

## IV. REGULATION IN TRANSPORT: THE PRACTICE

### A. Introduction

Many governments implementing economic reforms in recent years have increased the role of the private sector in the provision of transport infrastructure facilities and services. Instead of eliminating the need for regulation such reforms have emphasized the need for effective regulation and regulatory institutions for a number of reasons, including:

- The existence of natural monopolies;
- The limitations of “competition for the market”;
- The existence of asymmetric information between transport operators and regulators;
- The need for private investment in infrastructure facilities;
- The need to assign risks between operators and government.

This chapter examines the scope and implications of economic reforms in transport for the regulation of infrastructure facilities and services, both in general and for specific modes.

### B. Transport: economic reforms

Transport is pivotal to economic development. On the one hand, the achievement of economic growth and poverty reduction requires good physical access to resources and markets while on the other, quality of life is generally dependent on the quality of physical access to employment, health services, homes, education and other amenities. Conversely, in many developing countries the inadequacy of transport infrastructure and the inefficiency of transport services are recognized as being among the main bottlenecks to socio-economic development and social integration.<sup>33</sup>

Until the 1980s, transport infrastructure facilities (rights of way, track, terminals and associated traffic management) in developing countries were primarily provided by the public sector for all modes of transportation (road, rail, air, maritime and inland water) and at all levels (international, national, regional and local, both urban and rural). In transport “service” provision (conveyance of passengers and freight), railways were usually a public sector monopoly, while in air and maritime transport national “flag carriers” were also usually in the public sector. In contrast, in trucking, bus and inland waterway transport the private sector was predominant, despite the fact that state-owned enterprises for transport existed in many countries and non-transport state-owned enterprises often possessed their own fleets. Even in these subsectors, however, governments have usually played a critical role by determining charges for the use of public infrastructure and by regulating the type, quantity and prices of private sector services.<sup>34</sup>

---

<sup>33</sup> R.K. Thoopal, “Railway pricing and charges”, ESCAP Regional Seminar on Transport Pricing and Charges for Promoting Sustainable Development, New Delhi (December 2000).

<sup>34</sup> A. Armstrong Wright and S. Thiriez, “Bus services: reducing costs, raising standards”, World Bank Technical Paper 68 (Washington D.C., World Bank, 1987).

The provision of transport infrastructure facilities and services by state-owned enterprises, with restricted entry to the market, was widely believed to facilitate the achievement of multiple government objectives by increasing government leverage in policy implementation.

By way of example, governments have often attempted to secure one or more of the following objectives simultaneously, in the public transport sector:

- Service coordination (including integrated route structures);
- Through ticketing;
- Coordinated scheduling of services;
- Multi-modal coordination;
- Centralized information systems;
- Safety;
- Environmental protection;
- Cost and price minimization;
- Service quality;
- Affordability.

However, it has become increasingly recognized that monopoly per se is unlikely to contribute to ensuring sufficient, low cost and "affordable" transport.<sup>35</sup> For example, in the absence of subsidy, the imposition of an obligation on operators to provide uneconomically low fares may actually accentuate poverty by reducing the availability and quality of services. Similarly it is now widely recognized that it is better to address environmental impacts directly with the relevant technical or operating standards or taxes, rather than to approach them indirectly through the control of market entry. Further, state-owned operators, in most sectors, including the transport sector, are now widely regarded to have failed for a number of reasons, including:

- **Misguided intervention** – whereby governments, for example, have often imposed unsustainable fare and service conditions on public transport operators, overestimating what can be accommodated through internal cross subsidy;
- **Excessive operating costs** – for example, public transport costs per passenger kilometre have been shown to differ by 100 per cent and more as between public and private fleets in a number of developing country cities such as Accra, Ankara,

---

<sup>35</sup> The World Bank has stated that an increasing proportion of transport supply comes from the private sector in competitive market conditions. This includes 75 per cent of bus services, 95 per cent of road haulage, 100 per cent of paratransit; and an increasing proportion of rail services. By the year 2000, 100 per cent of rail freight transport in Latin America was provided by the private sector. In addition, privatising road maintenance has reduced costs by from 25 per cent to as much as 50 per cent in Colombia. Labour costs have been reduced by 50 per cent in rail privatizations in Argentina and Brazil. Competitive franchising of bus operations has reduced operating costs by between 25 per cent and 40 per cent in a number of European countries such as United Kingdom, Denmark, Finland and Sweden. Even in international transport concessioning of ports have reduced costs by 30 per cent in Brazil, while withdrawal of protection from national monopoly operators has reduced shipping costs by 30 per cent in Venezuela. Further examples of the scope for improved efficiency through regulatory reform can be found at [http://www.worldbank.org/html/tpd/transport/pol\\_econ/forms.htm](http://www.worldbank.org/html/tpd/transport/pol_econ/forms.htm)

- Calcutta, and Jakarta.<sup>36</sup> The introduction of competition has reduced operating costs per vehicle mile by over 30 per cent in several European countries;
- **Perverse management incentives** – where, for example, entry to transport markets is restricted, prices are usually controlled to limit the rate of return on capital. This has led to the "padding out" of costs by excessive capitalization; the unwillingness to pool resources such as terminals, an unwillingness to lease, the use of more expensive equipment and earlier vehicle replacement than a competitive market would support, and excessive vertical integration;
  - **Lack of dynamism** – for example, strict entry regulation excludes or limits the possibility of providing innovative forms of low-cost transport which meets the transport demands of the poorer groups or higher quality alternatives meeting the needs of those willing to pay.

The traditional approach therefore, to transport has been based on detailed government intervention in the sector, ostensibly to protect the public interest. In the case of infrastructure, direct state provision has been the norm. In the case of transport service provision, governments have controlled entry, product characteristics, price levels and maximum profit rates, either through regulatory commissions or through direct control of state-owned enterprises. Regulation has usually taken the form of protection of a monopoly supplier, often in the public sector.

State enterprises are not necessarily technically inefficient, for example, in various ways the performance of Chinese Railways matches the best in the world. However, the problem is that as long as they have recourse to deficit financing to maintain supply, they have little incentive to be cost-effective or to respond flexibly to changes in user demand.

Even regulated private enterprises suffer from interference from the government on matters of operational detail, which leads to the enterprise having poorly defined goals and relatively passive management that may be unresponsive to changing market conditions. This has had important consequences:

- (a) **Assets have not been maintained** - in public transport, attempts to protect the poor by keeping public transport fares at uneconomically low levels have led to the physical deterioration of vehicle fleets and to a reduction in the service provided by many urban bus companies and state-owned railway companies. Public roads have also deteriorated to the point of collapse in many countries;
- (b) **Service has failed to respond to need** - protected monopolies have failed to respond to new demands for expanded service or improved quality;
- (c) **Domestic transport costs have been too high** – in Argentina, the privatization of the railways demonstrated that labour costs were more than double those necessary for the maintenance of a financially viable system. In the United Kingdom, average operating costs per vehicle

---

<sup>36</sup> A. Armstrong Wright, "Public transport in third world cities", *TRL State of the Art Review*, No. 10, (TRL, Crowthorne, 1993).

kilometre in the bus industry were reduced by 30 to 40 per cent following deregulation and privatization;<sup>37</sup>

- (d) **International transport costs have been too high** - in Venezuela, it has been estimated that the practice of reserving cargo for national carriers has increased shipping costs by 30 per cent.<sup>38</sup>

In the majority of developing countries, the policy to preserve transport rights for national flag carriers is misguided.<sup>39</sup>

### **1. Economic reform: creating a competitive market-based transport sector**

Many countries are seeking economic reforms aimed at creating a competitive market-based transport industry. The critical weakness of the traditional way of providing transport facilities and services has been the absence of any structure of incentives to align the private interests of the supplier with the public interest. The absence of competition has enabled management, favoured customers and organised labour interests to appropriate part of the potential monopoly profit. It is now widely felt that the potential loss of patronage, earnings and, ultimately, employment resulting from a failure to respond to consumer demand in competitive markets is the most powerful means to force suppliers to respond to consumer requirements.

The main elements that are necessary in a liberalization programme for transport infrastructure and services are:

- Depoliticization;
- The commercialization of operational management;

---

<sup>37</sup> P.M. Heseltine and D.T. Silcock, "The effects of bus deregulation on costs," *Journal of Transport Economics and Policy*, 24(3): 239-254 (1990).

<sup>38</sup> H.J. Peters, "The maritime transport crisis", World Bank Discussion Paper 220 (Washington D.C., World Bank, 1993).

<sup>39</sup> Cargo reservation for national flag carriers shields them from competitive pressures in the international ocean transport market, with the result that the cost of their services is higher than that of the international carriers. The loss to domestic importers and exporters is the difference between what they pay for the carriage of cargo and what they would have to pay in a free market. The gains to balance of payments from using domestic shipping are much less than their freight revenues because the maintenance and operation of a national fleet is usually very foreign exchange intensive. Without domestic oil resources, steel making and an efficient shipbuilding industry, the only savings that materialize are the cost of crewing and vessel management—assuming that these functions would be fulfilled by nationals. In a study of Venezuela, it was concluded that freight rates were about 30 percent higher than would have been the case in a free market. On annual freight expenditures of US\$800 million, the cost to the economy was US\$287 million. Since 70 per cent of the freight payments were to foreign carriers, the extra foreign exchange cost was US\$187 million. The balance-of-payments gain from reserved cargo, once allowance was made for all inputs purchased abroad, was only US\$20 million. Losses were, therefore, 9.4 times as high as gains. Loss/gain ratios for other developing countries were Brazil = 7.4; India = 4.3; Philippines = 6.1; Turkey = 9.2. The validity of this conclusion depends heavily on the existence of competition in the international shipping business. For example, Asian countries depended heavily on the monopolistic Far East Freight Conference during the 1950s and 1960s, before they developed their own carriers.

Source: P. Messerlin and others, *The Uruguay Round-Services in the World Economy* (Washington D.C., World Bank, 1990).

- The selection and detailed design of an appropriate competitive market form;
- The development of effective competitors;
- Increased private participation in transport infrastructure financing;
- The development of regulatory institutions appropriate to the market form.

## 2. Depoliticization and commercialization in transport

Public sector transport activity can be made more businesslike in a number of ways:

- (a) **Unbundling of functions** In the monolithic sectors such as the state railways, the first steps towards lowering costs may have to be limited to the “unbundling” of functions. Unbundling of transport and non-transport activities, of transport infrastructure and operations, of different lines of business, functions or regions will allow for competition in the supply of inputs. Those components for which scale economies are lowest can then be subcontracted on a competitive basis. This already occurs to a large extent in a number of areas:
  - (i) In maintenance - particularly in the contracting out of road maintenance to the private sector;
  - (ii) In vehicle operations - in the separation of rail service provision from infrastructure or of the competitive operations of bus operations from service planning
  - (iii) In ancillary service provision (catering and baggage handling in air transport).
- (b) **Performance agreements** Efficiency can be increased by the use of performance agreements. Those state-owned transport enterprises that are the most successful in providing economical and efficient services also tend to be those which have the greatest degree of commercial autonomy, whether they are operating in domestic markets or in highly competitive international markets.
- (c) **Separating out public service obligations** The setting of political objectives should be separated from the management of transport enterprises. This can be achieved by combining commercial objectives with management autonomy within performance agreements. These should explicitly state the public service obligations and performance criteria that the enterprise must meet and the price that will be paid to the enterprise by government for the performance of those obligations.
- (d) **Corporatization** Greater market discipline in infrastructure provision is best achieved by full corporatization which gives the supply agencies a commercial remit and the freedom to set tariffs and determine expenditures. This will work well where there is a method of pricing directly for use and there are no externalities. These conditions appear to hold for inter-urban freight railways although not for urban passenger railways where externality effects may be large. The conditions also hold for selected links or sparse networks of inter-urban roads

and, to a lesser extent, for airports and seaports (because of water, air and noise pollution) or for urban and rural secondary roads (where both pricing feasibility and externality objections hold).

It should be noted, however, that for the successful commercialization of road infrastructure a number of additional requirements have to be met:

- (a) The accounts and performance of the road agency must be made transparent, with the amount of money spent on roads, the efficiency with which it is expended and the effects of that expenditure on performance clearly visible;
- (b) There must be a clear indication of what constitutes a charge for roads, with charges being separately specified from general taxation on use. Charges for road use must be directly transferred to the roads authority;
- (c) The level of charges and expenditures must be linked;
- (d) Both the level of charges and the maintenance and operational expenditures should be determined by representatives both of users and of those whose environment is affected by the roads.

The establishment of a user-managed commercialized roads authority does not automatically resolve the problem of how to treat externalities such as congestion, accidents and pollution. These will need to be incorporated in the overall reform process. In a competitive market, enterprises have the incentive to set profit maximizing prices. So long as all competing and complementary markets are competitive, and there are no adverse effects on third parties that are not charged for, these prices will also be economically efficient. Given the high level of fixed costs in many transport modes, efficient pricing may involve extensive differentiation of prices to make the most effective use of capacity. Peak pricing is already feasible and is reasonably widely applied in metros, urban and inter-urban rail, buses, airports and, in some cases, air transport services. The important requirement is that the freedom of enterprises to determine their price levels and structures should only be constrained if there is a real danger of monopoly exploitation. Distributional interests should be handled through public service obligations components in contracts between enterprises and government.

Privatization or commercialization of public transport without appropriate charges for the use of public infrastructure may accentuate distortions both within the sector and among sectors. Within a competitive transport market it is also critical that charges for the use of infrastructure are set correctly. The onus for achieving the right level and structure of charges falls on the government and the relevant regulator.

### **3. The development of effective competitors**

As in most sectors, competitive market forms in transport are of little worth unless there are effective competitors. The following practical steps can be taken to create competitors in a transport market:

## ➤ **Unbundling parastatals**

The creation of competition may be possible through the horizontal unbundling of parastatals. Where there are few economies of scale and entry to, and operation within, the market is to be completely liberalized, as is often the case in trucking, immediate privatization of the unbundled assets is probably the best procedure.

Even in public transport systems where it is considered desirable to maintain a degree of public planning and organizing function, the unbundling of the parastatal operators may be a sensible, or even a necessary first step towards a more competitive regime. For example, the first steps towards the privatization of London Transport involved the restructuring of the enterprise into 11 separate profit centres. These smaller units were required to compete with each other in competitive bidding for route service franchises. A similar approach has been adopted in Kazakhstan as the first step towards privatization of the urban bus industry. At the outset or at a later stage, the operating enterprises should be completely privatized. This is usually necessary both to eliminate the temptation of government to continue to interfere in operational management, and to give confidence to independent private enterprises that there is a fair basis for competition. It is noteworthy that following the regulatory change which required the full Corporatization of municipal bus enterprises in the United Kingdom most municipalities chose to privatize their bus companies even though it was not legally mandatory to do so.

Competitive processes may be introduced into the transport industry through vertical unbundling, even where there are apparently substantial economies of scale. A high degree of competitive pressure can be introduced especially where vertical unbundling is accompanied by horizontal unbundling with free market entry. This is now commonplace in ports and is increasingly common in the passenger service functions of airports.

The most extensive unbundling undertaken in a single restructuring is that of British Rail. Within the road sector, it is similarly possible to separate investment, asset ownership, maintenance responsibilities and operational management responsibilities in ways which permit differing degrees of competition for different functions.

## ➤ **Privatization of parastatals**

The privatization of parastatals is an important step in market liberalization. It is argued that parastatals cannot go bankrupt and hence can always afford to undercut private competitors. Therefore, private operators will be unwilling to enter competition against parastatals and parastatals, therefore need not fear competition even if entry is open. Even where there is no immediate structural basis for competition, or where the privatization process is seen to be too complex and difficult, it is still important to establish the principles of free entry and fair competition. This may be achieved by establishing the legal basis for free entry and fair competition in the market. The existence of a plan and

timetable for privatization will give a strong incentive to the management of parastatals to commence the internal reforms necessary to commercialize.

#### 4. The selection and detailed design of an appropriate competitive market form

A competitive environment can be created in a variety of ways.

- (a) **Competition in the transport market:** this occurs where there is no restriction on entry. “Competition in the market” can be between individual operators within a mode of transport, between groups of operators within a mode or between modes;
- (b) **Competition for the transport market:** where entry is restricted, it is possible to organise competition for the right to service individual routes, for the sole right to provide a whole network or to undertake particular functions as a subcontractor to a monopolist operator.

It should be remembered that competition can be created even where competition “in the market” is impractical by facilitating private operations within a framework of public control, that is, by creating “competition for the market”. “Competition in the market”, without barriers to entry is appropriate for the provision of many kinds of transport services and in particular:

- (a) Where the size of the market is large in comparison to the minimum efficient scale of operation of a mode of transport, several suppliers can operate concurrently at an efficient scale (for example, in trucking and rural bus operations);
- (b) Where the optimal scale is larger, competition “in the market” can still be effective if there are good modal substitutes (often the case for railways) or international competitors (usually the case for air transport and shipping services and often also the case for airports and seaports)<sup>40</sup>.

It is important when trying to create a competitive market that private sector operations are introduced and that former state-owned enterprises are not able to deter private competitors by using subsidies to maintain artificially low fares.

The withdrawal of protective practices, such as cargo reservation for national carriers or administrative market sharing, while difficult in the short-run, will often be the best basis on which the advantages of competition can be obtained. In contrast, there are some elements of the transport infrastructure, such as rail track and termini, that cannot be efficiently duplicated and free entry cannot, therefore, be relied upon to prevent a private monopolist emerging and charging unduly high prices.

There are several ways of introducing competition into the market for transport services:

---

<sup>40</sup> In the case of landlocked countries the effective competition may be between alternative corridors to the sea, with ports in different countries.

- (a) **Route franchising:** is a means of maintaining some public control over the level of services and prices in the public passenger transport market, while using competitive forces to secure supply at the lowest cost. This can apply either to unremunerative services alone (such as rural bus services) or for all services (such as suburban rail services). Further, the supplier can carry either only the cost risk or both the cost and revenue risk. Where fragmented competition is not possible because of the indivisible scale of operation, market discipline can still be introduced by concessioning facilities or systems. This has been applied to urban and inter-urban railways in Argentina and to the management of urban bus systems, particularly in francophone Africa.
- (b) **Competition between groups,** within a licensed franchise system, can be promoted by ensuring that the routes for which monopoly franchises are granted overlap sufficiently to encourage competition for patronage on common sections of route. This approach is practised to secure competition between different bus operators' associations in several Latin American cities.

It is also possible to introduce competition between operators of different kinds of public transport vehicles. It is also common in taxi markets in many countries where single vehicle ownership is the rule but where operators combine in competing marketing groups or in the use of competing radio dispatching circuits. This form of competition makes it possible to organize supply and limit anti-competitive or chaotic operating practices, so long as there is a competent franchising authority to prevent the emergence of a single strong cartel.

- (c) **Competition between modes** can be effective where demand is dense and varied, as exemplified by the role of privately operated minibuses in Hong Kong and Dakar. Some flexibility towards the introduction of new categories of services at higher prices may be a means of reconciling the maintenance of a basic low fare with the provision of adequate total capacity and a sufficiently varied range of price/quality combinations to meet demand. Within regulated systems, this can arise either by design, as in the “two-tier” bus systems, or by default as in the case of shared taxis.

##### 5. **Economic reforms: maintaining a competitive market-based**

A policy of deregulating a transport market may lead to the formation of cartels among operators aimed at excluding new competitors from access to crucial supplies or facilities, or artificially raising fares. The regulatory institution will then need to prevent the acquisition and exploitation of excessive market power by controlling anti-competitive commercial behaviour. In practice, the regulation of cartels is not a simple task as some forms of combination, such as operators associations in public transport or strategic alliances in logistics, may actually contribute to the efficient workings of the market.

If there is a dominant firm or financially strong incumbent in a market, there is a danger that anti-competitive or predatory behaviour will occur, even if a cartel does not exist. However, it is almost impossible to distinguish between predatory and strongly competitive behaviour. Pricing close to short-run marginal costs may well be efficient

behaviour when a firm has excess capacity, but it might equally form part of a strategy by a dominant firm to drive others from the market. Gwilliam and Shalizi<sup>41</sup> suggest that to minimize such dangers, it is advisable to accompany privatization and deregulation with a restructuring of the industry into a number of smaller firms. Where the optimal scale is very small (as in taxi and trucking sectors), ownership should be fragmented, if necessary, by transferring the ownership of assets to former employees. Competition in transport markets should then be subject only to general oversight by the competent national authority responsible for ensuring fair competition.

## **6. Private participation in transport infrastructure facilities and services**

Table 10 sets out the scope for private sector finance and management in the transport industry. Almost all transport operations can be undertaken by the private sector in some form. The table distinguishes between infrastructure facilities and services. In terms of transport facilities, the competitive award of long period concessions, licences or facility leases is the primary means for introducing market forces into the provision and management of infrastructure with the objective of stimulating efficiency by transferring risk to the private sector. Concessions and leases have been applied to toll roads, railways, ports and airports in many countries. Concession arrangements must be carefully designed, with the development of effective prequalification criteria to select reputable firms. They must discourage over-optimistic bids based on unrealistic traffic forecasts and prices or the understatement of construction costs. But there is evidence of substantial achievement. In the port sector, for example, the long-term leasing of berths, either with or without cargo handling equipment, has brought about increased efficiency in the utilization of labour and equipment in many countries. Where local entrepreneurial skills are limited, the periodically renewable management contract, may be better in the short term, although its long-term desirability depends on how quickly local capability is developed.<sup>42</sup> The key message is that the pace of regulatory reform must be tempered by considerations of administrative and commercial capability.

Franchise tender documentation should contain a clear stipulation of the service to be provided, including details of monitoring and enforcement procedures, the terms of remuneration for the service supply and the penalties for non-performance (specified in a form that is capable of being legally enforced). Safe and environmentally acceptable operation must also be monitored and enforced. It may, therefore, sometimes be sensible to combine the existing planning skills of the state-owned enterprise with the cost efficiency of private sector supply by allowing the state-owned enterprise to subcontract or by retaining the planning functions of the state-owned enterprise in a new regulatory role.

---

<sup>41</sup> Kenneth M. Gwilliam and Zmarak Shalizi, *Sustainable transport: sector review and lessons of experience*, TWU 22 10/96 (Washington D.C., World Bank, 1996).

<sup>42</sup> K. Gwilliam, S. Joy and R. Scurfield, "Constructing a competitive environment in urban public transport", draft, Transportation, Water and Urban Development Department (Washington D.C., World Bank).

**Table 10. The scope for private sector finance and management in transport**

	<b>Infrastructure</b>	<b>Services</b>
Urban road	Though usually free, access expressways and bridges can be tolled; concessions are also feasible	All should be private sector, with free entry competitive franchising in the bus market, according to local circumstance. Barriers to entry to the informal sector should be reduced
Inter-urban road	Usually publicly owned but construction and maintenance should normally be contracted out to the private sector. Concession development of high traffic volume toll roads and commercialization of public road agencies possible for major roads	Trucking and inter-city buses should be entirely private with free competition in the market
Rural road	Scope for commercialization is limited by low traffic volumes, transaction costs and social objectives. Construction and maintenance should be decentralized with appropriate financial allocations	Buses, non-motorized transport and trucking should be provided by the private sector with free entry to the market
Urban rail	Almost all public; concessions can be considered for some larger cities	Concessioning possible with social objectives being embodied in performance contract arrangements
Inter-urban rail	Usually public. Privatization or concessioning is possible for freight railways. Publicly owned companies should be commercialized	Privatization or concessioning should be encouraged
Waterborne (maritime and inland)	Major ports can be privatized or concessioned. Public sector landlord functions may remain for strategic planning purposes	Publicly owned fleets should be privatized. Cargo reservation should be abandoned
Air	Airports usually publicly owned, but can be concessioned, either for specific functions or through private management contracts	Nationally owned flag carriers should be privatized

*Source: TWU 22 10/96 (Washington D.C, World Bank, 1996).*

The effectiveness of infrastructure concessions also depends on how efficient governments are in designing and implementing contracts. Auctioning concessions to the highest bidder will give the greatest incentives to cost-efficient production and market-oriented operations, but will result in a monopoly profit that maximizes the price charged to the consumer. The alternative of awarding the concession to the supplier offering the lowest price, or the best combination of price and quality, requires a great deal more sophistication on the part of the government in appraising bids and monitoring performance. If intermodal or international competition is insufficient to prevent the exploitation of a monopoly franchise, controls have to be built in to the concession arrangement.

