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# The Economics of Cost Recovery in Transport

## Introduction

**Kenneth Button\***

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There have periodically been sea changes in the way in which the economic regulation of transport has been viewed. While the traditional divide between the ‘Continental’ philosophy of regulation — whereby regulation is seen as the norm to achieve wide socio-political goals and markets only adopted when this is coincidental with these goals — and the ‘Anglo-Saxon’ philosophy — with its neo-classical economic emphasis on the need to ensure markets are allowed to work efficiently and unencumbered by regulators — still exists, the focus has shifted very much towards the latter. We have moved into what Denis Swann and I (Button and Swann, 1989) once called the *Age of Deregulation*.

Since the deregulation of the US domestic airline industry in 1978, there has been a global trend towards market liberalisation and privatisation with the transport sector being particularly affected. The changes that have occurred have, most economists would seem to agree, been broadly beneficial. There has been a general downward trend in transport costs and the use of transport services has risen indicating the revealed preferences of potential users. The US term ‘deregulation’, although quite widely used, is, however, something of an exaggeration. There remain many generic regulations covering such things as mergers policy, labour conditions, as well as a plethora of safety, security, and environmental regulations. In addition, in many countries reforms to transport regimes have been slower in their introduction, and even in those that are consid-

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ered the most 'free market', regulations, although often in modified forms, still remain. What has taken place has been a move to reform regulatory structures to reduce the most heavy-handed elements of government intervention.

Where reforms have occurred, while generally beneficial, they have not always generated the types of results that were expected, and in some cases have been seen as far from successful. Some of these 'surprising' outcomes are simply the fact that analysts and politicians mis-forecast; a not unexpected event because a paramount reason for greater reliance on market mechanisms is that regulators and planners do not have full information and there are thus often good reasons to leave things to atomised decision-making structures such as markets. But in other cases foresight should perhaps have been exercised, at least in general terms.

The aim of this Special Issue is not to look at all facets of the regulatory changes that have been affected in the transport industries, but rather to focus on the particulars of cost recovery. The inherent advantage of competition is that it provides consumers with choice and forces suppliers to provide their services as efficiently as possible. A potential problem, long recognised in the economics literature, is that in some circumstances there are market imperfections that may lead to inability of suppliers to price in a competitive market in a way that their costs are fully recovered. In other words not all competitive situations meet the rigid requirements of perfect competition. In these cases 'adjustments' have to be accepted if private companies, in our case transport suppliers, are going to provide optimal levels of service in the long run.

The aim here is not to give short summaries of the papers contained in the Special Issue — hopefully they speak for themselves, and besides there are abstracts with each — but rather to set the scene more fully as to what the underlying issues are and how over the years transport suppliers confronted with this cost recovery problem have responded. In this scene-setting task, I make apology for the fact that all may not accept some of the points raised. As with a number of areas in economics there is an inevitable range of interpretations of facts and of the way the world is seen.

### **The fixed cost issue**

Economic theory tells us that, in open market conditions, when there are no fixed costs then bargaining between suppliers and customers will ensure that prices are kept to a minimum consistent with the suppliers recovering all costs in the long term. Since there are no fixed costs the marginal cost of meeting the customers' demand will be the entire costs of each unit of production. Once fixed costs are introduced into the situation and there

is competitive supply, then bargaining will push prices down to marginal cost, but they will be insufficient for capital cost recovery.<sup>1</sup>

In the transport case, as in many others, this issue was intuitively considered as far back as the mid-19th century when concerns were raised about the monopoly position of the railroads. These were seen as natural monopolies but prone to the potential of exploiting this monopoly power; Harberger allocative efficiency losses, as they are now known, were feared. The monopoly power itself, however, was seen as needed to stimulate adequate investment, and without this guarantee of protection from competition it was felt that entrepreneurs would shy away from the sector. The result was either legislation that effectively gave monopoly power to a railroad company over a certain jurisdiction but with rates-of-return regulated so that excess rents could not be earned, or the taking over of railroads by the state.<sup>2</sup>

