

DEREGULATION AND PRIVATISATION IN AN ECONOMY-WIDE CONTEXT

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INTRODUCTION

During the **1980s**, industrial and labour market policies in most OECD countries have moved towards more reliance on market forces and competition after a long period of interventionist policies (see the review in OECD, **1988**). The aim has been to increase the flexibility of economies, to improve resource allocation and, ultimately, to enhance growth.

This new attitude is largely the consequence of the inability of the interventionist policies followed in most countries during the **1970s** to cope with the shocks and sharp changes which characterised the decade. Indeed, the beginning of the **1970s** marks a shift from a period of steady growth and substantial stability of both nominal and relative prices, to one marked by inflation, shocks in relative prices and sharp cyclical fluctuations.

While governments generally responded in the first instance with further market intervention in response to these problems, the perception later emerged, if at different times in different countries, that the adjustment was made more painful by price and wage rigidities and by obstacles to the movement of factors between firms. This change in attitude began to emerge earlier in the United States, where market rigidities were blamed for the marked slowdown in factor productivity during the **1970s** and for the painful adjustment to the **1974** oil shock, although the United States was slower than most other countries to allow oil prices to rise to world market levels. In Europe, the perception that market rigidities were a cause of the economic slowdown was slower to take hold. However, by the late **1970s** attitudes began changing there too.

The new thrust of policy also influenced the attitude towards regulation. In the United States in particular, it was strongly felt that regulation played a part in hampering the working of markets, and therefore in the deterioration of economic conditions. In the late **1970s**, these arguments were supported by studies which showed that, in the United States, regulation had contributed to the fall in productivity growth during the **1960s** and that its impact had increased during the **1970s**, as new environmental and social regulations were introduced'.

These arguments have special relevance for the transport and telecommunications sectors which are the focus of this article. The functioning of these sectors has widespread implications for the rest of the economy: they account for about **10** per

cent of GDP in most countries; they provide the infrastructure of the economy; and they are characterised by substantial technical progress. Moreover, it is often argued that when these sectors are regulated they tend to have high wages and strong unions, and that the wage increases determined there tend to spread to the rest of the economy. An important effect of deregulation is to bring wages down to market levels.

Table 1 summarises the most important deregulation actions which have been taken in selected OECD countries in the sectors considered here. The process began in the United States, where wide-ranging deregulation programmes have been taking place since the mid-1970s. Between 1975 and 1980, the airline, road transport and railway industries were deregulated, and a start made in deregulating banking and telecommunications. Following a judicial initiative, long-distance telecommunications were opened to competition in 1984, although an important regulatory apparatus remained in place.

Elsewhere, deregulation of these markets began later and has generally been more limited. In Europe, the most important steps have been taken in the United Kingdom. Deregulation of long-distance bus transport, implemented in 1980, has been followed by a number of partial deregulation actions associated with a wide-ranging privatisation process. The most notable moves have been in telecommunications, although plans are also being drawn up for privatisation and partial deregulation of electricity generation and distribution and similar action is being considered for the railways. Attempts by the Government to liberalise international flights, however, have met with opposition from other European countries.

With a few exceptions, deregulation in other European countries has been slower, and the major efforts have been confined to the financial and telecommunications sectors. However, the Commission of the European Communities, often relying on the competition rules in the Treaty of Rome, is working to eliminate restraints on trade resulting from regulation. This action has recently been intensified with a view to completing the "internal market" by the end of 1992. In particular, the Commission has recently succeeded in gathering support for liberalisation of some types of telecommunications, and for gradual removal of restraints to competition in international flights.

Australia and New Zealand are attempting to encourage infrastructural development through deregulation of telecommunications and air transport. In Japan, politically sensitive sectors such as agriculture and road transport remain tightly regulated, as does land-use. However, deregulation is an important industrial policy instrument and a bold privatisation and deregulation of telecommunications has recently been implemented with the aim of exposing the sector to competition and of stimulating its growth.

In many cases deregulation has been far from complete, and the thrust has been on reforming regulations rather than on removing them. The reforms have focused on three main issues: the identification of pricing techniques, which could

Table 1. Main deregulation measures taken in selected OECD countries and by the EC Commission affecting the transport and telecommunications sectors

Sector of action	United States	United Kingdom	Japan	Other large countries	Australia New Zealand	Actions by the EC Commission
Airlines	1978. Airlines Deregulation Act: fixes timetable for deregulation, to be completed by 1982. Previously, deregulatory actions had been undertaken by CAB.	1987. Privatisation of British Airways and Airports Authority.	1987. Privatisation of remaining state-held shares in Japan Air Lines,	1986 Germany. Privatisation of Lufthansa. 1988 Canada. Entry restrictions on air carriers relaxed.	1985-1986 New Zealand. Relaxation of entry barriers for foreign airlines in international flights (since 1985) and of restrictions on foreign ownership for domestic routes (1986). 1986 Australia. Relaxation of restrictions on international freight and passenger charter flight; deregulation of domestic routes. 1988 New Zealand. Air New Zealand privatised.	1987 EC Council directive to implement gradual liberalisation (by 1991) of prices and access to airports.

Table 1. (Cont.) Main deregulation measures taken in selected OECD countries and by the EC Commission affecting the transport and telecommunications sectors

Sector of action	United States	United Kingdom	Japan	Other large countries	Australia New Zealand	Actions by the EC Commission
Railways	1976. Railroad Revitalisation and Regulatory Reform Act liberalises minimum prices. 1980. Staggers Act liberalises prices and provision.	1982. British Rail Hotels are privatised.	1987. Reorganisation of the State Railways split into twelve different companies and allowed much greater management autonomy. The profitable ones will be privatised.		1988 New Zealand. Decision to sell non-core Railway Corporation assets (mainly land).	
Trucking and Bus Transport	1980. Motor Carrier Act liberalises access and rates in interstate hauling.	1980-1985. Deregulation of long distance (1980) and local (1985) bus transport outside of London. 1985. Privatisation of the National Bus Company.		1986 France. Relaxation of truck licensing. 1988 Canada. Federal regulation of surface transport phased out. 1989 France. Minimum prices for trucking no longer binding.	1983 New Zealand. Truck licensing liberalised.	

Table 1. (Cont.) Main deregulation measures taken in selected OECD countries and by the EC Commission affecting the transport and telecommunications sectors

Sector of action	United States	United Kingdom	Japan	Other large countries	Australia New Zealand	Actions by the EC Commission
Telecommunications	<p>1961-1980. FCC decisions in favour of liberalisation of the market for telecommunication products and services; 1961: free use of terminal equipment; 1971: private line connection is allowed; 1980: FCC imposes limits on its own power to regulate "basic services".</p> <p>1982. Settlement of the anti-trust case against AT&T, establishing divestiture.</p> <p>1984. Modified final judgement, establishing the limits of action of local "monopolist" companies and of dominant firm, AT&T.</p>	<p>1984. Telecommunication Act. Licences of operation are given to the privatised British Telecom (dominant supplier) and Mercury. OFTEL, a new regulatory body is established.</p> <p>1986. Mercury is inter-connected to BT lines on special terms.</p>	<p>1985. Telecommunication Business Law: privatisation of Nippon Telegram and Telephone (dominant supplier); establishment of competition on local and long distance communications; up to ten (smaller) companies may be licensed. Liberalisation of equipment trade under approval by government agency.</p>	<p>1986-1988 France. Cross subsidisation between long and short distance telephone lines abolished.</p> <p>1987 Canada. Proposal for deregulation of VANS (Value Added Network Services).</p> <p>1988 Germany. Programme for liberalisation of VANS.</p>	<p>1988 Australia. Decision to establish an independent body, AUSTEL; competition will be allowed in consumer premise equipment; VANS free: the first phone monopoly will be revised in the early 1990s.</p> <p>1989 New Zealand. All statutory protection of Telecom's monopoly will be removed and competitors will be allowed to connect to Telecom's network.</p>	<p>1984. Opening up of access to public telecommunications contracts.</p> <p>1987. EC "Green Book" (masterplan) on telecommunications: including guidelines for a gradual liberalisation of some telecommunication markets.</p> <p>1988. Agreement on liberalisation of trade in equipment and of VANS services.</p>

lead to more efficient pricing by regulated enterprises; the introduction of market-based criteria, such as franchising, contracting out and competitive tendering in order to create competitive stimuli in natural monopolies; and the search for better ways to manage natural monopolies.

Particularly in Europe, wide-ranging privatisation has accompanied deregulation. In contrast to the United States, where regulation has traditionally taken place through an adversarial relationship between the regulators and the regulated private enterprises, governments in most other countries have tackled regulatory problems by creating public enterprises. Public enterprises have not only been the preferred instrument for regulating natural monopolies, but they are also widespread in potentially competitive sectors characterised by externalities, such as bus transport and garbage collection. Given this institutional background, the move towards deregulation has been accompanied by fundamental changes in the role of public enterprises. In some cases privatisation was necessary in order to open a previously regulated sector to competition. Often, however, privatisation concerned natural monopoly and in such cases privatisation has basically involved converting a public enterprise into a *regulated private* enterprise.

I. REGULATION AND DEREGULATION: CAUSES AND CONSEQUENCES

Deregulation has been motivated by the perception that regulation was not working properly and was imposing costs which exceeded the benefits. This section considers the arguments for and against regulation. In particular, it reviews the theory of contestable markets and shows how it can be used both to identify circumstances in which regulation is appropriate and to plan the process of deregulation.

A. Rationale for regulation

Regulation is a broad term used to define the various ways in which the government may intervene directly in the working of the market in order to influence the allocation of resources. It includes changes in the ownership regime of enterprises, nationalisation of particular sectors, administration of prices, creating legal barriers to entry into a market and setting quality standards. The form of regulation depends on the characteristics of the sector or the objectives of regulation. The focus of this article is on regulation through the use of price controls and barriers to entry – i.e. "economic" regulation².

1. *Economic arguments for regulation*

Economic arguments for regulation derive from the perception that there is some "failure" in the working of the market, so that the level or composition of output determined on the basis of private decisions does not maximize welfare. Among the arguments for "economic" regulation, market failure stemming from the structure of the industry has been particularly prominent. More specifically, the recent debate on regulation and deregulation has centred on three issues: the existence of a "natural monopoly", the emergence of "destructive competition", and the extent of "networking and co-ordination externalities".