## 7. Private financing of infrastructure

In the nineteenth and early twentieth century, most transport infrastructure was privately financed. However, from 1920 to 1980 there was virtually no further private financing of transport infrastructure particularly in developing or transitional economies. Since then, and most notably since 1988, private financing of transport infrastructure has increased dramatically. This applies particularly to the financing of assets for which:

- (a) Access can be limited (air and sea ports, tunnels, bridges and major highways, but not easily achieved for urban and rural local roads);
- (b) Projected traffic volumes are high (container ports, freight rail, primary roads);
- (c) Reliable cash generation is expected (market or regulated tariffs with reasonable pass-through arrangements, limited exposure to non-commercial risk and the availability of buy-out provisions);
- (d) Foreign exchange earnings are possible (ports, airports).

Private financing of construction is usually associated with continuing public sector responsibility for strategic network and locational planning. In the case of toll roads and urban mass transit infrastructure, private firms are normally given a concession to manage and operate the facility for a period of years, with the ownership of the asset returning at some point to the public sector. The “build-operate-transfer” is one possibility, with the transfer occurring at the end of the operational concession period. In ports and airports, the public sector is often primarily a “landlord,” providing only the basic access services (such as channel dredging and air traffic control) with most other facilities being provided and owned by the private sector.

Involving the private sector in the design and construction of infrastructure, even when it is owned and managed by the public sector, can increase supply efficiency. Private sector skills can then be used in: (i) putting the initial project together; (ii) assembling the necessary partners to complete the scheme; and (iii) procurement and operational management. Concessions is, therefore, particularly appropriate when these skills are scarce in the public sector, which is even more likely to be the case for urban rail schemes than for roads.

Concessions can ease governments' fiscal problems by moving infrastructure projects “off-budget” during the years of construction. This advantage is reduced to the extent that the government makes payments to allow dividends to be paid to investors before the commissioning of the facility or gives revenue guarantees in excess of the revenue-earning potential of the facility. Moreover, in principle, a public road administration, if given the status, obligations and freedom of a commercial corporation, could borrow more cheaply than a single project concessionaire<sup>43</sup> because of its ability to spread risk over a number of schemes, or repay over longer periods could. Hence the corporatization of the road network, which would also move road investment off budget,

---

<sup>43</sup> P. Blackshaw, J. Flora and R. Scurfield, “Motorways by BOT: political dogma or economic rationality”, paper presented to the PTR Summer Annual Meeting, London, England, September 1992.

may in some cases be a better way of mobilizing private sector skills and incentives than a programme of single project concessions.

The private sector can become involved in most modes of transport operation so long as there is a sound legal framework protecting private property and contracts. Large efficiency gains are achievable in transport infrastructure as a consequence of the absence of efficiency incentives in traditional supply arrangements. However, a number of factors make transport infrastructure less amenable to private financing than other infrastructure facilities:

- (a) For some types of infrastructure, such as local roads in urban or rural areas, the physical difficulties of excluding users who do not pay, or the high transaction costs of implementing direct user charges, makes the establishment of a competitive market difficult. Similar problems arise in scheduling the use of shared rail infrastructure;
- (b) Privatization may not be politically acceptable where there is a perception of large, uncompensated income transfers;
- (c) Where there are substantial externalities (such as road congestion and air pollution effects) which cannot easily be addressed by market-based instruments, there is a greater likelihood of government intervention. This will reduce the appeal of the sector for private involvement;
- (d) Where traffic flows are low, profitability from user charges is also likely to be low;
- (e) Some transport infrastructure is so intertwined with spatial planning that governments are unwilling to leave it entirely to the private sector.

The significance of these various effects differs among modes. The greatest potential for efficiency gains from privatization lie where monopoly protection has traditionally been strongest, as in the rail sector. The greater the number of dimensions in which prospects are good, the lower the risk to the investor, and the greater the probability of private non-recourse finance.

In Table 11 Meyer and Gomez-Ibanez<sup>44</sup> have developed an assessment of the potential for the introduction of private finance in various transport sectors compared with other infrastructure industries. The pattern in Table 11 suggests that much of transport infrastructure is not as attractive to private investors and operators as power or telecommunications infrastructure. For this reason the public sector will probably continue to bear a primary responsibility for transport infrastructure provision.

---

<sup>44</sup> J. Meyer and J.A. Gomez-Ibanez, *Going Private: The International Experience with Transport Privatization*, Table 15-1 (Washington D.C., Brookings Institution and Lincoln Institute, 1994).

**Table 11. The scope for private financing in transport infrastructure developing countries compared with power or telecommunications**

Potential for	Local facilities			National facilities			Power		Tele-communication
	Local roads	Urban rail	Local ports	Trunk roads	Main ports	Freight rail	Genera-tion	Distri-bution	
A competitive market	Low	High	Low	Medium	Medium	High	High	Low	Medium
Large efficiency gains	Medium	High	High	Medium	Medium	High	High	Low	High
Minimal transfers	Low	Low	Low	Low	Low	Medium	High	Medium	Medium
Few externalities	Low	Low	Low	Medium	Medium	High	Low	Medium	High
Profits from user charges	Low	Low	Low	Medium	High	High	High	Medium	Medium
No spatial planning effect	Low	Low	Low	Low	Low	High	Low	Low	High
Overall success	Low	Low	Medium	Medium	Medium	High	High	Low	Medium

*Source: Developed from J. Meyer and J.A. Gomez-Ibanez, Going Private: The International Experience with Transport Privatization (Washington D.C., Brookings Institution and Lincoln Institute, 1994) Table 15.1.*

## **8. Economic reforms: the need for regulation**

In general, there are three distinct reasons why it can be desirable to retain some public control or regulation of the right to supply transport:

- (a) Where the duplication of supply would be either wasteful or impractical, as with indivisible infrastructure (major highways, bridges, seaport or airport superstructure and railway infrastructure), the need to regulate stems from the danger of monopoly exploitation;
- (b) Regulation may be desirable where an unregulated market may result in:
  - (i) Matching of schedules (in local bus markets);
  - (ii) Increased pressure to engage in dangerous practices, such as overloading of freight vehicles or racing of buses;
  - (iii) Perceived losses in the stability and reliability of service, with consequential losses in patronage and reductions in vehicle occupancy;
- (c) While cost reductions resulting from unfettered competition may allow services to continue that were previously unprofitable, and may even lead to more frequent services being provided on previously unremunerative routes by using smaller vehicles that are more suited to low demand,

sometimes social objectives may require direct financing of some services that might otherwise be lost through competition in the market. For example, the elimination of cross-subsidies may reduce supply or increase the prices of services affecting the very poor, as in the case of rural bus services. In such situations, making markets “contestable” through competition for the right to provide subsidized services at least cost, will still allow unremunerative services to be provided at the least real cost.

All of these defects of the market process may require qualitative controls, for example, for standards for safe vehicle operation. However, they do not necessarily require the granting of monopoly franchises and certainly not require direct state involvement in service provision. Indeed, it is now widely accepted that the economic reform of transport provision should be aimed at shifting the responsibility for the supply of transport infrastructure and services from the government to the market.

The rationale is that within competitive transport markets, enterprises have the incentive to set profit maximizing prices. So long as all competing and complementary markets are competitive, and there are no adverse effects on third parties that are not charged for, these prices will also be economically efficient.

In practice, however, economic reforms often:

- (a) Replace publicly-owned monopolies with publicly-regulated private monopolies with the risk that prices are set permanently above marginal social cost;
- (b) Fail to ensure that charges for the use of infrastructure are set correctly. Privatization or commercialization of public transport without appropriate charges for the use of public infrastructure may accentuate distortions both within the sector and among sectors;
- (c) Fail to internalize the social costs of externalities, such as congestion, pollution and noise.

As a consequence, new regulatory requirements have emerged. It is, therefore, necessary to redirect the activities of governments in the transport sector to make markets effective and to provide what markets cannot. Governments must, therefore, perform three roles:

- (a) Establishing a market framework which requires the creation of a competitive structure and avoidance of anti-competitive behaviour;
- (b) Creating incentives for “economic efficiency” which requires the introduction of proper pricing for public infrastructure;
- (c) Establishing effective non-market institutions and processes, in areas where markets do not operate, which requires governments to both decentralize political responsibilities and direct local community involvement.

Owing to the high transaction costs of establishing markets for some infrastructure (such as urban and rural roads) and because of the strategic and distributional consequences of the absence of effective markets, governments must also continue to be responsible for structural, fiscal and investment planning. Such planning will need to complement market activities in transport. Even where the private sector finances transport infrastructure, it will still be necessary for the public sector to retain responsibility for the planning of the overall network structure. The specific issues to be addressed by a regulator will depend on the specific characteristics of the sector and the form of competition that is created. Where there is “competition in the market”, much attention will be needed to ensure that competition is effective. Structures that involve “competition for the market” will require the regulation of concessioning and franchising and associated pricing or commercial practices.

The effectiveness of the regulator will depend, to some extent, on the clarity with which the responsibilities of the government, the regulator and other agencies are divided and specified. Estache and de Rus<sup>45</sup> suggest a possible division of labour as set out in Table 12 below. There are clearly areas of potential overlap, however, it is essential to protect the independence of the regulator and ensure that it operates in a transparent manner, within a clear framework for accountability.

**Table 12. Suggested responsibilities of Government and regulators**

<b>Tasks</b>	<b>Government</b>	<b>Regulator</b>	<b>Other agencies</b>
Legal framework	➤		
Sectoral policy	➤		
Planning	➤		
Privatization design	➤		
Taxes and subsidies	➤		
Procurement auctions	➤		
Concessioning	➤	➤	
Franchising	➤	➤	
Pricing		➤	
Control and penalties		➤	
Technical regulation		➤	
Quality standards			➤
Environmental regulation			➤
Health and Safety			➤
Antitrust policy			➤

<sup>45</sup> E. Estache and Gines de Rus, *Privatization and Regulation of Transport Infrastructure* (Washington D.C., World Bank, 2000).

It should be emphasized that investor risk assessments will be based on a number of factors, including the nature, stability and credibility of macroeconomic policy, corporate governance, tax policy, labour market policy, and other non-policy risks. Risks can be mitigated however, through increasing stability in the government's policy approach. Reform through systemic regulatory, legal and related institutional reforms should be transparent, stable and predictable.

### **C. Railways infrastructure access and services**

The railway industry is undergoing a transformation in many countries from being a poorly managed public utility in decline with mounting financial losses to a more efficient market-oriented industry with a more commercial outlook. The industry has been subject to a range of economic and structural reforms designed to create competition combined with the creation of a new regulatory framework. To establish the appropriate form of competition and the associated regulatory institutions, it is first necessary to understand the economic characteristics of the railway industry.

#### **1. The economic characteristics of railways**

There are a number of economic characteristics of the railway industry which create particular problems for regulation, including:

- **Multiple-products** – Railway service providers are multi-product in nature since most firms provide both freight and passenger services. However, freight services are not homogeneous since they may comprise trainloads of bulk freight, or break-load services of wagonloads, or parcel and postal services, as well as other services of intermodal transport. In the case of passenger transport, long-distance traffic usually coexists with local services (suburban and commuter trains), regional services, and even with high-speed trains on certain corridors or routes.

There are a number of implications arising from the multi-product nature of rail services. First, it is difficult to allocate total operating costs among the different services offered because of the existence of costs that are joint or common to several rail users. Second, it may be more efficient for a single firm, rather than two separate firms, to supply both infrastructure and transport services and further, if the infrastructure and services are separated, the supply of such services may be more efficiently provided by a monopolist, rather than by competing firms. These issues create complex problems for rail regulators and policymakers.

- **Cost structure**

Railway costs are often classified into four broad cost categories:

- (a) Train operating costs, in general, vary with train mileage, including the costs of providing transport services (fuel, crew, maintenance and the depreciation of rolling stock);

- (b) Track and signalling costs (including the operation, maintenance and depreciation costs of the infrastructure) which usually vary with the length of the route and the number of trains for which railpaths are required;
- (c) Terminal and station costs depend on the traffic volume, but they vary considerably with the type of traffic;
- (d) Administration costs tend to vary with the size of the firm.

Cost allocation is therefore a complex matter and regulators usually adopt marginal-cost pricing principles and attempt to make a clear distinction between costs that are avoidable and those that are not. Since avoidable costs are uniquely allocable to specific traffic or users they represent a floor for regulated prices since charging less than the avoidable cost would be equivalent to operating at an economic loss.

### ➤ **Railway infrastructure**

The significance of infrastructure costs in the railway industry leads to significant economies of scale. Indeed, these have been so significant that the provision of rail transport services was typically regarded as a classic example of a natural monopoly. In recent years, however, it has been argued that whereas duplicating rail infrastructure is generally inefficient, the cost of operating rail transport services and rolling stock once the network has been deployed can be efficiently provided by more than one company, which can be viewed as an actual or potential competitor. Therefore, from the regulatory point of view, it has been concluded that infrastructure and services can be dealt with in different ways, the former as a natural monopoly, but also as a potential provider of adequate access for operators of train services. The operation of train services on the infrastructure could be provided either by multiple competing operators or by a single firm under some sort of concession or licence arrangement. The former representing, ‘competition in the market’, the latter ‘competition for the market’.

### ➤ **Indivisibilities**

Although the potential vertical separation of the industry can alleviate some of the natural monopoly problems, the rail industry remains a very capital-intensive sector which is subject to several other indivisibilities within its productive process. Specifically, the capital units (rolling stock, track and stations) can be expanded only in discrete or indivisible increments, whereas demand may fluctuate in much smaller units. Consequently, increases (decreases) in demand could clearly exceed the feasible increases (decreases) on the supply side, thus resulting in either excess or under-capacity. This ‘lumpiness’ of rail transport facilities has several important implications for investment and pricing. For example, the marginal costs of additional freight or passengers may be insignificant when there is idle capacity, but may be substantial when the capital is at the limit of its full use. Therefore, dynamic price and output considerations become crucial in order to recover the real costs associated with each period of activity.

➤ **Public service obligations**

Rail services are often controlled for the reason that they are perceived as a public or social service, to be provided irrespective of financial viability. The reason for such control is because the industry is regarded as an integrative mechanism able to overcome geographical barriers in certain areas, aid in the economic development of undeveloped zones, and even as a guarantee of minimum transport services for a particular segment of the population. Public service obligations on rail firms in the form of the compulsory provision of unprofitable routes or services need to be addressed by regulators when implementing economic reforms aimed at commercializing the industry.

➤ **Externalities in competing modes**

The policy goal of public service obligation is often supported with the idea that rail transportation contributes less to the rise of negative externalities than other modes of transport, especially road transport. There is abundant empirical evidence showing that the external costs derived from congestion, accidents or environmental impact (noise, visual impact, pollution etc.) could be reduced if a substantial part of the road traffic market was transferred to the railways. This intermodal externality arises from the fact that road transport does not fully internalize all the social costs that it generates and economists often recommend the use of congestion and/or pollution taxes, for example, to take this into account. However, when these mechanisms are not feasible or politically viable, it might be preferable to lower rail fares in order to obtain an overall improved intermodal balance. These principles should also be considered when defining the appropriate regulation for the rail industry.<sup>46</sup>

The regulatory requirements for the railways, in any given situation, will depend on its economic characteristics and its performance.<sup>47</sup>

## **2. The problems faced by railways**

During the past fifty years, the most common structure of the rail sector in many countries was the existence of a single state-owned firm, entrusted with the unified management of both the infrastructure and the rail services. During the same period railways in many countries have faced a range of interrelated problems, which typically have consisted of:

- Chronic financial deficits;
- Growing operating subsidies;
- Archaic pricing systems where charges are not related to cost;
- Lack of an equitable fare structure and excessive fares;
- Costs that have been excessively high;
- Low operating efficiency;

---

<sup>46</sup> J. Campos and P. Cantos, "Railways", in A. Estache and G. de Rus, *Privatization and Regulation of Transport Infrastructure* (Washington D.C., World Bank, 2000).

<sup>47</sup> I.N. Kessides and R.D. Willig, "Restructuring regulation of the rail industry for the public interest", Policy Research Working Paper 1506 (Washington D.C., World Bank, 1995).

- Poor management and technical efficiency;
- Low labour productivity;
- Severely congested services;
- Low service quality;
- Services failing to respond to need;
- Deficiencies in the physical infrastructure;
- Assets that have not been maintained;
- Inadequate funds to invest in transport infrastructure and/or services;
- Widespread state ownership and operation of transport infrastructure and services;
- Low private sector participation in the transport sector.

The list is not exhaustive and there are strong interrelationships between many of the problems. Further, it is not implied that state run railways are necessarily inefficient or lacking in investment funds. Clearly the specific causes of such problems will depend on the particular circumstances of each case. Nevertheless, it is possible to anticipate the generic causes of each sub-problem as follows in Table 13.<sup>48</sup>

In general, it was traditionally assumed that public monopolies required price and service regulation to protect the public interest. In addition, there was often an obligation on the state-owned railway companies to meet any demand at such regulated prices and changes to route networks and services usually required government approval. Similarly, competition was rare and often discouraged. Owing this protective environment, most national rail companies incurred growing trading deficits during the 1970s and 1980s. Furthermore, social obligations to their staff made it nearly impossible to reach any agreement on redundancies or even wage adjustments. In some countries, the companies were forced to finance their deficits by borrowing, so that their accounts came to lose all resemblance to reality. Thus, the main problems associated with the traditional policies on railways were:

- (a) Increasing losses on the companies' trading account, which were usually financed via public subsidies;
- (b) A high degree of inefficiency in management;
- (c) A business activity oriented exclusively toward production targets, rather than commercial and market targets.

Policy makers in many countries have agreed that the solution to this myriad of problems is likely to be found in creating a competitive 'market-based' railway industry.<sup>49</sup> It can be argued that the best way to align consumer needs and demand with the provision of railway services, in a manner which promotes economic and financial sustainability, is to create a competitive 'market-based' railway industry.

---

<sup>48</sup> ESCAP, 2001. *Sustainable Transport Pricing and Charges : Principles and Issues* (ST/ESCAP/2139).

<sup>49</sup> R. Kopicki, and L.S. Thompson, "Best Methods of railway restructuring and privatization", CFS Discussion Paper Series, No. 111 (Washington D.C., World Bank).

**Table 13. Problems of the railway industry**

<b>Railway problems</b>	<b>Causes</b>
Chronic financial deficits	Constraints on charges imposed through government regulation; Persistent excess capacity; Provision of guaranteed service levels at fixed prices or with ‘excess’ competition; Provision of services at below marginal cost; Failure to understand or identify costs; Ineffectiveness in collecting revenues; Low productivity; Unduly high operating costs; Overmanning.
Growing operating subsidies	Chronic financial deficits; Lack of corporatization; Inadequate distinction between the roles of government and railway operator; Inadequate subsidy policies.
Archaic pricing structures	Prices are not related to marginal costs; Costs not properly identified or measured; Inadequate financial and management; Accounting systems; Inadequate or non-existent pricing objectives or statements of pricing policy .
Lack of an equitable fare structure and excessive fares	Lack of user or community representation in service and price decision-making; Public or private monopoly.
Excessive costs; Low managerial and technical efficiency; Low productivity	Lack of competition or existence of a ‘natural’ monopoly; Overmanning; Lack of investment.
Low service quality; Congested services; Service have failed to respond to need	Lack of competition; no peak-load pricing; Inadequate cost recovery in pricing policies; Inability to reinvest operating surpluses or raise funds for investment.

**Table 13 (continued)**

<b>Railway problems</b>	<b>Causes</b>
Deficiencies in the physical Infrastructure; Insufficient investment funding; Assets have not been maintained	Failure of pricing policies to recover capital costs; Structural inability to retain/reinvest surplus funds; Regulations preventing investment or borrowing
Widespread state ownership of railway infrastructure and services; Low private sector participation in the railways	Lack of policy or strategic commitment to competition/corporatization/privatization

### 3. Economic reform and regulation in the railway industry

In principle, there are three main options for the vertical organization of the railway industry:

- **Vertical integration** – this corresponds to the traditional structure where a single, usually state-owned, firm controls all the infrastructure facilities as well as the operating and administrative functions;
- **Competitive access** – this occurs when there is an integrated operator (usually public), which is required to make its rail facilities (tracks and stations) available to other operators on a fair and equal basis. This method keeps the advantages of integration in terms of economies of scope, coordinated planning and reduction in transaction costs, but if the integrated company has incentives to leave out other operators, the overall effectiveness of the system may be compromised;
- **Vertical separation** – in this structure the ownership of facilities is fully separated from other rail functions (such as train operations, marketing and ticketing) and can also be privatized. This has the attraction that the rail infrastructure, which remains characterized by natural monopoly conditions, is separated from rail operations where potential competition among different operators may be implemented.

Vertical unbundling has the benefit that it places rail transport in a similar situation to road transport, especially with regard to infrastructure planning and pricing. Hence, governments could study investment proposals on the basis of a cost-benefit analysis, while pricing policies could be based on the criterion of social cost. An important problem here lies in the difficulty of defining the social cost of railway infrastructure use. The determination of the marginal or incremental costs of the use and wear and tear of one additional train is not, in principle, any more difficult than the equivalent calculation for road transport. The problem, however, becomes more complicated for the railway when this cost is evaluated in a congested environment. In addition, separation of infrastructure from services greatly facilitates the entry of more

than one operator on a single route. In profitable services this would permit notable improvements in the efficiency of the industry by allowing direct competition among operators, and thus eliminating monopolistic practices in the sector. In non-profitable services, infrastructure separation can be accompanied by tendering, thus stimulating increased efficiency through competition for the market, the introduction of innovations, and a clear improvement in marketing. However, the main problem with vertical unbundling is the potential loss of economies of scope derived from the joint operation of tracks and services. It is often pointed out that the relationship between the services supplied and the rolling stock used, as well as the quality, quantity and technical characteristics of the infrastructure, is so close that both aspects need to be planned together. Thus, the assignment of different services to several operators may imply a lower utilization of the staff and physical assets of the sector. Other problems include the lack of integration which may be confusing for the user and expensive to administer in a legal sense. Finally, the process of vertical separation of infrastructure and services may also lead to a reduction of investment incentives for firms or the agency managing the system.

There may, therefore, be a number of reasons why it might be sensible to retain a degree of public control of the right to supply railway services:

- (a) It may be that the duplication of rail operators on a given route is wasteful or impractical. The existence of indivisibilities in capacity provision could lead to the emergence of a 'natural monopoly' with its associated adverse consequences;
- (b) It may also be that unregulated competition could lead to undesirable practices such as frequent timetable changes, carriage overloading, and, volatile fares;
- (c) Direct competition could lead to the loss of particular services, which perhaps benefit poorer communities, for the reason that they are not viable without cross-subsidization or government grants. In such circumstances, it may be desirable to create competition for the right to provide subsidized services, at least cost.

Such imperfections give rise to the need for control, but do not necessarily justify continued state operations or the granting of monopoly franchises. Indeed the scope for private sector management in railways is considerable.

Since there are significant barriers to entering the market for railway services and the efficient scale of operation is large relative to the market, it is difficult to create 'competition in the market'. One possible way forward is to create 'competition for the market' which can be described as developing private operations within a framework of public regulation and control.

Competition in service provision can be effected through the selling of route franchises for both profitable or unprofitable railway routes. Regulation over safety, service quality, and prices can be retained while using competition to secure the lowest cost operator for a fixed time period. Further, introducing different operators on the same

or competing routes and maintaining competition with alternative modes can produce significant benefits.