The point here, however, is that the fixed costs were largely seen in traditional terms of indivisible track, terminals, and marshalling yards, and this continued well into the 1970s.<sup>3</sup> It subsequently became an issue again, in a somewhat different context, when it underpinned the unbundling of the various elements of transport supply that accompanied regulatory reform in the 1980s. Many measures of privatisation and regulatory change sought to separate out those elements that had genuine fixed costs in the traditional sense from those that did not. In the European Union, for example, elements of airport operations, such as ground handling, were seen to have small, if any, fixed cost components, and were set free from public ownership. The provision of road maintenance services in the UK was similarly treated, and there are many other examples. But that still left the issue of how to treat the residual elements where there were perceived to be fixed costs.

Another issue has also emerged. The traditional notion of a fixed cost may be too limiting for some types of industry or operations therein, including some within transport. Many transport suppliers offer a scheduled service entailing a guaranteed product at some pre-specified future

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<sup>1</sup>To the best of my knowledge, the Oxford economist Francis Edgeworth (1891) considered this in some detail as long ago as the 1890s, Jacob Viner (1931) in his seminal work on cost curves raised it, and subsequently the Nobel Prize winning economist Ronald Coase (1947) developed the topic further. In practical terms it was certainly an issue to be addressed in the eyes of the economists who were first asked to review transport markets as part of the European Economic Union's Common Transport Policy in the early 1960s (European Economic Commission, 1961). The issue of stability is also considered in the context of contestability theory that played some part in the transport regulation debates of the 1980s (Baumol *et al.*, 1982).

<sup>2</sup>Canada was something of an exception to this with its fostering of a duopoly system.

<sup>3</sup>This is the approach found in the main textbooks of the time, e.g. Locklin (1972) and Pegrum (1973).

date. This may entail using what are traditionally thought of as fairly flexible inputs; a scheduled airline flight involves an aircraft that can always be switched between routes, crew that can be rescheduled, and a take-off/landing slot combination that can always be used for other services. In fact, because of the nature of a scheduled service these all become fixed costs once the timetable is published; the plane is committed, the crew is committed, and the slots are committed. The fixed cost is thus not the conventional immobile and inflexible plant and equipment but rather the commitment of what may traditionally be seen as variable factors of production to a particular use in the future (Button, 1996).

The challenge confronting the transport supplier is thus how to ensure sufficient revenue is forthcoming to cover these costs in addition to more traditional variable factors such as fuel. In the case of scheduled air services operating in a competitive market, the airline is committed to tying up capital in each flight, but then has to compete with other carriers for customers to fill seats. In their quest for business each carrier will quite rationally reduce prices because providing a passenger covers its marginal cost it is worth carrying him. This is because a seat is in effect a fixed cost, perishable product. There is a continual incentive to fill seats that adds to competitive pressure and short-term excess capacity.

A simple explanation of the underlying problem is offered by Coy (2002). 'Think about why increasing-returns businesses are unstable. It costs a lot of money for them to gear up, but once they do, each incremental unit of output is extremely cheap to produce. Take airlines. Once they fill their planes enough to cover fixed costs, each additional passenger is enormously profitable. Trouble is, those profits invariably entice new entrants. Capacity increases. Fare wars begin. In desperation, airlines cut fares until some passengers are paying barely more than the cost of their meals. No longer earning enough to cover their fixed costs, airlines must merge or go bankrupt. Capacity falls, fares rise, profits increase, and the cycle begins again.' In the long term when investors lose confidence in the sector this leads to sub-optimal levels of investment despite excess capacity often being a short-term problem during peaks in the cycle.

