

Value of Time: to differentiate or not to differentiate?

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1 **Value of Travel Time: to differentiate or not to differentiate?**

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1 Abstract

2 The Value of Travel Time (VTT) is one of the most crucial concepts in transport
3 infrastructure appraisal, since travel time typically accounts for around 60-80 percent of the
4 monetized benefits of new transport infrastructure when formal Cost–Benefit Analysis (CBA)
5 is undertaken. The VTT can be differentiated on many dimensions examples being travel
6 purpose and mode. This study scrutinizes the extent to which the VTT is (not) differentiated
7 for empirical-theoretical, political-philosophical or practical reasons in the appraisal practices
8 of the United Kingdom, Norway, Sweden, the Netherlands and Denmark by studying the
9 country’s appraisal Guidelines and interviewing 32 CBA-experts. It was found that the five
10 countries make different decisions with respect to differentiating the VTT on the dimensions
11 mode, journey length and trip purpose. Moreover, it was found that the VTT is not discerned
12 between regions in the five countries. Guidelines underpin this decision by arguing that
13 politicians will reject CBA when the VTT varies between regions. The majority of experts
14 consulted for this study endorse this choice. Since there is scant empirical evidence in the
15 literature which underpins (or contests) that politicians will not accept this differentiation
16 Dutch politicians were asked to reflect on the desirability of a VTT differentiated between
17 regions. It was found that the majority of the politicians support this differentiation.
18 Politicians, amongst others, state that the purity and impartiality of CBA should be
19 safeguarded. This result questions the assumption articulated in Guidelines that politicians
20 will reject CBA when the VTT is differentiated between regions.

1. Introduction

The Value of Travel Time (VTT) is one of the most crucial concepts in transport infrastructure appraisal, since travel time typically accounts for around 60-80 percent of the monetized benefits of new transport infrastructure when formal Cost–Benefit Analysis (CBA) is undertaken (1). Within the overall process of transport project appraisal values of travel time enter the picture in two ways (2). Firstly, values of travel time are used in generalized cost functions in forecast models. Secondly, a social value of travel time is used in a CBA for valuing travel time accruing from a transport project. This paper focuses on the social values used in a CBA.

The VTT can be differentiated on many dimensions examples being travel purpose and mode. Deciding on the dimensions on which the VTT should be differentiated is an empirical-theoretical, political-philosophical and practical matter (1 & 3). Empirical-theoretical, since the extent to which the characteristics of individuals and trips influence trade-offs between costs and travel time can be derived from a mixture of empirical research and theoretical approaches (3 & 4). Political-philosophical, since one should ponder the extent to which the social value of travel time should be grounded in actual behavior. Amongst others, Sugden (5) argues that the VTT should be as differentiated between individuals/trips as possible, since the VTT should be grounded entirely in actual behavior. These scholars claim that, a non-differentiation could lead to a misallocation of tax payers' money. Mackie et al. (1) take a different philosophical stance arguing that there is no reason for the value that the individual is willing to pay to reduce travel time to be equal to the value that society as a whole attaches to the reassignment of time of that individual to other activities. Following this line of thinking it is very well possible that the ethical observer decides that the VTT should not be differentiated for political or ethical reasons, despite empirical evidence. Lastly, deciding on a differentiation of the VTT is a practical consideration, since Government must ensure that official procedures are practical and cost-effective for the use to which they will be put (3).

The contribution of this paper to the literature is twofold. In a first study the extent to which the VTT is (not) differentiated for empirical-theoretical, political-philosophical or practical reasons is scrutinized for the appraisal practices of the United Kingdom, Norway, Sweden, the Netherlands and Denmark by studying the country's appraisal Guidelines and interviewing CBA-experts. Subsequently, in a second study 16 Dutch politicians are asked to reflect on the result of the first study that the decision against a differentiation of the VTT between regions is predominantly based on the perception – articulated by Guidelines and experts – that politicians will reject a CBA when the VTT is differentiated on this dimension. Section 2 discusses the methodology. Section 3 outlines the results of the first study and section 4 presents the results of the second study. Section 5 explores the implications of the results of the two studies and section 6 concludes.

2. Methodology

To keep the scope of this study manageable policies of five countries (the United Kingdom, Norway, Sweden, the Netherlands and Denmark) have been selected as countries for which the VTT policy will be analyzed in this study. These countries were selected since they are qualified by several scholars as countries with serious (and well-documented) CBA track records (6). The proper documentation enhances the feasibility of meeting this study's

1 research goals. The implication of this demarcation is that the reader should bear in mind that
2 the results of this study are not necessarily generalizable to all countries worldwide applying
3 CBA for assessing transport projects. To limit the scope of the paper a second demarcation is
4 made being that the study solely focuses on the differentiation of in-vehicle travel time (e.g.
5 the value of waiting time is excluded in this study). To determine (the reasons for) the
6 segmentation of the VTT Guidelines outlining the VTT policy (e.g. 3 & 7) were examined.
7 Since the reasons for (not) segmenting the VTT were not always made explicit in the
8 Guidelines 32 CBA experts (policy makers and academics) who have experience with VTT
9 and transport CBA were interviewed (seven from the United Kingdom, Norway and
10 Denmark, six from Sweden and five from the Netherlands) to reveal the motivations.
11 Moreover, the experts were asked how they evaluated the VTT differentiation in their
12 country.

