OECD Economics Department Working Papers No. 251

The Implementation and the Effects of Regulatory Reform: Past Experience and Current Issues

Rauf Gönenç,

Maria Maher,

Giuseppe Nicoletti

https://dx.doi.org/10.1787/413754754615

OECD

Unclassified **ECO/WKP(2000)24**

Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

OLIS : 22-Jun-2000
Dist. : 29-Jun-2000

English text only

ECONOMICS DEPARTMENT

ECO/WKP(2000)24
Unclassified

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ABSTRACT/RÉSUMÉ

This paper reviews trends, outcomes and issues in regulatory reform in OECD countries. First, it summarises the evidence on the evolution of regulatory environments and the economy-wide and sectoral effects of reforms (including privatisation) in both competitive and non-competitive industries in the past two decades. Turning to network industries, it then discusses the main policy issues raised by the need to adapt the regulation of the non-competitive segments of these industries to increasing competition in liberalised markets. It focuses on four topics that dominate the debate over regulatory reform: i) the move from command-and-control to incentive-based regulatory approaches based on the removal of entry barriers in competitive markets, the adoption of price-cap mechanisms and the design of efficient and competitively-neutral charges for accessing the fixed networks of incumbents; ii) the pros and cons of structural measures such as privatisation, and vertical and horizontal separation of formerly integrated monopolies; iii) the ways to ensure that important non-economic objectives, such as universality of service, continue to be achieved in a more competitive environment at a minimum cost for society; and iv) the design of regulatory mechanisms and institutions that encourage best practice regulation.

JEL classification: L50, L51, L43, K23, L9.
Keywords: Regulation, liberalisation, privatisation, regulatory reform, network industries, competition policy.

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Cet article décrit les tendances et les résultats de la réforme de la réglementation dans les pays de l'OCDE. En premier lieu il résume l'évolution de l'environnement réglementaire et les effets globaux et sectoriels des réformes (privatisation y compris) dans des industries concurrentielles et non compétitives au cours des deux dernières décennies. Se concentrant sur les industries de réseau, il aborde alors les principales questions de politique économique soulevées par la nécessité d'adapter la réglementation des segments non compétitifs de ces industries à la concurrence croissante sur les marchés libéralisés. Il se focalise sur les quatre éléments qui dominent le débat de la réforme de la réglementation: i) le passage d'un régime axé sur les interventions et le contrôle à une approche fondée sur les incitations basées sur la suppression des barrières à l'entrée sur les marchés concurrentiels, l'adoption de mécanismes de prix plafond et l'introduction de tarifications efficientes et neutres du point de vue de la concurrence pour l'accès aux réseaux fixes; ii) les avantages et les inconvénients de mesures structurelles telles que la privatisation, et la séparation verticale et horizontale de monopoles précédemment intégrés; iii) les manières de s'assurer que des objectifs non économiques importants, tels que l'universalité du service, continuent d'être assurés dans un environnement concurrentiel et au moindre coût pour la société; et iv) la conception de mécanismes réglementaires et d'institutions le mieux à même de promouvoir les meilleures pratiques en termes de réglementation.

Classification JEL: L50, L51, L43, K23, L9.
Mots-clés: Réglementation, libéralisation, privatisation, réforme de la réglementation, industries de réseau, politique de la concurrence.

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THE IMPLEMENTATION AND THE EFFECTS OF REGULATORY REFORM: PAST EXPERIENCE AND CURRENT ISSUES

Rauf Gonenc, Maria Maher and Giuseppe Nicoletti[1]

SUMMARY AND CONCLUSIONS

1. In the past two decades, OECD countries have shifted from using public policy instruments, such as regulation or public ownership of enterprises, to a greater reliance on market mechanisms and incentives to pursue consumer welfare, industrial, regional and/or employment objectives. Similarly, traditional public interest goals, such as universal and equitable access to services and safety and environment concerns have increasingly been met within a competitive framework.

2. Regulatory reforms have had three main dimensions: liberalisation, state retrenchment and new regulatory design. Liberalisation and state retrenchment were mainly concerned with:

- liberalising prices and access to markets which had previously been restricted by legal and regulatory barriers;

- handing or returning to the private sector activities that had been run directly by the government.

New regulatory design was an essential element of regulatory reform to the extent that:

- rules had to be set in network industries to make access to the non-competitive segments of the industry by a plurality of service providers possible and efficient;

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1. The authors wish to thank Jørgen Elmeskov and Michael Feiner, whose comments on a preliminary draft have considerably contributed to shape the final version of this paper. Darryl Biggar, Sven Blöndal, Carlos Ocana, Nicholas Vanston, Ignazio Visco, Dimitri Ypsilanti and other colleagues in the Economics Department and the Competition and Consumer Policy Division of the Directorate for Fiscal and Financial Affairs have also provided comments that substantially improved the paper. Of course all remaining errors are the authors'. Olivier Boylaud's work on the OECD International Regulation Database has been of great value for making cross-country comparisons of regulation possible, and excellent statistical assistance from Martine Levasseur and technical assistance from Sandra Raymond and Helen Maguire is also acknowledged. The opinions expressed in the paper are those of the authors and do not necessarily reflect those of the OECD or its Member countries.

- in industries where liberalisation had involved the unbundling of vertically-integrated monopolies, markets had to be created *ex novo* to replace transactions that were previously taking place within the firm;

- in industries where (non-economic) public interest objectives were ensured within a regulated non-competitive environment, ways had to be found to achieve these objectives in a competitive framework;

- where firms had been privatised or activities had been contracted out, regulation through public ownership had to be replaced by arm's length regulation.

3. The purpose of this document is to review these regulatory developments in OECD countries and summarise the main lessons to be drawn from recent policy experience. The paper concentrates on the most important dimensions of regulatory reform: its scope and impact on performance, issues of regulatory design in network and transportation industries and political economy issues related to the design of regulatory institutions and mechanisms. Of the industries concerned by regulatory reforms in OECD countries, the focus here is on electricity, telecommunications, railways, air travel, road freight and retail distribution. This is both because cross-country (and sometimes historical) comparative data on regulations are available from OECD sources, and because these sectors are economically important. Liberalisation, privatisation and their related effects in some of these industries (telecommunications, electricity, air travel) have been extensively analysed in a series of related working papers.[2]

4. The document has four parts. Part 1 deals mainly with liberalisation and its effects on performance. Part 2 discusses the regulatory issues arising in the new competitive environment, including the satisfying of non-economic objectives within a market-oriented regulatory framework. Part 3 focuses on general privatisation issues, against the background of actual privatisation outcomes in OECD countries. Part 4 addresses some of the political economy issues raised by regulatory reform.