A ***natural monopoly*** arises when production by a single firm takes place at lower costs than production by more than one firm for any level and any combination of output demanded. In the case of production of only one output, a condition for natural monopoly is the existence of economies of scale, i.e. declining average costs as production expands. When the same plant may be used in the production of more than one output, it is also necessary that economies of scope prevail, i.e. the cost of producing the various outputs separately exceeds the cost of producing them jointly. In these cases the dominance of the market by a single supplier would be desirable (at least from a static point of view) because the natural monopoly has the lowest costs, and therefore makes optimal use of the resources of the economy. However, the traditional theory of market organisation indicates that the behaviour of monopolists should be regulated, because otherwise they would fix prices that were higher than socially optimal³.

In the provision of services, economies of scale and scope generally derive from the existence of "networks" – typically transport and communications systems serving a large number of consumers – which usually imply heavy fixed costs. They allow the production, at progressively smaller average costs, of larger quantities of the same service and the production of more than one kind of service. Furthermore, a single unit may have substantial advantages in co-ordination and management of very complex systems. An example is provided by telecommunications networks. Up to the mid-1970s, evidence of dynamic economies of scale appeared in the form of steadily declining costs as demand expanded due to innovations such as coaxial cable, microwaves and satellites. Further economies of scale came from co-ordination abilities, related to the possibility of switching calls around the network so that they could be processed by remote switches. The network also gave rise to economies of scope, as both local and long distance calls used the same lines and the same switchboard operators (Phillips, 1982).

"Destructive competition" may occur if the most efficient production technique requires heavy fixed costs, so that short- and long-term marginal costs differ. If demand is very variable so that firms "on average" must have excess capacity and if entry by other suppliers is possible in periods of high demand, then competition may lead to pricing below the level necessary to ensure capital replacement

at the optimal level; left alone, the market would not allow the most efficient techniques to prevail (Kahn, 1971). In many countries, regulation of transport, and in particular bus and truck transport, has been justified by the supposed negative effects on the structure of the industry which would be induced by "destructive competition".

Network and co-ordination externalities derive, like all externalities, from the fact that consumption or production decisions of economic agents are not independent, and that there is no market for the side effects of these decisions. Pricing output only on the basis of private evaluation would not yield the socially optimal level of output. More specifically, the value of the services provided by a network increases as each additional user is connected; therefore pricing the use of the network at a price corresponding to the cost of providing the service to the marginal consumer, as a market system would, means that the service will be produced at below-optimal scale. The importance of these kinds of externalities varies with the size of the market: if most people in an area are already connected to a telecommunication network, the externality effect from the connection of an additional user will be small. On the other hand, it will be high in cases where a new network providing, for instance, enhanced communications and data services is about to be developed.

Thus, it is not by chance that the history of economic regulation and deregulation is largely the history of sectors like transport and telecommunications which are characterised by network and co-ordination economies of scale and scope and by network externalities.

2. Optimal regulation

In order to substitute in the most efficient way for insufficient market incentives, the instruments of "economic" regulation – price administration and barriers to entry – should be based on optimality criteria.

Prices should ideally be determined by maximizing a social welfare function, which would take account of the existence of externalities, subject to the constraint of the financial equilibrium of the firm. For instance, in the case of a natural monopoly subject to price regulation, second-best rules suggest that prices should be fixed at the average cost of the output demanded at that price. When natural monopoly derives from the existence of economies of scope, fixed costs must be allocated among the different outputs to which they contribute. Optimal second-best pricing, or "Ramsey pricing", requires that they be distributed in such a way as to minimize the loss of consumer surplus deriving from the deviation of prices from marginal costs (Ramsey, 1927; and Baumol and Bradford, 1970)⁴. If there are externalities, the first-best price structure requires subsidisation of the outputs yielding positive external benefits. Because of the difficulty in implementing direct subsidisation schemes, the subsidy will in general be financed through cross-subsidisation and be sub-optimal.

Barriers to entry may be required if administered prices are fixed so that new producers are attracted, thus making the desired market structure unattainable. This is by definition the case of "destructive competition". Economic theory has also investigated the case in which an optimal price structure for natural monopoly is unsustainable – that is, it attracts new entrants. This happens if the cost for a marginal producer of producing one of the outputs of the natural monopolist is lower than the price at which the natural monopolist sells it. In general, this cannot happen if the natural monopolist produces only one output on the appropriate scale⁵. It may, however, take place if there is joint production and the demand relation between the two outputs is such that the optimally determined margin on one of the two products is high enough to attract inefficient producers supplying only this product. This "cream skimming" would jeopardise the sustainability of the natural monopoly. However, recent research has shown that this may happen only under certain demand conditions among the products, which must be complements, or in the case of vertical integration⁶. Finally, unsustainability of the price structure may derive from existence of cross-subsidisation, in turn related to the existence of externalities.

B. Implementation and inefficiency of regulation

1. Implementation of regulation

In practice, regulation is seldom implemented and administered on the basis of optimality criteria. First, there are information problems. In a world characterised by uncertainty, transaction costs and limited information, those who have access to information denied to others may try to use it to their advantage⁷. More important, much of the relevant information is not immediately available to the regulator and has to be provided by the regulated enterprises. There may be substantial problems in extracting the relevant information and there is a high risk that it will be provided selectively. The enterprises will, in fact, have incentives to provide wrong information, for instance by overstating its costs or its depreciation charges. Sappington and Stiglitz (1987), who have surveyed a number of recent contributions on this issue, confirm that it is likely that the regulated firm will try to orient regulation to its advantage at the cost of distortions in outputs and inputs. This result is particularly likely if it is difficult to monitor the behaviour of the firm because of information asymmetries and to determine appropriate penalties for non-compliance. These problems are enhanced in the case of joint production, where the regulator faces the additional problem of allocating joint costs⁸. Moreover, regulation is often motivated by criteria other than economic efficiency. Sometimes explicit distributional objectives are involved, or regulation is decided on the basis of equity, fairness and other public concerns. These concerns affect price determination. When distributional considerations are among the aims of regulation, the administered price structure may include elements of cross-subsidisation. Prices for different outputs, or for

different groups of consumers, may not be fixed according to cost and demand conditions, but rather be set so as to favour a specific group⁹. Excess returns on some of the output will then subsidise sale of the rest of the output below cost. In the United States, price regulation has long been based on the calculation of a "fair" rate of return over the value of assets; this "rate of return regulation" criterion is generally recognised as sub-optimal (Kahn, 1970, ch. 2)¹⁰. Its performance is further affected by the fact that it is generally based on commercial accounting data, which may be misleading for economic purposes¹¹.

Fairness and equity will generally imply concern for the structure of the industry. Barriers to entry will be set to guarantee that small operators receive a "fair" rate of return, and there will be a tendency to "average out" margins on different outputs, often in connection with the establishment of certain standards of service to certain areas or groups. Barriers to entry are often introduced based upon "social" considerations. Such an attitude is particularly strong in Europe, where "social" or "political" considerations play a considerable role in determining the behaviour of public enterprises.

As a result of these factors, regulated sectors are often plagued by excessive costs and by extensive forms of non-price competition, such as unnecessarily frequent service and too high quality standards which induce excess capacity. During the late 1960s and 1970s, a number of studies for the United States showed that regulated sectors – particularly in transport – were characterised by widespread inefficiency and that the level of prices was generally very high, although this did not necessarily result in high rates of profit, but rather in higher costs (Caves, 1962; Moore, 1975 and 1978; Keeler, 1972 and 1976; Boyer, 1977; and Levin, 1978).

Furthermore, Stigler (1971) has argued that regulation is mainly introduced in order to protect the enterprises already in the market from potential entry. In practice politicians may enact regulation not on the basis of an abstract public interest, but on the basis of the political rewards they may gain from the introduction of regulation. The interest groups which stand to gain most from regulation are therefore the ones willing to invest more resources in winning the support of politicians, so that regulated enterprises often succeed in ensuring that the regulations are tailored to their desires. Stigler's analysis is an extension of earlier work by Tullock (1967), who argued that firms will devote substantial resources to the attempt to induce decision-makers to introduce protective regulation. The misallocation of resources related to these attempts to create rents through regulation could be even higher than the misallocation related to monopoly power or to any other market failure which might justify regulation. Stigler's argument has been supported by Peltzman (1976), who has argued that regulation of railways was introduced under pressure from the railway companies. Regulation of other transport, in particular buses and trucking, was later introduced basically in order to prevent "intermodal" competition between these non-regulated sectors and railways. Empirical analysis has shown that "destructive competition" – often claimed in order to justify regulation – is not characteristic of road transport. Road transport exhibits relatively low fixed costs

and constant returns to scale, and is therefore structurally competitive (Breyer, 1982).

2. *The inefficiency of regulation*

findings about the inefficient *implementation* of regulation have given support to a number of studies which have argued that regulation is in itself an *inherently* inefficient process, and that this inefficiency must be taken into account in deciding whether to introduce regulation.

a) *Property rights and X-inefficiency*

Regulation tends to weaken the structure of property rights within the firm, imposing an upper boundary on the attainable rate of return¹²: as a result there will be less control efficiency. Regulated enterprises will be particularly affected by X-inefficiency, which derives from inefficient use of inputs (Leibenstein, 1986). Furthermore, there may be a tendency to increase "gold-plating" expenditures which benefit staff. This will artificially inflate costs, so that regulation based on actual costs will give inefficient results.

This argument has been developed in particular with respect to public enterprises. A number of theoretical studies have argued that public enterprises are particularly prone to X-inefficiency because of their structure of control. In a private enterprise, both internal control (by the shareholders) and external control (by the capital market) provide incentives to avoid inefficiency. Shareholders monitor managers to ensure that they maximize income; if managers fail to do so shareholders will sell their shares, while other managerial groups will bid for the control of the company in the belief that they will be able to obtain a better return from the company's resources (Jensen and Ruback, 1983). In a public enterprise, capital market monitoring does not work, while internal monitoring will be performed by politicians who are not necessarily interested in how efficiently managers allocate resources¹³.