13 In the second study 16 (former) Dutch politicians (3 ministers or state secretaries and
14 13 members of Parliament) were asked to reflect on the decision to not segment the VTT
15 between regions. Since it turned out to be quite challenging to recruit Members of Parliament
16 and (former) ministers the sample of politicians is rather small. Hence, the results of this
17 second study should be regarded as first insights into politicians' perceptions on VTT
18 differentiation.

19

20 **3. Study 1: differentiation of the VTT in the five countries**

21 This section discusses how and for what reasons the VTT is differentiated in the five
22 countries under scrutiny. To avoid repetition the United Kingdom being the country with the
23 most detailed (English language) documentation with respect to this study's topic is the first
24 country that will be discussed. The country descriptions start with an outline of the current
25 practice followed by a discussion of the topics which are debated in the literature and by CBA
26 experts.

27

28 **3.1 United Kingdom**

29

30 *3.1.1 Practice*

31 The British VTT is differentiated across business time and non-business time (which includes
32 commuting). The British VTT Guidelines (3) coin 'non-business time' as 'non-working time'.
33 For business time the VTT is discerned between modes. This follows from the marginal
34 product of labor (MPL) theory and the associated empirical evidence which shows that
35 business users of certain modes (especially air) tend to have relatively high MPL while
36 business users of other modes have a relatively low MPL (3). All countries under scrutiny in
37 this paper make a distinction between business and non-business time for the same reasons as
38 the United Kingdom. Hence, this distinction will not be repeated in the country reports of the
39 other four countries in the next sections.

40 At the time of writing this paper the United Kingdom undertakes a new value of travel
41 time savings study. However, the results of this study are not available yet. Currently, the
42 VTT for non-business trips is not segmented, despite an acceptance that VTT varies with
43 socio-economic characteristics (3). This non-segmentation has a long-standing tradition in the

1 UK. At the end of the 1960s minister Barbara Castle decided that for all publicly funded
2 projects, a single 'equity' value of non-business time would be used to value in-vehicle time
3 savings for all locations, modes, incomes and non-business journey purposes (8): *"The equity*
4 *value of time is based on the average income of travelers on the journey to work and is*
5 *updated using the growth in disposable income per head of population it is assumed to*
6 *hold for all individuals on all forms of non-work journeys"*.

7 8 3.1.2 Debate

9 A first point of criticism with respect to the current policy is that standard values for
10 non-business journeys are used regardless of the size of the time saving. Amongst others,
11 Welch and Williams (9) argue that small time savings should be valued at a lower unit value,
12 since recipients of small time savings do not notice the small time savings and/or cannot
13 make full use of them. Mackie et al. (1) argue that the arguments of Welch and Williams (9)
14 are bogus. One of their arguments is that society justifies safety schemes on the basis of
15 changes in small probabilities of accidents which may well go unnoticed by users. Moreover,
16 Ojeda-Cabral (4) reanalyzing the UK data concludes that, ceteris paribus, the extent to which
17 the VTT is not lower for small travel time savings is unclear. His explanation is that size
18 effects on the cost attribute – which were omitted in the original VTT study (3) – were found
19 to be highly significant.

20 A second point of criticism comes from Zhang and Laird (10) who point out that the
21 non-differentiation between journey lengths is not fair, since this leads to significant biases.
22 Zhang and Laird found that particularly urban schemes improving the VTT on short journeys
23 profit from the standard VTT, whereas the benefits of inter-urban schemes improving the
24 VTT for longer journeys are underestimated. Various studies (3 & 11) echo the result that
25 VTT for long distance trips are substantially higher than those for short distance trips. Mackie
26 et al. (3) discuss four possible explanations for this result. Firstly, the marginal disutility of
27 travel time may increase with journey length as fatigue, boredom and discomfort set in.
28 Secondly, travel time on longer journeys eats into the time available at the destination, so that
29 the opportunity cost of time spent travelling can be expected to be greater on that account for
30 longer journeys. Thirdly, the mix of journey purposes also varies with journey length;
31 activities associated with longer journeys must be relatively highly valued to justify the travel
32 time and cost involved in undertaking them. Fourthly, consumers are less perturbed by an
33 increase of a given amount which is relative to a larger amount. Ojeda-Cabral (4) coins this as
34 'the relative effect' which means that time and cost sensitivities should decrease as the
35 current levels of time and cost increase. If the sensitivity towards time decreases less rapidly
36 than the cost sensitivity (because time is fixed and cannot be transferred between periods) the
37 VTT would increase with journey length. This explanation is behaviorally plausible (12) but
38 contradicts traditional economic theory which assumes that €1 = €1 regardless of how it is
39 acquired or saved. Mackie et al. (3) recommend not differentiating the VTT between journey
40 distances, since they regard the fourth explanation to be plausible and do not feel comfortable
41 about basing a recommendation on a phenomenon which is inconsistent with traditional
42 economic theory. Again, the reanalysis of the British data by Ojeda-Cabral (4) sheds new
43 light on this issue. Ojeda-Cabral (4) found that the 'journey length effect' was confounded

