Oxera

Agenda

Advancing economics in business

Fares fair? The economics of setting ticket prices

Regulated rail fares in Great Britain are set to rise by 3% in real terms for each of the next three years, while the entire approach to fares setting is about to be subject to formal review. There are important economic issues surrounding these changes, such as the empirical evidence on how passengers respond to fare changes, and the types of fares regulation that might be introduced

One of the many recommendations of the 2011 report from the Rail Value for Money Study is that the UK Department for Transport (DfT) should undertake 'a full review of fares policy',[1] which should encompass a series of issues relating to the level, structure and regulation of the fares paid by passengers to use railways in Great Britain (GB). The GB rail industry is also embarking on its planning for the five years from 2013, in the context of a comment in the Rail Value for Money Study report that the industry needs to move away from 'predict and provide' towards 'predict, manage and provide'.

According to the Study, passenger rail fares contributed £6.2 billion to the cost of running the railways in Britain in 2009/10.[2] Regulated rail fares (comprising approximately half of those sold) have been rising by an average of 1% per annum in real terms since 2004 (the most recent fares review being in 2003),[3] and the Chancellor of the Exchequer announced in autumn 2010 that these fares would rise by 3% in real terms for the next three years.[4] Given the close links between regulated and unregulated fares (in terms of passenger buying behaviour), unregulated fares are expected to increase in tandem.

Recent evidence suggests, however, that GB rail fares are already high in international comparison. Work published in February 2009 by the consumer group, Passenger Focus, found that GB rail season tickets were more expensive than those in seven other European countries—although train frequencies were also relatively high.[5] In addition, walk-up fares (those available just before travel) for long-distance journeys are comparatively high, but GB offers the cheapest advance-purchase fares.

What is the evidence relating to the forthcoming fares increase, and how might the regulation of GB rail fares be adjusted to improve capacity utilisation? While there are numerous reasons why the government may wish to regulate the price of rail travel—for example, to encourage its use given its environmental advantages over road travel—rail fares regulation could also be used to improve capacity utilisation and to increase users' contribution to the funding of the rail network.

Existing regulation

Regulated tickets sold by GB passenger rail operators are subject to an overall price cap (RPI ± X), which is set by central government and covers all 'flows' (journeys from A to B) and a wide range of products. A 'basket' approach is used to set prices, in which the overall price of a basket of regulated products must not change by more than the national cap, although products within the basket are currently permitted to change in price by up to RPI + X + 5. Under the existing RPI + 1 framework, therefore, some ticket prices may rise by inflation plus 6%, as long as there are offsetting price reductions for other regulated tickets.

In practice, operators' prices are capped in relation to two baskets:

- a 'Commuter Fares' basket—containing designated commuter tickets (primarily, seasons and Anytime singles and returns) for all flows from which the operator derives revenue;
- a 'Protected Fares' basket—covering tickets outside commuter areas (typically, weekly seasons and Off-Peak returns).[6]

There is a 'halo' effect in relation to both of these baskets: because passengers can switch between ticket types to get a better deal, regulated tickets constrain operators' pricing of unregulated tickets. The precise degree of this constraint will depend on the availability of relevant alternatives for travel, which can be measured using diversion ratios (in this context, the rate at which people move between modes of transport in response to relative changes in aspects of service provision). In addition, operators do not necessarily set fares for all flows (the extent to which an operator can perform this function depends on whether it is the 'lead operator' on the flow), and different operators' baskets can overlap.

RPI + 3

One factor underlying the decision to allow higher rates of real-terms increases in regulated rail fares (from RPI + 1 to RPI + 3) is that the fare elasticities of the affected products are relatively small. If this assumption holds, the fare increases will raise revenue, since losses arising from a relatively small fall in demand following a price rise would be more than offset by the remaining passengers paying more for their travel. Indeed, the government has stated that the rise in regulated fares will cause the number of rail journeys to be 4% lower than it would otherwise have been by the end of the three-year period.[7]

The rise in regulated fares following the Chancellor's announcement will lead to formal change processes being triggered in existing franchise agreements. As a result of the franchise change clauses in the agreements, any additional revenue expected to accrue to the franchise operators will lead to reduced financial support, or increased premium payments. In other words, the DfT—rather than the franchised operators—will receive the increase in fares revenue arising from the fares increase. The change in national fares policy is thus used as a vehicle for increased user contributions to the cost of providing rail services in Britain.