5. The main findings of the analysis of liberalisation and privatisation are the following:

- Liberalisation in OECD countries has been undertaken in competitive industries as well as in some industries with scarcely competitive segments (such as telecommunications and air travel).

- The available empirical evidence strongly supports the view that liberalisation has been beneficial for efficiency and consumer welfare in reforming countries.

- Still, the pace and the extent of liberalisation has differed a lot across OECD countries and in many of them unnecessary regulatory barriers to competition and obstacles to market mechanisms remain (*e.g.* in the retail distribution industry).

- Liberalisation has been much slower in railways and electricity. This may be partly related to the difficult technical problems that subsequent regulation has to face and, as well, the lack of clearcut empirical evidence on the effects of deregulation on economic performance in these industries. Especially in the electricity industry, weaknesses in the regulatory framework, such as insufficient attention to ensuring competitive outcomes, have sometimes reduced the benefits of deregulation.

2. Boylaud and Nicoletti (2000); Steiner (2000); Boylaud (2000); Gonenc and Nicoletti (2000). Of course, regulation has been reformed and competition enhanced, in a wide variety of other industries and areas (see OECD, 1997).

- The OECD public enterprise sector is currently estimated to be less than half the size it was at the beginning of the 1980s. Privatisations have generally led to improved company performance and, in industry with non-competitive segments, better regulatory supervision. However, where privatisation revenue has been a prime concern, insufficient attention has sometimes been paid to ensuring efficient outcomes. Moreover, especially in some new member countries, the benefits from the change in ownership have sometimes proved disappointing, due to weaknesses in the legal, institutional and market environment.

6. The analysis of new regulatory design suggests several ways in which the quality of regulation and its friendliness to market mechanisms could be enhanced:

- Where possible regulators should allow competition to act as an effective surrogate for regulation, via horizontal and vertical unbundling. Still, due to the existence of the non-competitive component, some form of regulation of network industries is warranted. Specifically, it is imperative that pro-competitive regulatory controls are put in place that will restrain the owners of networks and infrastructures from abusing their monopoly position.

- Vertical separation can prevent the cross-subsidisation of competitive activities from non-competitive ones for predatory purposes, but where scope economies from vertical relationships appear to be large such as in transportation industries, long-term co-operation between service and infrastructure providers should not be discouraged.

- One of the primary goals of regulators should be to restructure tariffs so that they reflect underlying costs, in order to ensure that the allocation of resources and new entry are efficient.

- With some caveats related to coverage, and frequency of changes, policy makers should encourage the use of price-cap regulation (especially in industries such as telecommunications where cost information is difficult to verify) and other forms of incentive regulation.

- In transportation industries subject to congestion, market-determined access prices (such as peak-load charging and congestion pricing) would ensure efficient access to users in the short term. In the longer term, commercial supply of infrastructures (*e.g.* through privatisation together with market pricing of access) should be encouraged, to direct capacity extensions according to market demand.

7. The analysis also suggests that non-economic objectives need not stand in the way of greater competition and cost-based pricing:

- Empirical evidence concerning telecommunications suggests that the fulfilment of universal service obligations has not been threatened by the introduction of competition and cost-reflective tariff structures. At the same time, evidence from the airline industry suggests that safety standards can be maintained (and possibly improved) in a liberalised environment.

- Where competition and cost-based pricing can impact unfavourably on the affordability of non-economic objectives, policy makers should attempt to achieve social or universal service objectives through the use of public funds (*e.g.* direct transfers to low-income households or direct subsidies to the firms constrained by social obligations) and not through cross-subsidies and other inefficient regulations, such as restrictions on entry.

8. The possibility of "regulatory capture" by regulated firms or other interest groups and the effects of regulatory uncertainties on the investment behaviour of regulated firms need to be taken into account in designing regulatory mechanisms and institutions.[3] Political economy considerations suggest that regulatory institutions should be designed to i) ensure independence of the regulator from the executive branch of the government; ii) impose constraints on the regulator's discretion (for example by allowing appeal procedures with general competition authorities); iii) enhance transparency of the regulatory process so as to limit information asymmetries and reduce regulatory discretion; and iv) ensure consistency of regulatory approaches across industries. Regulatory mechanisms should incorporate a degree of pre-commitment so as to reduce the risk to firms that investment will be made unprofitable by subsequent regulatory decision while also, possibly, preempting political pressures arising as regulatory outcomes become known. Precommitment and constraints to regulatory discretion should not prejudge, however, the effectiveness of regulatory enforcement and the ability of the regulator to adjust regulation to changing technological and market conditions.

3. See Boxes 4 and 5 for an elaboration of the concepts of regulatory capture and regulatory uncertainties.

1. EVOLVING REGULATION: TRENDS AND OUTCOMES

1.1 Regulatory reform in selected industries

9. In the past two decades, the bulk of sector-specific regulatory reforms have concerned the service industries and the utilities. Services and utilities account for the largest (and growing) share of the OECD economies and are a vital input in the production of manufactured goods. Developments in demand, technology and the competitive environment have spurred the need for reform in these industries, and this has been buttressed by rapid progress in regulatory techniques.

10. In this part the focus is on seven industries, for which data on regulations and market (or industry) structure are available both across countries and (to a lesser extent) over time:[4] electricity, railways, fixed telephony (trunk and international), mobile telephony, air passenger travel, road freight and retail distribution. Electricity, railways and fixed telephony are network industries with high fixed costs, in which non-competitive and competitive market segments coexist. Mobile telephony and air travel also have network elements and sizeable fixed costs, but are largely competitive industries. The road freight and retail distribution industries are in principle fully competitive. Across these industries, regulatory provisions have been justified on the basis of both economic and non-economic reasons. Therefore, looking at this sample of industries makes it possible to highlight features of the regulatory reform process, and of its economic impact, and draw lessons that are applicable to other industries as well.