1 with size effects. Therefore, it cannot be said that the VTT actually changes in one way or
2 another as journey length increases.

3 Finally, the non-differentiation of the VTT between income groups is contested by
4 British scholars. Pearce and Nash (13) point out that projects which result in poor people
5 saving time at an increased money cost of travel could be selected in circumstances in which
6 they would rather forgo the time savings for the sake of cheaper travel. Mackie et al. (3)
7 observe that a positive relation between VTT and income has been found in all major VTT
8 studies. Hence, they recommend to undertake the entire evaluation of a transport project in
9 income quintiles so that the pattern of benefits across income and social groupings would be
10 displayed. A subsequent step would be to apply the social weightings recommended by the
11 Greenbook (14) to the time and money benefits so as to arrive at a social evaluation.
12 However, Mackie et al. (3) note that this approach is probably too challenging, since
13 institutions around the world such as the World Bank have found distributive analysis an
14 onerous and data hungry procedure. When a full social weighting scheme proves to be
15 challenging they recommend on pragmatic grounds to use a set of standard values of non-
16 business trips for routine appraisal work. For major policy alternatives and quasi commercial
17 projects Mackie et al. (3) recommend the use of a VTT which differentiates between income
18 groups combined with distributional weighting. Zhang and Laird (10) claim that the
19 increasing availability of large transport models, LUTI models and GIS datasets enhances the
20 feasibility of using local VTT values. They show with case studies that travel time benefits
21 calculated with local values can differ significantly from standard values and consequently
22 advocate increasing use of disaggregated (or even local) values of time in combination with a
23 distributional analysis. Despite the empirical evidence and practical feasibility, the British
24 Guideline for transport project appraisal Wehtag (15) advises against the differentiation of the
25 VTT between income groups on ethical grounds: *“if values of time for appraisal are based on*
26 *individuals’ willingness to pay (behavioral values) which are related to income, then*
27 *investment decisions will be biased towards those measures which benefit travelers with high*
28 *incomes. Investment would be concentrated into high-income areas or modes, and the*
29 *interests of those on lower incomes, who may already suffer from relatively lower mobility*
30 *and accessibility, will be given less weight. For this reason, the first source of variability is*
31 *controlled for by the use of average values, which should normally be adopted in transport*
32 *appraisal.”*

33 Three respondents explicitly argued in their interview that equity considerations are
34 the paramount reason for the non-differentiation of the VTT between regions. The first and
35 second respondent state that the decision not to differentiate is based on the idea that people
36 are equal. They argue that a differentiation of VTT will reveal that people in high income
37 areas such as London are willing to pay more for travel time savings than in Leeds, amongst
38 others, which skews investments to London. The second respondent regards a differentiation
39 of VTT by income or region as a potential political minefield. According to this respondent a
40 decision to differentiate will be interpreted as a very clear statement that Government regards
41 the time of a senior executive riding on a high-speed rail as more valuable than the time of
42 workers in the North-East of Britain who are paid almost nothing. The respondent foresees
43 that the politician who decides on such a differentiation will probably receive nasty questions

1 like: “*is the time of an executive worth more to you than a minute of time of a worker?*” The
2 respondent explains that politicians prefer to evade these questions and will think twice
3 before opening such a can of worms.

4 5 **3.2 Norway**

6 7 *3.2.1 Practice*

8 The Norwegian VTT for non-business trips is differentiated between modes and journey
9 length (16). Travel time savings on trips longer than 100 kilometers are valued almost twice
10 as high as trips shorter than 100 kilometers. The VTT is not differentiated between income
11 groups or regions.