The creation of competition in railway infrastructure provision is more problematic. The competitive award of long-term concessions, licences or leases of facilities, such as stations and permanent way, is the primary means for introducing market forces into the provision and management of railway infrastructure. This can be structured with the objective of stimulating efficiency by transferring risk to the private sector. The effectiveness of railway infrastructure concessions depends on the skills of governments in designing and implementing contracts. Auctioning concessions to the highest bidder will give an incentive to the most cost-efficient and market-oriented operators but is likely to provide the successful firm with a monopoly position. The alternative is to invite bids on the basis of the lowest price for a specified quality of service to be provided. This will require a high degree of sophistication in bid evaluation. There is scope for introducing private sector financing and funds into the building and maintaining of railway infrastructure by allowing them to assess and retain income flows from train operators, who themselves may or may not be in receipt of government subsidies. To some extent therefore, it is likely that private sector participation in railway infrastructure provision is going to involve some form of private sector-public sector partnership.

Finally, management efficiency can be increased by corporatizing the agencies responsible for the railway infrastructure. The discipline brought about through acquiring a commercial remit with accountability for prices and hence revenue, and expenditure can drive costs down and quality up dramatically.<sup>50</sup>

#### 4. Alternative regulatory frameworks

Liberalization of the railway industry creates new roles and functions for the regulator and new possible regulatory structures. The selection of a new structure will depend on the objectives of the economic reforms and any constraints may apply that typically may be one or more of the following:

- **Fiscal** where there is a need to maximize the proceeds of disposing of state assets and minimize any ongoing subsidy requirements;
- **Cost efficiency** from commercial operating practices;
- **Economic efficiency** arising from setting prices at marginal social cost;
- **Innovation** from technology-improving investment policies;
- **Equity** from ensuring transport services for poorer social groups;
- **Optimal modal-mix** in terms of the coordination of railway use and development with other modes of transport;

---

<sup>50</sup> A. Galenson and L.S. Thompson, "Forms of private sector participation in railways", Transport, Water and Urban Development Department, Report No. TWU-9 (Washington D.C., World Bank, 1993).

- **Risk minimization** in terms of maintenance of services over time and the risk of default.

Table 14 assesses the range of possible competitive structures and arrangements for railways in terms of their ability to satisfy the above objectives.

The current emphasis on fiscal and cost efficiency explains the widespread use of the policy of privatization, both by a system of concessions and by direct sale to the private sector. Public service obligations and other equity-related objectives are now often met by combining vertical separation with concessions or access arrangements. Hence, most countries have opted for concessioning their rail services and, in some cases, even their rail infrastructure, to private firms in exchange for a fixed payment.

**Table 14. Alternative regulatory frameworks for railways**

Framework	Objectives						
	I	II	III	IV	V	VI	VII
Vertical integration with state ownership	no	yes	no	no	no	no	no
Vertical integration with commercialized state firm	no	no	yes	yes	yes	yes	yes
Vertical separation with commercialized state firm	no	no	yes	yes	yes	no	yes
Competitive access with concessions	yes	yes	yes	?	yes	no	?
Vertical separation with concessions	yes	yes	yes	?	yes	no	?
Vertical integration with privatization	yes	yes	no	?	no	yes	no
Competitive access with privatization	yes	yes	no	?	no	no	no
Vertical separation with privatization	yes	yes	no	?	no	no	no

This form of restructuring has been favoured because it allows the government to retain ultimate control over the assets while the private sector carries out day-to-day operations according to some pre-specified rules devised in a contract. The main factors to be addressed in designing a concession contract are:

- **Contract type** – the size and scope of the package needs to be determined depending on the economies of scale and scope and the existing potential for competition. A country's geographic characteristics will influence the scope for horizontal concessions based on existing routes and networks. The extent of any vertical concessions will be determined by function according to the characteristics of the networks and current state of infrastructure and new investment required. Indeed, it is possible depending on local circumstances, to design a mixture of vertical and horizontal concessions depending on profitability and the financial constraints faced by potential bidders. Similarly, concessions that combine freight and passenger traffic may be appropriate, depending on market size and share.
- **Contract award procedures** – the regulator or relevant authority may reduce risks by carefully specifying the pre-qualification requirements, the type of auction, explicit rules for auctioning, and the selection criteria to be used in determining the successful bidder. Selection should be based on the aims of government and the relative importance of fiscal, equity and efficiency objectives.
- **Duration** – the length for which contracts are given can be set according to the objectives of government. Shorter contracts will create more robust competition. However, the incentive for firms to invest will be diminished. On the other hand longer contracts will encourage investment, but reduce enforceability. Re-auctioning at renewal will be preferable to automatic renewal in terms of increasing market and competitive pressures.
- **Contract contents** – the contract should clearly set out the service obligations, performance requirements and payment conditions placed on the recipient of the concession. Similarly, the contract should clarify the exclusivity and compensation for public service provision conferred on the concessionaire. The contract must describe how risk is to be shared between the government and the operator through the use of either net cost or gross cost mechanisms. Provisions must also be made for determining the ownership rights in respect of the assets both during and after the termination of the contract.
- **Price control** – the need for price control will depend on the extent of any monopoly power possessed by the concessionaire and the social objectives of government. Ideally marginal cost will form the basis of any price regulation combined with some form of price capping scheme. In general, price discrimination should be preferred to the use of cross-subsidization to secure the financial objectives of concessionaires.
- **Quality regulation** – the regulation of quality in the rail industry can be effected through defining the service levels to be achieved in terms of service frequency, monitoring performance against scheduled departure and arrival times, and reliability. Safety standards and externalities, both generated and avoided, on

competing modes can also be specified and monitored.<sup>51</sup> The contract could also specify the level and quality of investment to be made by the concessionaire and describe the methods of quality control to be used.

- **Infrastructure** – the contract should specify the conditions and prices for access to the rail infrastructure, including track and termini. In addition, any requirements in terms of coordination and intermodal competition and connectivity should be determined at the contract stage.

The drafting of the terms for bidding and the contractual conditions provide the main opportunity to achieve the objectives set by policy makers.

In terms of the actual concessioning procedures for train services the government or its franchising authority should draw up a shortlist of suitable firms that could then bid for a fixed term franchise or concession. Their bids could either be in terms of the maximum fee they would pay, or the minimum subsidy they would accept to run a service. This means that the auction should be in terms of a total rental or subsidy per route, rather than in terms of a levy or subsidy per passenger.

One serious problem with rental bidding as described above is that it provides an incentive for franchisees to charge inappropriately high (monopoly) prices. The reason is that to win a franchise a firm must offer to pay the highest rental, but is not committing itself to charge low prices. Subject to meeting the service requirements, a bidder has to offer as much of its potential profits as possible to secure the franchise. But then it is committed to maximizing its profits if it wins. In other words, to maximize the bid that they could make, the franchisees will need to determine prices of rail travel in such a way as to equate marginal revenue and marginal cost.

This is illustrated in Figure 14. The franchisee will set a price per journey of  $P_M$  in order that  $Q_M$  journeys are undertaken because this maximizes its profit. But it is well known that in this case consumers lose out owing the higher price. Furthermore, the loss that the consumers suffer outweighs the benefit (in terms of extra profit) that the franchisee gets. What is required to maximize the benefit to consumers plus profit is that rail journeys are charged at marginal cost ( $P_C$  in Figure 14). There is therefore a net loss of benefits caused by franchisees trying to maximize their profits in response to rental bidding.

In Figure 14 the net loss is the area abc. This problem persists even if it is the case that franchisees innovate to improve the rail services that they offer. Since they always have an incentive to set fares in order to maximize their profits, there will always be a net loss of the kind in Figure 14.

It is sometimes suggested in response to this argument that, since the government will ultimately be receiving most of the franchisees profits, the situation is not too undesirable after all, particularly if this reduces the size of the subsidy to be paid. The fallacy is that monopoly based prices produce net losses to society which are not reduced by paying taxes in the form of rental bids.

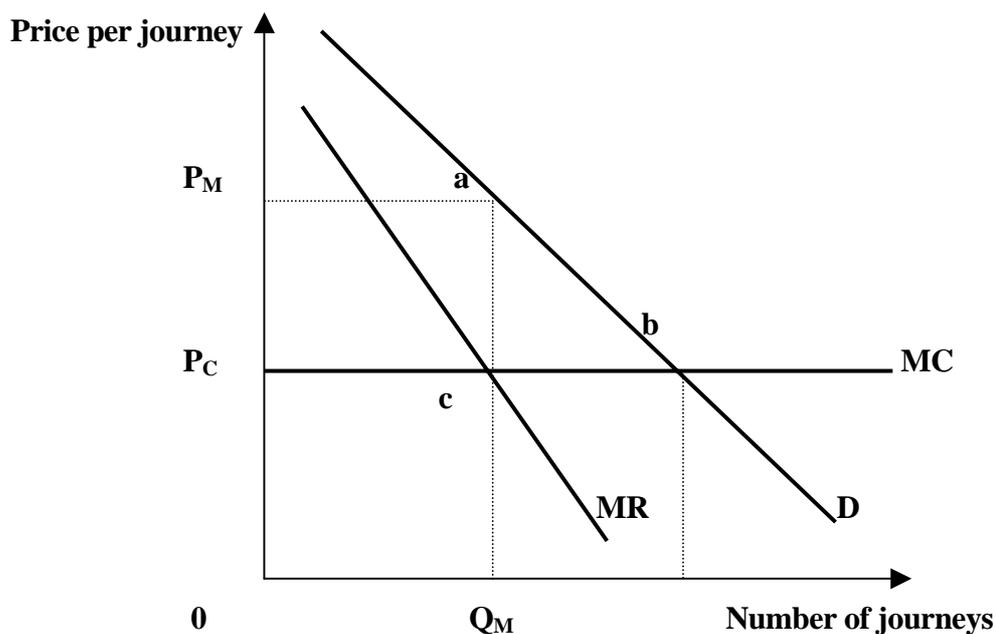
---

<sup>51</sup> K.J. Button, "Privatization and deregulation: Its implications for negative transport externalities", *The Annals of Regional Science*, 28 (1994).

A further criticism is that inadequate competition at the bidding stage may well leave substantial profits with the franchisees. Furthermore, it is uncertain whether competition in the form of other operators running or threatening to run services is likely to be sufficient to prevent monopoly pricing.

As previously mentioned, many rail routes make losses. This means that in practice most bidding for franchises takes the form of subsidy bidding. The normal justification for these subsidies is that there are benefits of rail transport beyond those benefits that users of rail transport receive. Governments have not always been very clear as to what the external benefits of rail transport are. Nevertheless, they implicitly recognize their existence. One interpretation of subsidy bidding is that it is designed to ensure the provision of socially desirable rail services at the least possible cost to taxpayers. Minimizing the public subsidy to railways is not, however, necessarily a rational objective of government policy. In the case of rail it could be argued that the objective should be to maximize the surplus of external (environmental plus social) plus private benefits over costs.

**Figure 14. Monopoly pricing for rail journeys - rental bidding**

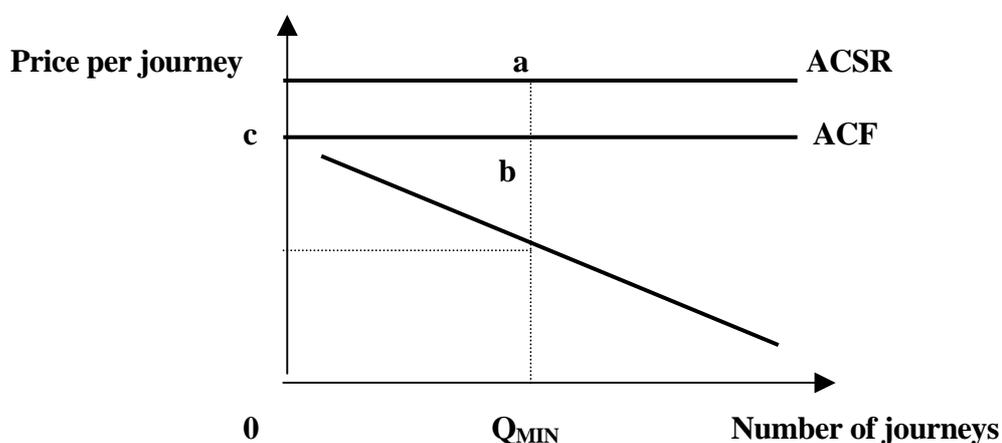


In order to do this an estimate of the environmental and other external benefits of particular rail routes is required. Environmental benefits might include avoided congestion and reduced emissions of carbon monoxide, sulphur and lead, for example. As for wider social benefits, it would be necessary to estimate the value of maintaining mobility of people who could use services under a purely commercial rail system. The explicit valuation of external benefits could then form the basis of a subsidy per passenger offered on a particular route. Further, the mechanism then exists to pursue social and environmental benefits by even subsidizing profitable routes in order to ensure lower fares and a more desirable modal split in support of sustainable development.

There are two points to note here. First, any ‘optimal’ subsidy must take account of the extent of rail usage by becoming a subsidy per passenger journey instead of per route, as is the case with franchising. Second, the calculation of optimal subsidies is likely to be very complicated and complex. Given this, subsidy bidding for rail may represent an improvement over nationalisation, provided that private operators can achieve lower resource costs than the former state-owned enterprise.

The idea is illustrated in Figure 15. Suppose that the conditions of the franchise are such as to set a minimum number of passenger journeys as  $Q_{MIN}$ . Provided that the average costs of a franchisee (ACF) are lower than the average costs incurred by the former state rail firm (ACSR), the total subsidy required to run the same rail service falls as measured by the area abcd.

**Figure 15. Costs of subsidizing rail - subsidy bidding**



Subsidy bidding has another potential advantage. Whereas the franchisee has no incentive to increase output beyond the required minimum, it does have an incentive to improve the quality of service that it offers. The reason is that improvements in the quality of service can be expected to shift the demand curve up and to the right. The franchisee can then obtain more revenue from passengers while still retaining the subsidy for operating the route.

In both rental bidding and subsidy bidding, there will be a need for price regulation and with vertically separated industrial structures access price regulation for infrastructure or network access.

## 5. Price regulation in the railway industry

Since economic reforms have involved the full or partial vertical separation of the rail infrastructure from train services, with significant private participation through concession contracts, price regulation has been essential to limit the potential abuse of market power by concessionaires. It has, therefore, been necessary to define the mechanism for price regulation in the concession contract.

Economic theory suggests that regulators should ensure that railway fares are equated with marginal social cost if monopolistic abuse of market power is to be avoided and economic efficiency is to be realized. In practice, however, the marginal cost pricing rule entails significant measurement difficulties and because of large economies of scale in railways, it may not yield financial profitability. Price discrimination policies, for example, were, and still are, common in transport, either by passenger type (students or elderly tariffs, frequent or commuter travelcards), number of consumers (group discounts), type or volume of freight (cargo rebates for some goods) or by time in the day or season (peak-load prices). The use of two-part tariffs, with one fixed component and a variable one, is also a common tariff policy in which each unit of consumption (for example, a single trip) is priced differently. All these methods allow for greater flexibility for the railways and increase their revenues without much affecting demand or their costs, but both their social acceptability and the informational requirements they demand can limit the extent of their application. Therefore, price regulation has been effected by a number of standard price control mechanisms, the most common being ‘rate of return’ regulation and ‘price capping’. Both price control methods should account for (a) the degree of monopoly power effectively conferred to the operator; (b) the extent of the government’s non-commercial objectives; and (c) the possible existence of limiting factors, such as intermodal competition.

Rate of return regulation involves constraining prices so that the regulated rail operator earns only a fair rate of return on its capital investment. It is used particularly in Canada, Japan and the United States. The regulator determines the revenue requirement, based on a firm’s accounting total costs during a test year, according to the variable costs and an estimate of the cost of capital to the firm, given by a “reasonable” rate level multiplied by a rate base. The ‘rate base’ usually includes most fixed costs less depreciation and working capital. The rate of return based price regulation calculation is

$$\text{Revenue requirement} = \text{Total cost} = (\text{Variable cost}) + (\text{Rate level} \times \text{Rate base})$$

The definition of the asset rate base, affected by the regulatory activity must account for three factors:

- (a) The treatment of past investments carried out by the rail firm prior to the regulatory period should be consistent and transparent in order to ensure that assets are not expropriated by the regulatory action, thereby increasing the cost of capital required by investors;
- (b) Future investments, and their projected operating costs, should be included in the asset base definition inasmuch as they do not imply “excessive” investment and only when they are fully incorporated to the firm;
- (c) Current investments present a thorny problem in determining the value of the firm’s capital. On the one hand, if the existing assets were transferable to other activities without cost, then their value would be either their replacement cost or resale value. On the other hand, if existing assets are sunk then the opportunity cost of using them in their present activity is zero. Since most of the assets currently used by railways are sunk, and financed before the concessioning process, both of these solutions are

troublesome. Since market values are much lower than replacement costs, then valuing assets at their replacement cost would yield large price increases and windfall gains for private stakeholders at the expense of consumers. On the other hand, attributing a zero value to the existing assets would lead to windfall gains for rail users and make shareholders reluctant to finance future investments. A crude method of addressing this problem is to undertake a financial projection of the cash flows that the firm would have earned had the regulatory regime remain unchanged.

Despite its simplicity, there are three problems associated with rate of return regulation in the rail industry:

- (a) There is little incentive for productive efficiency, since firms can pass production costs on to final users in the form of higher prices;
- (b) It leads to excessive investment and capital use because the firm is guaranteed a return on its investment;
- (c) The high degree of discretion usually enjoyed by the regulator in determining the rate base and the rate of return reduces incentives for profit or rent-seeking behaviour on the part of the regulated firm.

A development of this form of regulation uses cost-plus incentives that, in practice, take the form of a menu of costs reimbursement rules in which firms self-select themselves according to their preferences for sharing the operating costs with the regulator. The basic aim is to promote dynamic efficiency (in the sense of the regulated firm achieving the lowest unit cost in the long-run) by sharing some of the rents owing to efficiency improvements between the firm and the regulator.

‘Price-cap’ regulation involves the setting of maximum prices according to long-run marginal costs in order to offer a firm an incentive to improve long-run efficiency. In the rail industry, it is usually effected by the RPI-X method. This method involves the price for a basket of the firm prices being allowed to increase in any one year by no more than the increase in the RPI for that year, minus some fixed-cost (efficiency-related) parameter X.

$$Price (year 1) \leq Price (year 0) \times (RPI - X)$$

The regulator can control the prices of multi-product firms<sup>52</sup> by focusing on their revenues, correcting them according to adequate weights. It sets the price for a certain number of years starting with a reference price often calculated according to rate of return criteria. The purpose of this method is to increase the efficiency of the regulated rail operator, allowing the firm to earn substantial profits by improving their efficiency while simultaneously financing current and future operations. This implies that, in practice, when setting the level of a price cap, the rail regulator must consider several factors:

---

<sup>52</sup> In the case of multi-product activities, this expression can be easily adapted by requiring that a certain weighted average of percentage price increases not exceed the rate of growth of the RPI less X per cent. The weight for each price can be defined according to the share in total revenue of each product or alternatively, it can be imposed that the average revenue (calculating with accounting figures) can grow by at most RPI-X.

- The cost of capital;
- The value of the existing assets;
- The future investment programmes;
- The expected changes in productivity;
- Estimates of demand growth;
- The effect of X on actual and potential competitors.

One of the most critical issues is the setting and resetting of the productivity X-factor. A possible method consists in using indexes or indicators to measure the difference between aggregate rates of growth of outputs and inputs as a proxy for productivity. Setting the price cap is a critical activity for the regulator. If the cap is set too high, too little of the surplus will be transferred to consumers and deadweight welfare losses will be huge. If the cap is set too low, the firm may be unable to break even. It may then have difficulty in attracting capital and its service quality may deteriorate.<sup>53</sup>

These methods are valid not only for limiting monopoly profits earned in passengers or freight traffic, but also in the control of infrastructure access prices.

## 6. Infrastructure access

Depending on the extent of vertical separation, the operators of train services may either be directly responsible for the provision and maintenance of the railway infrastructure or alternatively buy access rights to use the infrastructure. Infrastructure includes the stations, terminals, track, and signalling which are characterized by longevity, joint use, scale economies and indivisibilities.<sup>54</sup> Such complexities mean that the pricing of railway infrastructure is difficult in both conceptual and practical terms.<sup>55</sup> The problems to be addressed are the same regardless of who is responsible for supplying the infrastructure. In the case where a single entity provides both the infrastructure and the train services, the task is one of cost allocation. On the other hand, in the case where separate entities are involved, it is matter of determining the charges to be levied by the entity responsible for the infrastructure for access to the rail tracks and stations by train operating companies.

In principle, the regulator should ensure that any charging framework should have the following key characteristics:

- **Comprehensibility** - the structure should be understood by the industry participants whose behaviour it is meant to influence and should not impose undue transaction costs to identify the appropriate information;
- **Transparency** - the structure should provide clear information to industry participants on the make-up of charges, and hence not confer undue advantage on particular industry participants, such as through information asymmetry;

---

<sup>53</sup> C. Liston, "Price-cap versus rate-of-return regulation", *Journal of Regulatory Economics*, 5 (1997).

<sup>54</sup> J. Dodgson, "Access pricing in the railway system", *Utilities Policy*, 4 (1994).

<sup>55</sup> Australia, Bureau of Industry Economics, "Issues in infrastructure pricing", Research Report 69 (Canberra, Australian Government Publishing Service, 1995).

- **Stability** - charges should not fluctuate or alter in arbitrary or unpredictable ways, except where significant short-term cost changes are being signalled if congestion (scarcity) pricing is introduced, short-run prices could be unstable. However, predictability about future average levels could be given in some cases by establishing a long-run avoidable cost around which short-run prices might be expected to fluctuate;
- **Measurability, cost effectiveness and objectivity** - the data required to derive charges should be objectively measurable, cost-effective to collect and unambiguous to apply (for billing purposes);
- **Cost reflectivity** - in order to meet the objective of economic efficiency, charges will need to be cost-reflective.

The costs that underpin infrastructure charges should consist only of those elements which are relevant to the specific pricing, investment or operating decisions under consideration. Relevant costs can, in general, be divided into variable costs which vary with output, and fixed costs, such as maintenance, operations and replacement, which are incurred whether or not more or less traffic is carried. Use of parts of the network by more than one user can result in costs that cannot be directly attributed to any one particular user, the "common cost problem".

A distinction needs to be made between price signals based on variable costs that guide operating decisions, for example, whether to operate six car trains instead of four car trains, and charges to recover fixed costs which do not vary with output and which need to be levied in the least distortionary way.

Price signals for the efficient production and allocation of railway infrastructure resources should be based on the avoidable (marginal) costs of changes in the use of the existing network and changes in the network itself. There are a number of characteristics of the railway network which result in avoidable costs varying according to the place and the time period in consideration. In particular, railway infrastructure is intensive in assets which are "lumpy" to install and renew, with long economic lives. This means that, in practice, charges may need to signal the corresponding avoidable costs associated with significant and sustained changes in demand in order to generate appropriate practical measures of incremental costs which at the same time provide meaningful investment signals and incentives.

However, because capacity is indivisible and fixed in the short term, were charges to be based on long-run costs and specifically, where these are lower than those based on short-run costs, this would lead to demand exceeding supply in the short-run. Where there is excess demand, the price mechanism by itself may not be able to balance supply and demand without very high charges in the short term.

Efficient costs should be forward looking to reflect what is anticipated about the future results of a decision to change prices or operations, or undertake investments. Efficient use of the network could require decremental investment where, for example, the benefits of keeping a line in use are outweighed by all of the costs, private and social. The kinked nature of the supply curve could mean that there is a large difference between

the incremental costs of enhancing capacity and the decremental costs of reducing capacity.

Other characteristics that need to be taken into account are:

- (a) The existence of multiple users of parts of the network with different requirements (for example, access right qualities);
- (b) The lack of any direct relationship between access charges and final demand, i.e. passenger fares which are determined by the train operating company;
- (c) The fact that there is no market-based mechanism for valuing some elements, such as congestion costs and access right qualities.