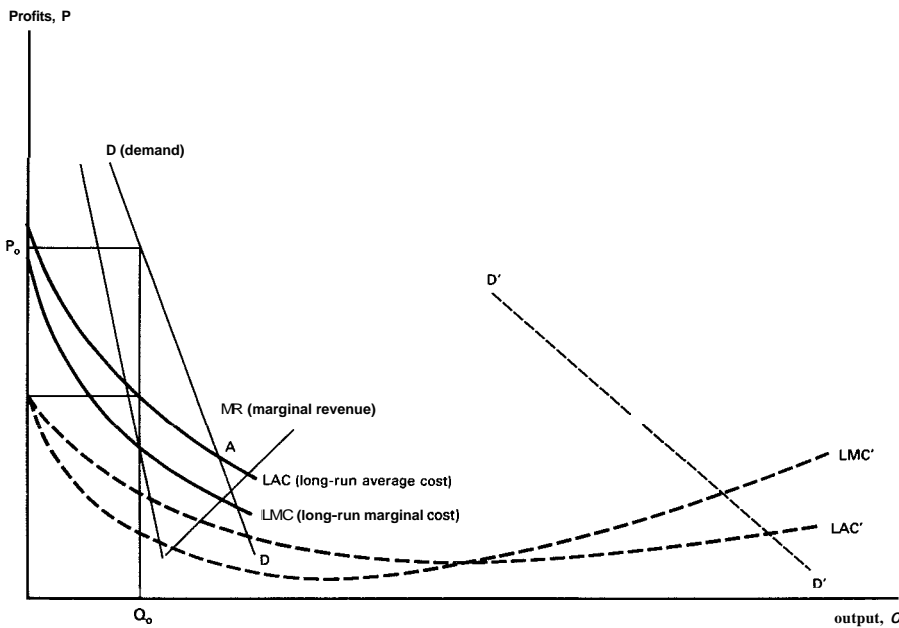
Analysis of the performance of public enterprises in Europe during the 1970s tends, on balance, to support these predictions. For the United Kingdom, Pryke concluded that the performance of nationalised enterprises was efficient during the 1960s (Pryke, 1971), but at the end of the 1970s he found widespread inefficiencies and concluded that public enterprises compared very unfavourably with private enterprises operating in the same sectors (Pryke 1981). Further evidence is provided by comparisons of performance between public and private enterprises over a number of countries and sectors, which have shown that private enterprises are generally more efficient even if the conclusion is not unequivocal (see Borcheding *et al.*, 1982, and, for a different conclusion on basically the same sample, Millward, 1982).

b) *Dynamic costs of regulation*

A substantial part of the cost of regulation derives from its effects on the evolution of the economy in the long run. In particular, regulation of a sector may prevent the adjustment of its structure to exogenous changes in cost and demand conditions.

The appropriateness of regulation depends on characteristics of both demand and cost functions. Over time these elements may change. Economies of scale or of scope may be affected by technical change which alters the cost function, or by changes in demand which extend the scale of the market well beyond the range compatible with economies of scale. An example of these changes is shown in Figure 1 (from Waverman, 1975). Point A corresponds to the original cost and demand situation, which justifies regulation. However, if cost conditions change, or if demand expands, the market situation may evolve to point B, where marginal costs exceed average costs and production by more than one producer would be conducive to economic efficiency.

FIGURE 1
NATURAL MONOPOLY AND CHANGES
IN COST AND DEMAND CONDITIONS



In such cases, it would be appropriate to abandon regulation and to allow competition. However, for a number of reasons, it is unlikely that such a change will take place. The regulators are unlikely to ask themselves whether regulation is still appropriate. After an extensive review of public utilities in the United States, Kahn concludes that "licensing of entry in most public utility industries tends to be an infrequent, once and for all, or almost all determination. Franchises legally have to be renewed and new firms may seek to be licensed, but the tendency is to rely on the same chosen instruments, year after year and decade after decade; the structure of the market and the identity of the firms selected to serve remain essentially unchanged" (Kahn, 1970, p. 20). While Kahn was reflecting on the United States' experience, this conclusion also seems to hold true for the European countries where public enterprises given responsibility for regulation usually acquire a legal monopoly status (Kaufer and Blankaert, 1983).

Furthermore, even if the regulators decide to review the appropriateness of regulations it will be difficult to reach a sound conclusion on the basis of information supplied by the regulated enterprise itself. Averch and Johnson (1962) and Sapington and Stiglitz (1987), have argued that regulation affects resource allocation within the firm and causes over-capitalisation so that fixed costs will be much higher than they would be under competition. The cost function may indicate the existence of economies of scale and of natural monopoly just because it does not represent the most efficient production technique available.

A second source of dynamic costs is the effect of regulation on technical progress. Extensive regulation may reduce the pace of innovation by hampering competition. Recent research on the economics of innovation stresses the importance of competition on the volume and pace of innovation (Dasgupta and Stiglitz, 1980). The argument relies on the role of competition as an incentive for firms to innovate and for innovations to spread. Spence (1986) argues that "monopoly firms do relatively little R&D compared with the optimum, because of the absence of pressure to do so. A monopoly does increase its profits by reducing costs, but these incentives are generally insufficient. What a monopoly lacks is exogenous, downward price pressure". While such price pressure is created by competition, it could in principle be created by regulation if specific features were introduced. Bailey (1973) suggests introducing a lag in price adjustments, so that the regulated enterprise would be compelled to introduce cost-saving innovation. However, in the competitive market there exists spill-over from one firm to another, which allows innovation to be introduced more quickly and at a smaller cost. This second factor would, anyway, tend to make an unregulated competitive system more conducive to innovation.

Recent empirical research indicates that innovative activity is positively related to competitive market structure (Ergas 1984; Kamien and Schwartz, 1982; and Gerosky, 1988). These studies show that there is a positive relationship between indicators of innovation such as expenditures on R&D or number of patents and the

degree of competition. In particular, Ergas shows that the countries characterised by higher variability of prices and lower obstacles to entry are also those characterised by more innovative activity. Gerosky, in a study on the United Kingdom, shows that the pace of innovation is higher where barriers to entry are low and in industries with many producers.

C. Contestable markets theory

The basic message of contestable market theory is that the characteristics of the equilibrium prevailing in a given market will not depend on the number of firms in the market but on its "contestability", defined as the absence of obstacles to entry for new competitors (for a summary of the theory, see Baumol, 1982; and Baumol, Panzar, Willig, 1986). In a contestable market, pricing and output decisions will be efficient¹⁴ and regulation is inappropriate. Regulation creates obstacles to efficient behaviour by restraining potential competition, imposing administered prices and limiting entry. According to contestable market theorists, a number of industries subject to regulation are potentially contestable. These include, in particular, the various transport sectors where sunk costs are low enough not to deter new firms from entry. As Levine (1987) recalls, airline deregulation in the United States was in fact predicated on the contestability of the industry, where capital was considered "marginal cost with wings" because airplanes could be easily leased or resold in an active resale market. In evaluating the contestability of a market, and deciding whether it is appropriate to regulate it, it is important to consider all of the various modes by which a good or a service may be provided and the scope for competition among them (Bailey and Baumol, 1984)¹⁵.

Contestability of a market requires three things. First, entrance should be free: entrants do not face any disadvantage with respect to an incumbent firm and may enter the market at any scale of production including that on which a contestable monopolist operates. Secondly, exit should also be free: any firm may leave without impediments to recovering any cost of entry. Put another way, there should be no "sunk" costs, i.e. costs which are specific to the investment and cannot be recovered if the firm leaves the market. Finally, the incumbent must not be able to prevent new firms from entering or forcing them to leave by temporarily cutting its price¹⁶.

In a contestable market, even in one characterised by only two firms, the equilibrium will closely resemble that prevailing under perfect competition (Baumol, 1982). Firms in the market will not be able to earn more than normal profits as determined by the conditions prevailing in the capital market. If they did so other firms could enter the market on the same scale of production, sell at slightly lower prices and take away the whole market. Moreover, the quantity demanded will be produced at minimum cost; if it is not, any firm could supplant existing producers just by producing more efficiently. Therefore, in a contestable market which is not a natural monopoly all goods will be priced at marginal cost.

The most surprising result of contestable market theory, however, is that conditions similar to those of competitive market equilibrium could hold even if the size of the market is such as to guarantee the existence of only one efficient firm, i.e. under natural monopoly. In particular, Baumol, Panzar and Willig (1982) show that if the conditions for contestability are met, the natural monopolist is likely to price its output on the basis of second best optimality as long as this price does not induce entry into the market by a competitor, i.e. as long as the price structure is "sustainable".

This conclusion rests on the consideration that for the producer, a Ramsey price structure requires the least information for its implementation. Therefore, if this price structure is sustainable and if there is threat of entry because the market is contestable, the monopolist is very likely to choose it. Adopting another price structure would imply higher costs in order to gather "global information on demand and cost functions for its products"¹⁷.

D. Contestability and deregulation

Contestability theory helps in establishing criteria for deregulation measures aimed at making entry easier. Obstacles to entry may derive from various factors: from legislation and regulation, from the structural characteristics of the market or from the behaviour of the market agents. Consequently, three kinds of actions – corresponding to the three main characteristics of a contestable market – are called for: remove regulatory constraints to entry, reduce "sunk" costs, and prevent anti-competitive behaviour by the incumbents.

1. *Elimination of regulatory barriers to entry*

The complete removal of obstacles to entry into and exit from a market would not seem advisable in the case of non-sustainable natural monopoly, where freedom of entry would disrupt an efficient market structure. Even in this case, however, limited freedom of access by smaller entrants may be appropriate to stimulate the efficiency of incumbents. For instance, in Sweden freedom of entry into telecommunications has improved the efficiency of the monopolistic supplier (DIW, 1986). In the United States, the Federal Communications Commission eliminated all regulation of cable subscriber systems with fewer than 1 000 subscribers even before telecommunications were opened to competition (Bailey 1981). Along similar lines the Interstate Communication Commission (ICC) recommended that administered prices in regulated sectors should not exceed the cost which would be born by a consumer or a group of consumers if they were to establish a firm which would produce own consumption (Baumol and Faulhaber, 1988).

Entry liberalisation implies a corresponding price liberalisation. Freedom of entry in markets where prices are administered according to some non-efficient

criterion, may result in an inefficient structure of the industry and in "cream-skimming" (Bailey, 1981). In cases where a specific price structure, including elements of cross subsidisation, has been imposed because of the existence of externalities or, more likely, because of distributional or "fairness" considerations, a shift to direct subsidisation schemes is necessary. This practice has been followed in the cases of airline deregulation in the United States and of bus deregulation in the United Kingdom¹⁸.

2. "Sunk" costs reduction and deregulation

Often sunk costs consist of investments in common facilities which give rise to economies of scale and scope as well as to externalities. In these cases the problem is that regulation extends not only to the use of the common facility but also to the services utilising it, even if this market is basically contestable.