There are several conditions when there may be an 'empty core', as this state of the market is known, and, hence, a market may not be sustainable. It is not only a condition associated with fixed costs, but can also be related to matters of avoidable (set-up) costs, indivisibility, or network effects, and severe fluctuations in demand, where some suppliers enjoy a degree of institutional or financial protection, and when there are significant variations in the costs of suppliers (Telser 1978). In practice many transport industries would seem to have cost conditions in which a stable, efficient equilibrium

is possible only by means of a suitable restructuring of the competitive environment.

There is often a tendency to link these sorts of issues with, in particular, arguments for public subsidies. One way of covering fixed costs, for example, would be to have them subsidised by the taxpayer. This type of situation should, though, be distinguished from some of the arguments for subsidies and market entry controls that have been used to protect declining transport industries (Kahn, 1988). An argument that has been widely used in the past is that destructive competition can emerge when fixed costs are a large part of overall costs and when there are long periods of excess capacity. In these conditions, the industry is seen as 'unconcentrated' in that consumers are too few in number relative to the total size of the market to perceive and to act on the basis of their joint interest to avoid the competition that drives prices down to marginal cost.

Historically the railways used this line of argument in many countries when confronted with lower-cost road competition. Breyer (1984) has tended to discount the practical importance of this type of problem in declining industries, seeing it as a short-term structural issue. In the case of an empty core, the problem may have nothing to do with insufficient demand but rather the inability of the supplier to structure prices and services to tap into demand.

The position of the airline industry worldwide has brought a focus more clearly centred on the cost recovery problem of a growth industry. The complexity of the underlying economic model that looks at network industries offering a committed perishable product has not helped in communication. The conclusions also run counter to some of the more traditional views of competition policy where there can never be too much competition.

The analytical framework looking at fixed costs as committed costs attracted attention in the US in the economic downturn of the early 1990s (Smith, 1995).<sup>4</sup> It was rejected at the time by the airlines and by policy makers who believed that massive cuts in capacity offered the solution to heavy financial losses being suffered by the scheduled carriers. The period following this, which saw rapid economic growth in the US, did see profits being earned, but even at the time of record income for the industry the hub carriers only managed a net marginal profit of 2.9 per cent. After 2000 losses began to emerge again and have continued to this day, with numerous carriers being in Chapter 11 bankruptcy. While there is a need to keep costs down, and to adjust capacity to confront business cycle effects, which may be difficult, the robust market for the

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<sup>4</sup>Although for compactness the focus here is on the US airline market similar pictures can be painted of other transport markets around the world.

services of several large low cost carriers over this period in the US does not seem to indicate chronic excess capacity.<sup>5</sup> The issue would seem to be more intrinsic to the cost structures involved rather than the overall cost levels.

This is not a problem peculiar to airlines and it can be found in other transport industries; the shipping sector has come in for particular attention. Sjostrom (1989, 1993) examined international liner shipping cartels (conferences) to seek consistency with an empty core. He looked for legal restrictions on entry (making the core theory for collusion less likely) or severe temporal variations in demand and costs (making the core theory more likely). Looking at the US he found that the theory of the core is supported. Pirrong's (1992) work put emphasis on exploring costs. He looked at cost, demand, and market organisation in scheduled shipping. The findings are consistent with Sjostrom's and suggest that collusion and coalitions serve to ensure stability and avoid competitive chaos.

The underlying cost recovery problem is far from new and is applicable to many modern industries beside transport. The financial problems of the telecommunications sector, for example, seem superficially to be of this ilk. But here the picture is muddled by its relatively recent deregulation, the rapid technical changes that are taking place, questionable accounting practices in some cases, and the nature of the licensing systems in parts of Europe. Certainly, however, the industry globally is losing money.

### **Methods of capital cost recovery**

Many industries function for considerable lengths of time despite not recovering their full costs of capital. In some cases this may be possible because capital debts are written down through institutional means. The Chapter 11 bankruptcy laws in the US effectively allow a company to be restructured, and its capital written down, without the entity being broken up. Several US airlines have made use of this mechanism (some on more than one occasion). The recent cases of America West, US Airways, and United Airlines are examples of this. From a wider perspective, competing firms often see this as unfair competition because the costs of their rivals have been reduced through legal means rather than through strict efficiency improvements.