The demand forecasting advice for fare elasticities used by the DfT to generate its expected revenue increases is somewhat dated, being based on a 2002 version of the GB rail industry's *Passenger Demand Forecasting Handbook* (PDFH).[8] The latest version of the PDFH, published in 2009,[9] contains updated evidence that suggests that fare elasticities are, in general, greater in absolute terms than those recommended in previous versions of the PDFH.[10] Season tickets, which form the bulk of regulated fares by value and are expected to contribute most to the revenue increase arising from the move to RPI + 3, typically display lower elasticities than other tickets. The assumption is that people commuting to work have fewer transport alternatives, and are therefore less likely than other groups to switch away from rail as a result of fares increasing. In the latest version of the PDFH, the season-ticket fare elasticities are up to 65% higher than in the 2002 version.

Indeed, recent research by Oxera and Arup for the GB rail industry (previously discussed in *Agenda*) has suggested that season-ticket elasticities in 2010 are even greater in absolute terms.[11] This evidence—that fare elasticities seem to have risen over time (between the 2002 and 2010 research) in absolute terms—should not come as a surprise. Common sense suggests that as fares rise (which they have done in real terms since 2003 for regulated products), all else being equal, people will become increasingly creative about choosing how they travel, finding alternative routes, tickets and modes to suit their needs.

On the basis of this evidence,[12] the DfT is unlikely to raise the revenue it expects from its RPI + 3 policy. It is too early to say that revenues might deteriorate (there are likely to be pockets of the market where even long-run elasticities are sufficiently small for the fare increase to generate revenue). However, the latest evidence suggests that the predicted shift from taxpayer- to user-funding of the railway might be less substantive than expected, and that this is likely to be accompanied by a considerable reduction in rail patronage compared with what would be expected without the change in policy.

Fares review

The proposed fares review is likely to cover several angles, including the level, structure and regulation of fares. A number of problems with the status quo are discussed in the Rail Value for Money Study report, including the following.

- As noted above, some GB rail fares are high in international comparison, and RPI + 3 will not change this.

- Fares are not linked explicitly (or, indeed, implicitly, except in limited circumstances) to the costs of service provision. While RPI + 3 aims to lead to users contributing more to the railway as it is improved, the national fares policy is not designed to reflect localised enhancements to the network. In addition, there are a number of structural aspects to fares that add to the lack of cost-reflectivity (including the fact that season-ticket fares per mile fall with distance), and regional imbalances in fares per mile that have nothing to do with the cost of service provision. This is in contrast to the situation in the Netherlands, where the fares of the largest passenger operator, NS, are linked to the access charges set by the infrastructure manager, ProRail.[13]

- The fares that passengers face are deemed complex, with 'low awareness [among passengers] of the different ticket types available and little understanding of the benefits or restrictions of each'.[14] However, this seems to suggest more of a market failure in the provision of intermediaries, which make the best-price tickets available for each journey, than in the tickets available. (Mobile-phone tariffs could be described in the same way, but in this area operators and other retailers have found ways of presenting complex information in terms of choices that customers understand.)

- Perhaps the most substantive issue raised in the review relates to the regulation of Saver, or (as they are now known) Off-Peak tickets. The availability of these tickets is restricted to after the morning peak, and, by some operators, also outside the evening peak. However, despite their likely appeal to leisure travellers, these tickets form part of regulated product baskets, causing 'the "peak" problem [to apply] to important inter-urban travel at times when regulated Saver fares apply'.[15] This issue is demonstrated in Figure 1, which shows the increase in crowding over one afternoon as restrictions on Saver tickets were removed from trains leaving Kings Cross station in central London.

In addition to the above points, Oxera's research into the passenger rail industry in recent years suggests that the following issues are relevant, particularly in relation to fares regulation.

Market failure?

In some cases, regulation can help to correct market failures. However, since the first passenger rail franchises were let after privatisation (with a form of fares regulation that has hardly changed since), relatively little attention has been paid to whether the products that are regulated today, in the geographies in which they permit travel, should still be regulated, and, if so, to what extent.