What is called for is a distinction between the natural monopoly and the contestable sections of the market, so that the latter may be opened to competition. Different proposals have been advanced: according to Bailey and Baumol (1984) the common facility could be subjected to regulation, or even operated by the public sector. Reliance by the regulators on market methods, like auctioning out rights of use, may also help to make the use of the facility more efficient.

These suggestions have been seriously considered – and in some cases have already been implemented – in situations where the system could be easily divided between competitive and natural monopoly areas, with the latter having heavy sunk costs that effectively prevent duplication of infrastructures. Examples are found in electricity and gas industries (Hammond, Helm and Thompson, 1985) and in railway transport (Starkie, 1984). For both electricity and gas it is argued that while distribution represents a natural monopoly, this does not necessarily hold true for production which therefore could be undertaken by a number of competing firms. This should allow competition among the producers or, at least, an easier monitoring of producers through "yardstick" competition. Deregulation schemes based on these considerations have been proposed in the United Kingdom for the planned privatisation of electricity.

3. Strategic behaviour and the role of anti-trust

Obstacles to contestability derive not only from the existence of regulatory or technical barriers to entry but also from the behaviour of market agents. When a previously monopolistic sector is deregulated, an incumbent that retains a dominant position may try to prevent entry of competitors by adopting strategic pricing policies.

Public intervention through regulation could be designed in such a way as to reduce these impediments to contestability. Bailey and Baumol (1984) suggest that incumbents and new entrants should be regulated asymmetrically. For instance,

price adjustments by the incumbents could be subject to lags so as to retard their reaction to entry by others. Asymmetric regulation has been implemented in cases where it was felt that the incumbent had substantial market power. For instance, after the opening of telecommunications to competition in the United States, differential treatment was given to AT&T and the smaller competitors.

An alternative approach is to use anti-trust law more widely to foster competition. To this end, it would seem appropriate to remove the restrictions which in many countries prevent anti-trust laws being applied to regulated sectors. This would subject the regulated enterprise to a more general supervision and impose a test of legitimacy on how a regulated enterprise exercises privileges deriving from regulatory arrangements¹⁹.

Use of anti-trust laws for deregulation purposes may have an even wider impact. In recent years there have been several cases in which judicial procedures initiated the deregulation process. In the United States, since the early "Carterphone" judgement which liberalised the use of terminal equipment, progress in liberalisation in the telecommunications sector has been marked by several judgements in anti-trust cases. The Commission of the European Communities has also used the anti-trust provisions in the Treaty of Rome to challenge anti-competitive behaviour stemming from national regulation; the most notable case concerns the intra-European agreements on airline passenger transport. In a different context, liberalisation of television broadcasting in Italy has been spurred by a High Court decision denying a legal monopoly to the State broadcasting company.

E. Welfare effects of regulation and deregulation

Abstracting from its dynamic effects on the economy, the potential benefits from deregulation of an inefficiently regulated sector may be illustrated in a simplified scheme first worked out by Harberger (1954) for the estimation of welfare losses from monopoly²⁰. In this case, the Harberger measure of welfare loss corresponds to that part of the reduction in consumer surplus which is not appropriated by the monopolist. In Figure 2a, the monopoly would set the price so that it exceeded the (supposedly constant) marginal cost by the amount **AC**, and the Harberger welfare loss would be the area of the triangle **ABC**.

The welfare effects of regulation depend on its impact on the pricing behaviour of the monopolist as well as on the monopolist's costs. If regulation were efficient, the price would be fixed at the level of average costs which, in the simplified case of Figure 2a, are equal to marginal costs²¹ and the monopolist would break even. The benefit from regulation would then be equal to the area of the Harberger triangle, **ABC**, less the costs of implementing efficient regulation.

However, for the reasons discussed above, regulation is unlikely to be efficient. Resources may be wasted so that actual average (and marginal) costs under regulation exceed marginal costs corresponding to efficient utilisation of resources. The

gain from regulation is therefore reduced to the triangle $AB'C'$ in Figure 2b. However this gain must now be compared not only with the costs of implementing regulation, but also with the loss deriving from the waste of resources corresponding to X-inefficiency which is equal to $DD'B'B$.

If, furthermore, regulation is introduced to protect an industry and allow the regulated monopoly an excess profit, prices will be fixed above the – possibly inefficiently determined – average costs. Enterprises, having an incentive to seek such protection, will devote resources to acquire the right to be protected by regulation (so-called “Tullock costs”). These costs must be subtracted from regulation benefits. Their size will depend on the characteristics of the market in which enterprises operate (Fisher, 1985): if enterprises compete on equal footing to get benefits from the introduction of regulation, resources will be invested in lobbying for favourable regulations up to the point where the value of invested resources corresponds to the present value of the flow of additional benefits expected from regulation. In this case, Tullock costs will correspond to the area of the rectangle $D'B'C'D$ in Figure 2c²².

In sum, regulation will generally be inefficient and will generate excess costs which may well exceed any benefits that regulation may bring. If the regulated sector is contestable, these costs will represent a pure waste of resources because in the absence of regulation the monopoly would be compelled to price efficiently and to keep costs at a level compatible with the efficient utilisation of resources. Hence, the benefits from deregulation derive mainly from three sources – from the elimination of the costs of regulation, from its effects on the cost curve and from the competitive pressure it introduces for efficient pricing.

F. Economy-wide effects of deregulation

Deregulation is often implemented not only in the belief that it will enhance efficiency in a specific sector, but also for the beneficial effects it may have in the rest of the economy. These could stem from a number of factors: the elimination of resource misallocation thereby freeing resources for use in other sectors; increased flexibility of the economic system through reduced price and wage rigidities and a better allocation of resources; a more competitive environment enhancing the capacity for growth. Quantification of these effects or just the description of the channels through which the sectoral effects spread to the economy is a very complex exercise which is rarely undertaken.

A study which attempts to evaluate the static effects of deregulation on resource allocation was undertaken by the Commission of the European Communities (1988a). It examines the effect of eliminating regulatory barriers to supply in sectors accounting for about 25 per cent of EC GDP²³. In practice, the effects may be expected to occur over a number of years and so the time span considered is six years.

As expected, the first impact of liberalisation is lower prices due to reduced monopoly power and a more efficient use of resources. Because of the increased

efficiency, production can expand to satisfy higher demand at lower prices. The CEC estimates show that "supply effects" cause a decline in the GDP deflator of 2.6 per cent over six years, while real GDP increases by about 2.1 per cent. Most of these effects would in fact take place over the first two years. Assuming that the Harberger measure of welfare can be applied to changes, the gain in social welfare would be about 2.7 per cent of GDP. However, since part of this would correspond to a better exploitation of scale economies, which are related more to the size of the integrated European market than to deregulation, the welfare effects of deregulation may be only between one-third and one-half of the estimated amount – say, 1 to 1.5 per cent.

The CEC simulation has the comparative-static character of the Harberger scheme, because it does not take into account the effects of enhanced competition on growth potential; the effects considered are only those deriving from the once-and-for-all elimination of the distortions implied by regulation. However, dynamic effects of deregulation on competition and innovation are likely to be important and they have often been relevant in inducing authorities to undertake deregulation. Some indications of the extent of these gains for the telecommunications sector are provided by two studies which investigate the potential effects of deregulating certain parts of the industry.

According to a study by von Weizsacker (1987) on Germany, the gains obtainable from the deregulation of "Value-Added Network Services" (VANS) would be very significant. Currently the market for these products – information services, electronic mail and data exchange – is monopolised by the Post Office and prices exceed costs by a large margin. According to his study, regulation has two harmful effects: high costs hamper diffusion of the service, preventing consumers from learning how to use them, and the monopolistic supplier has little incentive to introduce the new and enhanced products made available by technological improvements. Eliminating regulation would encourage both demand and supply. By the beginning of the next century, liberalisation of VANS would produce a welfare improvement equivalent to about 2 per cent of GNP, compared with a scenario without deregulation.

Analogous results may be obtained from a recent study prepared by INSEAD (1988) for the CEC. The study assesses the resource gain to European countries from a co-ordinated effort to change the current policy of national standards and certification requirements for telecommunications services. The effect of a complete liberalisation would be increases in labour productivity of between 25 and 50 per cent, with respect to the current trend. These results suggest that the welfare gains from deregulation may substantially exceed those estimated in the static framework.

There is a strong *a priori* presumption that deregulation will contribute to reducing rigidities in labour markets, thereby increasing the elasticity of the demand for labour in the regulated sector (see Lawrence, 1987). There could also be spillover effects to the economy at large. Studies of the impact of airline deregulation in the United States confirm this expectation. The demand for labour at prederegulation

wages has fallen and real wages have declined (Bailey, 1986a). Card (1986) shows that lower wages may keep employment from falling. Comparing a group of airline employees (mechanics) he finds that deregulation led to a reduction in average real hourly earnings of approximately 6 per cent between 1974 and 1985, while employment remained unchanged. The decline in wages resulted from a shift of the workforce from high paying large airlines to smaller airlines paying lower wages. That these airlines were able to attract mechanics at lower wages suggests that wage levels before deregulation had been pushed above levels in the industry.

The CEC simulation mentioned above shows that adjustment in the labour market may not take place smoothly. The coordinated liberalisation process described above would lead to a fall in employment of about 370 000 persons in the first two years, even though the long-run effect of the exercise is to produce an increase in employment of about 800 000 persons.

That the positive effects of deregulation may materialise only after some time, while the immediate results may involve a reduction of welfare, is an interesting implication of a study by Jorgenson and Slesnick (1987) which evaluated the global effects of deregulating natural gas prices in 1985 through the use of a general equilibrium model of the United States economy. In terms of long-term social welfare there is a clear advantage in adopting an immediate decontrol of prices. However, if control had continued unchanged, consumers would have benefited in terms of both efficiency and equity up to 1989 and then lost in the subsequent period. This happens because the immediate impact of deregulation is a change in prices, while the positive effects of deregulation appear only when there is a beneficial response in supply and resource allocation.

This may explain why deregulation does not take place more often despite the many associated benefits. If the positive effects materialise only gradually, it may be rejected if the time horizon of the decision-makers is shorter than the time span over which the benefits materialise.

II. DEREGULATION, PRIVATISATION AND REGULATORY REFORM

Recognising that existing regulatory mechanisms were causing substantial losses in economic welfare, during the last decade governments have explored a number of ways in which regulation could be removed or made more efficient. This section describes the various approaches that have been tried and discusses how far they have achieved their objectives.