1.1.1 Fully or largely competitive industries

11. Because of a lack of reliable comparative data (retail distribution) or a short sectoral life-time (mobile telephony), the historical analysis relates mainly to the road freight and air travel industries. For the latter, historical data concerns only regulations in domestic routes or in routes between countries members of regional agreements. Regulatory reform in road freight and air travel across OECD countries are analysed using a partitioning into high, medium and low regulatory intensity covering four dimensions: public ownership, barriers to entry, price regulation and service constraints (Figure 1). The indicator of service constraints includes provisions affecting the conditions under which services are provided. Annex 2 provides a description of the industry-specific regulatory indicators used in this section.

[Figure 1. Regulatory reform in OECD countries: fully or largely competitive industries]

12. The most striking regulatory changes occurred in the air travel industry at the domestic and regional level. Two decades ago, the domestic (and regional) air travel industry was dominated by publicly-controlled firms enjoying legal monopolies over their routes and subject to strict regulatory controls over fares and the services supplied. By 1998, domestic and regional routes were liberalised and

4. Time-series data on regulations is very scarce. Therefore, only very simple indicators can be constructed to follow the evolution of regulation in OECD countries over time. The dynamic indicators shown in this section are based on OECD (1992) for 1975 and 1990. The update to 1998 is based on data contained in the OECD International Regulation Database (see Nicoletti *et al*., 1999).

airlines were given the freedom to set fares. Although no data on service constraints is available for 1998, these constraints had already been somewhat reduced at the beginning of the decade. Public ownership was also significantly reduced, although in almost half of the countries the government retained shareholdings in national carriers. However, while the extent of deregulation in domestic and regional routes was extensive, international routes are still dominated by highly regulated bilateral air service agreements between governments (see below for a fuller account of the 1998 regulatory environment in international routes).[5]

13. The evolution of entry into the mobile telephony market was similar. At the beginning of the decade, all but four OECD countries (the United States, Japan, the United Kingdom and Sweden) had a single mobile service provider, often controlled by the state-owned public telecommunications operator. By 1998, entry had been liberalised in all OECD countries and only three of them (Switzerland, Iceland and Luxembourg) still had a single supplier (see below).[6,7]

14. Deregulation has also been extensive in the road freight industry. Even though regulatory barriers were initially less extensive than in other industries, by 1998 barriers to entry and service constraints had been virtually eliminated in all countries for which data are available, while some price controls and state-controlled trucking companies still remained in a few.

15. Figure 2 synthesises the regulatory environment in 1998 for competitive industries with and without fixed network elements, drawing on the information contained in the OECD International Regulation Database. In Panel A, the situation for mobile telephony and air passenger travel is described by an indicator of barriers to entry and an indicator of market structure. The existence of significant (more than 30 per cent) share ownership by the government is also indicated when appropriate. The regulatory and market structure indicators measure (on a scale of zero to six) the degree of unfriendliness of regulation to market mechanisms, and the distance of the market from a competitive structure, respectively. They are aggregated to yield a synthetic indicator that captures competitive outcomes in each country.[8] The summary indicator of regulation and market structure suggests that the least restrictive country in mobile telephony was the United Kingdom, followed by Japan, France, Australia, Korea and Sweden. However, the relative positions of these countries still differ considerably, with the United Kingdom being the only one having a fully liberalised and competitive environment. In air passenger travel, the United States and the United Kingdom had gone farthest with liberalisation, while Poland and Turkey had barely started regulatory reforms in this industry. The summary indicator masks large differences in market structure, public ownership and entry barriers across countries.

[Figure 2. Regulatory and market environment in 1998: fully or largely competitive industries]

16. In Panel B the regulatory environment in road freight and retail distribution is described by aggregating an indicator of barriers to entry and an indicator of government involvement in business

5. The current regulatory and market environment in air passenger travel in the OECD area is examined in detail by Gonenc and Nicoletti (2000).

6. Regulatory and market developments in mobile telephony are analysed in Boylaud and Nicoletti (2000).

7. It should be noted that entry into air travel and mobile telephony is limited by the shortage of landing slots in many large OECD hubs and the scarcity of airwave frequencies in mobile telephony markets, respectively. Possible regulatory solutions to some of these structural factors are discussed later.

8. The synthetic (stacked) indicator for mobile telephony was computed assuming equal weights for their individual components; the indicator for air travel was computed by means of factor analysis. See Gonenc and Nicoletti (2000) and Boylaud and Nicoletti (2000) for methodologies and sources.

operation.[9] By 1998, cross-country differences in regulation remained significant in both industries. In road freight, particularly restrictive environments were present in Italy, and, to a lesser extent, Greece, where both barriers to entry and involvement in business operation (mainly reflecting the persistence of price restrictions) were important. At the other extreme, New Zealand and United Kingdom have the lowest regulatory restrictions in both regulatory areas. In retail distribution, the most restrictive environments were found in France and Austria, with barriers to entry generally related to obstacles to the establishment of large outlets and business restrictions to limitations on shop opening hours. By contrast, in some new Member and Northern European countries, Australia and Canada, the regulatory environment was particularly liberal.[10]

1.1.2 Industries with non-competitive segments

17. In the past two decades, several factors have changed the public policy approach towards the regulation of network industries with non-competitive segments. First, countries that had relied on direct government ownership as a regulatory device increasingly considered arm's length regulation of a private firm as a valid alternative given developments in the product and capital markets and in regulatory techniques. Second, technological developments induced a reassessment of the borders between the competitive and non-competitive segments of these industries. Third, while public service obligations have remained a continuing public policy concern, their scope has been reassessed as network size increased, consumer preferences evolved and the use of alternative technologies gained ground. Regulatory enforcement has also increasingly been based on incentive mechanisms rather than on command-and-control provisions.

18. Figure 3 illustrates the move towards regulatory reform in such industries. Several dimensions of regulation and market or industry structure are considered: barriers to entry into the competitive segments of the industry and public ownership, each with three levels of intensity of regulation (see above), the degree of market competition in telecommunications and railways and the degree of vertical integration in electricity.[11] The general movement towards lower barriers to entry and private ownership, which characterises the three industries, is strongest in telecommunications,[12] where barriers to entry have been virtually eliminated and public ownership substantially reduced. Entry liberalisation (mainly in the freight service) and privatisation were much less pronounced in railways and electricity supply where, however, the organisation of the industry has changed somewhat because several countries have vertically unbundled their electric utilities.[13]

[Figure 3. Regulatory reform in OECD countries: Industries with non-competitive segments]

9. The indicators are simplified versions of those presented in Boylaud (2000), and were computed by means of factor analysis techniques. The presence of state-controlled firms is signalled, but is of marginal importance in all OECD countries. Since these industries are characterised by a large number of firms, the indicator of market structure is omitted.