The starting point is that charges should reflect the incremental (or avoidable) costs involved. Incremental costs are the avoidable costs of an incremental change in output. Both terms are used synonymously, but it should be noted that incremental costs can be different from decremental costs because of the kinked nature of the supply curve. Depending on the particular decision under consideration, these can relate to the costs of changes in the use of the existing network or to the costs of changes in the network itself. Avoidable costs may cover such items as:

- (a) Increases or decreases in operating costs (for example, signalling staff);
- (b) Increases or decreases in maintenance and renewal costs;
- (c) Costs of change and disruption, and compensation payable to other parties during construction;
- (d) Capital costs, including the value of additional land used, and an appropriate return on the capital costs.

These costs are forward looking and represent the costs an efficient network would incur - these costs are not simply avoidable, they are the most efficient costs that can be avoided. In the short-run some elements of the first three costs may be avoidable, but in the long-run all costs are avoidable. This is an important distinction because short-run avoidable costs will differ from long-run avoidable costs and the use of one rather than the other will give different price signals.<sup>56</sup>

Indivisibility (lumpiness) of assets with growing and changing demand can lead to:

- (a) Congestion costs - as the network becomes more crowded there is less flexibility to recover from the effects of delays;

---

<sup>56</sup> R. Braeutigam, "An analysis of fully distributed cost pricing in regulated industries", *The Bell Journal of Economics*, 18 (1980).

- (b) Opportunity costs - the costs of having slots occupied by lower valued services in place of higher valued services.

These need to be accounted for if the railway network is to be used efficiently, but if fully reflected in charges, they could lead to a wide divergence between short-run and long-run costs and the associated price signals, particularly where capacity is lumpy.

One further point about congestion pricing where there are opportunity costs is that it may, in the absence of capacity enhancement, yield supernormal profits, essentially pure (scarcity) rents to the ownership of the congested facility. It is necessary for the regulator to ensure that these profits are used to offset other charges.

Incremental costs are a function of the capability and condition of the existing assets, and are likely to vary systematically by route on the network. For example, variable costs can vary by route depending on the quality of the track, and fixed costs that are user specific, i.e., not common, can also vary by route. There are costs that do not vary with output but can be attributed directly to specific users where there is no shared use, for example, single use of a branch line. Route-based charging or other geographically-specific charging signals would potentially be appropriate to reflect cost variations and avoid undue discrimination.

Rules can be identified for determining whether the appropriate charge is based on short-run or long-run costs. These include:

- (a) Using the higher of short- and long-run costs in all circumstances;
- (b) Trying to reflect the nature of the underlying demand by using contract length as a proxy, for example, long-run costs for long-run contracts, and short-run costs for 'spot' contracts.

It can be argued that the appropriate cost to use should be the greater of short- and long- run incremental cost. If long-run costs are below short-run costs, and the charge is based on long-run costs, excess demand will occur in the short-run. In the absence of any price rationing, some form of quantity rationing will be needed which could result in efficiency losses (if users do not, or are not able to express their preferences). However, if the charge is based on short-run costs, unless all are aware that the costs are short-run, there could be over-investment resulting in excess capacity with potentially damaging re-adjustment costs.

Alternatively, the charge could attempt to reflect the persistence of the underlying demand, the forecast of future use of the route over the long term, as opposed to contracted use for the remaining part of a franchise. Short-run incremental costs could apply to short-term contracts and long-run incremental costs could apply to long-term contracts (or medium term contracts with trading rights) according to the needs of the customer. Short-run incremental costs could apply to demand management (use of the network), long-run incremental costs could apply to capacity enhancement (development of the network).

If the system of franchising had contracts that did not reflect the nature or persistence of the underlying demand, it would be restrictive to relate the type of costs to the contract length and this could lead to ‘gaming’ of contract length by operators seeking lower charges.

In order to prevent sending out signals that could be misread, it is better that, irrespective of the length of contract, only costs that reflect the nature of demand are taken into account, whether they are short-run or long-run. In this case, congestion costs would reflect short-run avoidable costs for short and long contracts, while capacity costs would reflect long-run avoidable costs, and either would be charged depending on the level of demand given existing supply.

There are a number of options for the charging structures appropriate for conveying these signals. One option would be to publish cost-based short-run charges, with a robust forecasting methodology that enabled users to chart their expected charges over time as the underlying short-run costs concerned, including congestion and opportunity costs, would vary as demand and capacity changes. Another option would be to publish indicative long-run incremental costs. Charges based on short-run costs would be expected to average to those over the expected lives of the assets concerned. These long-run costs would be relevant for long-run access contracts. Hence, if the evolution of short-run incremental costs could be predicted, they could be reflected in the published indicative long-run incremental costs drawn from an optimized investment plan. A third option could be to base charges on the average expected short-run incremental costs discounted over the life of the access contract. This could fit well within any system in which contracts of different lengths could be entered into, where charges for a contract of a given length would reflect the short-run incremental costs discounted over the life of the contract. This would offset the gaming problem mentioned above if the prices in the contract reflect the smoothed equivalent of the relevant short-run avoidable costs, and if future prices are stated and believed to be based on short-run avoidable costs or their smoothed equivalent for a relevant contract length.

Charges based on incremental costs, including capital costs annualized over the life of the assets, could completely replace short-run costs as the cost floor for variable charges. Alternatively, they could be used to underpin the cost floor of charges fixed for the duration of access agreements (as they relate to investment commitments to support demand levels expected to be sustained for at least the duration of most access agreements). The choice of mechanism should depend on assessments of how elastic demand will be in response to the price signals concerned in the short versus the medium term.

The size of the increment is an important issue. Too small an increment will result in most costs being treated as non-avoidable, too large an increment will result in all costs being avoidable. Where routes have more than one user it is likely that the incremental cost of all users of the route will exceed the total of the incremental costs of each user resulting in a common resource problem, the allocation of common costs. The appropriate size of the increment needs to be considered in light of the circumstances, such that the common resource problem least affects final demand.

Investment should only take place where there is an expectation of a reasonable rate of return. This will largely depend on demand signals and how persistent they are. Changes in congestion costs would reflect levels of existing demand relative to the capacity of the network at a particular point, but they may reflect only short-term variations in demand. Where capacity can be increased, and there is a forecast persistent demand, there will be a need to identify the likely value of additional capacity to determine whether there is a case for enhancement to the network. Where some high value flows are currently not able to operate because of insufficient access rights, this value may exceed avoidable costs, including congestion costs. Unless there is some form of secondary trading of access rights this demand is unlikely to be expressed in terms that would encourage changes in capacity.

The above analysis suggests that charges for railway track infrastructure should account for the following:

- (a) All the components of charges should be derived and calculated on a route basis;
- (b) All charges should cover the variable components such as track usage, electricity for traction when used, and congestion costs, and in the long term, revenue from all charges should cover total route-based long-run incremental costs;
- (c) Route-based costs should be recovered in relation to the level and nature of track access rights.

If the sum of route-based track access charges fail to cover the total revenue requirements of the infrastructure operator, then the most efficient method of recovery needs to be determined.

The control of track access, pricing and development of infrastructure is an inevitable part of any rail industry where vertical unbundling is combined with a degree of private participation in the provision of train services. In such cases, the ultimate goal of regulation should be to ensure that infrastructure access and its pricing promote an efficient structure of production, use and consumption of the transport services, while allowing network providers to make a sufficient return.

## **7. Quality regulation in the railway industry**

In an ideal world with a large number of competitive rail transport service providers and well-informed consumers of passenger and freight transport services, quality regulation would not be required. Indeed, market forces would gradually adjust the consumers' wishes or demands (in terms of prices, levels of output and of quality of service) to the firms' supply. Thus, if no price correction takes place, less punctual or unreliable rail companies, or those with poorer freight performance, would be driven out the market and only those whose price-quality ratios were in accordance with demand would remain. However, when information is inadequate, market failure can occur and competition may not lead to an efficient allocation of resources. Unsafe or unreliable services may proliferate and be sustainable if information to consumers is inaccurate or untimely. In such circumstances, the regulator will have an important role to play in

managing the service quality and performance of both train service operators and infrastructure providers.

Quality regulation presents particular problems depending on the form of price regulation adopted. For example, under a rate of return regulation, over-investing in non-required technological quality may accentuate the Averch-Johnson effect, discussed in chapter III. Alternatively, under a price-cap regulation, a subtle cut in quality can be a way of cutting costs. Therefore, the price regulation mechanisms could be inadequate if they do not include quality provisions. Since it is very difficult to agree and monitor a range of price and quality combinations, most regulators determine the quality standards or targets to be accomplished by train operators and infrastructure providers. These are then incorporated in concession contracts.

The regulator needs to determine the main dimensions of quality to include in any concession contract and how these will be defined and measured. The main variables include:

- **Operational quality** – the dimensions of which include train, route and service quality. In terms of trains the measurable indicators of quality are vehicle age, load factors and travel comfort factors such as noise, vibration, temperature and cleanliness. The number of stations served, service coverage, service frequency, first and last train times, and reliability and punctuality are usually used as measures of route quality. The quality of other services usually covers ticket sales, fares and schedule information, and responses to enquiries and complaints
- **External quality** – relates to the control of externalities such as noise, congestion, and environmental damage. Contracts can also include the definition of public service obligations and the implementation of safety procedures
- **Long-term quality** – relates to investment policies in respect of fleet, track and station maintenance and renewal expressed as contractual investment obligations

In setting quality standards, the regulator often makes use of yardstick competition by comparing rail operator performance at the national or regional level or by using comparators from other public utilities. The regulatory framework must also clearly assign responsibilities in respect of quality of service regulation to the respective parties. Campos and Cantos<sup>57</sup> propose the following roles to regulators and operators:

- **Regulators**
  - Design of quality of service standards
  - Level of application of these standards
  - Punishments, fines and sanctions
- **Operators**
  - Responsibility for achieving quality standards

---

<sup>57</sup> J. Campos and P. Cantos, “Railways” in *Privatization and Regulation of Transport Infrastructure* A. Estache and G. de Rus (Washington D.C., World Bank, 2000).

➤ **Both regulators and operators**

- Information to passengers about quality standards
- Inspection and reporting procedures
- Risk sharing of service quality fluctuations
- Technical quality

In essence, the quality regulation process comprises three stages:

- (a) Before entering the market, the aim should be to anticipate and minimize future conflicts between the regulator and the concessionaire of the rail service. Licences must specify the expected characteristics of the service in terms of, for example, routes and frequencies of trains or timetables. For passenger services, particularly in the case of urban or suburban trains, vehicle capacities and punctuality can also be set. Finally, in order not to forget the dynamic dimension of quality investment plans and financing rules must be specified.
- (b) During market operation, instruments for quality control in the rail industry should mostly be related to the direct monitoring of the firm's performance. This is the time to introduce incentives toward quality in price-mechanisms, to design the information revelation obligations of the firm, and the auditing (external or internal) processes to be carried out. In most cases, the use of instruments for technical control (such as tacographs or track electronic controls) complements the standard instruments.
- (c) After the transport activity has already occurred, compensations or punishments can be implemented. Both penalties and incentives must be graded according to the expected future evolution of the relationship, since severe fines or large subsidies may alter the standard behaviour of the operator in the market.

## **8. Performance indicators in the railway industry**

Performance indicators in the rail industry are used to monitor the behaviour of one or more regulated firms in order to evaluate the effectiveness of the regulatory measures they are subjected to. Relatively easy to compile and update they are only valid when comparisons, either between different firms or the same firm over time, are constructed on a similar basis. Comparisons across companies usually provide persuasive results that can be used by the regulator in setting objectives and designing future licence contracts.<sup>58</sup>

There are a large number of indicators that are commonly used nowadays to monitor the performance of firms within the rail industry around the world. In terms of various areas of performance measurement, the main indicators are:

---

<sup>58</sup> Australia, Bureau of Industry Economics, "Rail freight 1995: international benchmarking", Report 95/22 (Canberra, Australian Government Publishing Service, 1995).

- **Commercial performance** – in respect of prices and revenues, average fares or passenger revenues per kilometre may be used as the indicator. Load factors and average delayed arrival times are likely to feature as measures of service quality. Accident rates, noise and pollution emissions can be used to measure externalities;
- **Operational performance** – measures in this area will focus on labour and capital productivity. Measures of the former will be passenger or freight ton-kilometres per employee, while measures for the latter will be passenger or freight ton-kilometres per locomotive or standard train unit;
- **Financial performance** – is usually measured by efficiency or profitability measures such as costs or profits per passenger-kilometre, per employee, or unit of capital employed.

In benchmarking performance, it is important to compare firms operating in similar commercial environments in terms of scale, total revenues, traffic mix, and income per capita.

## 9. Regulatory institutions for railways

The sound design of the regulatory framework and the regulatory institutions requires a number of issues to be fully accounted for. Specifically, these include:

- **The degree of independence of the regulatory agency** – it is generally accepted that the regulator will perform most effectively when independent of the various stakeholders, namely government, passengers, corporate rail users, train operators, and infrastructure providers;
- **The relationship of the regulator with the government** – the reporting requirements need to be defined and arrangements for auditing created;
- **The scope and jurisdiction of the regulator** – when establishing a new regulatory function, decisions have to be made about whether it will be a single sector operation or part of a wider multisector agency. Even with a single sector agency it will be necessary to determine the boundary of responsibilities between agencies such as health and safety bodies and competition authorities;
- **The number of regulators and their appointment procedure** – it will be necessary to determine whether regulatory powers will be vested in a single executive, for example, a Director General, or in a board, commission or other corporate body.

Finally, although the usual belief is that privatized rail companies are more efficient than public ones, it has been shown that important increases can be achieved in efficiency levels without needing to fully privatize the industry. In addition, there remain some critical views with regard to the final viability of the restructuring experiences in some countries, in particular, if restructuring is accompanied by complex institutional arrangements that entail higher transaction costs among the agents within the industry. On the other hand, the vertical separation of infrastructure and services undoubtedly presents

advantages, but there are also disadvantages such as the loss of economies of scope deriving from a network integrated at strategic, tactical and operational levels. It should also be pointed out that the franchising processes do not always ensure a competitive result. It is failings of these kinds that have led to the creation of strategic planning authorities for the rail industry in some countries as part of the process of economic reform.

In conclusion, although there is no unique form of rail regulation that suits all circumstances, it is sensible to maintain flexibility and simplicity whenever possible. These criteria suggest that the design of licence contracts that include private participation and the organization of the industry adapted to each country's needs and characteristics, should be viewed as two of the key issues in the new regulatory environment of the rail industry. In turn, the use of these mechanisms also changes the role of the rail regulator, whose actions should be focused on fostering competition and market mechanisms whenever possible, while simultaneously providing a stable legal and institutional framework for economic activity.

## **D. Highways**

Highways represent the dominant method of transporting both freight and passengers in most countries. Further, the road network and traffic levels are still expanding in many regions. Owing to the longevity of amortization periods for roads and the absence, in many cases, of full-cost road pricing, private sector participation in road building and operation is much more limited than in other transport sectors. However, fiscal difficulties for governments with competing funding priorities has led to increasing private sector involvement aimed at improving commercialization, reducing costs, raising revenue, and increasing the user orientation of providers.

### **1. Private participation in highways**

Private sector participation in highways is nothing new. The development of privately owned turnpikes (toll roads) was the primary method of inter-urban road development in Europe pre-motorization and post-motorization in North America. Motorway development in many developed countries has been undertaken by the public sector, but funded by tolls collected from users. The search for increased efficiency has seen the development of road concessions that embrace a whole range of alternatives for involving the private sector from maintenance contracts on toll-free networks to full build-operate-transfer (BOT) concessions for toll roads.

Estache, Romero and Strong<sup>59</sup> have compared the characteristics of the alternative organizational structures, as follows:

#### **(a) Maintenance management contracts**

These cover road maintenance and do not involve direct cost recovery through charges on users. Payment is made directly by government to the private firm. The scale of investment by the private operator is very limited and the risks are limited to estimating the need for, and cost of, road maintenance. The public

---

<sup>59</sup> A. Estache, M. Romero, and J. Strong, *Toll Roads in Privatization and Regulation of Transport Infrastructure* (Washington D.C., World Bank, 2000).

sector risks are extensive and include the design and construction of the highway, the projection of traffic levels, and revenue estimation. Contracts are usually low in value and of short duration (2-10 years) and can be undertaken by relatively small local firms.

(b) **Turnkey contracts**

There are design and build contracts and involve a fixed payment from the government to the operator with no payment from the user to the operator. There is usually a significant financing requirement, of say \$50-\$600 million, for a short time by the operator who also bears the risks associated with design and construction. The public sector retains the planning, traffic forecasting and revenue risks. Such contracts are of short duration and may be awarded to local firms.

(c) **Operate and maintain contracts**

These contracts, typically for 2-10 years, cover the maintenance and operation of specific roads and normally involve some toll-revenue sharing with government. The investment and financing demands on the private sector are low, but there are risks associated with traffic and revenue forecasting, political intervention, and the need for increased management skills.

(d) **Rehabilitate-operate-transfer (ROT) contracts**

ROT contracts require the private sector firm to finance, rehabilitate, maintain and operate a road(s). Depending on the ability of the firm to make user charges, the contractor may either pay government or receive a subsidy from the government for the concession. The financing requirements can be significant and the private sector firm will need to accept risks associated with the costs of rehabilitation and with demand and revenue forecasting. The government may face regulatory risks and the contracts can be sizeable in value and extend up to 20 years. The scale of such contracts usually requires them to be undertaken by medium-sized national firms.

(e) **Build-operate-transfer (BOT) contracts**

BOT contracts require the private sector firm to finance, design, construct, maintain and operate a road(s). Depending on the ability of the firm to make user charges, the contractor may receive a subsidy from the government for both building the road and maintaining it. The financing requirements can be very high and the private sector firm will need to accept risks associated with the design and costs of construction, and with demand and revenue forecasting. The government may face regulatory risks and the contracts can be sizeable in value and extend up to 30 years. The scale of such contracts usually requires them to be undertaken by a consortium of large firms.

(f) **Corridor management**

These contracts require the private sector firm to finance, design, construct, maintain and operate a road network or develop a corridor. Depending on the ability of the firm to make user charges, the contractor may receive a subsidy from the government for both building the road and maintaining it. Normally the

government will need to contribute existing roads and land. The financing requirements can be very high and the private sector firm will need to accept risks associated with the design and costs of construction, and with demand and revenue forecasting. The government may face regulatory risks and the contracts can be sizeable in value and extend up to 30 years. The scale of such contracts usually requires them to be undertaken by a consortium of large firms.

In terms of public-private partnerships there is growing interest in the development of toll roads through ROT, BOT or corridor management schemes. Such schemes can be classified into four types:

- (a) **Congestion relievers:** these are generally used in congested commuter corridors and are relatively short, but expensive to build because of land costs. Such roads often require differential pricing between peak and off-peak periods and have significant revenue-earning potential;
- (b) **Inter-city arterial roads:** such roads are usually built to connect cities, ports and airports. They tend to be expensive to build because of their length, capacity and strength. Tolls usually differentiate between vehicles by weight since they carry trucks and buses in addition to cars;
- (c) **Development roads:** these are used as instruments of regional development and link cities with areas of potential economic growth. Since they are likely to carry low traffic volumes initially, they are likely to require public investment and subsidization;
- (d) **Bridges and tunnels:** these tend to reduce travel times and are expensive to build per kilometre. However, they can usually command a toll.

Such schemes are most likely to be successful where:

- (a) They complete a missing link in a network and save users significant time or money;
- (b) There is a tradition of paying tolls and there is an alignment of 'willingness' and 'ability' to pay;
- (c) Revenue-maximizing tolls with escalation provisions are permitted;
- (d) Existing traffic levels are significant.

## 2. Risk allocation

The allocation of risks between the public and private sectors depends on the type of contractual arrangement and the circumstances faced in a particular country. Governments sometimes offer terms that are too generous in an attempt to guarantee that a project will not fail. Similarly, some firms will bid too low in order to secure a concession. Highway contracts, particularly for toll road projects, need to be carefully designed in order to allocate risks appropriately. The main risks to be addressed are:

- (a) **Pre-construction risks:** these relate to land acquisition and the provision of new rights of way. The contractual risk arises where there are delays in the land purchase and transfer. Given their nature, such risks are normally borne by the public sector. In such circumstances, simple contractual rules will assist the regulator;
- (b) **Construction risks:** time delays and additional costs are usually associated with adverse weather and design changes. The former is a risk that is insurable and is normally borne by the private sector, the latter lies within the control of, and is therefore borne by, the government. The regulator needs to build up information to assist the judgements to be made in compensating concessionaires;
- (c) **Traffic and revenue risks:** these occur where schemes have been based on over-optimistic estimates of traffic and toll revenues that prove to be insufficient to recover the capital, operating and maintenance costs of the road. The regulator needs to access the original demand studies and assess where forecasting responsibility rests. The solution to such problems usually lies in extending the duration of a concession to allow full-cost recovery, although this can undermine the integrity of future concession processes and have adverse political consequences;
- (d) **Currency risks:** these occur where schemes are financed by foreign capital. Some contracts provide formulae to be applied when adverse (or favourable) exchange rate movements occur. Such formulae will distribute the costs (or benefits) of such movements between the government and the concessionaire and greatly assist the task of the regulator;
- (e) **Financial risks:** these relate to the possibility that toll revenues will be insufficient to the cost of capital in terms of debt financing and the required return on equity.<sup>60</sup> In principle, such risks should be borne by the private sector, however, in practice in developing countries governments usually share the risk through the provision of revenue or debt guarantees or direct subsidies;
- (f) **Regulatory risks:** this risk arises where there is uncertainty as to how a regulator may behave in implementing price regulation, effecting universal or public service obligations, or in enacting competition laws. Similarly, risks exist when there is the possibility that laws and regulations may change in a manner that has adverse financial consequences for the concessionaire. The most appropriate answer is that the contract should clearly define how such matters will be regulated;
- (g) **Political risks:** relate to the possibility that the government may fail to fulfil its obligations in a contract either directly by not undertaking contractual provisions,

---

<sup>60</sup> In principle, a regulator can assess risk factors under the concept of the cost of capital, which represents the required rate of return that investors require on their capital:  $\text{cost of capital} = (\text{required rate of return on debt}) \times (\text{percentage of debt in total capital}) + (\text{required rate of return on equity}) \times (\text{percentage of equity in total capital})$ . Regulators will have to assess the impact of their decisions on the cost of capital and the required rate of return of equity-holders which is likely to be greater than for debt financiers since they have a prior claim as creditors to a regulated private firm.

such as the building of feeder roads, or indirectly through changes in tax or competition laws. The concessionaire can expect to be compensated for breaches to contract by the government;

- (h) **Force majeure:** these relate to risks arising from events outside the control of either party. Some of these may relate to insurable risks while others may need the contract to be renegotiated.

When embarking on a toll road project, a government will need to consider whether it wishes to provide financial support in order to mitigate the risks faced by a private sector concessionaire. In essence, the two main reasons for considering such support are to offset:

- (a) Financial or exchange risks, by reducing capital expenditures sufficiently to cover debt service and provide the required rate of return on equity;
- (b) The risk that traffic, and hence revenue levels, will be lower than predicted, by improving revenues sufficiently to cover debt service and provide the required rate of return on equity.

In negotiating, or renegotiating, an agreement the parties, including the regulator, have various means of providing financial support if this is desired, including:

- (a) **Equity guarantees:** under such arrangements the government undertakes, in specified circumstances, to buy the equity of the concessionaire at a price which gives a minimum return on equity. Equity guarantees transfer the project risk from the private to the public sector;
- (b) **Debt guarantees:** these involve the government guaranteeing any shortfall in the capacity of the firm to repay principal or interest on debt. Such provisions reduce the incentives for concessionaires, but may reduce the cost of debt and increase the amount of loan financing available;
- (c) **Exchange rate guarantees:** these involve the government protecting the concessionaire from adverse movements in the cost of foreign finance arising from movements in exchange rates. Such guarantees are potentially expensive and represent a major risk for governments. They can increase the amount of loan finance available;
- (d) **Grants and subsidies:** unlike guarantees these are not contingent and can be lump sum, recurring or linked to operating costs, or related to public service obligations specified in the concession contract;
- (e) **Subordinated loans:** these fill the gap between the equity finance and the commercial debt finance. Such loans are usually given on commercial terms and thus need to be repaid with interest.

