt the following set of normative judgments: 1) humans who are a member of a society are the only ones who have standing; 2) impacts of government projects are valued using private willingness to pay; 3) standard numbers such as the VTT and the VOSL are not differentiated between income groups and regions; 4) an equally large weight is attached to everybody's utility changes regardless of their current situation (utilitarian social welfare function); 5) The social discount rate is based on market behaviour of people today (the descriptive approach). Scholars argue that for improving the usefulness of CBA in democratic decision-making it is important to conducting sensitivity analyses on normative judgments to inform politicians about the extent to which switching these judgements leads to different CBA scores (e.g., Kaplow et al., 2010; Stern, 2008). The key consequence of the implementation of normative sensitivity analyses is that CBA studies no longer assume that there is one correct set of normative assumptions. As a result, politicians rejecting the default normative premises can receive useful information regarding the desirability of policy options from the CBA study. Another consequence of normative sensitivity analyses is that no longer non-politicians (e.g. CBA analysts, civil servants participating in a steering group of a CBA or developers of CBA Guidelines) make equity judgments. That is, analysts are responsible for computing the welfare effects of a government project for various sets of normative judgments and politicians are charged with choosing the set of judgments that aligns with their worldview. A third consequence is that the CBA might not give a single estimation of the social welfare effect of a government project because the estimation may differ depending on the normative judgments endorsed by a politician. If a proposed government policy is positively (negatively) evaluated

for diverging sets of normative preferences, then politicians can be confident in deciding (not) to implement the proposed policy. Conversely, when different sets of value judgments provide conflicting recommendations, politicians may reasonably disagree about the social welfare effect of a government project. In that case, they have to engage in a debate on the reasonableness of different sets of judgments. However, even though CBA might not provide final answers, the introduction of normative sensitivity analyses democratizes CBA through safeguarding that politicians with different belief systems are equally equipped to use the results of a CBA to arrive at a well-founded evaluation of a government project.

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