10. For a number of countries summary indicators could not be computed due to lack of data. However, on the basis of the available information, restrictive environments were also found in Switzerland for road freight, and in Japan for retail distribution. At the other extreme, Australia appears to have few restrictions in road freight, and the United States appears to be particularly liberal in retail distribution (see Boylaud, 2000).

11. No reliable comparative data is available on market structure in the generation segment of the electricity supply industry.

12. The effects on market structure of regulatory reform in (domestic and international) long-distance telephony are analysed in more detail by Boylaud and Nicoletti (2000).

13. Regulatory reform in the electricity supply industry is analysed by Steiner (2000).

19. Precise information on price regulation is available only for 1998 (Figure 4). Countries are grouped in four pricing categories: rate of return regulation; incentive regulation (such as price caps); other regulation (including discretionary tariff approval by the government) and no regulation. Price regulation in the *electricity industry* was largely dominated by a cost-based approach, either in the form of standard rate of return regulation of vertically integrated utilities or in the form of long-run average incremental cost (LRAIC) regulation of transmission pricing, in industries where generation and transmission have been unbundled. In fixed voice telephony and railways, most OECD countries had switched to either price caps or no regulation.

[Figure 4. Price regulation in industries with non-competitive segments, 1998]

20. For each country, Figure 5 shows quantitative indicators of barriers to entry, public ownership and market or industry structure in industries with non-competitive segments, based on the detailed information contained in the OECD International Regulation Database. As with the competitive industries, the indicators are aggregated to summarise the regulatory and market (or industry) environment in each industry and country.

[Figure 5. Regulatory and market environment in 1998: industries with non-competitive segments]

21. Differences across countries are largest in electricity and telecommunications, reflecting different initial conditions (*e.g*. different private/public ownership mixes) as well as different scope and time pattern of reforms in each country. In many countries, the dominant role of the incumbent is the only remaining obstacle to competition in telecommunications and in almost half of the countries, public ownership has also been eliminated or is negligible. In the electricity industry, public ownership bears little relationship with industry organisation and entry liberalisation, with weak public control co-existing with vertically-integrated utilities and relatively high barriers to entry in the competitive segments of the industry in some countries. In only a few countries have both vertical unbundling and deregulation of entry been achieved. Regulatory and market conditions are more homogeneous in the railways industry, where public ownership was, and is, common, reforms have been generally more limited, barriers to entry are widespread, and intra-industry competition is weak.

1.2 Product market liberalisation and performance

22. This section reviews empirical studies of the impact of product market liberalisation on economic performance. An attempt to assess the effects of privatisation *per se* is provided in Part 3 of this document. Empirical studies are of three kinds: those looking at the effects on economic growth and the macro-economy; those looking at the effects in specific industries (or panels of firms belonging to specific industries); and those looking at panels of firms in a cross-section of industries. Further distinctions are between single-country and cross-country studies and time-series versus purely cross-section studies. The methodologies used to study these (actual or potential) effects include simulation approaches (*e.g*. using applied general equilibrium or macroeconometric models), descriptive analyses (*e.g*. drawing on simple plots or correlations) and econometric techniques. The definition of performance changes across studies, but generally includes measures of profitability, cost-efficiency and productive and allocative efficiency.

1.2.1 Macroeconomic outcomes

23. Table 1 (Panels A and B) summarises the results of studies relating various measures of product market liberalisation to macroeconomic outcomes. They are few in number, because it is inherently difficult to summarise a multifaceted and qualitative phenomenon such as regulation (and its enforcement) by means of quantitative indicators that can be used in aggregate empirical analysis. Moreover, there is a

lack of comparative data on regulatory and market environments across countries, and when the data exist, it is seldom available for more than a few periods, making time-series analysis very difficult.

[Table 1. Product market liberalisation and performance]

24. In the past decade, these difficulties have been tackled by either taking a simulation approach or relating simple indicators of the regulatory environment to macroeconomic outcomes. Three main sets of simulations are reported in the table: all reported significant and positive effects of product market liberalisation on the levels and growth rates of GDP (Table 1, Panel A). The OECD study (OECD, 1997), is a typical example. Using industry-specific estimates of efficiency gains in a plausible, medium-term programme of regulatory reform, combined with input-output aggregation and a dynamic simulation with the Interlink macro model, labour productivity and GDP gains were found to be positive for all eight countries examined. The long-run potential output gains (over a period of 15 to 20 years) varied from 5-6 per cent for Japan to less than 1 per cent for the United States, reflecting the different state of existing regulation in different countries. These results are qualitatively similar to those obtained by other researchers using alternative approaches.

25. Among the studies using relatively simple indicators of regulation, Koedijk and Kremers (1996) and Gwartney and Lawson (1997) both find a negative correlation between the strictness of national regulations (as measured by their indicators) and the average growth rates of GDP per capita in a cross-section of countries. The former used an indicator that includes six dimensions of product market regulation in eleven European countries; the latter constructed a broader indicator of "economic freedom" (including the policy environment in public finance, financial markets, product markets and foreign trade and investment) for 115 countries. Goff (1996) used an index of regulatory intensity (constructed by means of factor analysis techniques) and found that on average, regulation lowered growth by 1 percentage point over the 1950-1992 period in the United States. Dutz and Hayri (1998) relate an index of pro-competitive policy environment (resulting from a survey of managers of multinationals) to growth in a cross-section of countries. They find a positive effect of their indicator on the growth rate of GDP per capita. Finally, Edwards (1998) looks at the effects of trade-openness on TFP growth using a panoply of trade-openness indexes in a cross-section of countries. He finds solid evidence that openness has increased the average growth rate of TFP over the 1980-1990 period in his sample.

26. All the simulation studies described above report either a positive or an insignificant impact on employment of product market reforms when labour market regulations are kept unchanged (Table 1, Panel B). Moreover, the econometric study by Goff finds a significantly positive impact of regulatory intensity on the unemployment rate in the United States.