In addition to the above, it is possible for the government to provide support to ensure project revenues are met or that costs are reduced under adverse project outcomes. For example, ‘minimum traffic or revenue guarantees’ protect the concessionaire’s revenue where this falls short of the original estimates. Such guarantees should also provide revenue to the government where traffic and revenue exceeds the original estimates. ‘Shadow tolls’ involve the government topping up the revenue received from road users by the concessionaire. Formulae can be developed to prevent excessive financial commitments where high traffic volumes are realized. ‘Concession extensions’ can be used to extend payback periods. ‘Revenue enhancements’ can be created where the government either limits competition or permits business diversification adjacent to the road development for the concessionaire. The above provisions are in addition to the option of undertaking cost-reducing measures in respect of the project design. Regulators, both prior to concession bidding or during contract renegotiation, must develop a clear risk assessment and understand the value of alternative support measures in terms of cost or risk reduction to the concessionaire.

### **3. Contract design**

The contract for a concession provides the primary means of ensuring the effective regulation of the activities of a concessionaire. The regulator will seek to make sure that the operator behaves in the manner prescribed in the contract and that both the government and the concessionaire fulfil their legal obligations. A well-constructed contract will assist greatly in effecting sound regulation, resolving potential conflicts, and achieving the government’s overall objectives. Contracts should, by design, cover the following, in as much detail as is practicable:

- (a) The policy context and the government’s intent and objectives;
- (b) The relationship between the specific concession and national road and transport policy;
- (c) The role of the key parties to the contract;
- (d) The road or roads to be covered by the concession;
- (e) The respective rights and obligations of the public and private sectors;
- (f) Clear definitions of key issues such as road building standards, maintenance standards, and the circumstances in which force majeure may be invoked;
- (g) An estimate of building costs and valuation methods for assets transferred to the concessionaire;
- (h) The maintenance schedule and the estimates of traffic volumes and mix (in terms of vehicle weights) upon which it is based;
- (i) The basis upon which variations to the contractual terms may be effected if traffic volumes differ from those upon which the contract is based;
- (j) The investment plan for system expansion or upgrading;
- (k) The various types of guarantees and warranties associated with particular components of the project;
- (l) The identification of specific technical and commercial risks and how these are to be borne by the respective parties to the contract;

- (m) The penalties for breach of contract by either party and how these may be invoked;
- (n) The regulatory regime, matters to be regulated, and how regulation will be effected;
- (o) The information requirements of the regulator and the obligations of the concessionaire to supply it;
- (p) The extent of limitations on competition;
- (q) The procedures for resolving disputes;
- (r) The termination provisions;
- (s) Assignment and renegotiation rules.

#### **4. Awarding concessions**

When establishing a bidding procedure, it is imperative that the government, or regulator, advises the potential concessionaires of the criteria that will be used to choose a winner. The criteria should be derived from the object and purpose of seeking private participation. In addition to technical competence, the following are typical selection criteria used in awarding concessions:

- (a) The lowest toll level;
- (b) The shortest duration of the concession;
- (c) The highest payment to government for existing infrastructure;
- (d) The lowest subsidy required from government;
- (e) The lowest income or loan guarantees required.

#### **5. Price regulation**

The regulation of tolls may be necessary if there is little or no competition for a particular road or road network thereby rendering the concessionaire a potential monopolist. This is most likely with development roads, bridges and tunnels. Under such circumstances, the concessionaire may be able to set tolls that exceed marginal costs and so provide a monopoly profit.

In principle, road prices should be set in relation to marginal social cost, including externalities such as congestion, accident costs, and environmental pollution costs. Owing to the existence of high fixed costs, indivisibilities, joint and common costs, and peak-load pricing problems, the task of regulating road tolls is complex. Further, socially optimal pricing policies may not meet the rate of return requirements of private investors. The regulator must determine a set of pricing principles, preferably pre-contract, which meet the objectives of government in terms of road utilization and sustainability development.<sup>61</sup>

---

<sup>61</sup> ESCAP, 2001. *Sustainable Transport Pricing and Charges: Principles and Issues* (ST/ESCAP/2139).

## 6. Quality regulation and performance management

In terms of quality, the regulator should be concerned with the following matters:

- (a) **Road standards:** with regard to the design specification and planned maintenance programme in relation to the actual traffic volumes, traffic mix and climatic conditions. The regulator will need to inspect the performance and records of the concessionaire and make judgements as to whether the required standards have been met;
- (b) **Operational standards:** relate to such aspects of road service performance as lane availability and closures, toll-booth waiting times and availability, lane capacities and average traffic flows, traffic volumes and average speeds in peak and off-peak periods, emergency vehicle response times, and service levels at service areas;
- (c) **Safety:** is multi-faceted but concessionaires may be set targets in terms of road surface standards, signing and lay-out, driver behaviour and speed control aimed at minimizing accidents and their associated costs. The regulator can monitor the performance of the concessionaire on the basis of mutually agreed and relevant performance indicators;
- (d) **Environmental impact:** can be minimized at the construction stage through the use of land barriers to moderate visual intrusion and noise. Similarly, the regulator can often negotiate solutions to problems that emerge during the operation of the concession;
- (e) **User perceptions:** account can be taken of the satisfaction of road users through consumer surveys and questionnaires. The contract can include user needs in certain specified areas with agreed methods of assessing service standards.

Managing the performance of the concessionaire will require the regulator to audit records and monitor particular performance indicators in areas such as operating performance, capital and operating expenditure, revenue generation and collection, investment, financial performance, and asset management.

### E. Urban public transport

Urban public transport is critical to the welfare of the urban poor and a crucial element in any city development strategy to alleviate poverty. However, in many developing and transitional countries, it is in decline or failing to provide the necessary service. There are many reasons for the decline, but in the main it is due to the lack of appropriate planning, institutional and financial framework for public transport.

The interaction of public transport with land-use planning and its sheer financial magnitude require careful integration into a comprehensive long-term structure plan for the city. It should be the responsibility of the public sector to set strategy, identify infrastructure projects in some detail, including the horizontal and vertical alignment, confirm the acceptability of environmental consequences, tariffs and any contingent changes to the existing transport system. Usually the public sector must acquire the

necessary land and rights of way, ensure development permissions, commit funding and provide some necessary guarantees. If development at terminals, is desired it may need to facilitate consolidation of land holdings.

Modes of public transport require physical coordination (to achieve convenient modal interchange) and fares coordination (to keep public transport attractive and to protect the poor). Successful planning needs a comprehensive transport strategy plan, within which the relationship between mass rapid transit (MRT) and other modes (both physical and financial) are understood. There must also be integrated implementation management, with arrangements put in place to facilitate coordination between multiple public agencies and a comprehensive financial plan within which the costs of infrastructure and operations falling on the public exchequer are foreseen and securely provided for.

Many countries now recognize that competition in the public transport sector best guarantees its efficient supply, and through franchises and concessions it can mobilize low-cost operations to provide the best quality of service and price for any budget capability. Further, the informal sector can also contribute effectively to satisfy demand in competitive markets. Mass transit can contribute both to city efficiency and to the needs of the poor in the largest cities, but it can impose a heavy fiscal burden and should only be adopted within an integrated planning and financing structure ensuring the effective coordination of modes and affordable provision for the poor.

## **1. The significance of public transport**

The urban populations in developing countries, in general, have to rely on walking, cycling and road-based public transport for most of their urban travel needs.<sup>62</sup> Buses are the main mechanized mode, carrying 6.5 trillion passenger kilometres. In addition, there are over 2 million para-transit vehicles operating in these cities. Railways are important in larger cities. Metros in developing countries carry about 11 billion journeys a year, surface rail about 5 billion and light rail about 2½ billion. As cities increase in size to the point at which walking can no longer satisfy the major trip requirements of citizens, public transport, together with cycling, are the major modes of transport for the poor. Moreover, if adequate public transport is not available the relatively poor will shift first to bicycles, then to motorcycles, then taxis and ultimately to cheap cars. The failure of conventional public transport may also generate a burgeoning small vehicle para-transit sector. This will ultimately also have adverse consequences on congestion, air pollution and urban structure.

## **2. The urban bus sector**

In many developing countries of Asia, bus services were traditionally supplied by regulated monopolies. In colonial regimes these monopolies were often owned and managed as subsidiaries of major suppliers in the colonizing country. In post-colonial times, these were taken into national ownership as state-owned enterprises, but continued to operate as protected monopolies. In socialist economies nationally owned public sector monopolies were also common. Most countries, regardless of political characteristics

---

<sup>62</sup> Halcrow Fox, "Review of urban public transport competition", topic review paper prepared for the World Bank Urban Transport Strategy Review, 2000.  
<<http://wbln0018.worldbank.org/transport/utsr.nsf/Topic+Review+Papers?OpenView>>

have, however, witnessed a process of decline in the provision of urban bus services. Typically many governments have attempted to use the public transport industry as an instrument of social policy by simultaneously constraining fare levels and structures and by guaranteeing favourable wages and working conditions to employees. As deficits mount, and in the absence of a secure fiscal basis for subsidy, first maintenance, then service reliability and finally operating capacity has disappeared.

In response, in many countries publicly owned monopolies have now mostly collapsed and by replaced by:

- (a) Smaller privately owned companies operating under permissions granted by the municipal authorities;
- (b) A fragmented small vehicle para-transit sector.

In some case operations have remained in public ownership, but with the adoption of increasingly commercial approaches to business. In a few major cities, for example, in India, traditional public operators still dominate.

Given the inherent defects of the traditional uncontested monopoly and the demonstrated potential of competition to generate cost reductions and service quality improvements, the critical issue is to establish the best ways of organizing competition to secure the strategic objectives of the city for its transport system.

Competitive pressures have been introduced in an attempt to make public sector operations more efficient. Various forms have been adopted, both within the traditional monopolies between firms either “for the market” or “in the market”. These forms include:

➤ **Performance agreements and the competitive procurement of services**

At one end of the scale, public sector transport operators can competitively procure equipment and support services (such as cleaning, catering, professional services, construction, maintenance and engineering) in order to reduce costs, improve service quality, even out internal workloads and eliminate the need for peak capacity. Regular assessments can be conducted to compare the cost of undertaking functions in-house with that of subcontracting to outsiders. The combination of some freedom to subcontract with performance agreements between the operating agency and the government is one way of attempting to improve performance. Competition in performance can also take place between units performing similar functions within an organization, or by benchmarking on bus operators in other cities or countries. However, such arrangements tend to offer only weak incentives to management, poor leverage over factor suppliers (particularly labour) and tend to be poorly enforced. They are best seen only as an interim step in a process of privatization of supply and competition between independent commercially motivated organizations.

➤ **Competition for the market**

There are several ways in which firms can compete for a public transport market:

- (a) **Gross cost service contracting** involves the procurement by a public authority of specified services at a price determined through competitive tendering among competent operators. Contracts are usually for three to five years. The operator passes all on-bus revenues to the procuring authority and does not take any revenue risk. Gross cost service contracting requires that there is a secure means of ensuring that the procuring authority actually gets the fares that are paid on the vehicle, and careful monitoring to ensure that suppliers actually do provide the service for which they have been contracted.
- (b) **Net cost service contracting** is similar to gross cost contracting, except that the operator retains the revenue and hence incurs both the demand and supply side risks. This increases the incentive to the supplier to provide the service contracted for (otherwise he loses his fare revenue) and removes the need for complex fare collection and security arrangements. However, it makes modal coordination more difficult and often involves a higher net cost for the authorities as the supplier is incurring an extra risk, the revenue risk, against which he will be averse, and for which he will require remuneration.
- (c) **Management contracting** involves, for example, a bus operator taking responsibility for the management of operation of a system, possibly including service specification, within agreed parameters. The government or local authority usually owns the vehicles and other operational assets, although the operator may be responsible for asset procurement and maintenance, as well as negotiating labour wages and conditions. Intermodal coordination is relatively easy to achieve with this device, and so long as the payment arrangements are well structured there is a high incentive to provide high quality of service to attract customers. The weaknesses with management contracting however, are that the competitive pressure may be fairly weak, trade union power relatively strong and costs relatively high.
- (d) **Franchising** involves an authority granting a firm exclusive rights to provide a service meeting a number of general quantity, quality, and price standards laid down by the authority, usually as a result of a competition. Franchising arrangements may involve the operator either paying a premium for the franchise or receiving a subsidy for loss-making, but socially desirable services. Further, they may include provisions for investments to be made by the franchisee. The franchise may be for a self-contained area such as a town or sector of a larger city, but it is also possible to have route franchises, especially with fixed track systems. Franchising differs from service contracting by allowing the contractor a greater degree of freedom to develop the system. The franchisee may have to be paid by the authority to provide service and fare combinations that are not commercially viable.

- (e) **Concessions** involve the granting of an exclusive right to provide a service, but without payment by the authority although the authority may attach conditions, such as maximum fares or minimum service requirements. In all other respects the concessionaire is acting on his own behalf and not as an agent of the authority. Concessions are usually for rather longer periods, often ten years or more, to allow the contractors, to benefit from their development of the market.

➤ **Competition in the market**

The most extreme form of competition is that of a totally open market in which there are no restrictions on transport operators, except those imposed by general law on business practices, vehicle construction and use, vehicle emissions, and highways and traffic matters. Even where there is no quantitative limitation on competition, the open market is usually associated with some form of quality licensing that specifies minimum conditions for entry which may include vehicle specifications, environmental performance and maintenance standards. In some cases, the qualitative conditions may also cover the type of service to be operated (including stopping places), fares and trading practices. A more restricted form of competition in the market may occur where, although there may be several operators providing services in competition with each other, the total number of vehicles allowed to operate is limited by the authority. This is a very common form of regulation for taxi markets. Particularly where fares are also controlled, this usually results in licences acquiring a value as a "business asset".

Competition in the market gives suppliers the greatest degree of freedom to respond to consumer demand, and gives to the consumer the most direct instrument – his willingness to pay – to influence what is supplied. But market competition is not responsive to several important types of “market failure”:<sup>63</sup>

- (a) If there is insufficient demand to meet the costs of supply, then there will be no service, irrespective of the importance which society attaches to the provision of some basic minimum service level;
- (b) The market is not responsive to various “external effects”, such as congestion and environmental impact unless they are directly charged for;
- (c) Because of information asymmetry and the difficulties of “shopping around”, the process of competition may result in a combination of fare and quality of bus service supplied which is not what the majority of consumers would prefer;

---

<sup>63</sup> K.M. Gwilliam, A.J. Kumar and R.T. Meakin, “Designing competition in urban bus transport: lessons from Uzbekistan”, TWU Discussion Paper - TWU-41, Transport, Water and Urban Development Department (Washington D.C., World Bank, April 2000).

- (d) It will not be in the interest of the individual bus operators to adapt their services and fares to promote modal integration.

Such problems can be very severe, for example, the deregulation of the public transport market can produce massive overcapacity, increased urban congestion and environmental degradation if old and unsuitable vehicles are introduced into service. A number of aspects of anti-competitive or anti-social on-the-road behaviour have also occurred in completely deregulated markets, including:

- (a) "Hanging back" to maximize patronage either on the road or at terminals;
- (b) "Blocking" to obstruct rival operators' services;
- (c) "Racing" to beat rivals' vehicles in picking up passengers;
- (d) "Turning back" to pick up passengers waiting to travel in the opposite direction when lightly loaded.

Policy makers, as a consequence of these economic reforms, have to determine the appropriate form, or forms, of competition and their associated regulatory requirements.

➤ **Choosing an appropriate competitive regime**

In general, the introduction of competitive regimes as replacements for public sector monopolies in developed countries has led to cost reductions of between 20 per cent and 40 per cent with service levels having been maintained or improved.

Competition can work very effectively provided the competitive regime is appropriate to the objectives of the government or procuring authority. The selection must also take account of the nature of the public transport system being managed (particularly its size and number of modes), the potential strength of competition in the supply market, and the administrative capability of the procuring authority. It is also necessary to make sure that the generic system is well adapted to the local circumstances. Table 15 below sets out the merits of different competitive regimes in different circumstances.

Whichever system is chosen, effective competition between private sector suppliers can only be achieved if the public sector itself is appropriately structured and capable.

This imposes a number of critical institutional requirements, including:

- (a) The need for political supervision of public transport to be separated from professional management;
- (b) Service planning should be separated from service provision and adequately staffed and skilled;
- (c) In the case of franchising, the necessary procurement skills will need to be acquired;

- (d) Operations need to be privatized or at least commercialized;
- (e) State-owned operating units need to be restructured in a form conducive to competition, or made subject to strong external competition.

**Table 15. Selecting a competitive regime**

Factors	Preferred regime
Where the objective of government or procuring authority is to achieve multimodal coordination	The achievement of multimodal coordination and the implementation of distributionally motivated subsidy structures are easier to achieve with a small number of suppliers- this suggests that concessioning or area franchising rather than route contracting would be the preferred regime. Route contracting is suitable where the supplier is not dependent on direct fare revenue, as in gross rather than net cost contracts. Further, costs are likely to be lowest where competitive pressures are strongest, as with shorter route contract based systems..
Multimodal coordination in larger systems	The larger the system and the greater the number of modes involved, the more complex will be the co-ordination problems. If the authority itself does not have the administrative skills to perform this function, it may best obtain that service through a system concession with an experienced specialist company. It is also clear that it is easier to operate a competitive system when there are already several suppliers to the local market of appropriate size and competence. If there is only one incumbent public sector monopolist it can be split into several smaller competing units. If there are too many, fragmented operators, they can be combined into a smaller number of competing associations

Any programme of reforms may take time to implement and needs to be phased in and subject to progressive modification. The contracts used to create competition must specify:

- **The duration.** For route service contracts where the procuring authority is defining fare and service levels, the contracts can be of relatively short duration (three to five years). Particularly where there is a regular stream of contracts coming up for bid it is not necessary for the contract length to reflect bus life as vehicles can be switched between contracts either through second-hand markets or through leasing arrangements. Extension of contracts saves tendering costs, but can blunt competition, and where allowed to become the norm can be the basis on which an ostensibly competitive system becomes captured by a cartel of existing operators;
- **The rights and duties of the parties.** These need to be specified in as complete and consistent a way as possible. If fares are controlled, contracts should define the process for their adjustment to account for general cost inflation as well as defining the compensation for any discretionary fare adjustments introduced by the procuring authority. If this is not properly provided for, franchising systems are doomed to failure.

Competition between private and publicly owned operators can only work effectively if the public sector operators are fully commercialized. This requires that the public enterprise is subject to a bankruptcy constraint on their commercial behaviour, and cannot be “bailed out” directly or indirectly by central or local government. In most cases this will require some legal change in their status and will probably only be secure if there is also an independent auditing arrangement to ensure that they do not bid below costs to obtain business.

### **3. Para-transit**

The public transport sector in many developing and transitional economies in recent years has seen the explosive growth of publicly available passenger transport services outside the traditional public transport regulatory system, often referred to as para-transit. This does not necessarily mean that they are operating illegally, as in many countries entry to the sector is effectively free, with operators subject only to the general rules of the road and law of the land. Nor does it necessarily mean that they are operating completely independently as many informal sector operators are members of associations of operators.

Typically para-transit services are usually characterized by:

- (a) Services that are usually unscheduled and mainly on demand responsive routes, filling gaps in formal transit provision, such as public bus services and taxis;
- (b) Vehicles that are operated are typically small, including motor cycles. Smaller vehicles are used partly because of the lower financing requirements, the flexibility of operation, and partly because controls over small vehicles are lax even in situations where entry to the large vehicle market is strictly controlled. The vehicles used are also often very simple, and include non-motorized vehicles, motorcycle taxis, and motorized rickshaws.

Para-transit services are usually provided by informal operators with the following characteristics:

- (a) They are “non-corporate”, usually operated as single person enterprise, although frequently with a vehicle owner who is not the operator. Often the driver pays a daily fee to the owner, incurs operating and maintenance costs, and keeps all revenue in excess of the fee. This gives a high incentive to obtain paying passengers by all available means, including, touting, poaching and racing;
- (b) They are often outside the tax system or benefit from favourable treatment of the non-corporate sector. They may also have an advantage in competition with public sector operators with costs inflated by minimum wage regulations.

Para-transit performs many roles – in some countries it is the dominant mode of public transport “of the poor, by the poor”. It also supplements a declining formal sector or complements the formal sector by providing differentiated service in identified market niches. In other countries, it increasingly competes directly with the traditional providers.

Para-transit also provides a range of services including:

- (a) Feeder services linking inaccessible housing areas to the main transport routes;
- (b) Local distribution in accessible areas that are not served by conventional public transport;
- (c) Trunk services complementing or competing by quality differentiation with, the formal sector on major routes;
- (d) Direct longer distance services in areas where the formal sector supply is sparse or infrequent.

Para-transit services also represent a very significant entry point to urban employment for rural-urban migrants and those with the lowest levels of education and lowest incomes. Informal transport is often the mode of transport “of the poor” as well as “by the poor”, particularly in lower income countries. It is usually very market responsive, providing access to poor areas, direct routing, speed and flexibility of service. If there is a demand for these characteristics which is not met by the formal sector, the informal sector will invariably meet it, if permitted. This high degree of market responsiveness means that there may be little need for government support or economic regulation. It is inherently fragmented and hence highly competitive, although that has disadvantages as well as advantages and typically results in the emergence of either formal regulation or informal self-regulation through the emergence of operators associations.

Despite these advantages informal transport is perceived as:

- (a) Resulting in competitive pressure that leads to excess capacity, low load factors, and consequently anti-social and often dangerous operating practices, in terms of road behaviour, and is associated with crime and violence;
- (b) Contributing to urban congestion and adverse environmental impacts resulting from the use of small, old and ill-adapted vehicles;
- (c) Undermining of basic network of services.

Exponents of free markets have frequently argued that in the long term operators will see that it is not in their own interest to continue such practices which limit entry and organize more disciplined service. Such associations are common wherever the informal sector is unregulated. There are, however, several problems with such self-regulation:

- (a) Because it is outside public control, an association may act in the interests of its members, the suppliers, and not of the customers;
- (b) Because it is not based on any legal rights of exclusion, it may be enforced by illegal means;

- (c) The need to ensure fair allocation of revenues between members often results in suboptimal operating practices. For example, control to ensure that all vehicles are despatched from a terminal with full loads may equalize incomes, but at the expense of forcing passengers to walk long distances to terminals to access the service and low vehicle utilization rates.

Two economic distortions have contributed to the rapid expansion of informal services in small vehicles. First, there is often an excess supply of labour in urban areas co-existent with minimum public sector wage rates and inefficient operation for the formal operators. Second, in the absence of any pricing system for the use of scarce road space, or adequate proxy priority given to large vehicles, the informal sector small vehicle is able to provide a faster and sometimes cheaper service than the formal operator. As a consequence, totally unregulated entry in low income countries is likely to result in a higher level of congestion and environmental impact than is socially desirable.

These form important reasons why any regulatory framework must embrace the formal and informal public transport sectors. Governments should examine why para-transits exist in any case, and then try to identify a regulatory and administrative framework within which the potential of the sector can be mobilized and developed.

A number of different approaches have been adopted to overcome the excesses of para transit operations. Several countries allow free access in certain specialized markets, such as local feeder buses, air-conditioned services, and commuter charter bus services in Delhi. But these tend to be limited niche markets and often require a higher class of vehicle to attract patronage.

