



## Bulletin

- Water
- Energy
- Retailing
- **Transport**
- Financial services
- Healthcare
- Telecoms
- Media
- Post
- Competition policy
- Policy analysis and design
- Regulation
- **Strategy**
- Contract design and evaluation
- Dispute support services
- Market design and auctions

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## Advanced booking

### HOW AIRLINE-STYLE PRICING CAN BE APPLIED IN THE RAIL SECTOR

*Changes in the regulation of rail fares open the way for train operating companies to further develop the kind of sophisticated pricing strategies used to maximise profitability in air transport. Success with such strategies depends on detailed analysis of customer preferences and demand patterns. This bulletin explores the economic principles that underpin “airline-style pricing” and the ways in which they could be applied to passenger rail services in the UK.*

Supported by increasingly powerful ticketing systems and demand analysis, airlines have developed complex pricing strategies designed to maximise the profitability of air transport services. Although some moves to exploit such strategies have been made in the rail sector, recent changes in the Strategic Rail Authority’s policy on fares regulation could increase their potential value. The introduction of baskets for fares that were previously regulated individually and the simplification of existing fares baskets may provide new opportunities for innovative pricing. Further, the prospect of changes in the regulation of Saver fares by →

2006 (or sooner if significant benefits can be demonstrated) could increase the value of exploring new pricing strategies.

### YIELDING MORE

Although sophisticated pricing strategies, or “yield management” techniques are most developed in the airline sector, they can also help to maximise revenue in other industries that share the following characteristics:

- the “product” is *perishable* (i.e., consumption is time-sensitive);
- supply is *constrained* (i.e., capacity is limited, or increases in capacity are lumpy);
- a high proportion of costs are *fixed* (i.e., within existing capacity constraints, the cost of supplying an additional unit is low); and
- customers are *heterogeneous* (i.e., their preferences differ).

In an industry with these features, it makes sense for firms to try to “manage yield” by identifying passengers’ different willingness-to-pay (WTP), filling capacity with the passengers with the highest WTP, and charging different passenger groups as close to their WTP as possible. To achieve this, a firm must find a way to “sharpen” pricing policy by encouraging high-WTP customers to purchase higher-priced services, while simultaneously making lower-priced services available to low-WTP customers.

### PRICING AT THE SHARP END

In the left diagram the shaded area shows the revenue that a firm will make if it offers to sell capacity ( $Q^*$ ), at a single unit price ( $P^*$ ). By contrast, the shaded area in the right diagram shows the revenue that the firm could make if it were able to differentiate its pricing and charge higher prices to customers with higher willingness-to-pay. Note that in the second case it makes sense for the firm to sell all of its capacity, while in the first, the profit-maximising level of sales may well be below capacity.

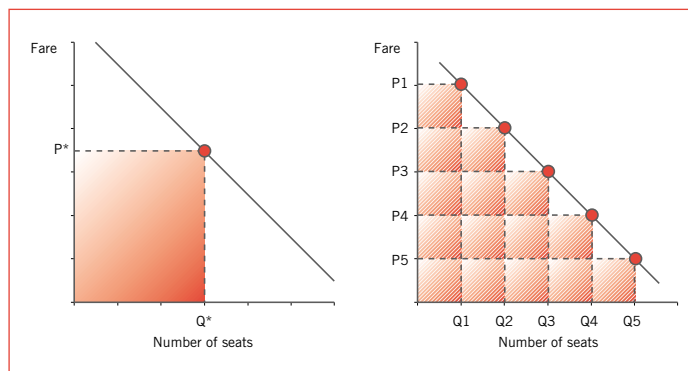


Figure 1: The rationale for price sharpening

### MADE TO MEASURE

To sharpen prices companies have to find ways of identifying customers with different levels of WTP, offering packages tailored to their preferences, and minimising “leakage” of high-WTP customers into lower-priced services.

The starting-point is to identify customers’ preferences and the product characteristics that can be used to differentiate between them. In the case of passenger rail services, the following characteristics clearly offer the potential for price differentiation, and many rail operating companies have already begun to experiment with this.

- **Route.** Rail fares are almost always differentiated by origin and destination. However, there may be scope for further differentiation by the specific path taken.
- **Service quality.** Some companies have already varied the distinction between First and Standard class, either by adding further categories (e.g. “Premier”) or collapsing the distinction on services where it was not yielding results. However, differentiation by service quality continues to be a key factor in “yield management”.

## Advanced booking

- **Inter-temporal ticket flexibility.** Price variation by time of day, day of the week and the period of validity for returns is commonplace. However, compared with airlines, most structures are still relatively unsophisticated.
- **Advance bookings.** While apex fares are commonplace, and some train operating companies have developed more complex advanced booking schemes, this is also a technique that offers much greater potential.
- **Journey flexibility.** Rail tickets offer varying degrees of flexibility between routes and operators. In the airline sector, such flexibility has become a focal point for pricing.
- **Bundled services.** Some companies already offer add-ons such as parking or connecting transport, however, differential pricing can of course be extended much further.

