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Summary:

Value of time, safety and environment in passenger transport – Positive health effects

Existing Norwegian guidance on the values to be used in cost benefit analysis of improvements for cyclists and pedestrians includes unit values per kilometre of the health improvement that additional cyclists and pedestrians are supposed to experience as a result of the physical exercise involved. The values, originally estimated by Sælensminde (2002, 2004) are approximately NOK 10 per kilometre for pedestrians and NOK 5 per kilometre for cyclists. They consist of three elements: The cost savings to society due to of fewer short spells of illness and cost savings due to fewer cases of chronic diseases, and thirdly a non-monetary "welfare effect", which is the subjective utility improvement due to better health.

It was part of the task of the Norwegian Valuation Study to revise these values. Our work has concentrated mainly on revising the assumptions about the proportion of new cyclists and pedestrians that will experience health improvements, currently thought to be 50 percent.

The health improvement depends crucially on the previous level of physical activity of the new pedestrians and cyclists, and to what extent their physical activity in transport tends to crowd out other forms of exercise. To study these issues further, we took advantage of the two-wave set-up of the stated preference study that formed the main part of the Valuation Study. In the first wave, the respondents were asked about their walking and cycling habits. Based on their answers, they were grouped in five categories, from those who used the bike as a mode of transport on a regular basis, to those who never used a bike and seldom walked.

In the second wave, the very same respondents were asked about their level of physical activity in general. The questions were framed so that it would be possible to compute an internationally acknowledged indicator of the level of physical activity, the so called MET (Metabolic Equivalent Activity, Craig et al 2003). Grouping the respondents into three groups according to their MET, it was then possible to compute the shares of these three groups in each of the five categories of travellers. One of the categories was of particular interest to us, namely those stating that they might consider to walk or cycle regularly if conditions for pedestrians and cyclists could be improved or barriers removed. Those in this category with a high level of physical activity should not experience any health improvement by becoming regular pedestrians and cyclists, while those with a low level of physical activity probably *would* improve their health.

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Of course, it will not be possible by this method to say if a group with a high present level of physical activity would actually be more inclined to take up walking and cycling than a group with a low level of physical activity, as long as both groups have stated the same degree of willingness to consider it. We will have to assume that they are equally trustworthy. Even so, we think that we get closer to the true number of new pedestrians and cyclists that will experience a health improvement in practice if we compute it from the share of relatively physically inactive among those that has stated a willingness to consider walking and cycling if conditions improve.

The final steps in this method are to consider the link between the MET score and the health risks, and to assess the MET score obtained in and outside of transport. The result we get is that the share of cyclists that get health benefits has to be lowered from 50 to 30 percent, while the correspondent share for pedestrians should be 15 percent. Since the health effect results from time spent, not kilometres travelled, the per kilometre value for cyclists turns out to be the same as for pedestrians, as their higher share of people who experience improved health and their higher level of intensity is offset by the shorter time they spend per kilometre.

Another issue that is raised in this report is whether or not the welfare effect should be included in the per kilometre value. In a prize-winning paper, Börjesson and Eliasson (2010) argues that health effects should not be included in the cost benefit analysis, at least not entirely. The argument is that if travellers do consider the health effect when choosing mode, without this effect being included as a variable when the researcher estimates demand functions for walking and cycling, the health effect will manifest itself as a lower value of time for cyclists and pedestrians. Doing the cost benefit analysis with this lower value of time actually means to include the health effect in the consumer surplus, and so including it also as an external effect is double-counting.

Based on a choice survey from Stockholm 2008, Börjesson and Eliasson establish that for a large group of respondents, health effects are a major reason for choosing to walk or cycle, but the estimated value of time for this group is no different than the value of time for other walkers and cyclists. The reasonable conclusion then is that, by and large, all walkers and cyclists have taken health effects into consideration in their choice of transport mode – and so we as researchers should leave them out of the CBA.

On the other hand, some of the health costs due to lack of physical exercise are obviously not borne by the individual, but by society at large through free health care and through health insurance. These monetary costs of illness due to lack of exercise must be included in the analysis as an external effect. The welfare effect might also be included if it is unclear whether or not it has been taken up by the value of time. We find that this is indeed not very clear (Elvik 1998), and conclude with presenting both options. In the table, the columns marked (1) include only the monetary costs, while columns marked (2) include also the welfare effect to the individual (the non-monetary cost). Whether to use (1) or (2) is left for future decision.

Table S.1: The value of positive health effects of walking and cycling. NOK per kilometre (2009)

	Cyclists		**Pedestrians**	
Costs	(1) Monetary	(2) Monetary and non-monetary	(1) Monetary	(2) Monetary and non-monetary
Reduced costs of short spells of illness	1,10	1,10	1,10	1,10
Reduced costs of serious illness	0,90	1,90	0,90	1,90
Total	2,00	3,00	2,00	3,00

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