In other cases industries can attract capital not because the industry as a whole is seen as viable but rather on the speculation that some companies

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<sup>5</sup>There have been arguments advanced that in network industries, such as air transport, stability can exist when there are a limited number of suppliers if some can earn relatively high returns on parts of their networks to cross subsidise other parts while other carriers make their return on other segments. Mutual interest deters destructive competition with each supplier enjoying a degree of market power in segments of the system. The advent of point-to-point services can be seen to have disrupted this, although the evidence to date is mainly North American (Dresner, 2004).

within it are. This effort to 'spot the winners' can provide a continual flow of investment even if the overall probability of making a profit is less than unity. This 'casino' effect can be heightened when an industry, or some elements of it, has a particular appeal to investors for non-commercial reasons. Some sectors simply capture investors' imaginations for periods of time.

The most common case of this is perhaps sports team companies, but air transport also has a cachet about it that may attract capital even if it does not earn a reasonable financial return. In the past the railways were in a similar position. Most industries are not independent entities but are part of larger value chains. In some cases those elements in the chain that are more than recovering their costs of capital may invest in other elements that are not recovering all costs. It is in their interest to do so either if they cannot fulfil their role of the loss maker more efficiently themselves, or if there are institutional constraints against them being direct providers. Airframe manufacturers often support aircraft purchases with favourable loans to ensure adequate sales or directly invest in airlines.

Industries also employ a wide variety of techniques to recover their full cost, or at least more complete recovery. The approach adopted seems to depend on a combination of the technical characteristics of the industry concerned, and the institutional environment in which it operates, as well as the general political acceptability of the system. The following offers a very brief overview of the main regimes.

### *Subsidies*

Subsidies have long been used to recover the costs of capital and, on occasions, operating costs. The argument, which goes back to the French engineering economists of the mid-19th century, is that once an investment has been made it is most economically efficient to maximise its use subject to the willingness of users to pay the incremental costs of their actions. The ongoing trend is to unbundle attributes of a service and to attempt to isolate those where the fixed costs are concentrated. These costs can then be subsidised and the other attributes sold in the market at competitive prices. This has, for example, been a widely used policy for railways, with subsidised (and generally publicly owned) track being separated from commercially driven operations (Brooks and Button, 1995).<sup>6</sup>

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<sup>6</sup>The UK's rail policy initially involved unbundling with track being placed under a single private authority while services were tendered for to keep operating subsidies to a minimum. The result has been a problem for the track authority (where most capital is tied up) to recover costs under a strict regulatory structure including capital subsidies. The operating companies have found it difficult to recover their costs even with local market power because of the unreliability of the track network.



A problem with any system of direct subsidies is that the incentive structure, unless the subsidies are allocated with care, makes it difficult to ensure X-efficiency in production if attained. If the recipient knows that losses are to be financed from external sources there is no incentive to resist pay rises for labour or to economise on capital outlays. Further, there is much less of an incentive to provide the goods and products that customers seek. Tied in with these factors, in some instances there have been concerns about capture of the system by those seeking economic rents from the subsidies, either directly or as providers of inputs into the transport system. Asymmetric information and the nature of the transactions costs involved in allocating subsidies, for example, make it difficult for those giving them to ensure effective use.

A variety of mechanisms have been developed to contain these potential intervention failures that can accompany direct subsidies. In particular, tendering for services has become more widely used with 'competition for the market' being seen as a mechanism to replace competition in the market. Tendering is not new but it has been finessed in recent years, and particularly in the UK where, since the mid-1980s, many bus services are subsidised either on a route basis or, as in London, on a network basis. While part of the justification for these subsidies is, in different contexts, to provide social services, and part as a second-best approach to vehicle congestion policy, there is also an element of fixed cost recovery.