A. Privatisation and deregulation

In many countries deregulation has been accompanied by privatisation. In Japan the national communication carrier (NTT) has been partly privatised as part of a wide programme of liberalising long distance and local communications (OECD, 1987a). In the United Kingdom, the partial liberalisation of telecommunications through the licensing of a much smaller competitor to the dominant carrier (British Telecom) was accompanied by the privatisation of the dominant supplier. Similar cases are represented by the planned privatisation of Australian Airlines, and by the planned privatisation and fragmentation of airports and harbour authorities in New Zealand (Vuylsteke, 1988).

In general, the recourse to privatisation stems from two considerations: the expectation of higher productive efficiency and the belief that a private enterprise is more likely to behave in a competitive fashion. However, while it is generally recognised that in principle the transfer of control from the public to the private sector should contribute to the cost efficiency of the firm by subjecting it to the control of shareholders and the capital market, the relation between privatisation and competitive environment is more controversial.

1. *Privatisation and competition*

The advocates of privatisation argue that a public enterprise is most unlikely to compete with private competitors on equal terms. The liabilities of public enterprises are guaranteed by the state and this provides an incentive to use financial resources for anti-competitive or cross-subsidisation purposes. Privatisation is therefore an instrument for subjecting the enterprises to capital market discipline by compelling them to obtain resources at market cost. A further argument in favour of privatisation is that it restrains governments from distorting competition by supporting inefficient enterprises – particularly in politically sensitive areas or sectors. By making these interventions more difficult, privatisation would then be instrumental in achieving the broader goal of government liberalisation.

Some empirical evidence, on the other hand, shows that when faced with Competition, public enterprises are as efficient as private enterprises²⁴. Moreover, some authors (Hemming and Mansoor, 1987, and Kay and Thsmpson, 1986) have argued that, particularly in the case of the United Kingdom, privatisation has often weakened competition. Because privatisation is a painless means of increasing current resources, governments may be induced to forsake a more competitive structure of the economy simply in order to raise more revenues. In addition, privatisation has sometimes become a political end in itself and its impact on competition may be given secondary importance.

While these points may be valid with respect to some specific privatisation exercises, it is doubtful whether they hold true for privatisation in general, as Hemming and Mansoor seem to argue. The perverse relationship noted by these authors

between privatisation and market structure may mainly be the consequence of the way in which certain privatisations have been implemented. In recent years, governments have been giving more attention to the competitive effects of privatisation and approaches are changing. In the United Kingdom, for example, the privatisation of British Gas as a single company led to fierce criticism and a different approach is being followed for the planned privatisation of electricity and the possible privatisation of railways. In the telecommunications sector the scope for competition was limited at the outset of privatisation, but was substantially expanded by the decision of the regulatory office (OFTEL) to allow Mercury access to the whole national territory in competition with the dominant (privatised) carrier – British Telecom (Vickers and Yarrow, 1986).

2. Partial privatisation

In a number of countries, privatisation has implied only a limited transfer of ownership from the public to the private sector, with control of the company remaining in public hands²⁵.

Since there have been few analytical studies of the behaviour of mixed enterprises, it is difficult to say whether the favourable effects on efficiency that are expected to follow privatisation can also be expected in this case. However, attempts at formal analysis show that partly state-owned enterprises are less efficient and have lower profits than private enterprises (Eckel and Vining, 1985). Maximization of shareholders' wealth will be only one of the objectives pursued by the enterprise and, because property rights will be weakened in a mixed enterprise, managers will have more opportunity to pursue their own goals.

Experience in countries where mixed enterprise is a more widely used instrument indicates that the real issue is the degree of autonomy of management from political interference. The likelihood of such interference probably depends on institutional as well as business conditions. The desire to implement processes which could not be reversed as political or business conditions change is probably one of the reasons why an initial orientation towards partial privatisation has sometimes given way to complete privatisation²⁶.

For the reasons cited above, the market valuation of a mixed public-private enterprise should be lower than that of an analogous private firm. Empirical studies of acquisition of private enterprise control by public entities show that the market valuation of the acquired enterprises falls: either the return is expected to be lower or it is expected to be riskier (Boardman *et al.*, 1986).

B. Reform of regulation

When deregulation cannot be implemented because of its social costs, the shortcomings of regulation can be reduced by making it more responsive to the

requirements of static and dynamic efficiency and to market conditions in general. Two issues have been considered in this connection: what type of regulatory rules are likely to yield the most efficient results, and what structure of regulation is most responsive to market incentives?

1. *Efficient regulation*

The first question essentially concerns the determination of the level and structure of prices and the condition of entry into the markets. Recent discussion has centred on two main aspects. First, what criteria should be used to determine optimal prices, particularly in the case of joint production by a natural monopolist when fixed costs must be allocated among different products consistent with a financial equilibrium constraint? Secondly, what mechanisms are most likely to ensure efficient application of regulation, in the sense of avoiding X-inefficiencies and other deviations from optimality?

As regards optimal rate-making, research at the end of the 1970s has shown that Ramsey pricing is optimal when the problem is to allocate fixed costs of a natural monopolist among different, jointly-produced outputs. Baumol and Faulhaber (1988) noted that Ramsey pricing – virtually unknown to regulators in the mid-1970s – has rapidly become a reference for efficient regulation. Recommendations by regulators often mention Ramsey pricing as an instrument for determining the appropriate level and structure of rates. However, the practical implementation of these rules is very difficult, because of the amount of information needed to compute Ramsey prices²⁷.

Because of this problem, research on the mechanisms of regulation has concentrated mainly on the definition of rules to ensure that the pricing behaviour of regulated enterprises will be as close as possible to Ramsey pricing. In general, these rules rely on market incentives for regulated enterprises to maximize efficiency.

Loeb and Magat (1979), for example, propose that, in order to induce enterprises to price efficiently, regulators should fix a price on the basis of their estimates of average costs and then give the enterprises a subsidy equal to the consumer surplus resulting from the setting of a lower price. The aim is to induce the firm to set production so that marginal costs (which remain unknown to the regulator) equal the prices consumers are willing to pay while ensuring that prices do not exceed an estimated average cost.

Sudit (1979) proposes a scheme which would reduce the information required by the regulator, while providing an incentive for the firm to achieve X-efficiency. The regulator should determine price increases by reference to the difference between the expected development of input prices and productivity. This would give the firm an incentive to improve productivity to at least that of the norm. Revisions of the base of calculation should take place from time to time. Sudit's proposal is similar to the one later adopted for OFTEL's regulation of British Telecom.

Vogelsand and Finsinger (1979) suggest that regulators should constrain over time an index of prices set by the firm, reducing the value of the index when the enterprise makes an extra profit. The enterprise could then choose how to allocate the permitted increase among its various products. The authors show that repeated applications of their criteria would induce firms to pursue Ramsey pricing.

2. The governance structure of natural monopoly

The search for mechanisms which render regulation more efficient has extended beyond the search for regulatory rules to identifying the most appropriate management or 'governance' structure for natural monopoly. The guiding idea behind this analysis is that different structures, such as public enterprises and regulated private enterprises, require different internal incentives to efficiency and different ways of assessing their performance.

The issue has become highly topical because of the tendency in many countries to privatise natural monopolies thereby changing their method of regulation from reliance on public enterprises to regulation of private enterprise. The subject has been made more controversial by proposals to introduce "market" criteria in regulation of monopolies, by creating a competition "for" the market rather than "within" the market, through the adoption of franchising.

a) From public monopoly to private regulated enterprise

While the rationale for privatisation of natural monopoly is the expected gain in efficiency from private ownership, Kay and Thompson (1986) have argued that a private enterprise may also be more reluctant to accept regulation and will have more incentive to misallocate resources in order to maximize return. While productive efficiency will be higher in the private enterprise, allocative efficiency will be lower.

Some authors have reversed the Kay and Thompson argument, suggesting that allocative efficiency is likely to play very little role in determining the behaviour of public enterprises. In sectors where public monopolies operate, regulatory bodies often have little power so long as information, technical resources and political influence are concentrated in the monopoly. There will then be less, not more, control of allocative efficiency (for a study of Germany, see Kaufer and Blankaert, 1983). A recent study compared the performance of public telecommunication companies in Europe with regulated private companies in North America and found that the latter were 25 to 50 per cent more efficient (DIW, 1986). The study attributed this to their more "commercial" attitudes and to the fact that regulation of private enterprises by an adversarial public body has acted as a more powerful incentive to foster efficiency because it is legally binding²⁸.

Crew and Kleindorfer (1986) note that the problems associated with private enterprise regulation depend on the way it is implemented and, in particular, on the use of "rate of return" regulation. As discussed above, alternative criteria may be introduced which offset some of the problems generated by regulation. It may be argued that a system based on adversarial control of a private enterprise by a public sector body may offer better opportunities for the introduction of these more efficient regulatory criteria than a system based on public enterprise, where the power of regulators is smaller.

b) Franchising

Franchising consists in granting the right to natural monopoly to the operator who guarantees to provide the service under the best conditions, usually including lower prices. At least in principle therefore, franchising creates a competitive incentive; it could both minimize the costs of supervision since these would be mainly incurred at the moment when the franchiser is being selected, and it would create incentives to minimize costs since the franchiser would aim to maximize profits once the conditions are set. Periodic renewal of the franchising contract would create a market for franchising which would ensure that conditions for the provision of the service are fixed in a "competitive" fashion. An attractive feature of the system would be that, in sectors where a subsidy is required, competitive bidding would lead to its minimization.

On the other hand, it is argued that franchising may reduce incentives to invest and maintain capital. This is an important problem in natural monopolies where fixed and sunk costs are often sizeable. Because of this, franchising is generally considered suitable only for ventures which do not imply too large capital investment, such as courier mail, garbage collection and airport maintenance (Hensher, 1986).

Demsetz (1968) has argued in favour of "operating" franchising, in which capital would be publicly owned and the franchiser would provide only managerial abilities. Domberger (1986) has suggested the application of Demsetz's proposal to public utilities in the United Kingdom. Investment decisions would be taken by the public sector, so that the problems associated with investment and the maintenance of assets are avoided.

Despite the attractive features of the scheme, Schmalensee (1979) and other authors have stressed a number of problems which affect any kind of franchising arrangement. They derive from the difficulty of writing contracts which ensure a specific level and quality of service in the presence of unknown contingencies. In particular, it is difficult to draw-up a long-term contract which does not induce inefficient behaviour by the franchiser. Long-term contracts are at the mercy of unexpected movements in prices. Shorter-term contracts or rate-revision formulae must then be used, but this would create incentives to inefficient behaviour and would

greatly increase the probability of the contract being broken. There would be a need to monitor the contract, through special arrangements and staff, thus eliminating one of the advantages of the system. Experience shows, furthermore, that monitoring may be extremely difficult.