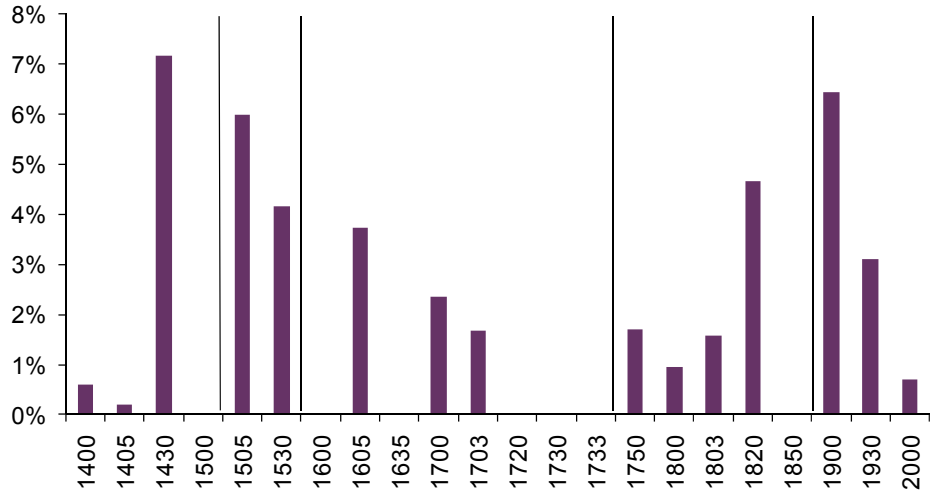
It might be considered counterintuitive to be regulating fares, particularly as the government is seeking to maximise the value of each franchise (and, specifically, to increase user contributions by exploiting any remaining market power that operators have). Fares regulation would be expected to reduce market power and the amount that operators are willing to pay to run franchises.

Model of regulation?

Assuming that there remain areas of the market where franchisees have market power (which would need to be tested on a case-by-case basis), the form of fares regulation needs to be considered carefully (particularly in light of the comments from the Rail Value for Money Study). Currently, the form of regulation is somewhat confused.

- The current fares basket approach includes products in the basket that, prima facie, should not be regulated—Off-Peak fares are one clear example (assuming that these are bought for journeys where the passenger has a wide range of travel

Figure 1 Illustration of crowding arising from the removal of ticket restrictions



Note: Percentage figures on the y axis are a measure of crowding (PIXC), where higher percentages mean greater crowding. The data is from a Friday afternoon (with times shown on the x axis), and the dips in crowding represent periods during which premium tickets are required to use departing trains.
Source: Oxera (2003), 'Review of Crowding Policy', prepared for the Strategic Rail Authority.

opportunities available), but the regulation of some Anytime tickets and weekly season tickets is no less unintuitive. One potential argument is that the current approach represents an approximation to Ramsey pricing (see box below), with low- and high-elasticity products included in the basket to enable operators to raise the prices of low-elasticity tickets, and lower the fares for products with high elasticities. Many baskets do not contain such a mixture of products, however, and this will mitigate the degree to which the welfare-maximising properties of Ramsey pricing can be achieved, and raise the question of why the selected products are being regulated. In addition, the empirical evidence suggests that the elasticities of some of the products that have been in baskets together have moved closer together. This is to be expected if operators have been pricing down the high-elasticity products at the expense of the low-elasticity products.

- An alternative would be to take a more scientific approach to fares regulation, in which products are regulated (potentially without the constraint of a basket) only if an operator has market power in relation to them. If an operator's product faced no actual or potential competition from other tickets, operators or providers of transport, regulation would apply. This economic regulation of rail fares would optimise regulation, focusing it on products where it was needed, and potentially enabling operators to price more flexibly to respond to competition in other parts of the market.

A potential issue with the use of Ramsey pricing is the extent to which the market is changing. It is becoming apparent that traditional mappings from typical journey purposes (commuter, business and leisure) onto ticket types are increasingly breaking down. Commuters are exchanging season tickets for the flexibility and convenience of Anytime (or even Off-Peak) tickets; business travellers are increasingly buying in advance (and eschewing first class to meet demanding new expenses policies); and large proportions of leisure travellers are taking advantage of advance-purchase options. The price discrimination that Ramsey requires (to enable lower-elasticity passengers to face greater price increases, and vice versa) is therefore becoming increasingly difficult. Regulators and operators can no longer assume that a product has a fixed price elasticity, since it might be being bought for one of several journey purposes.