The difficulty even with the more sophisticated methods of tendering is that while it can potentially introduce more efficiency into the use of subsidies, incumbents tend to have an advantage over possible new suppliers; at the very least they have better knowledge of the market and the tendering process. There are also challenges in defining exactly what transport suppliers are actually tendering for. The funding authority can specify a tight remit for the tender that allows for a high level of quality control but this misses one of the key elements of any competitive system, the innovation that can come from markets. Alternatively a looser set of parameters is possible but then the authorities inevitably have to make trade-offs between the tender and the 'quality' of service that will be provided.

### *Monopolies*

Natural monopolies can recover their full costs by dint of their market power. In technical terms they have the ability to set either their prices or their outputs to ensure that revenues exceed costs. The standard analysis assumes that they establish an output where marginal costs are equated with marginal revenues and then sell this output at a price that clears the market. But revenues can be even higher in circumstances where price discrimination is possible. At the extreme case, where each potential customer

is isolated, the average revenue can be collected — hence the airlines' attraction to yield management.

Natural monopolies are, however, by their nature uncommon and are largely confined to the extractive industries, although some transport infrastructure, such as deep-water ports, do enjoy significant amounts of natural monopoly. Their rarity in transport is to a large extent because, while a particular mode may for physical reasons have 'monopoly' over the services of that mode, its services can themselves be substituted by other modes — air travel can be substituted in some cases by rail services, bus services by car, and so on.

In practice, there is always the tendency for governments to intervene when there is the potential for a natural monopoly to arise. This may be through regulations or public ownership. Whatever the case, an inevitable trade-off emerges between containing the possible inefficiency and exploitation that can accompany natural monopoly power, and the potential intervention costs that can accompany government involvement in markets. But there are also many instances where government consciously creates monopoly power with the aim of allowing full cost recovery.

Institutional monopoly comes about through such things as licensing and, where there are subsidies, the tendering out of services. In some cases the structure is explicit, such as the licensing of a set number of taxicabs in a city or the tendering out of a bus service, but in other cases it may be in the form of self-regulation. The latter has been common amongst the professions engaged in transport — engineers, accountants, lawyers, and so on. This is a subject little studied in the transport economic literature where labour markets, by and large, are given short shift. Effectively, the government gives over the responsibility of limiting the degree of market entry to the industry itself. This in turn regulates who supplies the service and at what price. Adjustments can be made to ensure full costs are recovered. One of the arguments for doing this is that considerable skill and information are needed to ensure that those in the market are qualified, and it is more efficient for professionals to use their resource base to determine this.

The application of this type of self-regulation can also apply more directly to transport industries. It has been used, for example, in some air transport markets for things such as customer's rights, and the International Air Transport Association has fulfilled this self-regulatory role in a number of ways over the years.

Institutional monopolies can also emerge as part of wider transport policy. Licensing systems, for example, often confer monopolies designed not only to allow full cost recovery on services where there would otherwise be a willingness of consumers to pay if it was not for excessive pressures of

competition, but also foster cross-subsidisation for services that would not have been viable even if there were no excessively competitive forces at work. The bus licensing system operated in the UK from the mid-1950s had this feature and so did the pre-1978 system of domestic air service route licensing in the US.

A difficulty with any institutional monopoly, as with a natural monopoly, is containing the market power that exists. Regulations are widely used, but their form has changed with time. Traditional rate-of-return regulation, which was used for many years in the public utilities as well as transport in the US, allowed prices to recover all costs together with a reasonable rate-of-return. Beside the inevitable matter of how a 'reasonable' rate of return was to be defined, the limitation of the approach was that it was frequently captured by the industry under regulation, or by the regulatory body that had a vested interest in avoiding excessive confrontation (Stigler, 1971; Posner, 1975). Essentially the industry had control over cost information and there was no incentive to keep costs down when any increase could be passed on to customers. Combating this was difficult for the authorities who, in any case, had minimal incentive to be too robust in their application of the rules because the appearance of high complexity justified larger bureaucracies. In some cases workers or suppliers of inputs further exploited this because they knew there was no incentive for management to fight input cost increases.