27. The empirical evidence concerning product-labour market interactions suggests that concurrent liberalisation may moderate wages and increase employment. Some simulations find that simultaneous reforms in product and labour markets have a significant positive employment impact. A recent study by Nicoletti *et al*. (2000), controlling for several dimensions of labour market regulations and institutions, finds a positive relationship between some OECD indicators of the strictness of product market regulation (OECD, 1999) and both the average business non-employment rate and manufacturing wage premia over the 1982-1995 period in 19 OECD countries.[14]

28. From a policy standpoint, exploring these interactions is paramount because it may provide insights on how to best configure the breadth and the sequencing of reforms in the two markets. There are

14. This analysis is based on summary indicators of regulation developed from the data contained in the OECD International Regulation Database. Details on the summary indicators can be found in Nicoletti *et al*. (1999).

two main channels through which product market reforms can affect labour markets (see, for instance, Nickell, 1999). First, stepping up competition on the product market increases output and the demand for labour, and makes the latter more sensitive to wages. Second, competitive pressures in the product market dissipate economic rents, putting downward pressure on the associated wage premia. In addition, increased product market competition may also change the incentives of entrepreneurs and workers to lobby for or against labour market reforms (Boeri *et al*., 2000).[15]

1.2.2 Industry-level outcomes

29. There are many empirical studies of the effects of deregulation on industry performance and the survey in Table 1 (Panel C) focuses only on the six industries examined in this section.[16] The advantage of industry-specific studies is that regulatory changes can be related to (more or less) detailed measures of industry efficiency, of the prices and the quality of the products supplied, and to developments in the industry's profits, wages and employment.

30. A cursory review suggests several considerations. First, there is overwhelming cross-industry evidence that in most cases liberalisation of entry and prices has improved static and dynamic efficiency, enhanced quality and lowered prices to consumers. Second, the effects on employment vary according to the industry and the country concerned. For example, liberalisation in road freight and telecommunications has had a favourable impact on industry employment in several countries (Mexico and Korea for telecommunications and United States and Mexico for road freight) while evidence from the United States suggests that in rail freight post-reform efficiency gains were matched by a substantial decrease in employment. Third, in air travel, reforms have often had beneficial effects on efficiency and fares (see, *e.g*. Gonenc and Nicoletti, 2000), but these have been partly offset by fare increases in market segments more sensitive to airport dominance by incumbent carriers (Evans and Kessides, 1993; Borenstein, 1992). Regulatory flaws in the access to the fixed network elements of the air transport industry are partly responsible for these problems. Fourth, reforms in the electricity supply industry are bedevilled by slow entry, the persistence of market power of incumbent generating companies and the technically complex regulatory issues to be tackled after basic entry liberalisation and unbundling of generation from transmission (and, possibly, distribution) has been implemented (market co-ordination, access pricing, benchmark competition, etc.) (see, *e.g*. Newbery and Pollitt, 1997). Finally, the little available evidence concerning the effects of liberalisation in retail distribution suggests that outlet restrictions distorted industry structure and kept prices high (e.g. in Japan), while simulations hint that liberalisation of entry and opening hours may increase industry employment and lower prices.[17]

15. Another possible channel is the effect of lower entry barriers on entrepreneurial initiatives, which affects directly self-employment and indirectly dependent employment (see Krueger and Pischke, 1999).

16. OECD Reviews of Regulatory Reform constitute a particularly rich source of information on the effects of industry-specific reforms on performance (see OECD, 1999*a*, 1999*b*, 1999*c*, 1999*d*, 2000*a*).

17. The dearth of empirical studies concerning retail distribution largely depends on the lack of reliable cross-country data on the industry's regulatory framework and the difficulty of measuring performance. An attempt to fill these gaps is provided by Boylaud (2000).

2. ADAPTING REGULATIONS TO THE NEW COMPETITIVE ENVIRONMENT

31. The promotion of competition raises questions concerning how to best design regulatory mechanisms such that incentives for efficiency are increased while, at the same time, minimising the cost of the regulatory burden. These issues do not regard sectors that are inherently competitive but only those with segments that are non-competitive or where infrastructure supply poses challenges to competition. Meeting non-economic objectives in a competitive environment also raises concerns about regulatory design, the possible use of other policy instruments and, more fundamentally, questions as to whether or not these objectives should and can be maintained. These points are addressed in the following subsections by first looking at regulation in network industries and transportation, and lastly by focusing on several non-economic objectives such as universal service, safety, and environmental concerns.

2.1 Regulatory issues in network industries

2.1.1 Regulation rationales

32. Network industries usually have a component that is non-competitive.[18] For example, the local loop in telecommunications, electricity transmission and distribution, gas and water pipelines, and rail track, are all characterised by economies of scale which give rise to a natural monopoly.[19] Competition in these components may be unsustainable and undesirable, since *ceteris paribus* costs will be minimised if the non-competitive activity is operated as a monopoly. Although, historically, the regulation of network industries has often been based on various public interest criteria, such as national security concerns and ensuring equal access to all services, the principal economic rationale for regulation rests on the existence of market failures.[20]

33. The presence of natural monopoly characteristics often means that competition cannot be relied upon to provide the socially optimal outcome and some form of government intervention in these industries may be desirable.[21] The hope that entry or competition will erode the monopoly power of a network in the not-too-distant future, so that regulation can be eliminated altogether is probably misplaced (White, 1999). The important policy issue therefore is how to combine regulation of the non-competitive

18. Network industries, in this section, are defined as those industries in which a fixed infrastructure is needed to deliver the goods or services to end users *e.g.* gas and water pipelines, telephone cables and wires, and electricity cables and wires.

19. For example, see Maher (1999) for local telecommunications, and Joskow (1989) for electricity.

20. Market failures can be broadly classified into four types: natural monopoly, externalities, public goods and asymmetric information. Market failures need not be mutually exclusive. For example, many natural monopolies are also characterised by externalities.

21. However, in some cases, competition may act as an effective surrogate to regulation. For example, in the case of rail track intermodal competition (*e.g.* from road freight or air travel) can mitigate the market power of the incumbent.

component (the network) with the organisation of competition in activities which use the network as an input and are potentially competitive sectors.

34. Many network industries also exhibit network externalities or network effects. These arise when demand for the product or service increases with network size, since there are benefits to being connected to a larger network, *e.g*. telecommunications, software and information technologies, banking (ATM networks), railways and airlines. Network externalities on their own do not imply that competition is not viable since markets that exhibit network externalities can sustain more than one firm.[22,23] However, the presence of network effects does provide incentives for firms to engage in anti-competitive behaviour. For example, switching costs and lock-in effects serve to increase firms' market power (Farrell and Shapiro, 1988 and 1989).[24] This is why network interconnection and access issues are so important with regard to competition policy (Economides and White, 1994).

