ABSTRACT (MAX 1000 WORDS): While considerable achievements have been made with respect to estimating the socioeconomic benefits of reduced transport time variability (TTV), fewer research results exist which can be used to predict changes in TTV. It does however seem clear that we have to use different approaches in the case of road transport, where capacity utilization is unrestricted, and railway transport, were capacity utilization depends on the timetable implemented. In the case of railways, one has to distinguish between changes in the short run, in which the timetable is unchanged, and the long run, in which the timetable is adjusted so as to exploit all potential benefits.

While traditional cost-benefit analysis (CBA) typically concerns the latter case, estimating the impact of short run changes is however also important. It enables us to evaluate the benefits of smaller measures (like maintenance projects) which are themselves too small to result in a change in the timetable but which could be very efficient in terms of improving reliability. What complicates things in the short run is that a technical improvement might only result in more slack in the timetable and not observed improvements in transport time or reliability. Even in the long run, timetable assumptions could batter for the results of a CBA (Börjesson and Eliasson 2013).

Another side of the reliability topic which deserves further study is the impact of TTV on demand for transportation services. Earlier studies of rail passenger transport (Batley et al 2011) indicate that although reliability is highly valued, it has little effect on demand. A possible reason is that urban commuter trips constitute a large share of railway trips, and that many commuters have limited options in terms of other travel modes. This could be different in the case of freight customers, who choose rail over road transport due to price but who are very sensitive to low reliability.

We have access to detailed data on both passenger and freight trains for all origin-destination pairs and sub-segments (links) of the main rail corridors of Norway for the years 2011-2013. The data contains the time at which each train passes a station or another observation point. One important factor, which affects driving time in the short run, is temporary speed limit reductions on railway link either due to technical failures or construction/maintenance work. We employ this data to study (1) the impact of reduced speed on mean driving time and variability on railway links, (2) the relationship between delays and variability on the affected link and at the final destination and (3) the impact of changes in reliability on the demand for railway services.

There are many studies on factors affecting train reliability based on simulation and fewer based on traditional econometric analysis (Gorman 2008). We argue that the behavioral nature of rail management calls for more of the latter. In our case, since we have many observations per corridor and sub-segment, we can use fixed effects regression methods to control for unobserved factors which account for cross-sectional differences in reliability across links and corridors. It is also possible to study the spatial interdependence of driving time between railway links, which gives evidence on the amount and use of slack in the timetable. Large parts of the corridors are single-track railways, hence crossings also play an important role.
Our results so far show that there we can identify an effect of reduced speed on driving times on the link level, even if the reduction only affects a very short part of the link. The results also indicate that trains which are already delayed have slightly lower driving times measured on the link level, implying that there is some slack in the timetable. At the same time, the overall effect on arrival of speed reductions seems to be equal to or larger than the effect measured at the link level. This is because while some trains are able to compensate for their time loss, some become so delayed that they cannot make their planned crossings and therefore have to wait longer. It is hence important also to look at variability and not just mean driving time. Further analysis of these relationships and analyses of the effect on demand are still to be undertaken.

References:


COMMENTS: Work in progress