12 13 *3.2.2 Debate*

14 The differentiation of the VTT in Norway is not debated in the academic literature. However,
15 six respondents explicitly stated that they consider the decision not to differentiate VTT
16 between income groups or regions to be acceptable. One respondent states that it is likely that
17 the Value of Time of people living in Oslo is higher than people living in the periphery: “*You*
18 *can observe that people in Oslo walk fast and people living in the peripheral areas walk*
19 *laidback, hence it is likely that Value of Time in Oslo is higher.*” Despite this observation the
20 respondent argues that one should first prove this effect empirically before it is incorporated
21 in the Guidelines. Three other respondents state that, in principle, the Value of Time should
22 differ between income groups and/or regions when this effect is established, but that this is
23 not incorporated in the guidelines, since it is politically unacceptable:

- 24 • Respondent 1: “*In principle you should do it, but I think it is politically very difficult.*
25 *If you differentiate between income groups you implicitly say that some human beings*
26 *are not that interesting. The only thing poor people have enough of is time. There are*
27 *political pitfalls. So better leave it alone;”*
- 28 • Respondent 2: “*What we are doing in practice is that we use one value for all income*
29 *groups, we don’t differentiate which means that we somehow make some equity*
30 *judgment implicitly.”*
- 31 • Respondent 3: “*In practice standard time values are used to a more equal treatment*
32 *of rich and poor people. People get the same value for their time.”*

33 **3.3 Sweden**

34 35 *3.3.1 Practice*

36 In Sweden the non-business VTT is differentiated by mode and journey length and not
37 differentiated by income groups or regions (17). The decision to vary the VTT by journey
38 length and mode results from the Swedish Value of Time Study (17) which detects a VTT
39 differentiation on these dimensions (even after controlling for social-economic differences
40 such as income). One respondent explains that the main explanation for the differentiation in
41 journey length is that in general the time spend on an activity (e.g. attending a meeting or

1 visiting relatives) is more valuable to a person when the person travels a long distance
2 compared to an activity for which one only travels for a few minutes.

3

4 3.3.2 Debate

5 Börjesson and Eliasson (17) recommend to differentiate the VTT between Stockholm and the
6 rest of the country since they found in their study that the VTT for car trips is considerably
7 higher in the county of Stockholm compared to the rest of the country even after controlling
8 for differences in income, employment status etc. The authors discuss several possible
9 explanations for this result, but the most plausible explanation is that people living in larger
10 cities have a higher 'Pace of Life' than people living in rural areas (18). However, the
11 Transport Administration eventually decided against a differentiation because of the
12 impression that differences in VTT depend mostly on income differences. One respondent
13 argued that the 'Stockholm effect' exists without a doubt, however this is too politically
14 sensitive to include in the Guidelines: *"people will not tolerate a higher VTT for Stockholm*
15 *because they think the reason is that all the decision makers live in Stockholm. I don't think*
16 *they will ever change it. It is very politically sensitive."* Two other respondents acknowledge
17 that this effect might exist.

18

19 3.4 The Netherlands

20

21 3.4.1 Practice

22 In the Netherlands the VTT for non-business trips is differentiated across journey purpose
23 (commuting and other) and modes (2 & 19). Significance et al. (19) explain that the key
24 explanation for this differentiation is that the Dutch Ministry of Infrastructure and the
25 Environment explicitly ordered Values of Time discerned in these dimensions. The appendix
26 of the Dutch Guidelines for valuing travel time savings (20) provides a differentiation of the
27 VTT between income groups. One respondent explains that this differentiation is only used
28 for assessing the distributional effects of road pricing policies and not used in CBAs for
29 conventional transport projects. According to respondents the key reason for not
30 differentiating the VTT between journey lengths and regions is that it is not expected that the
31 VTT will differ significantly on these two dimensions because the Netherlands is a small and
32 densely populated country. Another respondent states that a second reason for the non-
33 differentiation of the VTT between regions might be that it is politically undesirable to
34 differentiate between regions. The respondents argues that like it is politically difficult in
35 international discussions on climate change to vary the Value of a Statistical Life between
36 developed and undeveloped countries it would be difficult for Dutch politicians to accept a
37 different VTT between the urbanized area (Randstad) and the rural areas.

38

39 3.4.2 Debate

40 In the Netherlands there is no heated debate around the differentiation of the VTT among
41 policy makers and academics. One respondent argued for a differentiation of the VTT
42 between regions, since he believes that this differentiation exists as a result of self-selection.
43 The respondent thinks that people with a high VTT are more likely to stay or move to the

1 cities because a variety of amenities is accessible within short travel times. On the contrary,
2 people with a low VTT are more likely to stay or move to rural areas. These people have to
3 travel longer to amenities but apparently do not experience high disutility from longer travel
4 times. Another respondent agrees that this differentiation might exist. However, this
5 respondent emphasizes that the added value of this differentiation is questionable especially
6 when one compares this with the added value of the improvement of other aspects of
7 transport appraisal. According to this respondent an appraisal of a transport project is as
8 strong as its weakest link. He thinks it is more efficient to improve the quality of transport
9 appraisals through improving other aspects than via a differentiation of the VTT between
10 regions.