35. The market outcome is likely to be socially inefficient in the presence of positive consumption externalities and their existence has been used to justify subsidising access to a network. However, while network externalities are quite large in the early phase of an industry, in mature industries such as telecommunications, where penetration rates are quite high, it is likely that the divergence of social and private benefits is quite small.[25] On the other hand, the social costs associated with non-interconnecting networks may be quite high and mandating interconnection is often justified on these grounds.

36. In the past, governments dealt with market failure in network industries either through public ownership or through regulation of privately owned monopolies. The first approach was widely employed in Europe and Oceania; the United States and, to a lesser degree, Canada opted for the second approach. The practical implications of the two approaches differ considerably, due to the different nature of the incentives introduced by regulation or by direct ownership (see Part 3 below). In both cases, due to economies of scale and scope, the non-competitive (network) component of the industry was vertically integrated with potentially competitive activities. Examples of the competitive and non-competitive activities of various network industries are provided in Table 2. Furthermore, socially optimal Ramsey pricing,[26] combined with non-economic objectives such as universal service or carrier of last resort obligations, required regulated tariff structures which exhibited cross-subsidies. Government regulation or

22. For example, although at a competitive disadvantage, a smaller network can charge a lower price to counteract the lower utility that consumers receive from being on a smaller network. As long as consumers have heterogeneous preferences or incomes there will always be some consumers who prefer the lower price smaller network.

23. This is also supported by casual empiricism, since in the absence of economies of scale on the cost side, industries that exhibit network effects as found in software, faxes and mobile telecommunications, and banking ATM networks, are characterised by relatively competitive market structures. Whereas industries that exhibit cost-side economies of scale are often dominated by a single firm due to the "natural" monopoly outcome.

24. Also see Salop and Scheffman (1983) for an analysis of the strategic effects of raising the costs of competitors.

25. For example, using data on the United States, Perl (1984) found that the additional benefits to be gained from subsidising access to telecommunications networks are quite small, with the benefits being almost eliminated by the administrative costs involved.

26. In the presence of economies of scale, pricing at marginal costs entails losses for the firm. In the absence of a first best outcome, where prices are set equal to marginal costs and the government provides a direct subsidy to cover the loss, a second-best solution sets prices such that the firm breaks even. With so-called Ramsey prices, services with relatively high values to their consumers contribute relatively large net revenues to the coverage of fixed and common costs (mathematically expressed as the inverse of their price elasticities of demand).

ownership, therefore, often prevented or restricted competition in the potentially competitive segments of the industry in order to maintain the status quo and the sustainability of non-cost based tariff structures.

[Table 2. Network industries featuring both competitive and non competitive segments]

37. Although market failures of the sorts discussed above give rise to a *prima facie* case for government intervention, the actual intervention chosen may make the situation worse. Over the past two decades governments became increasingly aware of the prevalence of government or regulatory failure as mounting empirical evidence showed that regulation of private enterprises had not succeeded in decreasing prices in those industries considered to be natural monopolies, and actually increased prices in potentially competitive sectors, see Peltzman (1989). It has also become clearer that privatisation of public monopolies is often a prior and necessary condition for the liberalisation of markets (see Part 3 below). The incentives of the government to engage in behaviour that favours the incumbent state-owned enterprise at the expense of other firms in the industry is very high, particularly if the state-owned enterprise is in financial difficulty. This, in turn, has the effect of deterring entry since potential entrants find the risks of expropriation too high.

38. Where the network is a true natural monopoly, the choice between government ownership and private ownership with regulatory oversight is not an easy one. A principal-agent relationship arises regardless of whether governments choose public ownership or regulation of privately owned monopolies. Agency problems are indeed the crux of the regulatory problem. Regulated firms are almost always better informed than the regulators about their costs, demand for their services, and the consequences of adopting particular regulatory schemes.

2.1.2 Incentive regulation

39. OECD governments have become increasingly aware that the use of incentive regulation may improve the quality and enhance the efficiency of regulation while, at the same time, minimising its burden. Incentive regulation endeavours to reduce asymmetries of information and to counter unproductive behaviour on the part of the firm.[27]

40. A key aspect of incentive regulation are policies regarding *entry* into segments of the industry where competition is feasible. This entails completely liberalising activities that are competitive. The introduction of competition enhances regulatory efficiency because it reduces the asymmetric information problem by providing the regulator with valuable information regarding the costs and demand. In addition, entry minimises the regulatory burden by circumscribing the area over which regulation is required and by allowing competition to eventually supersede regulation.

41. In the non-competitive components of the industry where ex-post competition is not feasible, the regulator can sometimes introduce ex-ante competition into the market, for example, through the use of auctions for new capacity. To benefit consumers, auctions require that firms bid to provide the new capacity at the lowest price.[28] Auctions therefore reveal information regarding the incremental costs of non-competitive activities. Ensuring that new capacity remains integrated with the existing network can then be addressed through appropriate interconnection policies.

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27. Improved pricing policies such as peak-load pricing, congestion-sensitive pricing, and user cost-sensitive pricing, which are also vital for improving allocative efficiency, are discussed in the next section.

28. Otherwise auctions only succeed in redistributing rents from firms to the state with no direct benefit to end-users.

42. *Yardstick competition*, which uses the performance of other firms as a benchmark by which to compare the performance of the regulated firm, is another example of incentive regulation that enhances the information available to the regulator. Benchmarks may include the costs of specific inputs, the rate of return earned and cost of capital faced by firms with similar technologies or capital needs. The regulator may also use the performance of similar firms in other countries. This is the approach suggested by the European Commission for the regulation of interconnection prices in telecommunications. Yardstick competition could have been used in regulating the London airport market. Unfortunately, all four major airports in the London area are owned by British Airport Authorities (BAA). Had this not been the case, the regulator could have used the performance of one airport against another as a yardstick by which to measure efficiency or performance.