In a study of cable TV franchising, Williamson (1976) argues that when the assets are owned by the firm, bidding by the various applicants does not take place on equal terms because the incumbent has substantial advantages, including knowledge of demand and supply conditions, information about the value of fixed assets, and ownership of "human" (managerial and other abilities) which are needed to perform the task. The outcome of the bidding process is skewed in favour of the original franchiser, and excess returns will in any case be earned by him. Many of these problems of asymmetry would still occur even in the case of "operating" franchising²⁹.

III. THE EFFECTS OF DEREGULATION IN PRACTICE

The theoretical considerations presented above indicate that the potential gains from deregulation could be substantial. This conclusion is supported by a number of studies made in the 1960s and 1970s for the United States. Among them, Keeler (1972) estimated that at the beginning of the 1970s, excess margins in airline transportation amounted to not less than 20 per cent of costs and tended to increase with the length of the routes. Airlines were characterised by substantial excess capacity, and capacity utilisation on regulated lines tended to fall over time. Moore (1975) estimated that in the 1960s, the loss from inefficient regulation of surface freight transportation amounted to a minimum of US\$3.4 billion, half of which stemmed from inefficient regulation in rail transport. Higher estimates of US\$8.9 billion were obtained when the costs of shifting to less efficient transport modes are taken into account.

Whether the potential benefits of deregulation materialise depends on the relevance of the conditions justifying regulation and on the way regulation is implemented. This section reviews the effects of deregulation in transport and in telecommunications, mostly on the basis of the experience in the United States where deregulation took place earlier and on a larger scale. Comparison of the effects in the two sectors appears particularly useful because, with the exception of railways, transport is characterised by a basically competitive structure and low sunk costs. As regards the telecommunications industry, it is still a very controversial issue as to whether or not it constitutes a natural monopoly.

A. Transport

The deregulation processes which have taken place in airlines, railways and trucking in the United States and in bus transport in the United Kingdom have yielded basically positive results. Deregulation has generally resulted in lower prices, better capacity utilisation and increased frequency of services. In cases where firms in price-regulated markets competed on quality of service, some deterioration was observed after deregulation. However, it is quite likely that in these cases pre-deregulation standards may have been well above those the consumer wished to pay for³⁰.

Estimates of the effects from deregulation of trucking in the United States show a substantial improvement in performance. According to Delaney (1987), transportation efficiency increased sharply and in 1985 the improvement amounted to US\$26 billion – a saving of approximately 10 per cent on the annual transportation bill. Similar results have been found for the deregulation of the long range bus service in the United Kingdom (Davis, 1984, and OECD, 1987b) where the market had been shrinking for many years and the regulated companies had substantial excess capacity and excess costs. Deregulation reversed the trend, inducing a 17 per cent increase in inter-city services, lower fares and better service. Bus deregulation has also had a beneficial effect on intermodal competition, forcing British Rail to improve its service in order to maintain its share of passenger traffic. Similar beneficial effects have been observed following the liberalisation of local bus services in 1985.

Welfare gains from airline deregulation in the United States are estimated to have been substantial. Using a direct estimate of “welfare gains”, Morrison and Winston (1986) find that the benefits from deregulation were of the order of one third of airline revenues in 1977. Using a different procedure Caves et al. (1987) estimated that deregulation had lowered unit costs by 10 per cent with savings of over \$4 billion in 1983 alone.

Following deregulation, new “hub and spoke” configurations have permitted companies to better adapt their equipment to the size of the market. Smaller planes and mini-buses bring passengers from the periphery to the hub. The deregulation of airlines in the United States and of bus services in the United Kingdom both provided for direct subsidy programmes to ensure that services were provided for remote areas, but the new service configurations reduced the subsidy requirements below the levels originally planned (Bailey, 1986a, and OECD 1987b). Better “dimensioning” of supply has often allowed continuous service to locations which had been expected to be dropped from schedules, while the abolition of constraints on supply has markedly improved capacity utilisation³¹.

Although the results of deregulation have been positive overall as expected, the benefits of deregulation and the characteristics of the market after deregulation have sometimes differed substantially from those predicted before deregulation. On the basis of the early studies on the costs of regulation, deregulation was expected

to lead to substantial reduction in costs and prices in all transportation modes and to an increased supply of services. Because, with the exception of rail, the transport sector has relatively low barriers to entry, the change was expected to be brought about not only by increased competition among modes of transport and increased rivalry among firms already in the market, but also by a substantial entry of new firms into the market.

Recent calculations by Boyer (1987) have shown that lower prices and more traffic – the expected outcomes from United States rail deregulation – did not materialise. On the contrary, in the post-deregulation period prices rose by approximately 2 per cent per year and the railways' share of surface freight dropped. By 1985, gains from railroad deregulation amounted, at best, to a mere \$90 million or only 0.32 per cent of rail revenues in that year.

Similarly, in the case of airline deregulation the market structure did not evolve as predicted. Substantial new entry was expected as well as an increase in the market share of new companies because the cost structures which the established airlines had inherited from the regulatory era were characterised by heavy fixed costs and by high salaries. In practice, by the mid-1980s the large airlines which had been dominant in the regulated era were still in a dominant position although they had gone through a long and painful process of restructuring and cost cutting (Levine, 1987, and Baumol and Willig, 1986). The degree of concentration in the industry has increased further since then, following the merger of some large airlines (Kahn, 1988). Thus, the positive effects of deregulation were apparently attributable mostly to an increase in rivalry which was, however, distributed unequally among the various sections of the market (Sandler, 1988).

Levine (1987) has argued that the stable market structure was the result of the way deregulation was implemented. In particular, little was done to ensure equal access to the common facilities which characterise the airline network. This allowed large airlines to maintain barriers to new competition. For example, the distribution of airports "slots" after deregulation took place on the basis of the situation before deregulation, making it very costly or even impossible for new companies to acquire slots in some airports (Baumol and Willig, 1986). The hub-and-spoke route design, unanticipated at the time of deregulation, appears to have created substantial market power for airlines in their home hub. Furthermore, deregulation and multiple supply on the same routes have resulted in wide reliance on external reservation and ticketing services and, in particular, on travel agents and computerised reservation systems. The dominance of a few reservation services owned by large airlines has given them an important degree of market power both in the provision and in the processing of information, thus preventing equal access to it. The way this has been done has sometimes raised questions of legality – as witnessed by various anti-trust cases.

The exclusive use of common facilities by an incumbent operator was also an initial characteristic of the deregulated bus system in the United Kingdom. The

National Bus Corporation (NBC) continued to be the sole utiliser of the network of bus terminals, compelling the new entrants to use emergency accommodation. "Strategic" use of these facilities has probably been a substantial reason for NBC's continued dominance of the sector (Davis, 1984). However, the recent privatisation of NBC and its dismemberment into ten separate subsidiaries is likely to have reduced the problem.

B. Telecommunications

For many years it was believed that the whole telecommunications network was a natural monopoly due to economies of scale and scope, quality requirements and networking externalities. Until the end of the 1970s, not only long-distance telecommunications but also terminal equipment sales and utilisation were regulated in most countries. Since then sale and utilisation of terminal equipment have been liberalised in most countries (OECD, 1987a). There is also agreement that VANS do not present strong economies of scope with respect to basic services and liberalisation of these services is envisaged or planned in most countries.

The United States, the United Kingdom and Japan have gone further by extending deregulation to the telecommunication network. This move was prompted by the perception that the scale of operation of telecommunications had exhausted the potential for economies of **scale**³² and that interconnection of long-distance operators on local lines greatly reduced economies of scope. It was felt, therefore, that the natural monopoly rationale no longer existed, at least for long-distance telecommunications.

Deregulation has taken different forms in the United States on the one hand and in the United Kingdom and Japan on the other. In the latter countries it has opened the market to new entrants, while maintaining a dominant supplier which also takes charge of certain public commitments. It was believed that the threat of entry by new firms would stimulate the efficiency of the dominant supplier, while the latter was thought to be better at utilising scale and network economies and resolving externality problems.

In the United States, where deregulation stemmed from the settlement of an antitrust suit, the AT&T telecommunication network has been split up in order to prevent having a dominant company involved in both local and long distance communications. Boundaries have been created between natural monopoly (local) and competitive (long distance) areas of the telecommunication network, the former being regulated and protected from entry while the latter are left open to competition. Local service has been devolved to seven separate companies which are prevented from competing outside their territorial boundaries and which are restricted to specific types of communication businesses. Although long-distance communication has been opened to competition, access fees have been established which continue to be subject to regulation and which include a substantial element of

cross-subsidisation in favour of local service (OECD, **1987a**, and Crew and Kleindorfer, **1986**).

In the United States, deregulation appears to have had two main effects. First, it has allowed a change in the price structure. Before deregulation, local service was subsidised on a large scale by long distance traffic. Long distance calls were priced at five or six times above marginal costs in order to subsidise local callers. This was found to be inefficient because the price elasticity of demand for local service is estimated to be very low³³. Following deregulation there has been an adjustment in prices. Local rates have increased in real terms by 5 per cent a year, while long distance rates have declined by 8 per cent a year (Crandall, **1988**). Within the two categories, the structure of rates has also been widely differentiated according to cost and demand conditions in the various segments (Kahn, **1984**).

The second effect of deregulation has been to increase competition substantially in the market for switching and transmission equipment which, before deregulation, was dominated by Western Electric, a subsidiary of AT&T. Increased competition has resulted in substantial declines in equipment prices: for instance switch prices per line have fallen by 11 per cent a year since deregulation. Furthermore, there seems to have been an increase in innovation in sectors like switching, where technology had long lagged behind advances in other telecommunication sectors (Crandall, **1988**).

Both developments appear basically favourable from an efficiency point of view. However, concern has recently been voiced on the prospective developments of the regulated system. First, it is argued that despite the readjustment in prices, the level of cross-subsidisation tends to render the system unstable because the continued subsidisation of local users keeps access rates for long-distance operators well above stand-alone costs. There is a risk that long-distance operators and large users may decide to by-pass the local companies. This would gradually reduce the revenue base of the local companies, with effects on service, investment and maintenance (Crew and Kleindorfer, **1986**, and Phillips, **1986**).