11 **3.5 Denmark**

12 *3.5.1 Practice*

13
14 The Danish VTT study (7) outlines that the VTT is not differentiated between income groups,
15 modes, regions, size, journey length or journey purposes (7). The reason for not segmenting
16 between journey purposes for non-business trips was that in the econometric model, the travel
17 purpose turned out not to contribute significantly to explaining the VTT. Fosgerau et al. (7)
18 argue that self-selection into modes is the most likely explanation for the observed differences
19 in the VTT between modes. People who have a high VTT use the fast and expensive modes
20 while those who have a low VTT use the slow and less expensive modes. However, the
21 Danish VTT study (7) outlines that the steering group has taken the view that this property is
22 likely to cause policy makers to reject the results. Hence, the steering group argued that CBA
23 will be considered most relevant by policy makers if the analysis treats everybody equally. It
24 has therefore been decided to use a standard value for all modes and incomes. Finally, it was
25 an explicit wish of the steering group not to make a distinction between long and short trips,
26 since the segmentation by trip length is hard to handle in practical applications (7).
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29 *3.5.2 Debate*

30 The decision not to differentiate the VTT between regions was not discussed explicitly in
31 (Fosgerau et al., 7). However, respondents agree that the VTT is not differentiated on this
32 dimension for political-philosophical reasons. Respondents disagree on the topic of
33 differentiating the VTT between income groups and regions. Two respondents believe that a
34 standard VTT results in a misallocation of investments. One of the respondents states that
35 Jutland (sparsely populated region in the North of Denmark) is over financed as a result of the
36 standard VTT. On the other hand, three respondents support the decision of not differentiating
37 the VTT. One respondent makes the following statement: *“When a Value of Time which
38 differentiates between income groups is used the CBA would be harder for politicians to
39 accept. If they don’t like the project they will disregard the CBA using the argument that it is
40 unfair that income is much higher in the capital city. I oppose to differentiate the values,
41 because it will undermine the CBA.”*
42

43 **3.6 Comparison of the five practices**

1 Table 1 shows how the VTT is differentiated in the five countries. Between brackets the
 2 motivations for the decision (not) to differentiate are denoted. Motivations which are made
 3 explicit in Guidelines (or related documents) are highlighted (bold and italics) to distinguish
 4 them from motivations which are derived from interviews with CBA experts.

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TABLE 1: Differentiation of the Non-business VTT in the Five Countries

	Mode	Distance	Trip purpose	Region	Income	Size
United Kingdom	No (<i>PP, E</i>)	No (<i>PP, E, T</i>)	No (<i>PP</i>)	No (<i>PP</i>)	No (<i>PP</i>)	No (<i>E, T</i>)
Norway	Yes (<i>E</i>)	Yes (<i>E</i>)	No (?)	No (PP)	No (PP)	No (T)
Sweden	Yes (<i>E</i>)	Yes (<i>E</i>)	No (?)	No (<i>PP</i>)	No (<i>PP</i>)	No (<i>T</i>)
Netherlands	Yes (<i>E</i>)	No (PR)	Yes (<i>E</i>)	No (PR, PP)	Only for road Pricing (PR)	No (T)
Denmark	No (<i>PP</i>)	No (<i>PR</i>)	No (<i>E</i>)	No (PP)	No (<i>PP</i>)	No (<i>T</i>)

7 PP = Political-philosophical;

8 E = Empirical;

9 T = Theoretical;

10 PR = Practical

11

12 Table 1 shows that the five countries make different decisions with respect to differentiating
 13 the VTT on the dimensions mode, distance and trip purpose. Moreover, Table 1 shows that
 14 the VTT is not discerned between regions and income groups based on political-philosophical
 15 grounds in the United Kingdom, Sweden, Norway and Denmark. In the Netherlands the VTT
 16 is not discerned between regions for practical and political-philosophical reasons.

17

18 **4. Study 2: politicians on the (non) differentiation of VTT between regions**