43. *Price-cap regulation* is perhaps the most widespread type of incentive regulation in the OECD, and one that often employs yardstick competition. Unlike rate-of-return regulation, price-cap regulation does not require detailed and continuous information about costs and demands.[29] Instead, the aim of price cap regulation is to provide adequate incentives for the company to reveal costs and to induce lower cost techniques. With incentive-price regulation the regulator sets a cap, including an adjustment factor X, for a specified period, that the firm can charge for a defined basket of goods and services.[30] Over longer intervals, the adjustment factors and the baskets are reviewed and possibly changed. For the pre-specified period, however, the company can make any changes it wishes to prices, provided that the change in the average price of the specified basket of goods and services is below or equal to the price cap.[31]

44. The main argument in favour of price cap regulation is that it is less vulnerable than rate-of-return regulation to cost-plus inefficiency and over-capitalisation since the firm has the incentive to minimise all of its costs (Beesley and Littlechild, 1989).[32] Part of this expected increase in efficiency can then be passed on to consumers via the level of X. The shorter the time period between regulatory reviews, however, the more price cap resembles rate-of-return regulation. Therefore, although price cap regulation provides better incentives for productive efficiency, its merits relative to rate-of-return regulation depend on how it is applied in practice (see Box 1).[33]

45. Price cap regulation also subjects firms to greater risks and, therefore, may raise their cost of capital (Alexander and Timothy, 1996). By shifting some of the risk to the public, rate-of-return regulation can lower the risk premium demanded by the regulated firm. An alternative to either rate-of-return or price cap regulation is some intermediate form of regulation such as profit-sharing, which permits the sharing of risks and rewards between owners and consumers. This retains the incentives to minimise costs provided

29. In rate-of-return regulation, prices are set annually such that the regulated firm is allowed to cover its production costs plus some fair rate of return on its investment. Since the basis of regulation is costs, this requires detailed information on costs and demands that the regulator is able to verify.

30. It is also possible to have sub-caps on individual services within the overall basket.

31. Most countries use the retail price index (RPI) minus X. However, some countries (*e.g.* Australia) use the consumer price index (CPI) as the representative index instead of the retail price index.

32. This is because under price cap regulation the firm is allowed to keep the excess profits it can earn between the setting of the price caps (but must also absorb any losses). Under rate-of-return the firm has little incentive to reduce its costs and has an incentive to overcapitalise, creating productive inefficiencies (Averch and Johnson, 1962). Cabral and Riordan (1989) and articles by Acton and Vogelsang, Braeutigam and Panzar, Sibley, and Lewis and Sappington in the *Rand Journal of Economics* (1989) symposium on price-cap regulation discuss the enhanced incentives provided by price-cap over rate-of-return regulation. See also Braeutigam and Panzar (1993).

33. Moreover, where quality is difficult to observe rate-of-return regulation may be preferable since this weakens the incentives of the regulated firm to reduce costs at the expense of product quality.

by price cap regulation while, at the same time, minimising the risk of unanticipated changes in the regulatory contract (see Part 4 below).

Box 1. **Issues in price-cap regulation**

An important issue in price cap regulation is the determination of the caps and the frequency with which they are adjusted, especially the value of X. For example, at the end of the period (usually 3 to 5 years), both X and the composition of the basket are reviewed and adjusted, and a new time period until the next review is specified. The shorter the interval between the setting of the price caps, the closer RPI-X is to rate-of-return regulation, see Acton and Vogelsang (1989). This is because, when reviewing the value of X, the regulator's perception of the scope for performance improvements is influenced by how well the incumbent has done in the recent past as indicated by its rate of profit. Therefore, Liston (1993) argues that a well-functioning price cap regime requires as much knowledge about costs as rate-of-return regulation.

Since at the end of the day the regulator uses the rate of return as a benchmark when setting the cap, the firm may still have an incentive to inflate or distort its costs. The determination of the price-cap, the basket of goods and services to which the cap applies, and especially the timetable for review, all constitute part of an "implicit" regulatory contract. A problem arises however when excessive profitability leads to unanticipated changes in the value of X since unanticipated changes undermine the regulatory contract (see Part 4 below). For example, in the United Kingdom, unexpectedly high rates of return have led to unanticipated changes in the value of X in both the telecommunications and electricity industries. This weakens the incentives that price cap regulation is supposed to instil and can be detrimental for both investment and entry in the industry. Therefore, price cap regulation (as it is applied in practice) may also provide incentives for the regulated firm to engage in various inefficient activities such as cost padding, construction of excess capacity, lobbying, etc. This is because, regardless of the form of price regulation, asymmetric information inevitably leads to regulators being poorly informed relative to those they regulate and provides incentives for gaming behaviour on the part of regulated firms.

Another problem with price-cap regulation arises precisely from the price flexibility that it is designed to promote. For example, while price caps allow firms greater flexibility to adjust the structure of prices and recover their costs in an efficient manner, it also allows cross-subsidisation which is allocatively inefficient and may be used anti-competitively. One important issue, therefore, is determining the composition of the basket of goods and services that are subject to the price cap. This is particularly important when firms are selling some goods or services in potentially competitive markets. In this case the incumbent firm can bundle competitive services with monopoly services and has an incentive to set prices (within allowances permitted by the cap) to the detriment of competition. In the United Kingdom, for example, British Telecom while operating under a price cap, aggressively countered entry into its long-distance market by lowering prices while raising prices in its uncontested markets (Vickers and Yarrow, 1988 and Armstrong *et al*., 1994). This is one of the arguments in favour of separation of non-competitive activities from those that are competitive as it removes incentives for cross-subsidisation. However, by placing sub-caps on the non-competitive activities, price regulation may also be used to prevent anti-competitive cross-subsidisation.

46. Retail price cap regulation of the incumbent public telecommunications operator or other dominant operators is now prevalent in the telecommunications industry in OECD countries.[34] Price cap regulation is also widespread in railways. By contrast, the electricity industry is still governed primarily by cost-based regulation. For example, Table 3 shows that for a majority of countries transmission prices in the electricity industry are cost-based, the exceptions being Italy, Norway, and the United Kingdom. One

34. Regulation of interconnection or access charges are prevalently cost-based. Prices for mobile telephony tend to be unregulated. For details on price regulation in telecommunications see Boylaud and Nicoletti (2000).

of the reasons why price-cap regulation is more prevalent in telecommunications than in the electricity industry may be that cost information is easier to obtain in the latter.[35]

[Table 3. Price regulation in network industries, 1999]

2.1.3 Access pricing

47. Interconnection or access charges, which determine the price at which entrants will be granted access to the network of a vertically integrated incumbent, play a crucial role in the success or failure of entry in competitive services. The problem arises because to enter a market an entrant will generally find it financially impossible to replicate the facilities of the incumbent. Given the market power of incumbents, access charges will generally have to be regulated.[36] The regulator's dilemma is to find algorithms for setting access charges at a level that will only allow entry of competitors that are at least as efficient as the incumbent in supplying competitive activities. Charges that are too high relative to actual costs will deter entry into competitive markets, prevent competitors that are potentially more efficient from surviving and encourage inefficient bypass of the incumbent's network.[37] Setting charges below the pertinent costs of the incumbent (which effectively amounts to a subsidy to entrants) also distorts the competitive process by inducing inefficient entry into competitive markets.