Second, it is feared that the rigid separation between local and long distance operators created by regulation may have negative effects on the prospective introduction of services characterised by network or co-ordination economies of scale and by network externalities. Attention is especially focused on the effects of the territorial and functional limitations imposed on local companies. There are good reasons to think that network economies may well extend across or beyond the boundaries of the local companies. Moreover, it is feared that the restrictions imposed on local companies to operate only in the same lines of business (like voice communications) may prevent economies of scope – for instance in the development of more advanced, integrated systems of data communication (Phillips, **1986**, and Diaz Dennis, **1987**). It is argued that these new systems will entail the possibility of networking externalities. Their exploitation, however, requires either very complicated and expensive contracts, or some forms of subsidisation through the pricing

system, and substantial co-ordination among the companies involved (Phillips, 1986).

An interesting question raised by these problems is whether telecommunications really is a natural monopoly, or whether the problems arise from the way that deregulation has been implemented³⁴. A number of authors argue the first case on the basis of the evolution in the structure of the industry since divestiture; AT&T remains the dominant company and earns healthy profits despite asymmetric regulation, while its competitors struggle to break even (Phillips, 1986; Egan, 1987; and Zajac, 1987). These authors stress that the main problems with previous telecommunications regulation in the United States were not related to natural monopoly but to the sustainability of the price structure which was imposed on the monopoly. This involved too high cross-subsidisation and induced "cream-skimming".

Other authors argue that the way the system has been opened to competition is at the heart of the problems (Crandall, 1988; Crew and Kleindorfer, 1986; and Kahn, 1984). In particular, they question the rigid separation between regulated local networks and competitive long distance companies. This prevents co-operation and competition among the local companies, which are the most likely to exploit economies of scale and scope, and among them and AT&T. Following this latter line of thought, proposals have recently been made to blur the distinction between regulated and competitive areas and to allow the local companies to compete in all areas of activity and outside their territorial jurisdiction (Diaz Dennis, 1987). This should allow a better utilisation of their superior networking and co-ordination capabilities. The consequence in terms of market structure would probably be a movement towards oligopolistic competition. Again this seems to call for a new and different role for regulation. Instead of closing and fragmenting the market, regulation should be directed at fostering co-operation opportunities, and at preventing dominant firms from hindering competition.

From a more general point of view, the experience of the United States illustrates the problem of reconciling competitive stimuli in the market with the risk of opening an unsustainable natural monopoly to inefficient competition. The path of more gradual liberalisation followed in Japan and the United Kingdom, which leaves a dominant company in charge of "social" obligations but introduces competition by smaller competitors, may be a reasonable compromise.

IV. RESULTS OF DEREGULATION AND FUTURE PROSPECTS

Since it began in the United States in the late 1970s, deregulation of public utility industries and in particular transportation and telecommunications has gone forward in many OECD countries. Deregulation has been widely applied in the

United States and the United Kingdom, more recently in New Zealand and more selectively in Japan. In continental Europe, deregulation has been slower partly because regulation has often been seen as an instrument for favouring "national champions". Recently, however, pressure for deregulation has intensified mainly because of the efforts of the Commission of the European Communities in preparing for the "internal market".

It seems likely that deregulation will also be pursued in hitherto reluctant countries. The results of deregulation have generally been good and experience is pointing the way to solutions of some problems that have arisen. At the sectoral level, efficiency has increased and costs have been reduced. Over time, these effects are expected to spread to other sectors, resulting in higher efficiency and better competitive conditions at the national level. Budgetary and efficiency considerations in the management of public services provide an additional incentive for privatisation and deregulation.

In most countries the scope for deregulation of public utilities is substantial. In transport, railways are a national monopoly in all European countries, and in most of them they also represent a national problem. The road followed in Japan, where the railway system was split into separate subsidiaries and partly privatised, may be followed in the United Kingdom and perhaps in some other European countries as well. "Franchising" of some railway facilities is being considered in both the United Kingdom and Italy. As the bus deregulation experiment in the United Kingdom has shown, competitive pressure to improve the efficiency of railways may be created by deregulating alternative modes of transport that were originally regulated in order to protect the railways. Deregulation of trucking appears to be among priorities in Japan and Germany.

Outside the United States, air transport remains heavily regulated. Intra-European flights are tightly regulated and European national airlines have often entered into anti-competitive agreements. However, domestic short-haul flights have been opened to competition with positive results even though access to the most profitable domestic connections is restricted in most countries. Guidelines for a gradual liberalisation have been drawn up by the Commission of the European Communities. Progress is expected under the planned integration of the European market.

Telecommunications may be the sector where opening to competition could be most fruitful because of its widespread impact on the economy, its role in the economic infrastructure and the rapid pace of innovation. By encouraging competition among different providers, deregulation enhances efficiency in the provision of telecommunication services. Competition among equipment suppliers in wider markets will tend to reduce the risk of failure and allow economies of scale especially in the field of research and development. Furthermore, deregulation in telecommunications could allow substantial improvements in productivity which, until recently, has lagged behind that of other sectors. It is not by chance that in Japan

deregulation of telecommunication was implemented before liberalisation of other tightly regulated sectors was even considered.

In continental Europe the telecommunication sector is still tightly regulated, in spite of the agreement reached in **1988** by the EC countries on the liberalisation of **VANS**. National monopolies continue to maintain their hold on national markets in Germany, Italy and France. In some of these countries there is still quasi-vertical integration between networks and equipment suppliers in order to favour national technology. In the long run, this situation must change because of rising competition among the various national networks in the wider European market and because of the gradual opening of domestic procurement to foreign suppliers. However, the development of a competitive environment may take a long time and substantial opportunities for growth could be lost. In the meantime, most telecommunication markets, including deregulated ones, will continue to be dominated by the leading national suppliers.

After public utilities, another major field for the application of deregulation and privatisation is public services – health, education, transport infrastructure, etc. A number of factors favour such a development: the difficulties experienced by all countries in managing these services lead to poor productivity and low efficiency; provision of these services puts growing pressure on government budgets because of the difficulty of monitoring costs; many public services could be provided in a more flexible fashion by a private organisation. Early experience in the United Kingdom, the United States and New Zealand suggests that it is possible to transfer responsibility for the provision of certain public services to private entities which may be open to competition or be appointed by franchising.

The review in the preceding pages also shows that while deregulation usually has positive effects, its implementation may pose two particular problems. First, opening a sector to competition may require sustained efforts by government in order to create and maintain market conditions. The endeavour is made difficult because often a deregulated market evolves along lines which were not predicted beforehand. One approach to these problems is to rely more heavily on anti-trust legislation to promote competition.

Second, deregulation implies that distributional and fairness issues – which were often reasons why regulation was introduced in the first place – have to be tackled in a different manner. After deregulation the working of the market sometimes reduces the need for cross-subsidisation as new configurations of supply meet the requirements of groups previously protected by regulation. Nevertheless this may not happen in all cases. At the heart of the problem is the need to disentangle efficient performance from distributional objectives and to achieve each objective through distinct policy instruments. This calls for a review of subsidisation mechanisms and, in particular, of the possibility of replacing cross-subsidisation by direct subsidies to ensure a level and price of service to targetted groups.

NOTES

1. Denison (1979) and Crandall (1980) argue that environmental regulation has had a substantial effect on total factor productivity. Siegel (1980) found the same effect on labour productivity. Analysing the effects of overall regulatory activity, Christiansen and Haveman (1981) found that increased regulation accounted for a quarter to half of the decline in total factor productivity between the early 1960s and the mid-1970s.
2. In contrast, "social regulation" generally refers to attempts to impose certain standards with respect to quality, health and safety (OECD, 1987b).
3. An exception is represented by Demsetz (1968 and 1982) who views natural monopoly as a transitory phenomenon, which will be eliminated by technological changes induced by the opportunity for competitors to reap monopoly profits. Regulation, by preventing this opportunity, would hamper innovation and therefore have undesirable dynamic effects.
4. The optimal pricing conditions for a regulated multi-product monopolist are given by (Philips and Roberts, 1985):

$$\sum_{k=1}^m (P_k - MC_k) \frac{dx_k}{dp_i} = Lx_i \quad [1]$$

where the term in parenthesis is the difference between the price of each output (P_k) and its marginal cost (MC_k), L is the Lagrange multiplier, x_i is the quantity produced of each product i , and the term dx_k/dp_i is the cross-substitution effect. It may be easily seen from [1] that if the demands for the products are independent (the cross-substitution effect is zero) the deviation of prices from marginal cost is inversely proportional to the elasticity of demand (E).

$$\frac{[(p_i - MC_i)/p_i]}{[(p_j - MC_j)/p_j]} = E_j/E_i \quad [2]$$

However, in general the demand for the products will not be independent and the cross substitution terms will be different from zero. If the products are complements, the terms will be negative so that the margin between prices and marginal costs on some outputs should be very low. In some cases it may even be possible that prices on some outputs are fixed below marginal costs (in particular if $E_i \geq 1$ and the complementarity relation is strong enough). Correspondingly, there will be a high margin on other outputs, which could induce inefficient entry.

5. Sustainable single-output monopoly is guaranteed at a price equal to average cost if average costs exceed prices for quantities demanded at a lower price (the average cost curve intersects the demand curve from below). Otherwise entry will be feasible for an enterprise undercutting the natural monopoly. In general, a single product natural monopoly will be sustainable.
6. Faulhaber (1975) and Baumol, Bailey, and Willig (1977) show that sustainability of the optimal price structure depends on the demand relations between the various products. If two products are substitutes, a Ramsey price structure is sustainable even if it is not the only sustainable one (Baumol, Panzar and Willig, 1982). However, if the products are complements, the optimal price structure may not be sustainable (Philips and Roberts, 1985). This is also the case if the monopolist is vertically integrated (Panzar, 1980).
7. Williamson (1975) has analysed the working of markets under uncertainty when people are guided by self-interest. His analysis derives from previous work by Coase (1937) and Alchian (1965). See also Alchian and Demsetz (1972).
8. Sappington and Stiglitz (1987) note that multiple observations of the firm allow better control: repeated interaction between firm and regulator reduces information problems because the regulator can infer information from repeated behaviour. Moreover, X-inefficiencies and excess expenses

may be detected if comparison with other firms is possible ("yardstick Competition"): in this case, schemes which reward relative performance could be implemented. Even schemes of this kind, however, may pose management problems: Nalebuff and Stiglitz (1983) show that in general imposing a penalty on the "loser" can provide better incentives than rewarding the "winner". However, in a risky environment, if enterprises are penalised too heavily for failures and not sufficiently rewarded for superior behaviour, there will be incentives to avoid risks with effects on the rate of innovation.