19 The observation in section 3.6 that the VTT was not differentiated between regions in the five
 20 practices under scrutiny is remarkable, because empirical evidence reveals that the VTT in
 21 cities such as Stockholm and London is significantly higher than in the periphery even after
 22 controlling for socioeconomic differences (*11 & 17*). Moreover, CBA experts spontaneously
 23 argued that they expect the VTT to be higher in other capital cities (Copenhagen and Oslo)
 24 than in the periphery. The higher VTT in (capital) cities is also supported by empirical studies
 25 which conclude that people living in cities have a higher ‘Pace of Life’ than people living in
 26 rural areas (*18*). Several CBA experts interviewed for this study believe that the non-
 27 differentiation is undesirable, since it leads to wasting money on projects in regions where the
 28 real VTT was much lower than the average VTT used in current CBAs. However, the
 29 majority of CBA experts consulted in this study and several CBA Guidelines consider a non-
 30 differentiation of the VTT between regions desirable underpinning their preference with the
 31 argument that politicians will not accept (or even undermine) CBA when the VTT varies
 32 between regions. Despite this conviction of CBA experts there is no empirical evidence
 33 available in the literature which underpins (or contests) that politicians will not accept a
 34 differentiation of the VTT between regions apart from the prescription of minister Barbara
 35 Castle end 1960s that the VTT should not differ between individuals on all forms of non-
 36 work journeys. Hence, it was decided to analyze the preferences of Dutch politicians towards
 37 differentiation of the VTT between the Randstad (four major cities and their agglomerations)
 38 and ‘the Region’ (North, East and South of the Netherlands).

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FIGURE 1 Four agglomerations which are coined as 'the Randstad'.

4

5

16 politicians were asked to answer the following question:

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'Suppose that a result from the new Dutch VTT study is that people living in the Randstad have a VTT of 12 euro and people living in the region have a VTT of 8 euro. Should we then differentiate the VTT between the Randstad and the Region, use an average value or estimate the benefits of a transport project both with the disaggregate values (8 euro and 12 euro) and an average value.'

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The responses of the politicians are presented in table 2. A distinction is made between 'regional politicians' (RP) and 'non-regional politicians' (NRP). Politicians are labelled as 'regional politicians' when they explicitly stated in their interviews that they aim(ed) to allocate more money for infrastructure to 'the Region' (and less to the Randstad). One MP illustrated being a 'regional politician' as follows: *'as an MP you belong to a political party but you also represent your region. If you want to be re-elected voters have to see that you represent them well in the National Parliament. That's why I argued for projects in my region.'*

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TABLE 2 Politicians' Perceptions on the (non) Differentiation of the VTT between 'the Randstad' and the 'Region'

Respondent	Regional or non-regional politician	Party	Support differentiate among region	Response
1	RP	Liberal	Yes	If the differentiation is based on proper research you should use this differentiation in a CBA. In the Randstad we have more transport problems than outside the Randstad, so I think that the results make sense.
2	RP	Christian-democrat	Yes	I support the differentiation, since it makes sense that values are higher in the Randstad. As a result of the congestion in the Randstad family life is under pressure. Fathers arriving late at diner or at the child care. Horrible. I can imagine that these people are willing to pay a large sum of money to arrive on time at home. However, I also think this can be taken as evidence that the Randstad is 'too expensive' and we should invest more in the regions.
3	RP	Christian-democrat	Yes	I think that CBAs should be as pure and impartial as possible. Hence, I am in favor of the differentiation. However, as a regional politician I can still argue for regional projects despite poor CBA scores.
4	RP	Christian-democrat	No clear opinion	Honestly, I don't know what to choose. However, in my role as a regional politician I will probably contest this result and argue that the value should be 12 euro in the region and 8 euro in the terrible Randstad.
5	RP	Labor	No	As a regional politician I would favor the decision to use average values and argue against a discrimination between regions. Everyone has the same right to arrive early at home after a day of work.
6	NRP	Right-wing populist	Yes	I would support a differentiation. In the end politicians should aim for maximizing the welfare of the country and it is clear that the cities contribute more to welfare than the regions. Of course you have to do something for the regions, but the focus should be on the stronger economic areas.
7	NRP	Liberal	Yes	I would favor a differentiation. It is just a fact that transport problems in cities differ from transport problems in rural areas, so you should acknowledge this difference. We can spend the tax payers' money only once and in times of scarcity I would prefer an allocation of money to the biggest problems which are probably located in cities.
8	NRP	Liberal	No clear opinion	I don't have a strong opinion. I tend to say that you should make this difference since I can imagine that there is some self-selection. People decide to settle in the region because they prefer living in a beautiful area of the country over short travel times. If you don't like to travel you settle in the Randstad. Although I tend to favor a distinction I can comprehend that other politicians will argue for an average value since this will treat all Dutch people equally.
9	NRP	Liberal	Yes	I think you have to make the distinction between the Randstad and the Region. The usefulness of CBA is that it reveals that investments in the urban areas are more profitable than investments in the rural areas. If you decide to calculate the costs and benefits with average values the added value of CBA evaporates.
10	NRP	Democrat	Yes	You should differentiate because a project in the Randstad has a different effect than a project in the Region.
11	NRP	Democrat	Yes	You should differentiate. If the VTT in the Randstad is higher than you should not pretend that there is a standard value for the Netherlands.
12	NRP	Democrat	Yes	You should make this distinction, since the pace of life is different in the city than in the rural areas. In general, people living in the Randstad have higher expectations with respect to living standards. They assign high value to the accessibility of amenities. They don't mind paying higher rents in reward to living in a city which fulfils their needs.
13	NRP	Christian Union	No	The extent to which I think the distinction is warranted depends on the cause for this difference in valuation. I can imagine that people assign a higher value to five minutes of travel time savings when their travel time is ten minutes than when their travel time is two hours. I think it is not fair to make this distinction if the difference is caused by the fact that the relative travel time savings are lower for people in the Region, since they make longer trips.

