The relationship between congestion and average delay is established and much of transport policy is directed at reducing average travel times. It is, however, increasingly being realised that the day-to-day variation in travel times is costly to travellers as a source of uncertainty, causing unexpected delays and deteriorating travel experiences. This cost is likely to be increasing as secular growth in traffic levels make travel times increasingly unpredictable to individual travellers. Consequently, travel time variability (TTV for short) has increased in prominence as an important target for transport policy.

Some consensus has been reached about the theoretical basis for measuring the cost of TTV (Small & Verhoef, 2007). Two broad approaches emerged. While both approaches assert travellers’ aversion to TTV, their distinction rests on the underlying behavioural response to TTV. One approach directly links the aversion to TTV with the mental stress arising from the inability to predict travel experiences and expectation that one may have to make extemporaneous travel choices due to TTV. Alternatively, the scheduling approach relates the distaste for TTV to outcomes such as arriving earlier or later than desired. Fosgerau & Karlström (2010) showed that these approaches are equivalent under certain conditions.
Despite having a stronger theoretical basis (Small & Verhoef, 2007; Fosgerau & Fukuda, 2012), the customary scheduling framework involves two notably restrictive premises. The assumption of exogenous scheduling preference lacks generality which, even in situations such as a meeting where arrival times are not pre-determined, excludes the possibility that scheduling choices could depend on the distribution of travel times (de Palma & Fosgerau, 2011). In contrast, the preference to travel at a particular time can be affected by temporal agglomeration benefits at workplace and the cost of congestion which arises when too many people travel at similar times (Fosgerau & Small, 2010). Moreover, because the customary scheduling model relies on a representative individual, it takes scheduling choices merely as an individual matter. While, in contrast, scheduling choices can be widely seen as optimal reactions in a context involving social interactions (Basu & Weibull, 2003).

Fosgerau et al. (2013) addressed these caveats in a model involving interdependent scheduling preferences; i.e., a framework in which travel outcomes depend not only on one’s own choices and realisations but also on travel choices and outcomes of others. Despite implicitly reflecting the notion of an optimal time to start a meeting, their model neither explicitly examine the choice nor the implication this choice has on the cost of TTV. This is the purpose of the current paper. To achieve this, we extend their model by adding the concept of an agreed time to start the meeting and a penalty that may be imposed when one arrives later than this time.

In a framework where individuals bargain to choose an optimal time to start their meeting, we examined equilibrium scheduling choices, analysed efficiency of these choices and derived the cost TTV. Due to the sociality of scheduling preferences, we found that a change in TTV for one person has implications to others involved in the meeting. In a two-person model, a small reduction in TTV for either person is found to beneficial to both individuals. The findings in this paper indicate that the value of reliability depends not only on the distribution of each person’s travel duration as in Fosgerau & Karlström (2010), but also on the distribution of the difference of individuals’ travel times. These findings have important implications to the current practice in eliciting experimental designs for empirical analysis.

References