A rather different approach advocated to address the problem of the core supply of informal transport services is the creation of “curb rights” permitting registered operators to pick up and set down in specific areas, but not otherwise constraining their activities. It is very similar to the licensing arrangement found in some taxi markets. But it is usually supplemented with some control on fares or capacity, and also often overlaid with regulation or self regulation to determine access priority. It has not been applied on any substantial scale to buses or minibuses. The more common solution in the parastatal bus sector has been found in the form of medium-term route franchise contracts. The immediate impediment to the inclusion of the informal sector in such systems is often the desire of the municipal authorities to guarantee regular scheduled service on routes requiring a number of vehicles. This can be overcome by combining competitive franchising with freedom of establishment for, or encouragement of, operators associations. The main problem in pursuing that regulatory path is to prevent collusion and the emergence of a cartel able to exploit monopoly power. Competitively tendered franchising arrangements may be able to address this concern and may also make it possible to address the issues of congestion (by limiting the amount of capacity franchised to operate in particularly congested areas) and environment (by setting qualitative standards or criteria in the selection process). The ultimate objective, then, should not be to maintain a highly fragmented bus industry for its own sake, but rather to encourage the development of an entrepreneurial culture on which competition can be developed.

#### 4. Mass transit

Mass rapid transit (MRT) comprises a spectrum of modes of urban public transport which use specific fixed track, or exclusive and separated use of a potentially common user road track, such as metros, suburban railways, light rail transit and busways). MRT usually has superior operating capacity and performance to unsegregated road based public transport (such as buses, taxis and para-transit).

MRT can, in principle, contribute to the achievement of all the main objectives of urban development policy. It can improve efficiency of the city economy by reducing travel costs and by maintaining a higher level of city centre activity and the associated economies of agglomeration, than would otherwise be the case. The impact of poverty can be reduced directly where MRT is the major carrier of the poor, and indirectly through the benefit the poor get from economic prosperity.

The planning and evaluation of many mass transit projects presumes that there will be effective modal integration, including the creation of appropriate interchange facilities and bus service restructuring. If the objective of a MRT investment is primarily to improve road transport conditions, the restructuring of public road passenger transport may be critical to the achievement of the desired objective. The key to an effective modal integration is the existence of a strong regional coordination authority backed by the different levels of government.

In addition to establishing an appropriate structure, effecting modal integration and creating competition, a regulator will need to deal with the issue of transport pricing. This is a complex matter. Public transport serves very disparate markets. In many large cities it serves the basic movement needs of those without private transport. In more congested cities, it may also aim to attract commuting trips of higher income car owners or potential car owners. The problem is that the two markets are likely to require quite different price/quality combinations.

With road based systems this can be reconciled by the provision of higher quality services (air-conditioned, seat only, medium size vehicle) on the same infrastructure as more basic services at lower costs. With rail based systems it is more difficult to price discriminate for commuting journeys effectively, yet because of the high minimum capacity it may be necessary to combine both market segments to make effective use of capacity.

The important point to bear in mind with respect to MRT strategy is the high level of fixed costs of the rail systems, and the substantial external effects and interactions between modes. It is, therefore, not advisable to take a puristic view that all modes should be independently self-financing. Cross-modal financial transfers may certainly be justifiable in such circumstances. In any case it should be recognized that subsidies are pervasive in all forms of urban transport and is often true that motorized road users do not meet the full costs of the infrastructure that they use. Insistence on “pure” private financing may result in the adoption of price levels and structures which maximize revenues at low traffic volumes, hence losing substantial external benefits and excluding the poor from use of the system. The fact that some subsidies may be efficient and acceptable does not mean that any subsidy is. Indeed, the minimum criteria for subsidy should include the following:

- (a) The subsidy should not be open ended, but should be embodied in a contract;
- (b) The right to provide a subsidized service should be subject to competitive tender;
- (c) The level of acceptable subsidy for a service or agency should be subject to explicit cost-benefit appraisal;
- (d) The cost of the subsidy must be fiscally sustainable.

The role of regulation in public transport depends on the role of competition in the public transport strategy for a particular urban area. A strategy for urban public transport requires careful planning and integration. There are a large number of methods of procuring various forms of public transport and regulating them. Gwilliam<sup>64</sup> has constructed a useful means of understanding urban public transport competition regimes and transitions. This is described in Figure 16 below.

Figure 16 describes alternative methods of providing public transport facilities and services from public monopoly to open competition. The former implies maximum regulation since services are provided by the public sector and the latter allows regulation through the forces of supply and demand. Moving diagonally right from public monopoly implies less public funding and less regulation. It should be emphasized that the various regimes are not necessarily mutually exclusive since a public monopoly provider could still be subject to quality licensing. The figure, however, refers to the main regimes available for procuring public transport.

In principle, bus services can be provided by any of the methods described (the whole domain). However, rail services and mass transit systems are normally provided by regimes in the “rail domain” and para-transit services are normally provided in the “para-transit” domain.

Figure 16 describes the regimes available to policy makers in a range of circumstances, both planned and unplanned. For example, a government may wish to retain ownership of all transport assets, but operate them with the skills and expertise of the private sector. As the diagram shows it may seek greater commercialization through management contracting. Alternatively, it may seek further efficiencies and be prepared to relinquish part or all ownership and opt for gross or net cost contracting and franchising. If a sector is faced with financial or institutional collapse, it may be preferable to allow the open market to provide services.

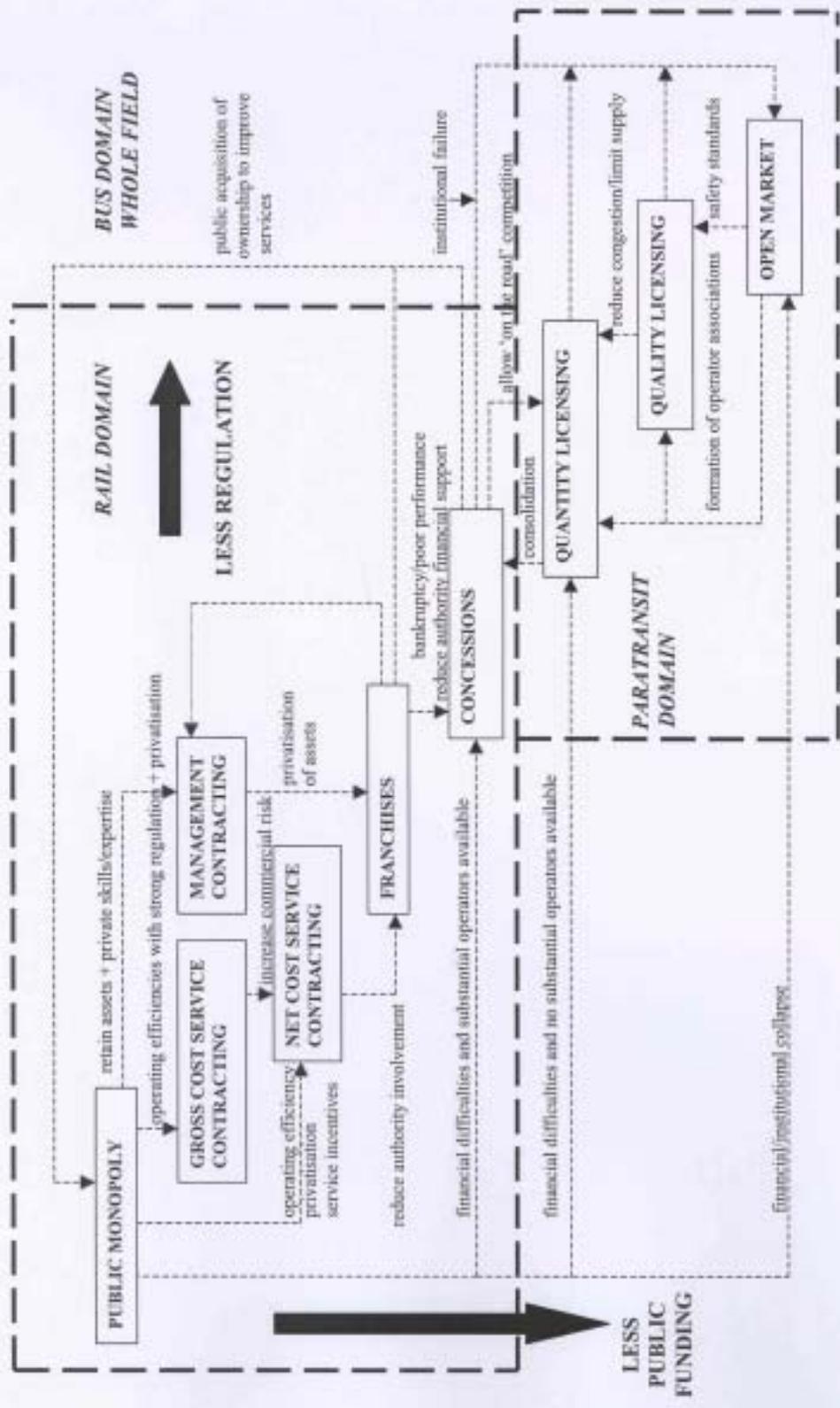
In a similar way, a government may wish to regulate an open market in order to improve safety standards through quality licensing or reduce congestion through quantity licensing. Concessions can be used in circumstances of institutional failure, but where several substantial operators do exist in the market.

The selection of an appropriate regime and regulatory framework will depend on the prevailing market circumstances, the demand and cost characteristics, the objectives of government, and the regulatory capacity available.

---

<sup>64</sup> K. Gwilliam, *Urban Transport Strategy Review* (Washington D.C., World Bank, 2001).

Figure 16. Urban Public Transport Regimes



## **F. Port, inland waterways and maritime transport**

Ports, inland waterways and maritime transport present different challenges for policy makers and regulators. The differences arise from the cost characteristics and the market structures through which facilities and services are provided of each subsector. Indeed, some would argue that with regard to shipping and maritime transport services, there is no case for intervention in the market and hence the emphasis should be on deregulation and not regulation. While this is broadly valid, there are still residual regulatory requirements with regard to such matters as pollution control and safety standards. In addition, there is a possibility that the operators of scheduled shipping services may form cartels and act in a monopolistic manner when determining freight rates and service levels.

The port industry is undergoing a transformation in many countries from being a poorly managed public utility in decline with mounting financial losses to a more efficient market-oriented industry with a more commercial outlook. The industry has been subject to a range of economic and structural reforms designed to create competition. These changes have created new regulatory requirements. To establish the appropriate form of competition and the associated regulatory institutions, it is first necessary to understand the economic characteristics of the port industry.

### **1. The economic characteristics of ports**

Ports comprise a collection of physical resources, including facilities and land, and services designed to provide an interchange between water and land transport systems. The facilities or infrastructure comprise the physical assets, such as breakwaters and quays, while, port services provide efficient transit of ships within the port and the transfer of passengers and goods between ships and inland transport (road, rail and inland waterways). Furthermore, ports are multifunctional markets and industrial areas where goods are not only in transit, but they are also sorted, manufactured and distributed.

Since there are many aspects involved, it is useful to divide seaport activities between: (a) infrastructure, (b) services provided by the port that require the use of the infrastructure, and (c) coordination between the different activities performed at ports.

A port infrastructure comprises berths, docks and adjacent land where ships and cargoes are served. To reach that area, a port also requires infrastructure related to maritime access (channels, locks and aids to navigation) and to land access (connections to roads, rail network and inland waterways). The main facilities and services provided by ports for cargoes, include:

#### **(a) Ship arrival/departure**

- Navigation aids
- Approach channel
- Pilotage from outside the port
- Lock (if any)
- Protected water
- Port pilotage
- Towage

- Berthing/Unberthing
  - Berth
- (b) **Quayside**
- Opening/Closing of hatches
  - Breaking out/Stowage
  - Cargo handling on board ship
- (c) **Cargo/container transfer to/from quay**
- Superstructure such as fixed and mobile equipment (cranes, van carriers, transtainers)
- (d) **Cargo/arrival departure**
- Cargo handling on quay
  - Transport to/from storage
  - Storage superstructure (sheds, fuel tanks, office buildings etc)
  - Delivery/receiving
  - Road and rail shipment facilities
  - Other land transport access infrastructure

Similar services are provided for passenger services. Ports may also provide a number of additional services. Services to ships may include radar surveillance and traffic management, water, telephone, stores and fuel, police and security, repairs, fire fighting, waste disposal, and medical services. Services to cargo may include warehousing, security, weighing, lighterage, and rent of equipment. Port areas also include value-added activities such manufacturing.

There are many different activities being performed simultaneously within the limited space of port areas, with ships and land transport vehicles constantly entering, being serviced and exiting. Coordination between the different activities performed at ports is, therefore, essential to ensure the proper use of common facilities, and to take responsibility for safety and the general design and development of the port and its facilities. In most ports, this role is performed by a ‘port authority’, which is normally, but not necessarily, a public institution.

Historically many ports, given their expensive specialized assets, sunk costs, indivisibilities and economies of scale, have possessed a degree of locational monopoly. However, a number of technological developments have transformed the sector into a highly competitive one.<sup>65</sup> The key developments have been:

- (a) Increasing capital intensity in cargo-handling operations has generated excess labour. Unitization and containerization, in particular, have produced significant reductions in the costs of cargo handling. However,

---

<sup>65</sup> Y. Hayuth and D. Hilling, “Technological change and seaport development”, in B.S. Hoyle and D.A. Pinder, eds., *European Port Cities in Transition* (London, Belhaven Press, 1992).

they have created significant capital financing requirements for specialized terminals and equipment;

- (b) Building increasingly larger specialized ships that require substantial port investment in new infrastructure and equipment in order to realize the potential economies of scale available in the transport of large quantities of containers and bulk cargoes;
- (c) Developing integrated transport chains and hinterland transport infrastructure. This has reduced trans-shipment costs such that it is now often preferable for a shipper to use a distant port instead of a closer one, provided that the former has better facilities and connections than the latter.

Technological change combined with the emergence of a more competitive environment have brought about, in many countries, reviews of the role of the public sector in the development, management or administration of ports. Such reviews have often led to the economic reform and restructuring of the port industry.

## **2. The organization and provision of port facilities and services**

It has been common for ports, because of their strategic significance to the national economy and their market power, to be publicly owned and managed. Indeed, in some countries seaports have been regarded as foci, or growth poles, for regional economic development. Ports such as Antwerp, Rotterdam and Hamburg have been linked to their municipalities and have often received public subsidies for the building and improvement of port facilities. Constraints on public financing have led to many governments seeking ways of increasing private participation for investment in port infrastructure, facilities and in the provision of port services. This combined with increasing inter-port competition has created the need to design more adequate regulatory mechanisms to guarantee efficiency. There are a number of potential ways of structuring port provision, involving differing degrees of competition.<sup>66</sup>

- (a) **Landlord port:** In this model, the port infrastructure is owned and managed by the port authority. However, remaining port services are provided by private firms that own the assets of the port superstructure and all equipment required for service provision such as cranes, vans and forklifts. In general, this is the most common form of organization for large ports.
- (b) **Tool port:** In this model, the port infrastructure and superstructure such as buildings, cranes, vans, and forklifts are owned and managed by the port authority. Private firms provide services by renting port assets, through concessions or licences.
- (c) **Services port:** In this model, port authorities are responsible for the port as a whole. They own the infrastructure and superstructures, and they also hire employees to provide services directly. The Port of Singapore has been the

---

<sup>66</sup> M. Juhel, *Government Regulation of Port Activities: What Balance between Public and Private Sectors?* (Washington D.C., World Bank, 1997).

prominent example of this model. However, there are plans for private participation that would transform it into a tool port.

While in general landlord and tool ports are usually publicly owned and service ports are normally in private ownership, there is no fixed relationship between the way the port industry is organized and the structure of its ownership. Indeed, in ports where the infrastructure is publicly provided, services are often privately provided. Further, some port facilities such as lighthouses, aids to navigation and marine access channels may be regarded as public goods. Nevertheless, they may still be publicly procured from private providers.

Although either the public or private sector may provide port facilities and services, there are still certain responsibilities that remain in the public domain, including:

- Provision of infrastructure for maritime access;
- Provision of infrastructure within the port area;
- Strategic port planning;
- Promotion and marketing;
- Regulation and control of safety within the port;
- Environmental protection;
- Managing port assets (infrastructure and superstructure).

Advocates of competition usually propose that the responsibility of public port authorities should be limited to the above. However, even this is not clear-cut since government may contract out such roles and even privately-owned ports can undertake a number of the above functions. In summary, ports do not have to be publicly owned, they can be run as commercial institutions.

### **3. Economic reform and regulation in the port industry**

While there is no standard or traditional model of port ownership and there are examples of very efficient ports in both public and private ownership, the majority of ports, until recently, were characterized by the following:

- Public ownership, in whole or in part;
- The use of state or local government budgets to finance the building of most large;
- infrastructure construction costs;
- Financing by the port authority of the costs of maintenance and repairs for infrastructure;
- Financing of the port authority with a mixture of public funds, port tariffs and fees from private firms operating in the port;
- An excess of port labour, which have a high degree of unionization and strong collective bargaining;
- Relatively poor port efficiency in terms of ship turnaround, productivity levels and ship waiting times;
- Relatively high tariff levels and unit prices for ships and cargoes.

The above, combined with the impact of technological change in shipping and cargo handling, has produced pressure for modernization through major investment. At the same time, the capacity of governments to finance or subsidize such requirements has diminished and indeed many states have positively sought to reduce public funding for fiscal reasons. The solution has, therefore, to lay in introducing or increasing private participation in the industry in terms of the ownership, investment and operation of port facilities and services. Private participation has, in turn, required economic reforms aimed at liberalizing access to the port industry. Four strategies for reforming ports have been followed across the world:

- **Commercialization** aimed at making port institutions work independently from political interference, and to develop rapid responses to market circumstances. Commercialized firms must be subject to the same financial discipline that all other businesses face;
- **Liberalization** involves allowing the free entry of new private operators in order to reduce monopolistic situations within ports. This can be achieved either by creating competition for the market or in the market;
- **Privatization** involves selling those former public enterprises to private firms in order to eliminate subsidies, improve efficiency, and make users pay the full costs of services. Privatization can involve a partial or a complete transfer of assets, according to the type of service offered;
- **Modernization** involves improving the institutions that manage ports by introducing changes in incentives so managers will perform their tasks as skillfully as possible.

Private participation in the port industry can be effected in a number of ways:

- **Full privatization** - whereby all the assets and liabilities of a publicly owned port are transferred to the private sector. This can be used where the primary objective is to raise public funds from the sale of assets and avoid future obligations to port financing;
- **Build, operate and own** - whereby parts of a publicly owned port are privatized for development by private operators. It is usually some short-term financial imperative that is used to justify the use of this form of privatisation;
- **Build, operate and transfer** - whereby new or refurbished facilities are built by private firms, but are transferred to the public sector after a specified period of time. This is often termed concessions;
- **Joint ventures** - whereby two parties with common interests join forces. Thus, for example, in some cases a firm can supply technology and know-how, while another might have knowledge of market opportunities and customer contacts. Such arrangements often involve ventures between public and private sector firms;

- **Leasing** - whereby port authorities simply rent-out port assets (buildings, storage facilities and cranes) to be used by private operators during a fixed period, and thus they obtain income from contract fees. Contrary to concession contracts, in this case private firms are usually not required to make investments, therefore they only assume commercial risks;
- **Licensing** - whereby the port authority allows operators to provide some services which only require relatively simple equipment, and thus assets are generally owned by private operators. Infrastructure or superstructure is provided for operators to use, generally at a specified fee, by the port authority. Stevedoring companies, pilots, tug operators or consignees often work under this type of agreement;
- **Management contract** - whereby the port authority retains the ownership of the infrastructure and port facilities, but decisions on its running are taken on a commercial basis by private firms. In such cases, both investment and commercial risks are retained by the public sector since managing firms do not invest and hence risk their own capital in the port.

In general, it can be argued that services such as pilotage and towage that do not require the exclusive use of infrastructure or superstructure port facilities could be organized competitively subject to the requirements for safety and environmental protection. Thus, where compulsory pilotage is deemed necessary, pilots may need to be licensed on the basis of their competence, but not regulated in terms of the fees for their services. In ports with large shipping movements, it may be possible to organize a competitive towage market whereby licensed operators compete and tariffs are determined by market conditions and not fixed by the port authority. The need for regulation arises when there are fewer service providers with the possibility of collusion and monopoly pricing. In the case of medium/small ports, it is clear that there is a need to establish some limits on prices and conditions of service in order to avoid market domination by a few firms who may try to exploit their position to extract rents from port users. On the other hand, services that do require the exclusive use of assets, such as terminals or cargo storage areas are probably better suited to the use of concessions designed to reconcile the interests of private operators and the public. The concession contract will provide the primary means of regulating the operator.

The need for regulation<sup>67</sup> depends on the form of competition that is created in a particular port following economic reform. In turn, the scope for competition in a port depends primarily on the scale of its operations and its level of development. For example, in small local ports<sup>68</sup> serving small communities with basic general cargo and container facilities, usually transported by relatively small ships it is possible to introduce 'competition for the market'. This can be achieved by inviting tenders from firms that are willing to operate the port for a defined period of time. When traffic reaches a given level, it is profitable to invest in specific equipment, like for example, a dry-bulk terminal, with berths able to serve deep-draught ships. It is also likely that some investments will be

---

<sup>67</sup> M. Juhel, "Government regulation of port activities: what balance between public and private sectors?", International Course on Privatization and Regulation of Transport Services (Washington D.C., World Bank, 1997).

<sup>68</sup> M. Stopford, *Maritime Economics* (London, Ed. Routledge, 1997).

required to improve land access and to buy equipment to handle containers, although they would still be moved through general cargo berths. It is possible in these larger local ports to establish a system of auctions where private firms bid for the right to operate the terminal. Once the bidding process is over and a single operator is chosen, it is necessary to have some regulation over the charges that this firm imposes on port users, since otherwise it would enjoy a monopoly position. However, this need for regulation is less strict if there is competition between ports. Incases where a region offers alternative ports to shipping companies, there is less need to regulate prices charged at the terminal, since the market mechanism would make the private operator keep prices low or lose traffic. On the contrary, if those alternative ports do not exist, the private operator enjoys some market power that must be controlled by regulation.

In large regional ports, handling significant levels of long-haul traffic with specialized terminals suitable for large ships, such as container terminals and specialized bulk terminals, traffic volumes may be large enough to support 'competition in the market'. The largest ports are classified as regional distribution centres and include Singapore, Hong Kong and Rotterdam. These ports have excellent equipment for transport interchange between all modes (railways, road, inland waterways). The role of these ports is to act as hubs, where large long-haul ships undertake trans-shipment operations. From the hubs, smaller ships or other transport modes distribute cargoes to the surrounding region. Such ports can be divided into several independent terminals, thereby inducing competition between operators for the traffic that calls at the port. The market should ensure that users receive services that meet their needs at the lowest fees, therefore, negating the need for regulation unless there is a risk of collusion on pricing between the providers of port services. Competitive pressures will tend to be greater where two or more large ports serve a particular hinterland, thus creating inter-port competition.

Concession contracts can be regarded as an intermediate solution between public ownership and full privatization of a port. Private participation is introduced to achieve efficiency gains in the industry, and at the same time political concerns are safeguarded by not making society lose ownership of essential assets. In most situations regulatory leverage will be applied through the proper drafting of concession contracts, since private operators must be compelled to fulfil their obligations not only on service conditions and charges, but also on equipment maintenance, safety, and quality of services provided.

When designing a concession contract, there are several aspects that must be carefully tailored, including the object of concession, exclusivity in the use of assets, concessionaire obligations and payments, the term of the concession, penalties and fines for breach of the contract, and risk allocation. The problem of excess labour, common to almost all ports around the world, is also an element that must be considered when designing concession contracts. Another relevant feature is to carefully design the system to select the winner of the concession.

