

Nexus Quality Contracts Scheme Proposal

Fares impact modelling

This note explains how Nexus has modelled the impact of its pricing proposals in the Quality Contracts Scheme.

Continuous Monitoring

Nexus carries out 'Continuous Monitoring' surveys on all forms of public transport in Tyne and Wear. During these face-to-face surveys passengers are asked for information about their journey, including their boarding point and destination, how much they paid for their ticket and what type of ticket it is. Approximately 0.5% of passengers are interviewed, and the results are scaled up to produce a set of figures that is considered statistically robust over a 12-month period at the Tyne and Wear level.

The output of Continuous Monitoring is used as the basis for Network One's payments to participating operators for their share of total journeys involving Network One tickets, and also to calculate the basis for concessionary travel reimbursement payments. The University of Southampton conducts an annual audit of the methodology.

Elasticity

Elasticity is a measure of the strength of customers' reaction to fare changes, on a scale of -1 to +1, where numbers below zero indicate an adverse response to fare changes. The 'Black Book' is a piece of research published by TRL Limited for the DfT that sets out suggested transport elasticities, and is widely used across the transport industry to help assess the likely impact of proposed fare changes.

The standard short run UK Bus elasticity defined by the Black Book for is -0.42, so for example a 10% increase in the cost of fares is assumed to lead to a 4.2% decrease in the number of people wishing to travel within a 1 or 2 year period following the change (known as 'demand'). For reference the Black Book short run elasticity for light rail is -0.3.

Fare impact modelling

Through Continuous Monitoring we can model, for each ticket type, the average fare paid and the number of trips across Tyne and Wear during a given period. Using the information collected about boarding points, we can use this to estimate, by local area, the current demand for each ticket and how much customers pay.

The next step is to translate the current ticket types and prices into the ones set out in the QCS Proposal, which is done through a conversion table. Because we know both the boarding and destination point of the trip, we also know how many zones the trip would fall into under the QCS Proposal.

If for example 30,000 trips per annum are currently taken between two points at a price of £1.35 for an adult single ticket, and under the QCS Proposal both the boarding point and the destination point are within a single zone, the new proposed fare for those 30,000 trips will be £1.30, reflecting the fares proposed in the QCS Proposal for a single zone.

The impact on demand is estimated by multiplying the Black Book elasticity (-0.42) by the difference in price (-£0.05, or -3.7%) for that ticket type, in this example resulting in an increase in demand of 1.56%, or 467 additional passenger trips during the year.

This calculation is carried out for each ticket type and area of boarding, and the results are added together to give the total effect of the proposed fares compared to what passengers currently pay. It is also possible to use the area of boarding to make a judgement over the localised impact of the proposed QCS fares compared to today – for example that in a given area 60% of adult fares reduce, 20% stay the same and 20% increase.

Limitations of this approach

Whilst Nexus is confident that the approach it has taken is reasonable in terms of assessing the aggregate at the Tyne and Wear level, there are some limitations in this modelling process that should be taken into account.

Continuous Monitoring data is only available for Tyne and Wear, and therefore no assessment has been made of possible impacts on patronage in the parts of Northumberland and Durham that are affected by the QCS Proposal, including cross boundary services. Whilst Continuous Monitoring is statistically robust at the Tyne and Wear level, any analysis at a lower level should be treated with some caution. That means that the district-level information about the impact of the proposed QCS fares cannot be guaranteed for statistical accuracy, although it can be used to reach broad conclusions of trends for background information.

The 'Black Book' Elasticities are widely used throughout the transport industry and so are considered to be robust. However commercial operators may have detailed historic commercial demand data which would allow them to develop a set of elasticities that are more applicable to their local market. In the absence of that more detailed and localised data, which operators have not provided, Nexus can only base its analysis at the highest level of a single figure of elasticity applied to all bus tickets and types, whereas in practice elasticity may be different for, say, an annual season ticket in comparison with a single ticket.