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Title A Fair Comparison of the Value of Travel Time in the Netherlands in 1997 and 2009/2011

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Abstract

Context and motivation

Recently, new values of travel time (VTT) have been published in the Netherlands. These values are based on surveys conducted in 2009/2011. Previous values of travel time were based on a study from 1997. This paper compares the results from these two studies in order to see how the value-of-time evolves over time and whether this can be related to the evolution of factors such as income, comfort, and the availability of technologies used during the trip (such as mobile phones, wifi).

We expect the VTT between 1997 and 2010 to increase because of the change in price level over this period. Also, we expect a further increase as a result of real income changes (income increase over and above the price change). Between 1997 and 2010 consumer prices rose by 31.5%. Real income has increased by about 30% over the same period. So on the basis of price changes up to 2010, we expect that the values increase by 32%, and there would be a further increase (of about 15% using the income elasticity of 0.5 currently employed in The Netherlands) as a result of the real income increase over and above the price increase, giving about an expected 47% increase in the VTT. New technologies such as mobile phones (also hands free), laptops, iPads and smartphones with mobile internet have been become much more common in The Netherlands over this time period. Therefore, VTTs could have been going down in the time period 1997-2010 because it has become easier for all travel modes to use travel time in a more productive and/or enjoyable way. When comparing the 1988 and the 1997 VTT data collected in The Netherlands, Gunn (2001) had already observed the same phenomenon. The VTTs did not change much in the period 1988-1997 in real terms. In this period real income substantially increased (e.g. wages rising more than prices), but this had not led to large increases in the VTT. Gunn explained this stability by hypothesising that the impact of real income growth was more or less balanced by technological developments that allow travellers to make a better use of travel time (mobile phones, laptops).

This paper investigates how much the VTT changed in the Netherlands between 1997 and 2009/2011 using a fair comparison. This included a re-analysis of the 1997 data using the 2009/2011 methodology. We also determined the impacts of each new step in the 2009/2011 analysis on the VTT. Knowledge of these impacts is useful for other VTT studies as well.

Methodology

A direct comparison of the results of the 1997 and the 2009/2011 studies is not possible, since both surveys were analysed using different techniques. A close comparison between the 1997 and the 2009/2011 analytical approach reveals seven differences. The 2009/2011 survey : includes a dependency of the VTT on the travel time itself

includes non-linear effects in the cost and time terms.
uses a different set of socio-economic factors (e.g. education was added in the new study).
estimates models in willingness-to-pay space rather than in utility space.
uses panel-Latent Class models
uses a different expansion procedure.
uses different data for the expansion totals

We studied the effect of these differences, by re-analyzing both data sets step-by-step. After each step, we calculated the VTT and compared them between the surveys.

Results

The analysis reveals that most of these differences only have a marginal effect on the VTT, except difference 5. The use of the panel-Latent Class models increases the VTT substantially, for all purposes, both for the 1997 and the 2009/2011 data. On average the VTT increases by +31%. In other words: if the 1997 study had used a panel-Latent Class model (which was not available in its current form at that time), we would have obtained considerably higher VTTs. The shift from MNL models to latent class models between the old and the new study leads to a substantial increase in the VTTs indicating that ignoring unobserved heterogeneity leads to a substantial downward bias in the VTT. The best comparison between 1997 and 2009/2011 can be made by comparing similar latent class models based on both data sets. The growth in the VTT over the period 1997 – 2010 based on a fair comparison between the two surveys (not corrected for inflation) is:

Car

Train

Bus, tram, metro

All surface modes

Commute

+13%

+49%

+9%

+23%

Business

+13%

+60%

+98%

+26%

Other

+71%

+59%

+52%

+65%

This table shows that the VTT on average increases by about the amount that was expected upfront. However, large variation between modes and purposes exists. The train VTT increases substantially, whereas for the average increase of car is much more limited. Possible explanations are that in 1997 the mobile phone was already rather common (as was the laptop). The mobile phone could be used in the train, but not so much in the car, since the mobile phone car kits

became popular after 1997. Another explanation may be that trains are more crowded than in 1997. We think that the importance of new communication technology is larger for commuting and business trips than for other trips, since there is more pressure to use communication technology for work-related purposes. Furthermore, other trips are often made together with other people and these trips are rather short.

Contribution of research

The conclusions of this study can be used to improve the forecasts of the value of travel time in the future. Usually, the VTT is increased by inflation and income (in The Netherlands using an elasticity of 0.5). This study shows that this increase is in the right order of magnitude, but additional modifications need to be made.