More recent regulatory policies have set price-caps, which have allowed annual price increases that are at a level below that of changes in the retail price index — the RPI-X formula.<sup>7</sup> In the UK this type of regulation is widespread and applied to telecommunications, energy utilities, and to water, but it is also used to regulate such transport sectors as the BAA London airports and the NATS air traffic management system. The rationale behind the policy is that institutional monopoly is needed to allow economically efficient provision and full cost recovery but in dynamic sectors with falling costs there is a need to ensure not only that monopoly rents are not taken but also that customers benefit from falling costs over time. Practically, in the UK, while it proved relatively useful in the short term when formerly nationalised industries had significant levels of X-inefficiency to shed, as costs have moved closer to prices so price-capping has become more cumbersome and the regimes have moved towards more traditional rate-of-return regulation. Recent experiences by the regulator of NATS offers some confirmation of this view.

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<sup>7</sup>Some costs outside the control of the industry (e.g., oil costs) are generally allowed to be passed on directly.

### *Internal coalitions*

Since the inability to recover full costs is frequently due to the excesses of competition, the suppliers in the market may act to reduce this by forming horizontal coalitions. At the extreme this may involve efforts to merge or take over so as to develop, in effect, a degree of quasi-monopoly power. Much more common in transport are various forms of alliance. These provide a basis upon which the nature of competition can be adjusted to allow higher returns to be earned. The creation of shipping conferences in 1870 was, for example, the first major modern effort to create internal coalitions within international transport.

Alliances are now common in the airline industry and even extend to some limited alliances between airports. They appear, at least in their strategic forms, to have been beneficial to the airlines. The reforms of freight rail transport in the US have resulted in a number of major alliances including those across the US/Canadian and US/Mexican borders. The outcome of these rail alliances has been capacity rationalisation (10,000 miles of track between 1987 and 1999) and a significant growth in productivity and operating income in the 1990s (Transportation Research Board, 2002). A problem, however, is raising funds for investment in new services while rationalisation is taking place.

One reason for this problem is the nature of traditional antitrust and mergers legislation in many countries. Alliances often require legal approval because they have the potential of violating many tenets of competition and hence may violate generic antitrust regulations. These regulations have traditionally been designed to cope with the potential excesses of rent seeking monopolists. They have not generally been aimed at considering matters of cost recovery when there may be excessive competitive pressure in sectors where there are fixed costs. They have even less been designed to look at cases where these fixed costs are associated with service commitments rather than physical capital rigidity. In most cases, however, companies have to raise revenues directly from their sales to recover their full costs. This is done in practice in a variety of ways but one thing is common to many of them. The firm needs a degree of market power to generate sufficient revenue. This type of issue is not always part of traditional antitrust thinking where ideas of potential excessive market power form the basis of arguments rather than the desirability of some degree of market power to allow long-term commercial viability.

### *Long-term contracts between supplier and customer*

By negotiating a long-term cost recovery contract with a major customer at the time a service is introduced, a supplier can ensure that there is a guaranteed revenue flow that will cover most, and, if approached correctly,

all, of the capital outlay. This is often standard practice in such traditional industries as steel production where long-term agreements are reached with customers. The key features here are that the investments tend to be very lumpy and relatively long-lived, and that there are not many potential customers.

Such arrangements are not uncommon in the air transport field. Perhaps the most discussed is the Civil Reserve Air Force (CRAF) of the US whereby the federal government gives exclusive contracts to US carriers for the carriage of their personnel on condition that aircraft and crew are available at times of national emergency. Similar arrangements have helped in many European countries. Another example is long-term contracts between post offices and airlines to carry mail. Such contracts are also found outside the airline sector, for example between railroads and power stations for the regular carriage of coal. Branch lines are constructed on the basis that coal will be carried at a pre-determined rate for a contracted number of years.