14	NRP	Labor	Yes	This is not a choice that should be made by politicians. Academics should make this choice and if they find that VTT in the Randstad is higher than in the region it is legitimate that they make this differentiation. If the VTT is higher in the Randstad this would not surprise me at all.
15	NRP	Green	No clear opinion	I don't think my opinion is of any value. I have to admit that I am not really interested in the monetized travel time savings. What I need to know for evaluating a project's desirability are the number of people who experience travel time savings each day and how many travel time savings these people save on average. This is a level of aggregation in which I can think.
16	NRP	Socialist	Yes	If objective research establishes that the VTT is different than you should make this distinction. It is clear that there are differences between the Randstad and the Region. Incomes are different, real estate prices and rents are different. So it is no wonder that the VTT differs as well.

1

2 A key observation that can be derived from table 2 is that 11 out of 16 politicians clearly
3 support a differentiation of the VTT between regions. Several politicians state that CBA
4 should be based on empirical evidence as much as possible to enhance the purity and
5 impartiality of the instrument. Politician 5 clearly argued against a differentiation. This
6 politician reveals an egalitarian worldview arguing that everyone has the same right to arrive
7 early at home. Politician 13 considers a differentiation not warranted when the difference in
8 value is caused by the fact that people in the Regions make longer trips and therefore
9 experience a relatively small travel time compared to the total duration of their trip. Three
10 politicians did not had a clear opinion (politicians 4, 8 and 15). Politician 8 tends to support a
11 differentiation, but understands that other politicians support average values. Politician 4
12 states that he would contest a differentiation after the interviewer told him that the
13 differentiation would result in lower CBA scores for the projects in his region. The statement
14 of politician 15 echoes the routine in the United Kingdom to present disaggregate information
15 with respect to travel time savings. It can be concluded that preferences of politicians with
16 respect to differentiating the VTT between regions are heterogeneous. However, the fact that
17 the majority of politicians supports a differentiation questions the assumption articulated in
18 Guidelines that politicians will reject CBA when the VTT is differentiated between regions.

19

20 **5. Implications of politicians' perceptions**

21 The result that the majority of the politicians support discerning the VTT across regions
22 whereas experts decided against this differentiation because they believe that politicians will
23 otherwise reject CBA is surprising and raises the question whether experts made a poor
24 judgment or that the stated preferences of politicians not align with their preferences in reality
25 (i.e. the politicians gave socially desirable answers in the interviews). On the one hand, the
26 fact that the majority of the politicians opt for a differentiation supports the first
27 interpretation. On the other hand, arguments can be found in this study for supporting the
28 judgment of the experts. Politicians 4 and 5 announce that they will challenge a
29 differentiation of VTT between regions in public. Moreover, one British respondent
30 interviewed for this study argued that it takes a lot of courage for a politician(s) to argue for a
31 differentiation of the VTT between regions when rivalry politicians emphasize that this
32 implies that the time of an executive living in the capital is valued more than the time of a
33 worker in the periphery. The respondent coins this as a 'political minefield' and a 'can of
34 worms'. It is not unimaginable that politicians preferring a differentiation of VTT between

1 regions in the end will agree with a non-differentiation to avoid this contentious political
2 issue.

3 What are the implications of the two plausible interpretations of this study's results?
4 When it is established that experts misjudged political preferences with respect to
5 differentiating the VTT the implication of this study should be differentiating the VTT
6 between regions when this distinction is established empirically. The only valid argument
7 against this differentiation mentioned by a Dutch respondent is that the added value of the
8 differentiation should be scrutinized. This is an interesting topic for further research. When
9 the added value of the differentiation for the quality of transport appraisal is low (compared to
10 alternative improvements) the modification should be re-evaluated.

11 However, when the statements of politicians turn out to be hypothetical implying that
12 politicians will be hesitant to decide on a differentiation of VTT between regions in reality,
13 the results of this study will still have implications. The first implication is that the practices
14 violate the premise that social appraisal of government projects involves both descriptive and
15 normative economics and that the descriptive assessment of a government project should be
16 separated from the normative assessment of the project (e.g. Arrow et al., 21). Although
17 theory prescribes that a social appraisal should start with a descriptive assessment of the
18 aggregate net willingness to pay of the project's effects which can be used as input for
19 normative (and heterogeneous) social welfare functions of decision makers, normative
20 considerations are interwoven in the descriptive analysis in the five practices under scrutiny
21 (e.g. the VTT should not be differentiated between regions) and the output of this analysis is
22 not portrayed as an input in heterogonous social welfare functions, but as a descriptive
23 assessment of the social costs and benefits of infrastructure projects (e.g. Treasury of the
24 United Kingdom, 14). The issue here is that concealing the normative considerations in the
25 descriptive analysis prevents decision makers from making an own assessment and ask for a
26 recalculation of CBA when the normative considerations do not coincide with their own
27 belief system.