9. Non-distortionary (lump sum) taxes and subsidies are seen as the optimal solution of distributional problems. Given the authorities' welfare function, which includes a preference for a certain income distribution, welfare maximization will imply the determination of appropriate lump sum transfers (Bos, 1986). Among the alternatives to a lump sum transfer, a subsidy scheme based on income taxes only distorts labour-leisure decisions, while price regulations distort relative prices throughout the economy (Ng, 1984).

However, a number of arguments can be raised against public subsidies: first, a tax-subsidy scheme may be costly to implement, both because of costs in the administration of the subsidy and because of induced distortions in resource allocation. For instance, Ergas (1987) notes that suppliers may be induced to allocate a larger part of fixed costs to the subsidised areas of business, while the government may instead try to fix the level of subsidy administratively, irrespective of the actual difference between costs and prices. Furthermore, because taxes and prices are fixed by different authorities, prices and tax levels would not be determined simultaneously. The resulting price-tax subsidy structure is not likely to be optimal.

Feldstein (1972) has argued that cross-subsidization may give better results than marginal cost pricing coupled with a subsidy scheme. Ease of implementation and low administrative costs also favour cross-subsidization. In addition, the cross-subsidy may not be so inefficient if the products concerned are broadly consumed; in this case it may be considered as equivalent to a broadly based consumption tax, which may be more efficient than other forms of taxation (Ergas, 1987). On the negative side, the possibility exists that cross-subsidization can be used in an arbitrary fashion to favour undeserving categories (Kahn, 1984).

10. Rate of return regulation is widely used in the United States and in many other countries it is the basis of price regulation. The reason is the relative simplicity of application, which is based on a "cost plus" formula of the kind:

$$R = O + s(V - D)$$

where R are total revenues, O are operating expenses, s is the allowed rate of return, and $(V - D)$ is the "rate base" defined as the value of assets less depreciation with both V and D at current replacement costs. The regulators may adjust the rate base $(V - D)$ or the operating expenses if certain expenses or capital assets are deemed not to be "used and useful".

11. For a discussion of the use of accounting data for economic analysis, see Fisher and McGowan (1983).
12. See De Alessi (1980). For a survey on property rights see Furubotn and Pejovich (1972).
13. Public enterprises will generally be more prone than regulated private ones to pursue objectives super-imposed on them by political authorities, thus further increasing efficiency problems. It is generally recognised that public enterprises actually pursue "multiple objectives" (Marchand *et al.*, 1984, and Bos, 1986). By itself this would not be a problem, as long as these goals enter into the society's welfare function. It should, in principle, be possible to influence enterprise behaviour in such a way that it is optimal, although this will usually imply some sacrifice of allocative efficiency in order to achieve other objectives. However, the perception grew during the 1970s, when performance of public enterprises deteriorated in most countries (see Pontarollo, 1981, for Italy and Pryke, 1981, for the United Kingdom) that, in the absence of a well-defined value-maximization criterion, the efficiency target of the enterprise would be blurred and managers would be able to pursue their own objectives. The obligation of pursuing "multiple goals" in fact would shield public enterprise management from pursuing even second- or third-best efficiency, and would allow a justification of actual performance, however bad it may be, on the basis of the constraints superimposed.

14. Contestable markets theory has mainly been developed by Baumol and his associates (Baumol, Panzar and Willig, **1982**) from a seminal contribution by Demsetz (**1968**). Some of the proponents of this theory have had an influential role in various deregulation processes, particularly in airline deregulation: see Bailey (**1981**) and Levine (**1987**). Contestable markets theory is controversial. Some authors have been very critical of the theory and have argued that it does not explain anything that "may (not) be explained by established analyses of market structure and entry" (Shepherd, **1984**).
15. Tests of contestability basically center on the relation between structure of the market and efficiency. Traditional market structure theory predicts that structure would affect performance (see Scherer, **1980**, ch. 9). Contestability would instead predict that performance does not depend on actual market structure, but on barriers to potential competition. Tests conducted with respect to airlines, often regarded as the typical contestable industry, show that the industry is in fact only imperfectly contestable (Graham, Kaplan and Silber, **1983**, and Morrison and Winston, **1987**).
The consequences of these findings are not clear. Some authors have argued that even small deviations from contestability may yield efficiency outcomes which are much less satisfactory than the ones discussed earlier (Schwartz and Reynolds, **1983**). Morrison and Winston (**1987**), on the other hand, draw the conclusion that actions to remove obstacles to contestability should be intensified. Others argue that in any case contestability may represent a desirable paradigm for government policy, in the same way in which perfect competition represents a point of reference for anti-trust policy. The issue is whether the paradigm may lead to government decisions which make "markets work better for the public than they do under current arrangements" (Levine, **1987**).
16. The latter assumption has been subject to considerable criticism, because it rules out "strategic" behaviour by the incumbent (Vickers, **1986**).
17. This conclusion is, however, conditional on the "sustainability" of the natural monopoly, which depends on a number of conditions including, in particular, the demand relations among the various outputs produced by the natural monopolist.
18. A different approach which has received attention recently may be applied where there is a network and the rate can be divided in two parts (see Kahn and Shew, **1987**, and Littlechild, **1975**). The first part would cover access costs, irrespective of consumption, and in the aggregate should allow recovery of fixed costs. The second part relates to service utilisation which may be priced at, or close to, marginal costs. The access part may contain a subsidy element – for instance consumers with high access costs (e.g. electricity consumers in remote areas) could be made to pay the same as consumers with low access costs (e.g. consumers living near the generating plant).
19. Recently, anti-trust legislation has been given a thorough review, based on the perception that too often the objective of legislation has been to protect certain groups of enterprises (particularly smaller ones) without due concern for economic efficiency and scale economies. For an assessment on these lines see Owen and Breautigam (**1978**). In the United States as elsewhere, recent developments in anti-trust legislation have been directed at making it more conducive to efficiency in market structures. See for instance the revision in United States merger guidelines in **1982** and **1984**, and the changes in French competition legislation in 1986.
20. For a recent application to deregulation analysis, see McCormick *et al.* (**1984**) and Cherkes *et al.* (**1986**).
21. The simplifying assumption of constant returns (average cost equal marginal costs) is not essential for the discussion.
22. However, as noted by McCormick *et al.* (**1984**), whether deregulation would lead to these benefits will in fact depend on the nature of the "Tullock costs". If these resources are completely spent before regulation is imposed (for instance for financing costly legal proceedings), they are "sunk" and will never be recovered even if deregulation takes place. However, probably only a part of the resource diversion will correspond to sunk costs, while a good part will correspond to current outlays (Cherkes *et al.* **1986**).
23. The simulation provides an estimate of the economy-wide consequences of several effects: the abolition of frontier controls, the opening up of public procurement in the Community, the liberalisation of financial services and finally the so-called "supply effects", i.e. the reduction of X-inefficiency and monopoly rents due to a large scale, co-ordinated policy of deregulation.

24. Caves and Christensen (1980) show that Canadian public railways, which for many years had performed worse than Canadian private railways, improved its results substantially after the two systems began to compete with each other. Ashworth and Forsyth (1985) show that Air Canada, a public enterprise, was the most efficient airline among national "flag carriers" during the late 1970s. Studies on the performance of the United Kingdom National Bus Company also show that the performance of the company, still in public ownership, improved after long range bus services were deregulated and opened to the competition by private firms (Davis, 1984).
25. This is for instance the case in Japan, where privatisations of NTT and of the railway companies concern only a minority of share-capital (Vuylsteke, 1988).
26. This was originally the case in the United Kingdom where privatisation plans initially called for the sale of only a minority of the shares of the privatised companies to the public leaving control essentially in the hands of the state (Steel, 1984). This also happened in New Zealand, where partial privatisation of state enterprises and entities ("corporatisation") was initially envisaged before privatisation became a crucial element in an ambitious plan of liberalising the economy (OECD, 1988).
27. These problems exist because the regulator has less information than the firm. As discussed in a previous section, for the firm Ramsey prices will actually be the most economic solution from an informational point of view.
28. Empirical research shows that regulated private enterprise are generally more efficient than public enterprises (see a survey in Borchering *et al.*, 1982). However, some authors have pointed out that these findings are of little relevance for the purpose of comparison because they mainly concern small enterprises engaged in the provision of public services. They point instead to some recent analysis comparing private and public electric utilities, which shows that public utilities are as efficient as private ones. A problem with these studies is that generally they only look at productive efficiency. Atkinson and Halvorsen (1986) have argued that the superior productive efficiency of private enterprises compensates for their inferior allocative efficiency.
29. A number of studies of operating franchising in the United States, quoted in Hensher (1986), show that implementation of the bidding process remains a problem in operating franchising. Competitive bidding for the contract and appropriate monitoring of the contract are not implemented. The contracting environment does not seem to be particularly conducive to efficiency, and because of administrative inertia there is a tendency to renew the contract with the same companies.
30. For surveys covering the United States, see Bailey (1986a and 1986b) and Kahn (1988), and for the United Kingdom, see Davis (1984) and OECD (1987b).
31. Market structures have also changed, enhancing the exploitation of common facilities and networks. In the trucking sector in the United States, for instance, the average company size has increased and cooperation agreements have been struck between companies. Moreover, transport brokers have been established to facilitate co-operation and load sharing (Bailey, 1986a).
32. In particular, extensions of the system were expected to take place at constant returns to scale, scale economies being mostly attributable to the interconnection of short and long distance communications (Phillips, 1982).
33. The price elasticity of demand for local access has been estimated at between -0.05 and -0.2 (see Taylor, quoted in Crandall, 1988).
34. Empirical tests based on data from the United States and Canada give mixed answers to the question of whether telecommunications is a natural monopoly or not, depending on the chosen specification. In general, studies focusing on production of a single output tend to support the existence of natural monopoly (Dobell *et al.*, 1972, and Vinod, 1982). On the other hand, more sophisticated studies which treat short and long-distance calls as different outputs tend to reject the existence of natural monopoly (Fuss and Waverman, 1981; and Evans and Heckman, 1984). In particular, the study by Evans and Heckman has had a considerable influence. This was conducted in connection with an anti-trust suit between the Department of Justice and AT&T and supported the view that long-distance telecommunications is a potentially competitive market.

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