A concession contract must explicitly state the obligations of the concessionaire in terms of the level and quality of service to be provided. It also should specify clearly how charges to users are to be determined, who owns the revenue obtained from those charges, and what are the payments to be made between the parties. The usual norm is that the concessionaire is obliged to pay a fixed annual fee to the port authority or the institution responsible for the concession. It is possible to design a contract in which this

fee is negative. In such cases, the concessionaire receives a payment from the port authority when the concessionaire's obligations include the provision of some service under the consideration of public service, and revenues from port users for that service do not cover costs. The level of charges for the services provided by the concessionaire (cargo handling, storage etc) is usually left in the hands of the operator, although it is subject to some form of external regulation, depending on the degree of competition within and between ports.

There is no universal rule about how long the life of a concession should be. In principle, the longer the lifespan, the private concessionaire has more incentive to make adequate investments to enhance the assets, since profitability will be dependent on the state of the facilities. However, the longer the period between two concessions, the less information the regulator may have on cost and demand conditions. Therefore, there is a trade-off between incentives and information for regulating a concessionaire optimally. In general, for larger capital schemes concessions will need to be longer, sometimes up to 25 years, to allow the concessionaire sufficient time to recover the capital investment involved.

The allocation of risk to the respective parties is a critical feature of contract design. It is desirable to allocate risk to the party that can best effect actions to either eliminate or moderate a particular risk. The main risks<sup>69</sup> encountered in port concessions are:

- **Design/Construction risk:** this type of risk arises in respect of concessions that place responsibility on the firm to undertake new investment or to rehabilitate existing facilities. The object should be to provide incentives such that capital works are completed within budget or ahead of schedule. The use of international standard designs will allow for the estimation of reasonable costs and completion periods for investments in berths and other port infrastructure;
- **Operating cost risk:** this type of risk exists when a concessionaire seeks to renegotiate a concession because operating costs have exceeded the levels predicted at the time the contract was concluded. There will be a possible case for recompense if the variations have resulted from actions taken by the port authority, for example, in granting permissions or licences;
- **Revenue risk:** this type of risk exists when demand and revenue forecasts have proved over-optimistic so that the concessionaire receives lower revenues and faces potential bankruptcy. It is implicit to the system of competitive tendering that firms are held to their contracted payments of fees and are allowed to go out of business on occasions. The downside for the port authority and its users lies in the potential disruption to services if the concessionaire goes bankrupt. Although the risk should lie with the concessionaire to maximize the incentive to correctly assess demand prospects, it may be necessary to build a degree of flexibility into the initial contract. For example, firms may be permitted to vary port charges to attract business during periods of lower than expected demand. In addition, the

---

<sup>69</sup> C. Crampes and A. Estache, "Regulatory tradeoffs in designing concession contracts for infrastructure networks", Economic Development Institute, Policy Research Working Paper, 1854 (Washington D.C., World Bank, 1997).

contract duration might be extended if demand drops significantly, thereby allowing a longer capital repayment period;

- **Financial risks:** these include exchange-rate risks owing variations in currency values and interest rate risks arising from adverse changes in the cost of capital. A number of methods exist for managing such risks, including hedging and insurance. Even though both parties should cover for this privately, concession contracts may also include provisions on this point;
- **Environmental risks:** In order for private operators to reduce those risks arising from oil spills and collisions in the port to a minimum, they should be strictly liable for any accident caused by negligence.

Finally, the tendering process for concessions should prescribe how successful firms will be selected.<sup>70</sup> It is normally sensible to have a two-stage procedure whereby the financial and technical capabilities of prospective firms are evaluated at the pre-qualification stage. Short-listed firms can then be invited to submit tenders or detailed financial proposals. The main criteria used to evaluate competing bids will be the ability to meet, as closely as possible, the service specification at either the highest fee payment or the lowest subsidy. Alternatively, the criteria could relate to charging the lowest fees to port users, if the port authority wanted to maximize economic efficiency. Since concessions often relate to extended periods of time and economic circumstances may vary significantly it is appropriate to include provisions for the circumstances in which renegotiation of the contract may be permissible and what form it may take.

#### 4. Price regulation for ports

There is a wide range of port pricing systems in operation around the world.<sup>71</sup> These can be broadly divided into ‘port dues’, which are charges for the use of the port facilities as a whole, and ‘specific port tariffs’ which are charges payable either by shipowners or cargo owners for specific services.

- **Port dues** - port dues comprise dues on cargo and on ships. Dues on cargo are generally calculated on the basis of the volume or weight of the cargo. Dues on ships are usually calculated on the basis of gross registered tonnage (GRT), net registered tonnage (NRT), or length of ship.
- **Specific port tariffs** - specific charges are many and varied. The main tariffs include the following:
  - (a) **Berth occupancy** - where additional charges may be effected on the basis of tonnage or ship and quay length. Normally, the charge is levied on a time basis, such as per day;
  - (b) **Aids to navigation** - are normally charged on the basis of ship’s size and are made for a given period of time or number of visits;

---

<sup>70</sup> M. Kerf and others, “Concessions for infrastructure: a guide to their design and award”, Technical Paper No. 399 (Washington D.C., World Bank, 1998).

<sup>71</sup> United Nations Conference on Trade and Development, *Port Pricing* (1975).

- (c) **Berthing/unberthing** - are normally charged by ship size or per operation;
- (d) **Pilotage** - is charged on a variety of bases, including vessel draught, ship size, or a combination of tonnage and distance piloted;
- (e) **Towage** - can be charged on the basis of the characteristics of the ship, such as size, or of the tug, such as its power. In the case of the latter the charge may be defined either per operation or per unit of time (for example, per hour).
- (f) **Storage and warehousing** - most ports offer a free period for cargo or container storage awaiting transit. Thereafter, the charge is normally derived on the basis of length of stay combined with either the characteristics of the cargo or area occupied.
- (g) **Cargo-handling** - most cargo-handling firms charge on the basis of weight or occasionally, by volume. In addition, the tariff is often classified by cargo type.

Owing to inertia and lack of proper accounting records, many port pricing tariffs bear little relation to costs, as economic theory normally recommends.

The potential monopoly position of public or private providers of port facilities and services creates the primary need for regulation. The main aim of the regulator should be to relate port charges to costs as would occur if the market was competitively organized.

Two major problems arise in relation to devising a cost-based tariff. The first is to determine which expenses are to be covered by prices, and the second is to decide how these should be covered. Deciding the method of recovery also involves choosing a unit (such as ship type, GRT, NRT or freight tons handled) upon which to base the charges.

It is possible to categorize expenses into five categories:

- (a) Immediately escapable costs (short-run marginal cost);
- (b) Joint costs;
- (c) Common costs;
- (d) Inescapable costs (fixed costs);
- (e) Social costs (externalities).

Social costs can actually be subdivided into items (a) to (d). It represents the difference between the usual market price and social opportunity costs, including an allowance for indirect costs and benefits to third parties and amenity values. The most common divergences relate to port congestion and to the difference between wages to port labour and the social cost of unskilled labour.

Immediately escapable costs should form the basis of the minimum charges in a cost-based port tariff. Port users should be required to meet those expenses that could be immediately avoided if they did not receive the service. However, such charges alone are unlikely to cover total costs owing the declining cost nature of the industry, unless excess demand exists.

Although the joint and common costs can be recovered in a number of ways, there is a rationale in employing price discrimination to allocate the indivisible expenses ‘according to what the traffic can bear’. This principle is consistent with the notion of ‘he who benefits, should pay’; it recovers the indivisible expense from beneficiaries without the need for cross-subsidization or general revenue subsidies. It also encourages the maximum utilization of capacity; the individual users contribute to these expenses in proportion to the magnitude of their individual benefits.

The principle of price discrimination can also be applied to inescapable costs. The main difference is that while joint and common costs are escapable, inescapable costs are fixed even in the long term. Therefore, in the case of joint and common costs the relevant assets should only be renewed if users are prepared to pay sufficient revenues to meet the costs of renewal. However, fixed port costs are inescapable and should continue to be used, whether or not the revenue paid by users covers their historic or replacement cost. Such assets may have been made on the basis of inaccurate assumptions about demand and revenue.

The issue of social costs is more problematic. The theoretical solution of the problem is to calculate port dues and charges on the basis of social accounting prices, with due allowance for indirect costs, such as congestion, and for the government to meet any resulting financial deficit. However, such an approach would create a number of major difficulties, including:

- (a) Adversely affecting the government’s budgetary planning;
- (b) Posing complex management accounting problems;
- (c) Distorting competition between private and public sector infrastructure and transport operators;
- (d) Possibly discouraging rigorous investment and dis-investment decision-making.

Since the demand for port services is generally inelastic, it is preferable to adopt a policy based on price discrimination with one qualification. (Inelastic demand with respect for port prices exists because of the very small element that port charges comprise in total transport costs). It will be necessary to trade-off the need for tariff simplicity against the need to differentiate extensively charges by cargo type. Indeed, ports may use the concept of a ‘promotional due’ to provide temporal variation in the tariff and market-testing.

A relevant question when introducing private participation at seaports is to determine the payments that the operators must make to the port authority or the agent that owns the infrastructure assets (i.e., concession fees). Even if those fees do not directly affect port users, it is evident that the higher the payments that private operators make for the use of infrastructure, the more income that port authorities receive, and port tariffs can

then be reduced accordingly.<sup>72</sup> However, private operators will then try to pass their higher costs to users through their cargo handling charges, so a careful balance should be established by port authorities regarding those prices that it can directly control. An advantage of this mixed-form of revenue for port authorities (from port tariffs and concession fees) is that part of the demand risk is left to the private operators, who then have correct incentives to provide efficient low-priced services in order to minimize that risk. Additionally, concession fees provide port authorities with a safe continuous cash flow, and therefore they have the possibility of financing general port costs or even part of the facilities construction/rehabilitation costs. There are no established procedures to determine the level of concession fees to be paid by private firms. An optimal rule should be to relate payments to the opportunity costs of the infrastructure and those superstructure elements that the concession might be associated with. For infrastructure, an approximation for the opportunity cost could be the market price of port adjacent land, although modified by the specific characteristics of the surface used by the concessionaire. Meanwhile, the opportunity costs of equipment granted by a concession are easier to estimate since they would be equal to the price that they could reach in a rental market. Price-cap systems or a rate-of-return type of regulation would constitute alternative options to regulate the behaviour of private operators, depending on the information and the experience that the regulatory institution might have on the type of service subject to regulation.

## **5. Quality regulation for ports**

Ports are potential generators of externalities in the form of congestion, pollution, and accident risks. Port regulation needs to combine economic regulation with the regulation of such effects.

Port congestion tends to arise where there is temporary or permanent shortages of capacity. Capital investment programmes, intended to increase port capacity, can increase the problems of delays to ships or cargoes. For those ports which are contracted out to be privately managed, or if they are fully privatized, a regulator should be concerned with guaranteeing that decisions on port capacity are taken sensibly.

In an efficiently functioning and competitive market, concession contracts would match the price with the quality of services provided. In principle, a private operator would be interested in cargo handling services being provided quickly and safely in order for its clients to be satisfied. But it could be the case that a profit-oriented operator values only speed at the expense of safety (the cream-skimming problem).

In order to provide incentives for loading/unloading services to be provided as efficiently as possible, it is possible to include in the concession contract some minimum standards on safety and servicing times to be achieved by concessionaires. For example, it could be possible to include a variable part on the concession fee, which could depend on ships average waiting times. By using this instrument, the private operator would have incentives to service ships optimally and to invest in the required equipment to reduce those waiting times as much as possible. Similarly, some penalties could be contemplated if some indicator on safety standards falls below a certain minimum (for example, the number of cargoes damaged or lost).

---

<sup>72</sup> L. Trujillo and G. Nombella, "Seaports", in *Privatization and Regulation of Transport Infrastructure*, A. Estache and G. de Rus, eds., (Washington D.C., World Bank, 2000).

In terms of general safety, a high density of vessel traffic in the access zones of a port and within its area increase the risk of collision between ships. Given the negative externalities that maritime accidents cause on other port users, and the potential environmental consequences, regulation on general port safety and quality of services related to ships movements must be strict and compliance closely monitored. A range of rules and other instruments are available to the port authority, including licensing certain operations and compulsory pilotage.

## 6. Performance indicators for ports

Concession contracts that are performance oriented usually rely on the measurement of indicators of port performance, both in the drafting of contracts and in the monitoring of performance against contract. There are several types of indicators that can be used, relating to:

- **Physical performance** in respect of measures such as ship turnaround times, cargo-handling times, berth occupancy rates, and cargo dwell times, depending on ship and cargo types;
- **Factor productivity** in respect of such measures as tons of cargo handled per worker or gang-hour, or per crane-hour, or per berth-metre;
- **Economic and financial indicators** as measured by indicators which act as a proxy for port finances and the level of charges to users including: total income or operating surplus per GRT/NRT or operating surplus per ton handled.

Service standards form an important element of any concession. In practice, the setting of thresholds or standards for improvement can set by benchmarking against those achieved at similar or competing ports.

## 7. Regulatory institutions for ports

Economic reform and the creation of competition in ports necessitate a revision to the roles that ministries, public agencies and port authorities must play. Traditional port regimes have suffered from a range of problems including - political pressures; excess of bureaucracy, lack of clear plans and objectives, inadequate management techniques, lack of incentives, and lack of investment funds. Although the above reforms imply a withdrawal of government involvement in the port sector, there is still a need for government involvement in two ways:

- **To promote and direct the reform process**
- **To regulate the new private operators**

Trujillo and Nombella<sup>73</sup> have proposed the following structure responsibilities in a reformed port industry. An optimal seaport system should allocate tasks between institutions in the following way:

---

<sup>73</sup> L. Trujillo and G. Nombella, "Seaports", in *Privatization and Regulation of Transport Infrastructure*, A. Estache and G. de Rus, eds. (Washington D.C., World Bank, 2000).

➤ **Government**

- Provision of laws to transfer port asset ownership and the realignment of responsibilities;
- Provision of an adequate legal environment;
- Provision of adequate competition laws to prevent anti-competitive behaviour.

➤ **Regulator**

- Preferably an independent agency or institution responsible for supervising the process of privatization and liberalization, in order for the reform not to be a mere transformation from public monopolies to private ones;
- Provision of improved cost efficiency;
- Promotion of low port charges;
- Control of the profits available to new concessionaires through careful contract design.

➤ **Port authority**

Its role should be narrowly refocused and delimited to:

- (a) Managing the remaining public common infrastructure;
- (b) Guaranteeing the existence of minimum safety conditions in the port area;
- (c) Protection of the environment;
- (d) Promotion of private participation.

## **8. Inland waterways**

Transport on rivers and canals with barges or lighters and in small vessels along the coast and between islands plays an important role in the transport system of many countries. In an international context, the system also provides an important means of feeding and distributing cargoes to and from deep-sea vessels. The issues involved in the provision and regulation of waterway infrastructure facilities are very similar to those for ports described above.

Inland waterway transport services, on the other hand, can be provided as a common carrier on the basis of a scheduled service, as bulk carriage for a single client, or on an own account basis, among others.

Provided the market is large enough, there is nothing inherently wrong, in terms of cost structure, in promoting a competitive waterway sector. In terms of bulk freight, there is no real evidence of economies of firm size. Only where firms offer common carrier services that carry goods for different customers, is there a major risk of wasteful competition. It is, thus, in the parcels business, with its high fixed costs, that competition could lead to a duplication of services and low load factors. For bulk traffic, there is no real objection to allowing shippers to choose between alternative waterway operators, with the alternative of using their own vessels also available to them. Competition should lead to the minimization of the average costs of providing the desired standard of service -

prices will be based on average cost, which under conditions of constant returns to scale will reflect marginal cost.<sup>74</sup>

A couple of concerns do arise, however. First, common carrier inland waterway services bear much higher fixed or inescapable costs and may lead to the emergence of a natural monopoly, although the extent of potential monopoly power may be limited by competition from other modes. Second, because of economies of scale, endeavouring to cover total costs may lead to a divergence between price and marginal cost. This problem is most marked in the case of infrastructure costs, if charged for, particularly where certain services regularly have spare capacity in order to meet peak demand or maintain service quality.

There appear to be three solutions to these problems for the barge operator:

- (a) The operator could base prices on marginal costs, with the resulting deficit being financed by government subsidy – this is unlikely, but may be justified to compensate for non-internalized externalities created by other modes;
- (b) The operator could base prices on average cost, but this could only be sustained with a degree of protection from competition from other modes;
- (c) The operator may seek to discriminate between traffic flows according to the shipper's willingness to pay in order to cover the difference between average and marginal cost.

The advantages and disadvantages of each approach are as follows. In case (a), the government needs to be able to estimate the volumes and corresponding marginal costs conforming to the optimal allocation of traffic in order to determine the appropriate subsidy. If it does not do so, then it will revert to deficit financing with no real ability to exert financial discipline on the operator. The financial deficit will have to be met either by taxation or by diverting other forms of government expenditure. The opportunity cost of this expenditure will need to be assessed and investment in the waterway system will need to be evaluated using social cost-benefit analysis.

In case (b), the government will need to become involved in the day-to-day administration of the freight service and will have to employ arbitrary methods to allocate vessels to traffic and to establish priorities. Again, investment in the waterway system will need to be evaluated using social cost-benefit analysis.

By contrast, approach (c) largely eliminates the regulatory role of government. This is because the allocation of freight is determined by the market and long-term planning and investment can be made on grounds of profitability. The basis for discrimination usually is class of freight determined by value and the extent of competition from alternative modes of transport.

---

<sup>74</sup> ESCAP, 2001. *Sustainable Transport Pricing and Charges: Principles and Issues* (ST/ESCAP/2139).

The above assumes that the providers of inland waterway services compete with operators on other modes who charge prices equivalent to marginal social cost, including externalities. This is unlikely in practice. In particular, the costs of road infrastructure, congestion, pollution, accidents and noise are rarely fully internalized. In many developed countries, government subsidizes waterways through the provision of grants towards the costs of building new berths and termini, and/or tax road hauliers, in order to promote the diversion of freight traffic to the waterways.

Government regulation may, therefore be necessary to ensure that cost pressures do not compromise safety standards either in terms of maintenance or in working practices. In addition, government intervention may be required to ensure the internalization of externalities and the recovery of infrastructure costs.

## **9. Maritime transport**

Maritime transport comprises three principal forms of operation: industrial transport, charter (non-liner) shipping, and liner services.

Industrial shipping provides services mainly to meet the well-defined transport needs of large industrial enterprises, such as oil companies and energy firms. The ships are either owned and operated by such firms, or are contracted by them on a long-term basis. The fleets are usually engaged on regular routes with shiploads of bulk and homogeneous cargoes.

Ships operating in the charter markets usually operate on a non-scheduled basis with no fixed itinerary or fixed sailing schedule. Users or charterers either pay charter rates, which are related to the amount of cargo shipped, or fixed prices, normally per day or per deadweight ton, for the hire of the vessel.

Liner shipping services are offered through ships which operate to a prefixed sailing schedule between fixed ports on a regular basis. In liner operations, ships carry cargo, as common carriers, to many different shippers. Each shipper pays freight in accordance with a tariff based on the volume, weight or value of the cargo.

In charter shipping, there are many suppliers of services with fairly homogeneous services to offer. In the various subsectors, such as tanker or dry cargo, the ships may vary with regard to their size and equipment, but basically they can all do the same job of moving bulk cargoes.<sup>75</sup>

The charter markets are open markets, in the sense that it is easy to buy or build a ship and put it into operation. There are a large number of buyers and sellers of shipping services, and no individual shipowner is large enough to be able to influence the market charter rate. There is also an active second-hand market and, as such, it is relatively easy to leave the business. In consequence, perfect competition exists with prices being determined by the forces of supply and demand. Shipowners are essentially 'price-takers' and have to make operational decisions on the basis of market prices. Since price elasticity is relatively low, changes in freight rates have only a marginal effect on demand. Therefore, small changes in supply and demand can produce large changes in

---

<sup>75</sup> Martin Stopford, *Maritime Economics* (London, Unwin Hyman, 1988).

price or freight rates over a short period of time. In principle, in the charter markets, the shipowner will aim to obtain rates which will cover all costs, including the opportunity cost of capital tied up in ships, and yield maximum profits. In the short-run, while a ship is still operable, the shipowner has considerable fixed costs: depreciation, company overheads and operating costs. These costs will have to be borne whether the ship is sailing or idle and, therefore, will not influence the decision on whether, or not, to accept a particular freight rate. A rational shipowner will accept rates provided the marginal or avoidable costs involved are covered. Indeed, a profit maximizing firm will operate up to the point where marginal revenue equals marginal costs. All income above marginal costs will contribute towards fixed costs and the owner, by continuing to operate, will be better off than refusing cargoes, in the very short term. In the short-run, say, over the period of one voyage, the shipowner's marginal costs comprise the voyage and cargo-related costs. In the longer term, operating costs may also be viewed as variable and these too will need to be covered by charter rates. In the very long-run, to remain in business, the shipowner will need to cover all costs from charter revenue.

The charter markets are subject to considerable variations in prices, which are always equal to short-run marginal cost. Short-run marginal costs may lie above or below long-run marginal costs depending on the extent of excess demand and supply in the charter markets which are highly efficient and sustainable. Attempts by governments to regulate the markets through protectionism and cargo reservation are likely to lead to losses of social welfare.

By contrast, the liner markets are characterized by monopoly and oligopoly. In the liner trades, individual routes are often controlled by a single operator, who sets the freight rate or tariff. On some routes, a limited number of firms provide parallel services and collude over the setting of rates, sometimes by forming conferences or price-fixing cartels. In the liner trades, operators usually provide dedicated services on particular routes. In most liner markets, there is considerable competition from independent lines, charter shipping and air freight. Even within a conference, it is the individual lines that are the sellers. Intra-conference competition is commonplace, which leads to 'illegal' rebating, the use of open rates, and the breakdown of conference agreements. Conferences are rarely powerful monopolies that are able to systematically exploit shippers. Conferences and a degree of concentration exist in the liner trades because of the higher entry costs and the fact that fixed costs are very high for scheduled services. It is often claimed that competition can be wasteful in the sense that extreme rate volatility could result from open competition. Further, liner trades may be conducive to the emergence of natural monopolies, if only for limited periods of time.

Many different types of cargo are transported by liner vessels. Since there are widely differing values to the cargoes shipped, and marginal costs associated with specific cargoes can be very low and well below marginal cost, price discrimination is prevalent. Price discrimination, or *ad valorem* pricing, implies that the same service is sold to different shippers at different freight rates. High value cargoes tend to pay higher unit charges than low value ones, thereby contributing relatively more to the fixed costs of the service than cargoes with lower unit values. It is sometimes suggested that this may amount to cross-subsidization. However, since fixed costs cannot be allocated to specific cargoes in a rational manner, this argument is difficult to sustain. Indeed, it is argued that price discrimination, as operated by liner firms, tends to reduce welfare losses to society as a whole. Without it, less cargo would probably be transported.

The Ocean Shipping Reform Act of 1998 in the United States has led to the demise of many conferences and the increasing role of independent carriers and consortia. The independent operators in liner markets have traditionally been weak competitors to the conferences. They were always vulnerable to price wars started by conferences and the threat of one was thought to be a powerful incentive to avoid aggressive pricing. The less costly alternative was either to join the conference or to charge the same rates as the cartel. Deregulation has, however, changed the position and rate wars are now more commonplace.

An argument in favour of administered pricing for liner operations is that as long as space is available aboard the ship, it costs a shipowner very little to load extra cargo since most costs are fixed for scheduled shipping services. In periods of little competition, a conference may obtain rates that cover full costs even for low value cargo. During periods of competition, however, this may not be possible. If the rates for these cargoes still cover their marginal costs, the conference will accept it. As a consequence, some firms would go out of business until price and capacity were again in equilibrium. Defenders of the conference system argue that competition would produce too much volatility in the market and neither freight rates nor services could be offered with any certainty. It is also argued that conferences are needed in order to provide stable and continuous transport services. Proponents of competition suggest that it will force market prices down to the relevant short-run marginal cost of the service, and that, when surplus space exists, these rates will not be sufficient for operators to cover their costs and break even in a financial sense. This will not be a stable position and the most expensive lines will go out of business first. As a result of competition shippers would be forced to compete with each other for the remaining space available. This would drive rates up to the point where profits returned. This, in turn, would provide an incentive for new firms to enter the route and offer services. Rates would again cover average costs, but these would perhaps be lower than those that would exist with conferences or other cartel arrangements in place. It is debatable whether any form of price discrimination would continue under competitive conditions.

