



Cost–benefit analyses of walking and cycling track networks taking into account insecurity, health effects and external costs of motorized traffic

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Abstract

The study presents cost–benefit analyses of walking and cycling track networks in three Norwegian cities. The cost–benefit analyses take into account the benefit of reduced insecurity and the health benefits of the improved fitness the use of non-motorized transport provides. In addition to reductions in health costs, the analyses also take into account that a change from travel by car to cycling or walking means reduced external costs (e.g. air pollution and noise) from motorized traffic and reduced parking costs. The benefits of investments in cycle networks are estimated to be at least 4–5 times the costs. Such investments are thus more beneficial to society than other transport investments.

The results of such complete cost–benefit analyses make it possible to calculate the benefits to society that are not realized because motorized traffic prevents people from bicycling or walking as much as they otherwise would prefer. These “barrier costs” attributable to motorized traffic are estimated to be of at least the same magnitude as air pollution costs and more than double the noise costs. Barrier costs should therefore be taken into account in the same way as other external costs, when the issue is to determine the proper level of car taxes or to evaluate different kinds of restrictions on car use.

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1. Background and a brief literature review

Cost–benefit analyses (CBAs) are used to assess the impacts of road investment projects in Norway and many other countries. However, such analyses are not used to assess the impacts of measures designed to improve the safety and/or mobility of pedestrians and cyclists. The reason for this might be that important impacts such as insecurity and health effects are very difficult to make an adequate monetary valuation of and that the results of such CBAs therefore will be uncertain. To illustrate the limited amount of literature on this subject it may be mentioned that Elvik (2000) was the only relevant article found in a search for literature in the databases ISI, MEDLINE and PsycINFO for different framings of the words “insecurity”, “health” and “(bi)cycle”. Nevertheless, other articles exist that present CBAs of measures for pedestrians and cyclists, although insecurity and health effects are not included. Elvik (2000) presents hypothetical examples of “ideally designed” CBAs that address all such impacts. His examples show that most important impacts can be quantified and assigned a monetary value, and that, for example, based on reasonable assumptions, the benefits of safe crossing facilities outweigh the costs. This result is supported by Korve and Niemeier (2002) in their CBA of an additional bicycle phase at an existing signalized intersection. Other recently published studies related to the subject in the current paper, and therefore worth mentioning, are de Ortúzar et al. (2000), Noland and Kunreuther (1995) and Hopkinson and Wardman (1996). de Ortúzar et al. (2000) estimate the demand for a cycle-way network and provide an overview of literature on the demand element that is an important part of input data for the CBAs. Noland and Kunreuther (1995) discuss short-run and long-run policies for making bicycle transportation more popular for daily commuter trips. They conclude that both “pro-bike” policies and policies that are “anti-auto” in the long-run might be necessary for increasing the volume of bicycle transportation. Hopkinson and Wardman (1996) evaluate the demand for new bicycle facilities based on a stated-preference route-choice study. They conclude that improved safety is more highly valued than reduced travel time and that the next stage of development would be to consider the benefits of combinations of routes and facilities linked in a network.

The current study presents CBAs of walking and cycling track networks in the three Norwegian cities of Hokksund, Hamar and Trondheim. For the first time, CBAs take into account the fact that a change from travel by car to cycling or walking means reduced health costs, reduced external costs (e.g. air pollution and noise) from motorized traffic and reduced parking costs. A project group working on a National Cycling Strategy in Norway initiated the study of these more thorough CBAs. The motivation for undertaking the study is the Norwegian Parliament’s request to the Government (Ministry of the Environment, 2001) in which the Government is asked to “*prepare a National Cycling Strategy, the main goal of which is to make it safer and more attractive to choose a bicycle as a means of transport. This Strategy must form a part of the National Transport Plan.*”

2. Cost–benefit analyses as scenarios at a strategic level

2.1. *Walking and cycling track networks are not sufficient—other measures, like safe crossing facilities, should also be implemented*

The development of seamless walking and cycling track networks has the potential for increasing the amount of walking and cycling in Norwegian cities. However, since there is great

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