Something that might come to the rescue is smart ticketing. A passenger buying a long-term ticket on a smartcard (which stores information about fares paid) will reveal much more than operators know today about that person's behaviour. They might commute into work only four days a week or they might work from different locations, and this information will be valuable to operators, which can use it to price-discriminate between trips with different price elasticities.

Smartcards are also a good way of making the best use of capacity. By giving passengers incentives to travel at different times of the day, or not at all, they can use passenger behaviour to smooth peaks in demand. At the moment, while season tickets enable operator cash flow, they provide journeys to passengers at zero (direct) marginal cost. Thus, there is no financial incentive to choose whether journeys are taken at the height of the peak period or at the lowest point of the off-peak period.

However, the operational benefits of smart ticketing will come at a cost, in terms of the cards, the readers, and, importantly, the back-office functionality to offer passengers the relevant prices for each journey.

What is Ramsey pricing?

In markets, such as rail, that are characterised by imperfect competition and very high fixed costs, setting prices equal to marginal cost is unsustainable because it does not allow firms to recover their fixed costs. In such situations, Ramsey pricing offers a second-best solution for efficient price-setting.

In markets where it is possible to price-discriminate, the Ramsey pricing result suggests that products with the most inelastic demand should have the highest price–cost mark-up, and vice versa. That is, where costs are the same across products, prices should be set higher for products with more inelastic demand.

The aim of Ramsey pricing is to recover a firm's fixed costs while maximising consumer welfare. It is based on the idea that increasing the price of a product is more effective at generating additional revenue the more inelastic the demand for that product is. As such, increasing the price of a product with elastic demand may reduce overall revenue as demand for the product falls. Increasing the price of a product with inelastic demand has a limited effect on demand—and the price increase will subsequently generate increased revenue.

By placing a higher price–cost mark-up on products with more inelastic demand, firms can therefore cover their fixed costs while minimising the overall level of price increases.

Source: Oxera (1999), 'The Application of Ramsey Pricing in Utility Regulation', *The Utilities Journal*, June, pp. 40–1.

Is the answer to increase flexibility?

The forthcoming GB rail fares review will need to consider both the level and the structure of fares, in the context of the government's objectives. If the objective is to make better use of capacity while raising revenue, increasing the pricing flexibility available to train operators may be a solution. This, in turn, would increase the value of the franchises for which the train companies submit bids to the government to operate, while not necessarily increasing the overall level of fares. As shown in the discussion above, this process could be achieved by implementing a more economic approach to fares regulation.

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[1] Rail Value for Money Study (2011), 'Realising the Potential of GB Rail', detailed report, June, p. 122.
[2] Ibid., p. 116.
[3] Strategic Rail Authority (2003), 'Fares Review Conclusions 2003'.
[4] HM Treasury (2010), 'Spending Review 2010', October.
[5] Passenger Focus (2009), 'Fares and Ticketing Study Final Report', February.
[6] Specifically, tickets formerly known as Savers, or, where Savers did not exist before February 2003, the equivalent full-fare return tickets.
[7] Hansard, November 10th 2010, c335W.
[8] Department for Transport (2009), 'Rail Passenger Demand Forecasting Methodology TAG Unit 3.15.4', p. 5. Association of Train Operating Companies (2002), *Passenger Demand Forecasting Handbook*, version 4.0.
[9] Association of Train Operating Companies (2009), *Passenger Demand Forecasting Handbook*, Version 5.0.
[10] The elasticities contained in more recent versions of the PDFH are clearly long-run; what are less clear are the time horizons covered by the elasticities in PDFH version 4.0.
[11] Oxera (2010), 'Why Do I Care about Forecasts if they are Always Wrong?', *Agenda*, August.
[12] Also, the rise in fare elasticities is not limited to the proportion of regulated fares that consists of season tickets.
[13] See Rijksoverheid (2005), 'Vervoerconcessie voor het hoofdrailnet 2005 – 2015', (the concession for passenger transport), Article 15 (2 and 3).
[14] Rail Value for Money Study (2011), op. cit., p. 118.
[15] Ibid., p. 119.