

Modelling the Demand for Toll Roads in the UK

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Abstract

The M6 Toll road is the United Kingdom's first toll motorway. The 43km three lane motorway was designed to alleviate traffic congestion around Birmingham and was built under a public-private partnership scheme. The road was fully opened on 14th December 2004 and generated 45 million (68 million) in revenue in its first full year of operation. On opening, the standard toll for cars was £2 but this has increased significantly to a current charge of £4. Its existence supports a range of choice modelling opportunities. This paper describes the development of a modelling framework to underpin the assessment and forecasting of private passenger vehicle demand for toll roads. It was undertaken as part of a UK Department for Transport funded study. The research centres upon a large scale market research exercise involving focus groups and questionnaire surveys incorporating a series of Stated Preference (SP) experiments. A sample of over 3200 motorists was obtained. In the main, the SP experiments dealt with drivers route choice between a tolled motorway, an un-tolled motorway and local A roads, with additional route choice experiments looking at time of day choice, late running and the influence of journey time reliability, and a series of supplementary SP exercises covering a range of infrastructure and travel conditions. A family of discrete choice models has been estimated to explain and predict route and time-of-day choice as a function of toll charge, vehicle running costs, journey time, displacement time, journey time reliability and travel time conditions. The latter distinguishes between time spent in free flow, stop-start, busy, light congestion, heavy congestion, and gridlock conditions. Other supplementary SP exercises have been used in an attempt to unpack route specific constants. These deal with attributes such as road surface quality, lighting, the presence of information and of speed cameras, the proportion of heavy goods vehicles, the number of lanes and lane width, as suggested as most important by the focus groups. In addition to evidence on the relative attribute valuations of a wide range of attributes relevant to motorists' route choices, the analysis also explores the existence of non-linearities in response and taste variation across the sample using mixed logit techniques. These issues are particularly important in the context of the appraisal of new infrastructure schemes.

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