In general, there is need for little or no economic regulation in the provision of maritime shipping services since the scope for competition is considerable. The only exceptions relate to (a) the limitation of externalities such as pollution and accident risks which require technical regulation in terms of legal standards and licensing of ships and their officers, and (b) the limitation of monopoly power in liner trades where conference practices are deemed to be anti-competitive.

## **G. Airports and air transport**

Airports and air transport present different challenges for policy makers and regulators. The differences arise from the cost characteristics, and the market structures through which facilities and services are provided of each subsector. Deregulation in air transport and ‘open skies’ policies have led some observers to suggest that there is no case for intervention in the market and hence the emphasis should be on creating competition and not regulation. While this is broadly valid, there are still residual regulatory requirements with regard to such matters as pollution control and safety standards. In addition, there is a possibility that the operators of scheduled air services may through mergers act in a monopolistic manner when determining air-fares and service levels.

The airport industry is undergoing a transformation in many countries, from being a poorly managed public utility in decline with mounting financial losses to a more efficient market-oriented industry with a more commercial outlook. The industry has been subject to a range of economic and structural reforms designed to create competition. These changes have created new regulatory requirements. To establish the appropriate form of competition and the associated regulatory institutions, it is first necessary to understand the economic characteristics of the airport industry.

### **1. Airports**

Airports are complex and multi-product enterprises, which include the provision of a wide range of facilities and services related both to aeronautical operations and the commercial aspects of serving airlines and their passengers. Kapur<sup>76</sup> has classified airport activities as follows:

#### **(a) Aeronautical services (operational)**

- Air traffic services
- Telecommunications
- Police and security
- Emergency services
- Runway, apron and taxiway services

#### **(b) Aeronautical services (handling)**

- Aircraft cleaning
- Provision of power and fuel
- Luggage handling
- Freight loading and unloading
- Processing of passengers, baggage and freight
- Customs and immigration
- Passenger information services

---

<sup>76</sup> A. Kapur, “Airport infrastructure: the emerging role of the private sector”, Technical Paper 313 (Washington D.C., World Bank, 1995).

(c) **Commercial services**

- Car parking
- Terminal transfer
- Intermodal termini
- Duty free and retail shopping
- Restaurants, bars and leisure services
- Hotels
- Banks

Airport infrastructure was commonly believed to be a public utility and therefore airports have traditionally been owned and operated by central or local government. Even with publicly owned airports a number of commercial services were usually operated by the private sector. For example, retailers and restaurateurs would purchase concessions or rights to operate within an airport, often on a monopoly basis. The concession payments would attempt to extract the potential rent or excess profit available to the concessionaire and because the payment went to the public sector there was little perceived need for regulation. However, owing concerns about the efficiency of airports run by state enterprise and the need to reduce fiscal deficits, many governments have sought private sector involvement in the provision of a much wider range of airport activities.

**2. Economic reform and privatization in airports**

It is feasible and desirable to introduce ‘competition in the market’ airport activities for all commercial services by privatizing publicly-owned activities and liberalizing market entry. In smaller airports it may be more practicable to create ‘competition for the market’ through offering franchises for car parking, shops, bars and cafes. It is certainly feasible to introduce ‘competition for the market’ in respect of the provision of all aeronautical services, both operational and handling. The difficulty lies in judging the desirability of such privatization. Most observers see no problems with privatizing all handling services, but opinion is often split over extending this to air traffic control, security and emergency services.

In terms of creating competition in the airport industry, it is possible to identify a number of alternative structures<sup>77</sup> with varying degrees of privatization varying from none to total:

➤ **Public ownership with public operations**

This is the traditional model whereby airports are state owned under the operational management of a government department.

➤ **Public ownership with commercialized public operations**

Under this model, airports are owned by the state. The airports themselves however, are established as public corporations and are subject to the same accounting and legal obligations as private sector firms.

---

<sup>77</sup> O. Betancor and R. Rendeiro, *Airports in Privatization and Regulation of Transport Infrastructure* (Washington D.C., World Bank, 2000).

➤ **Regional ownership and operations**

This model is an extension of public ownership with commercialized operations, only this time they are owned not by central government but by local authorities or groups of local authorities.

➤ **Public ownership and private operations**

This model represents the first step to privatization and embraces a number of modes of operation, including:

- **Joint ventures** – between public and private enterprise with the aim of harnessing funds, experience and skill from the private sector;
- **Partial/majority divestiture** – whereby the state sells equity shares in the airport to realise funds yet retains a stake in the development and direction of the airport;
- **Management contracts** – whereby the state contracts out to a competent firm the management of all or part of the airport for a defined time period. Such contracts usually include performance, maintenance, incentive and infrastructure investment provisions;
- **Concessions** - whereby long-term concessions are granted to private sector firms who are permitted for a number of years to build or lease facilities and assume commercial risks for costs and revenues. Normally at the end of the concession period ownership of the facilities and associated assets transfer to the state. Concessions now include a number of variants: build-operate-transfer, build-own-operate-transfer, and lease-develop-operate schemes.

➤ **Private ownership and private operations** – where the airport and its component services are sold to the private sector. This can be effected in a number of ways ranging from selling it as a single entity, to unbundling into a number of tiers of services.

If public monopolies are turned into private monopolies, some regulatory provisions may be needed to protect consumers' interests. In determining whether regulation is required, it is important to determine whether adequate competition exists on an activity basis. For example, the introduction of several retailers may be sufficient to guarantee effective competition. Further, even where an airport contracts out the concession to provide baggage handling, the regulator will still need to be interested in whether the bidding process has captured the monopoly rent or whether it is still desirable to introduce a degree of price regulation.

### **3. Price regulation in the airport industry**

Airport charging systems cover a wide variety of charges related to different airport facilities and services. These include landing, lighting, parking, refuelling and storage facilities as well as aircraft, passenger and freight services. Existing pricing systems at international airports have evolved over years in a hotch-potch manner.

Charges range widely in structure and levels, but most systems have one thing in common: the main aircraft charge is normally based on the maximum all-up-weight of the aircraft, often with break points in the scale. This is, in many cases, supplemented by a passenger charge which may be paid directly by the passenger to the airport and may vary from one type of passenger to another type of passenger.

The International Civil Aviation Organization (ICAO) recommends that airport charging systems should be such that each type of traffic should bear its fair share of airport costs. But ICAO does not specify how airport costs are defined or measured, or how a fair share of such costs should be assessed. Some airports interpret the requirement to mean that airport charges should be related to long-run marginal cost. However, this is extremely difficult to measure; it is unlikely to lead to an optimal usage of airport capacity, provide guidance on investment requirements or allow a particular financial objective to be met.

The regulator should aim to create an airport pricing system that reconciles the objectives of optimizing the use of existing capacity and guiding investment decisions within the framework of financial sustainability for the airport. Specifically, airport pricing can support these requirements in three ways:

- (a) By measuring the aggregate demand for each service and its social profitability. This will determine whether effective demand warrants the continuation, expansion or contraction of airport services and facilities;
- (b) By encouraging the use of excess capacity and rationing capacity when there is excess demand;
- (c) By providing information to support the coordination of long-run and short-run decisions so that total system costs are minimized and the surplus of value over cost is maximized.

To achieve these objectives, the regulator should recognize that airport prices need to be related to the marginal social cost of the resources used to provide each service.

The issue of social costs, however, is problematic. The theoretical solution is to calculate airport charges on the basis of social accounting prices, with due allowance for indirect costs, such as congestion and noise.

The main constraint on creating a sound airport pricing policy is likely to be the need to recover costs through revenues. This constraint may apply at the level of the airport as a whole, or at the level of individual facilities and services. The costs may be defined either as all capital and operating costs or as only operating costs. In practice, it may not be possible to recover total costs, for example, where overcapacity exists because of inaccurate demand forecasts, low initial utilization, or indivisibilities in capacity provision.

Airports possess a degree of locational monopoly that may give rise to the potential for monopoly pricing. Although some countries use this to justify state ownership and operation of airports, many countries have managed to create strong

private sector involvement in the provision of both airport infrastructure and airport services.

The principles which apply to airport pricing are those of marginal social cost pricing in conditions of lumpy investment where long periods of less than full capacity operation are inevitable, complicated by periods of congestion and existence of externalities, particularly arising from aircraft noise. If the airport is required to be self-financing, then it is likely that it will need to raise additional revenue above that which would result from efficient prices. This suggests that the airport should devise a pricing structure which:

- (a) Always charges enough to avoid excess demand;
- (b) Never charges less than short-run marginal cost, including social costs;
- (c) Charges 'what the market will bear' until the financial target is achieved.

Two major problems arise in relation to devising a cost-based tariff. The first is to determine which expenses are to be covered by prices, and the second is to decide how these should be covered. Deciding the method of recovery also involves choosing a unit, (such as aircraft type, aircraft weight, passenger numbers or freight tons handled) upon which to base the charges.

It is possible to categorize airport expenses into five categories:

- (a) Immediately escapable costs (short-run marginal cost);
- (b) Joint costs;
- (c) Common costs;
- (d) Inescapable costs (fixed costs);
- (e) Social costs (externalities).

Social costs can actually be subdivided into items (a) to (d). It represents the difference between the usual market price and social opportunity costs, including an allowance for indirect costs and benefits to third parties and amenity values. The most common divergences relate to airport congestion and aircraft noise, both of which may not be priced.

Immediately escapable costs should form the basis of the minimum charges in a cost-based airport pricing system. Airport users should be required to meet those expenses which could be immediately avoided if they did not receive the service.

Although the joint and common costs can be recovered in a number of ways, there is a rationale in employing price discrimination to allocate the indivisible expenses 'according to what the traffic can bear'. This principle is consistent with the notion of 'he who benefits should pay'; it recovers the indivisible expense from beneficiaries without the need for cross-subsidization or general revenue subsidies. It also encourages the maximum utilization of airport capacity and the individual users contribute to these expenses in proportion to the magnitude of their individual benefits.

The principle of price discrimination can also be applied to inescapable costs. The main difference is that while joint and common costs are escapable, inescapable costs are fixed even in the long term. Therefore, in the case of joint and common costs, the relevant

assets should only be renewed if users are prepared to pay sufficient revenues to meet the costs of renewal. However, fixed airport costs are inescapable and should continue to be used, whether or not the revenue paid by users covers their historic or replacement cost. Such assets may have been made on the basis of inaccurate assumptions about demand and revenue.

Thus, using measures of aircraft size and passenger numbers may be deemed fair on the grounds that it is the largest and heaviest aircraft that determine the capacity and strength of runways, stands and termini. However, they also indirectly measure 'ability to pay'. For example, larger aircraft have larger payloads and hence larger revenues. Further, they will tend to be employed on long-haul routes with higher unit fares.

In calculating charges, it will also be necessary to recognize that the relationship between demand and capacity may differ between terminals and runways. It is possible that the peak periods for these will be slightly different each day and that while one may suffer from excess demand, the other may not. Thus, peak charges may apply to different periods for runways and other aircraft-related services compared with passenger facilities. In this regard, it may be appropriate for an airport to determine the capacity limitations for each type of airport facility and to invite airlines to 'make bids' for user rights against the declared capacities for particular periods during the year.

The most significant cost that does not appear in the accounts of airlines or airports is that of noise. Predominantly, aircraft noise remains an externality which affects people residing in an airport's flight path. In principle, it is possible to estimate the cost of noise or the willingness to pay for less noise. In an ideal world, airlines and their users should compensate those adversely and directly affected by aircraft noise. In practice, the regulator can encourage airports to tax noise pollution in an attempt to moderate its impact and internalize this externality.

The first step in calculating airport charges is to determine airport costs. In this respect, the various airport services and facilities which give rise to expenditures have to be classified in a way that facilitates cost analysis. The identification of appropriate 'cost centres' is the best methodology. A 'cost centre' is an accounting device for allocating costs and building up the pricing structure. To avoid cost mis-allocation, the definition of the cost centre should be undertaken with care and should be based on the following criteria: the service provided; the location where the service is given; the duration of the service provided; and the user of the service.

The second step is to calculate the specific costs for each cost centre using the principles set out above. Costs need to be measured using social accounting values in order to avoid omitting externalities. Further, a time horizon relevant to the pricing decision needs to be determined. This will normally be one year, and it will be necessary to identify whether costs are escapable or inescapable within that period of time. There will be a significant amount of overheads, which cannot be allocated to specific cost centres and these will need to be recovered in some way.

The third step is to identify 'revenue centres'. These are accounting devices which allow the grouping of all revenues of the same nature. Cost centres and revenue centres should be linked together so that the extent of cost recovery could be monitored.

The fourth step is to collect information on the utilization of assets corresponding to a given cost centre. Thereafter, the airport could consider what the desirable level of asset utilization should be over its life and assess the extent to which airport charges can contribute to the improvement of the asset utilization. For example, periods of excess demand may be managed by surcharges based on the period of occupancy or use of particular facilities.

The final step is to determine the charges and charging basis by cost centre. It is probable that an element of price discrimination will be required to cover total airport expenditures. Similar considerations apply to ancillary facilities, such as retail services, car parking, and land transport access.

The regulator will often be faced with inadequacies in the cost information available and will be handicapped in reaching pricing recommendations. Further, if the incumbent operators are monopolists, there will be a need to be sure that the actual charges levied within a particular pricing system are consistent with those that competitive firms would have levied. The regulator may thus adopt a system of price-capping based on either fixing the rate of return available to operators or preferably on allowing price increases of RPI-X as discussed earlier. The latter is preferable and requires the collation of performance data from other airports which may be deemed to be benchmarks against which to compare a particular airport.

Once an airport regulator has decided to regulate prices it should then be concerned with the consequences in terms of the quality of airport services and how it could measure performance in order to manage or regulate quality.

#### **4. Quality regulation in the airport industry**

An airport that faces a regulated price will try to reduce its costs in order to get a higher profit margin. Hence, elements related to quality of service must be closely supervised. In general, quality regulation is needed in order to overcome the problems of inadequate or incorrect information being available to airport users, both airlines and passengers. This problem is particularly acute where services are provided on a monopoly basis. Regulators, however, face similar asymmetric information problems regarding product quality. In practice, regulators can undertake quality assessments at airports by either undertaking quality surveys or by establishing standards and measuring performance.

Quality surveys might include assessing views of users on aspects of airport services, such as security procedures, telephones, check-in procedures, departure lounge cleanliness, flight information, toilets, departure lounge comfort and so on. Surveys of airlines might cover aspects of services that affect the efficient turn around of aircraft, such as refuelling, cleaning, repair times, and queuing for departure slots. Such surveys are inevitably subjective, but they can be used to assess airports against each other. An alternative approach might be to use comparative data from similar airports to set minimum standards for similar variables. Both approaches require monitoring of performance and incentives designed to provide improvements.

There are four mechanisms that allow for the control of quality:

- (a) Publication of quality standards that airports are expected to meet and the publication of the results of monitoring actual airport performance;
- (b) A quality index might be incorporated inside the RPI-X formula. In this approach the level of X may be determined against the achievement of measurable standards;
- (c) The provision of compensation for users of poor quality services. In this approach operators that fail to meet performance standards may be required to compensate passengers or airlines receiving a below-par service;
- (d) Fixing minimum quality standards for airport services to be incorporated in concession contracts.

The regulator has a responsibility to assess the service standards correctly otherwise there is a risk that operators will go out of business in unreasonable circumstances.

Regulators also have responsibility for assessing quality in respect of safety and externalities. There are a number of methods available to the regulator for influencing behaviour, such as prohibiting flights at unsociable hours to reduce noise pollution, licensing operatives in high-risk activities, setting performance targets to reduce congestion, and enforcing the internalization of externalities in airport charges.

## **5. Air transport**

Air transport is possibly the most heavily regulated industry in both terms of safety and economic regulation. Economic regulation is embodied in international agreements that govern the development of international air services. Article 1 of Convention on International Civil Aviation (1944), which established ICAO also established the principle that every state must obtain the agreement of other state or states to operate international air services, normally through bilateral agreements although there are also multilateral agreements.

Bilateral agreements provide for the:

- (a) Reciprocity and equality of opportunity in sharing of traffic rights;
- (b) Procedure for approval of fares and rates; entry and exit from the routes;
- (c) Restrictions on route operations;
- (d) Limitations on the development of capacity;
- (e) Designation of airlines, substantial ownership and effective control of the designated airlines;
- (f) Taxation.

In the current climate of increased liberalization and globalization, the general policy of ICAO is for greater freedom in the provision of international air transport services through “open skies” agreements that provide for unrestricted traffic rights,

capacity and tariff flexibility. However, for domestic services, every state still has sovereignty to decide its own policy.

Initially, it was expected that airline deregulation would lead to a general reduction in fare levels through the entry of new airlines on particular routes.<sup>78</sup> However, the early route expansion strategies developed by a number of the former trunk carriers in the United States quickly proved to be unsuccessful. The high traffic density routes, which were the focus of expansion, were the target of other airlines and were suddenly subject to excess capacity and plummeting fares. The former charter airlines, with low operating costs, competed aggressively on price. By contrast, the incumbent high-cost operators with their wide-bodied aircraft were at a competitive disadvantage as hub-and-spoke route networks developed. Such networks were the main method of achieving expansion through the generation of new traffic. Hub-and-spoke networks require smaller aircraft operating frequent services and supplying feeder traffic. The former trunk operators were not well placed during the initial phase of route expansion.

The competitive responses of the incumbent operators, following deregulation, were many and evolved in three discrete phases, as follows:<sup>79</sup>

#### **Phase 1: Defensive tactics: cost-reducing activities**

- (a) Improving labour productivity
  - (i) new wage structures
  - (ii) reduced demarcation
  - (iii) new management
  - (iv) de-unionised set up
- (b) Aircraft
  - (i) investment in more efficient
  - (ii) aircraft downsizing
- (c) Network
  - (i) operate a hub-and-spoke network

#### **Phase 2: Revenue generating activities**

- (a) Develop a CRS (computer reservation system)
- (b) Introduce frequent flyer programmes
- (c) Vary travel agent commission levels
- (d) Increase service frequency
- (e) Enter code sharing alliances
- (f) Improve in-flight service
- (g) Increase advertising
- (h) Benefit from price discrimination

---

<sup>78</sup> G. Williams, *The Airline Industry and the Impact of Deregulation* (Ashgate, 1993).

<sup>79</sup> ESCAP, 2001. *Sustainable Transport Pricing and Charges: Principles and Issues*, (ST/ESCAP/2139).

### **Phase 3: Offensive tactics: transforming the new competitive environment**

- (a) Control of CRS
- (b) Active yield management
- (c) Tie in commuter feeder services

Deregulation brought about a fundamental change in the point of sale of airline seats, with passengers turning to independent travel agents for ‘impartial’ advice. Agents were sought by passengers because of the emergence of a wide range of airline and fare options. Airlines developed competitive advantage by offering differential and sales target based commissions to agents and by installing on-line CRS giving instantaneous advice on fares and seat availability.

Another important means by which airlines sought to enhance their revenue has been price discrimination. This was an unexpected outcome of deregulation, as policy makers had anticipated that the ensuing competitive environment would make the practice not viable. The peaking demand characteristics of airline markets are such as to allow a considerable variation in price, partly owing the inability of carriers – even in competitive markets – to vary supply to the same extent. The key to achieving the full benefits of such a policy lies in an ability to minimize revenue dilution. Ordinarily, discriminatory pricing necessitates the existence of monopoly or a highly collusive oligopoly, as it is only in these types of markets that firms are able to exercise the necessary control over their customers. The non-storable nature of the service, however, alters this situation.

The vast amount of information gathered by CRSs has enabled their owners to fine-tune their price discrimination activities through yield management techniques. These have allowed them to extract even more economic rent, their non-CRS owning rivals earning less as a consequence. Without the ownership of such equipment, airlines had little option but to use one of four CRS vendors at very high fees.

Deregulation and liberalization have led to greater competition among airlines with regard to the quality of service and other fringe benefits provided and also in respect of fares. The process of deregulating air transport has resulted in greater competition leading to reduction in fares, which is seen as an advantage for the passenger. Airlines often offer discounts on published fares to attract traffic and fill the seats during off-peak periods, and governments and regulatory authorities tend to condone such practices. Thus, it is the level of demand and supply that effectively determines prices. Short-run marginal cost plays an important role in determining the minimum fare, while passenger characteristics influence actual fares in terms of determining “willingness to pay”. This has led to the argument that airline prices need to be regulated to avoid cut-throat and wasteful competition among airline operators. Some people, perhaps adopting a somewhat critical view of the deregulation policy, maintain that this reduction in fares can be at the detriment of aircraft maintenance and thus of safety. This provides a further justification for continuing economic regulation.

One response to excess demand and competition has been the restructuring of the market through mergers and consolidation. Airline mergers may lead to an increasingly monopolistic industry and build up the potential for fare increases. Proposed mergers between airlines and transnational ownership of airlines are being reviewed by the

regulatory authorities, especially in the United States to avoid monopoly or near monopoly exploitation of the market.

Similar concerns have been expressed about the increasing dominance of airline alliances. Such alliances increase the scope of air services to different parts of the world and offer improved frequencies and better connectivity for the passengers. Another marketing arrangement to emerge in recent years is that of 'codesharing'. This is a practice whereby one carrier permits another carrier to use its airline designator code on a flight or where two carriers share the same designator code on a flight. The practice is intended to produce better utilization of the rights under the bilateral agreements, cost savings, economies of scale, and increased net revenue. Regulatory authorities are likely to prevent the abuse of market power by such groupings.

Privatization and transnational ownership are currently growing mainly because of financial problems faced by many governments and state-owned airlines. These institutional changes may lead to improvement in the management and operation of airlines. If such changes reduce operating costs, competition should keep downward pressure on airfares.

Economic reform in air transport has led to the need for regulators to focus on the one hand with the problems of wasteful or excess competition and on the other the desirability of proposed airline mergers and other collusive arrangements between operators. The other area of regulatory intervention relates to externalities, particularly relating to aircraft noise and congestion which were discussed with reference to airports.

#### **H. Summary**

1. Transport is pivotal to economic development. On the one hand, the achievement of economic growth and poverty reduction requires good physical access to resources and markets while on the other, quality of life is generally dependent on the quality of physical access to employment, health services, homes, education and other amenities. Conversely, in many developing countries the inadequacy of transport infrastructure and the inefficiency of transport services are recognized as being among the main bottlenecks to socio-economic development and social integration.
2. In an attempt to improve efficiency many governments have implemented economic reforms in recent years that have increased the role of the private sector in the provision of transport infrastructure facilities and services.
3. Instead of eliminating the need for regulation, such reforms have emphasized the need for effective regulation and regulatory institutions. This need in the transport industry is due to the existence of natural monopolies, the limitations of "competition for the market", the existence of asymmetric information between transport operators and regulators, the need for private investment in infrastructure facilities, and the need to assign risks between operators and government.

4. It should be emphasized that investor risk assessments will be based on a number of factors, including the nature, stability and credibility of macroeconomic policy, corporate governance, tax policy, labour market policy, and other non-policy risks. Risks can be mitigated however, through increasing stability in the government's policy approach. Reform through systemic regulatory, legal and related institutional reforms should be transparent, stable and predictable.
5. It is essential to protect the independence of the regulator and ensure that it operates in a transparent manner, within a clear framework for accountability.
6. The various subsectors of the industry have grappled with similar issues in attempting to create competition and then to decide whether and how to regulate those elements of the reformed markets which still give cause for concern in terms of the public interest.
7. There are no standard solutions applicable to all modes and in all markets and locations. This chapter has identified the market and cost characteristics that will determine the appropriateness of a wide range of alternative market arrangements and their associated regulatory requirements.