To make the most of such strategies, a firm must be capable of offering a range of ticket options simultaneously, and changing the pricing and availability of those options quickly. Detailed analysis of demand and preferences is needed to identify the optimal ticket types to offer and the best way of allocating demand between them. Specifically, a firm will wish simultaneously to optimise:

- the total number of tickets sold on each service, so as to fill available capacity; and
- the mix of passenger types on each service, so as to maximise revenue.

Each of these problems is considered below.

#### **MORE ROOM AT THE BACK**

The natural starting-point is the analysis of demand forecasts for individual services. This provides a basis for assessing how demand can be optimised for each individual service, and across different services, to make the most of available capacity. One major problem in estimating demand, however, is that there is normally a gap between the number of tickets booked and the number of people who actually decide to travel. So airlines, for example, commonly aim to overbook capacity. Of course, the proportion of no-shows is not a constant; so the number of passengers who turn up on the day may be above or below capacity.

Compensation can be offered to “persuade” passengers to accept a later flight, but the airline may still suffer a loss of goodwill and future business. Consequently, many airlines choose a trade-off point at which the total number of tickets sold lies above available capacity, but below the level of expected demand.

Several features of rail passenger services can make this trade-off more complex:

- **No check-in process.** Over-booking may not become apparent until passengers have boarded, making it more difficult to resolve.
- **The availability of “walk-up” fares.** Since the quantity of tickets for non-reserved seats cannot generally be rationed directly it must be addressed through pricing.
- **The availability of standing room.** This provides a greater degree of flexibility in capacity than on an aeroplane. However, the number of standing passengers can have a serious impact on boarding and alighting times, as well as on service quality.

Such factors make pricing design and ticket availability more, rather than less, important.

#### **SAVING THE BEST TILL LAST**

Optimising the mix of tickets offered – the second problem identified above – requires a series of decisions to determine how many tickets to sell at each price. In some industries (notably tourism), “yield management” favours reducing prices as the moment of consumption approaches, in order to fill capacity. Passenger rail services, however, serve both leisure and business customers, and the latter, who have a higher WTP, may often

decide to travel at short notice. Key questions for train operating companies are how much capacity to reserve, on what services, and how much to sell in advance at discounted prices. The example below illustrates an approach to maximising revenue.

#### A BIRD IN THE HAND...

A transport company with limited capacity must decide how many seats to make available for cheaper leisure fares, and how many to reserve for potential (higher-paying) business travellers. If it reserves too few, revenue will be damaged by the loss of high-paying passengers; if too many, revenue will be damaged by the fact that some capacity goes unfilled.

Here, the solution is at  $Q^*$ , where the expected marginal revenue from both kinds of ticket, adjusted for the probability that they will be bought, is equal. In other words, the likelihood of selling  $Q^*$  business fares is sufficient to make it profitable to reserve this capacity, rather than offer it at the cheaper price from the outset.

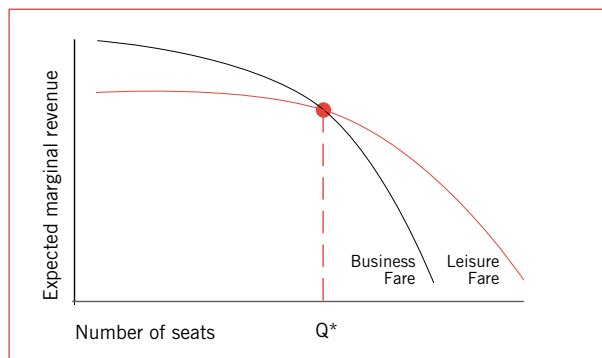


Figure 2: Optimising reserved capacity

Putting theory into practice requires extensive data analysis. An initial assessment of the probabilities of selling different volumes can be derived from historic sales data. With the right systems, a firm can also make continuous use of information from bookings to review its expectations. Further, in accounting for the many different factors that can influence demand, econometric techniques such as regression analysis can have significant advantages over simple trend analysis in estimating the type of marginal revenue curves illustrated above.

#### MAKING IT HAPPEN

Speed, flexibility and understanding customer preferences are key to developing the sharpest pricing strategies. Specifically, development and implementation of sophisticated pricing strategies requires investment in:

- comprehensive customer and demand analysis;
- accurately targeted marketing; and
- more advanced electronic ticketing systems.

Such strategies can, however, be started on a relatively small scale, perhaps trialling one or two innovative ticket types. Once started, the approach can create a virtuous circle – as on-going monitoring of demand responses feeds into continual refinement of pricing. For this reason, the development of optimal pricing is an evolutionary process, not a one-off exercise. Similarly, the pay-off to investment in the foundations can thus be expected to increase year on year.

*Frontier Economics has provided advice on pricing strategies, customer analysis and demand projections to many businesses in the retail, transport and utility sectors.*

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