28 The analysis of the Guidelines and interviews with CBA experts reveal that preventing
29 a rejection of CBA by politicians is the key motivation for violating this premise of social
30 appraisal. Hence, some concessions to micro-economic theory are accepted to foster the
31 political acceptability of CBA over a state of affairs with no CBA at all. This genuflection for
32 perceived political pressure is a dangerous slippery slope, since it is not clear where the
33 tipping point lies which makes developers of CBA Guidelines (and other actors who are
34 convinced of the goodness that comes along with CBA) taking the stand that it is better to
35 have no CBA at all compared to a CBA that is peppered by assumptions which satisfy
36 politicians.

37 Besides the dangerous slippery slope a decision against a differentiation of the VTT
38 for political-philosophical reasons complicates the interpretation of the results of a CBA
39 study. Although CBA is predominantly derived from micro-economic theory and a utilitarian
40 social welfare function the decision in Guidelines against the differentiation of the VTT
41 between regions assumes that politicians have an egalitarian social welfare function with
42 respect to this topic assigning equal weight to travel time benefits of people living in the
43 periphery and people living in the cities all else being equal. This mixture of egalitarian and

1 utilitarian elements makes it difficult to pinpoint what conclusions can be drawn from a CBA.
2 Hence, CBA suffers from internal inconsistency.

3 One way to reclaim consistency is separating the normative assessment from the
4 descriptive assessment in social appraisal of transport projects implying that the VTT should
5 be differentiated in the descriptive assessment, when empirical arguments point in this
6 direction which are supported by micro-economic theory. To be clear, politicians have the
7 right to deviate from this descriptive assessment in their own normative assessment. To
8 illustrate, suppose that the descriptive assessment concludes that the aggregate net willingness
9 to pay for travel time savings accruing from Project A and Project B are 200 million euro and
10 300 million euro respectively. In this case politicians can still draw the conclusion – from
11 their own normative perspective – that the travel time savings of Project A are worth more to
12 society than the travel time savings of Project B. Politician 3 explicitly states that he thinks
13 that the CBA (descriptive assessment) should be as pure and impartial as possible, but that he
14 can still argue for the desirability of projects with poor CBA scores (which coincide with his
15 normative perspective).

16 A second way to regain consistency is grounding the social appraisal entirely in
17 egalitarian assumptions. In this case the value of all peoples' travel time savings should not
18 be differentiated at all. However, when this line of thought is extrapolated to other
19 methodological areas of the CBA the results will be non-trivial. For instance, abandoning
20 discounting should be considered, since it can be argued that merits for people living in the
21 future are unequally treated by discounting (e.g. Chichilnisky, 22).

22 From the two solutions aiming to regain consistency in the theoretical framework of
23 CBA the first one is attractive from a democratic perspective. The essence of this solution is
24 that no longer non-politicians (e.g. civil servants participating in a steering group or
25 developers of CBA Guidelines) make equity judgments with respect to differentiating the
26 VTT, but that politicians are charged with these equity judgments. This solution entails that
27 travel time benefits of a transport project are determined in the descriptive assessment.
28 Subsequently, politicians are allowed to assess the worth of the travel time benefits to society
29 based on their (heterogeneous) social welfare functions.

30

31 **6. Conclusions**

32 This study concludes that the United Kingdom, Norway, Sweden, the Netherlands and
33 Denmark make different decisions with respect to differentiating the VTT on the dimensions
34 mode, journey length and trip purpose. Moreover, it was found that the VTT is not discerned
35 between regions and income groups and that this decision is predominantly based on the
36 perception of CBA experts that politicians will not accept this variation. Since there is scant
37 empirical evidence in the literature which underpins (or contests) that politicians will not
38 accept CBA when the VTT is segmented between regions 16 Dutch politicians were asked to
39 reflect on the desirability of a VTT which is differentiated on this dimension. It was found
40 that although some politicians argued against a differentiation, since they think that everyone
41 has the same right to arrive early at home, the majority of the politicians support this
42 differentiation. These politicians, amongst others, state that the purity and impartiality of the

1 CBA should be safeguarded. This result questions the assumption articulated in Guidelines
2 that politicians will reject CBA when the VTT is differentiated between regions.

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