*Advanced revenue with subsequent capital adjustments*

Most transport activities involve making an investment with fairly predictable costs and then seek to repay this from much less certain revenue flows. An alternative is to try to secure a more certain revenue flow and then to adjust capital outlays so that a viable return may be earned. This is in effect what many charter airlines do and also many contractual bus operations. They sell capacity in advance to tour operators and others, and are thus fairly well informed many months ahead of when their capacity has to be delivered. Freight railway companies in Canada and the US, when carrying seasonal products such as wheat, pursue similar practices.

As we see in one of the papers in this issue, this approach has been refined recently in the context of some scheduled airline services. In a number of US cities groups of businessmen have tried to attract carriers with guarantees of adequate patronage for an initial period. These are known as travel banks. In Wichita some 400 businesses raised \$7.2 million to attract carriers. Air Tran started operations in May 2002 with services to Atlanta and Chicago's Midway airport. It received some \$3.0 million to cover losses in its first year and \$1.5 million in the second. Similarly, Pensacola raised \$2.1 million from 319 businesses to attract Air Tran while companies and individuals in Stockton bought \$800,000 of prepaid tickets to attract American West.

Looked at in a somewhat different way, the full-service airlines engage in this type of long-term revenue management through frequent flier programmes, and in the past liner conferences have used deferred rebates to retain regular customer loyalty. These are, amongst other things, intended

to reduce fluctuations in the revenue flow and thus inject greater certainty into longer-term planning.

*Vertical integration*

If one link in the transport value chain fails to recover its full long-run costs but the chain in its entirety is viable, then one option is for the loss-making element to vertically integrate with profitable links. Historically this was done in many transport industries when feeder services were vertically integrated with the mainline services — for example, in the early 20th century the railway companies often operated bus and trucking services to feed traffic to their mainline services. It is common practice for many large companies to self-insure to avoid the costs of outsourcing. In the early days of aviation airlines were often vertically integrated with aircraft manufacturers (Boeing and United Airlines being an example), and built their own terminals at airports, and today the airlines have investments in the NATS in the UK. In terms of ticket distribution and information systems, airlines were involved in the development and use of computer reservations systems. In the US there was direct ownership of the systems until divestiture was thought to be a better commercial proposition. The development of Orbitz in the US and the somewhat less all-embracing Opodo in Europe reflect a partial return to this form of vertical integration.

Shipping lines have often been involved in developing port facilities; again to take a UK example P&O heavily invested in the Port of Felixstowe. Another case where vertical integration has been common has been the railways — although this is changing in Europe. In the US the Staggers Act of 1980 removed most economic regulations over the freight railways. The rail companies had control over track and operations. Competition pushed down revenues but reductions in capacity (which often involved selling non-core lines to smaller railroads), reduction in the numbers of workers, more productive labour practices, and containment over wage increases meant costs fell even more. In 1986 the railroad operating expenses were 93 per cent of costs but by 1995 they were 86 per cent of costs. Basically, the railroads had control over a major input cost — their infrastructure.

The difficulty with vertical integration is that it imposes additional managerial strains to the system. It essentially often moves transport service suppliers away from their core business and reduces the efficiency with which they can determine their profit centres. What it also often does is to move economic rents down the value chain, transferring them from elements where there is monopoly power to those where high levels of competition make the recovery of fixed costs more problematic. While this is a potential second-best approach to full cost recovery, the overall adverse

effects on efficiency may be very high and the outcome far removed from a first-best world.

### *Discriminate pricing*

Discriminate pricing is widely practised in transport and other network industries. The underlying idea was summarised a few years ago by the UK Office of Fair Trading (1999). 'In general undertakings will need to set prices above their incremental costs so that common costs, for example, can be recovered. Price discrimination between different customer groups can be a means of achieving this; it can increase output and lead to customers who might otherwise be priced out of the market being served. In particular, in industries with high fixed or common costs or low marginal costs, it may be more efficient to set higher prices to consumers with a higher willingness to pay.'

Price discrimination has been widely used in transport to recover costs. It was used almost at the outset by shipping conferences (Goss, 2002) and continues today, albeit in a modified form, even as maritime transport moves into the container age (Brooks and Button, 1996). It was developed and refined in dynamic form in the US domestic air transport market as yield management during the 1980s; essentially fares change as a plane fills. Peak and off-peak fare differentials are common for local public transport systems. Regarding 'information transport', deregulated long-distance telecommunications providers give quantity discounts to both large and small customers; charge business and individuals different rates; and offer calling plans that offer discounted rates based on individual characteristics and usage patterns.

The idea of yield management is to extract as much revenue from customers as possible by levying prices that reflect the willingness of customers to pay. Consequently, customers less sensitive to price pay more and contribute to the capital cost of the service, while those who are less willing to pay are charged lower prices that at least cover their marginal costs. It has been long used in a particular form to recover the capital costs of various public utilities such as passenger rail services and urban bus services. Here the aim is not to price differentiate between users so as to maximise profit but rather to generate revenue so that an acceptable return is earned after all costs (including the cost of capital) have been covered. This approach, known as Ramsey pricing, constrains the level of prices levied at the upper end.

### *Two-part tariffs*

Explicitly separating out capital from operating or marginal costs and charging for each separately has been a standard way for many utilities to

recover their full costs.<sup>8</sup> In the case of telecommunications (be it hard wire or cellular) consumers normally pay an access fee (roughly equal to the capital cost) and a usage fee. In some cases, if the marginal costs are extremely low, there is simply an access fee that subsumes the estimated costs of individual calls. This is a standard practice for local telephone services. The two-part tariff is also to be found in a variety of private sector activities — for example, the golf club membership and the green fees.

The successful use of two-part tariffs depends very much on both the relative importance of the capital element in costs and the frequency with which individual consumers use the good or service. It is generally far more successful when there is regular and heavy use. This is because the supplier can employ information to adjust pricing and investment plans and consumers do not feel a heavy burden when it comes to paying the periodic ‘membership’ fee. It is also most efficient when the service being offered is fairly homogeneous. This makes allocating the fixed fee easier.

The use of strict two-part tariffs in transport is relatively limited because most people do not travel often enough to make it an attractive option and, from the transport operators’ perspective, the nature of trip making means that it is difficult to allocate a reasonable approximation of capital costs to each consumer. Some road charging regimes may, however, be seen as approximating to a two-part tariff (an annual licence fee plus a variety of user charges). The link between costs and prices are, however, rather opaque even in regimes where there are road funds that dedicate at least part of the taxes and charges road users pay to infrastructure use and operation (Newbery, 1988). One problem is that in many countries at least part of the payments made by road users are seen as sumptuary taxes unrelated to cost recovery.

### **Some final thoughts**

Transport economics is essentially concerned with problem solving within particular institutional and technical constraints. The issue addressed in various ways in this Special Issue is how the challenges of full cost recovery can be achieved in transport markets. The very nature of the papers clearly reflects Coase’s point that there is no single way of recovering full costs in competitive situations where there are any forms of fixed costs. There are multiple ways, some more efficient than others, but efficiency is not always easily discerned in situations where information is not complete, and in many cases asymmetric, where there are obscure transactions

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<sup>8</sup>In a way this may be seen as form of price discrimination in that average costs of trips vary according to the number of trips made and thus ultimately reflects willingness to pay.



costs, and where the motivations of the actors do not conform to the ideas of public interest theory. The challenges are compounded when political economy is enmeshed in neo-classical positivism. In reality, in many cases it matters as much who pays for the full costs of transport as how the efficiency of the system is achieved.

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