48. Several pricing rules have been proposed. These include cost-based rules, demand-based rules, and efficient entry rules. A purely accounting approach (or cost-based rule) requires the estimation of the long-run average incremental costs incurred by the incumbent in the provision of access. The difficulty is that incremental costs can be estimated in several different ways (*e.g*. stand-alone costs, avoidable costs, or fully-distributed costs)[38] and in addition an allocation of common costs is required. This entails a mark-up of price over marginal cost in order to recover total costs. In accounting approaches the mark-up is not based on any principle of efficient resource allocation and often apportions the common or fixed costs across products in an arbitrary manner. Demand-based rules such as Ramsey pricing (see above) are designed to recover full costs while minimising the efficiency losses from setting prices above short-run

35. Costs are easier to allocate in electricity supply because the "product" is relatively homogeneous. Telephone networks, though, deliver several different kinds of service (local, long-distance, mobile, data transmission, etc.). Therefore, in telecommunications, where informational requirements are high, more incentive-based measures may be required to promote efficiency in the industry.

36. Regulation can take many forms. The approach taken in New Zealand is one of 'light-handed' regulation, in which access charges are freely negotiated between operators and the terms of these agreements are made public. This approach relies on the Competition Authorities to discipline the market power of incumbents in conjunction with the threat of more intrusive regulatory interventions (or 'standard' regulation) when anti-competitive behaviour is observed (OECD, 1999*e*).

37. Inefficient bypass occurs when entry is motivated by the avoidance of access/interconnection tariffs that are above costs, and results in a duplication of the network which is not cost efficient. Since final retail prices will reflect access charges this can result in inefficient entry in competitive activities. For example, large business users may build alternative facilities so as to bypass the network and avoid access charges, while at the same time providing themselves with services in competitive activities. This entry is inefficient if it would not have occurred with prices reflecting underlying costs.

38. Avoidable costs only include those costs that the incumbent could have avoided if access to the competitor had not been provided. Fully distributed costs includes the direct costs of providing access and allocates common or joint costs over all services (including access). Stand-alone costs are the costs of producing a product without producing any other product, *e.g*. the costs that a new entrant would have to incur if it were to supply the product by itself. In the presence of economies of scale or scope, stand-alone costs will be higher than avoidable costs.

marginal costs. However, Ramsey prices are difficult to compute and could lead to cross-subsidisation and inefficient bypass.[39]

49. Efficient entry rules relate to the idea that the provision of access causes not only incremental direct costs but also involves opportunity costs e.g. a reduction in the incumbent's profit arising from the provision of access. The efficient component pricing rule (ECPR), which is frequently advocated, replicates the pricing behaviour of competitive markets and is competitively neutral in that it does not give an unfair advantage to either the incumbent or the entrant. The ECPR sets the access price equal to the final product price minus the cost of inputs other than the network (Baumol, 1999). However, if the final product price is higher than socially optimal (*i.e*. does not equal marginal cost), an access price that is equal to the price determined by the ECPR will in general be inefficient.[40] This is because the rule does not promote any dissipation of the incumbent's monopoly rents.

50. Another factor that further complicates the access pricing issue is the existence of non-economic objectives and cross-subsidies (see below). For instance, the use of price-cap regulation for access charges may distort efficient price structures. In telecommunications, if customer access charges are capped at a price below costs, the incumbent firm must charge a price above costs for other services. In this case caps on local access that prevent a normal rate-of-return on this activity may affect prices in the long-distance market. The need to maintain prices at a level that provides for an adequate overall rate-of-return means that the incumbent is at a competitive disadvantage when competing in the long-distance market. Tariff structures that are not cost reflective create the wrong incentives by encouraging entry that is motivated by cream-skimming opportunities. These issues are discussed in further depth below where the problems associated with funding non-economic objectives in a competitive environment are addressed.

2.1.4 Vertical separation

51. One important policy issue is how to control a dominant firm's anti-competitive behaviour towards its rivals. Separation of the ownership of competitive activities from the non-competitive component, supported by restrictions preventing re-integration into competitive activities, is often advocated as a way to reduce incentives for anti-competitive behaviour.[41] For example, the main advantage of vertical separation is that it reduces the incentives of network owners to restrict access to rival firms in the upstream or downstream (potentially competitive) markets.[42] However, it is often the case that there are economies of scope between the various components of network industries, which argue in favour of vertical integration.[43] At the end of the day, the benefits of vertical integration need to be weighed against their costs. Table 4 summarises some of the key factors influencing the choice between vertical separation and integration.

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39. In a multi-product industry, Ramsey prices could lead to high margins on some products resulting in cross-subsidisation i.e. prices for products that are greater than those based on 'stand-alone' costs.

40. The optimal access price in this case should be lower, see Laffont *et al*. (1998).

41. See Biggar (2000) for a discussion of when regulated companies should be vertically separated.

42. A vertically integrated structure is less of a problem if competition can substitute for regulation. For example, to the extent that there is competition from air and road transport, vertical integration in the rail industry may not be an over-arching concern.

43. The loss in economies of scope is mitigated when vertical contractual arrangements can be used to reap the benefits of vertical integration. This may depend, in part, on the nature of the legal system. A legal system that is accommodating to the needs of long-term contracts is a factor in favour of separation; and a weak or imperfect legal system will be a factor in favour of integration, see Biggar (2000).

[Table 4. Key factors influencing the choice between vertical separation and integration]

52. Whether or not policy makers should pursue vertical separation depends ultimately on the severity of agency problems. In any regulatory process obtaining reliable information on costs and demand from the regulated entity is difficult. It may be easier to obtain reliable information when the non-competitive activity is vertically separated as this reduces the opportunities and incentives for shifting costs and profits around within the firm for strategic purposes against both rival firms and the regulator.

53. Another advantage of vertical separation is that it focuses the regulatory intervention on the underlying market failure and minimises the scope for regulatory failure. For example, vertical separation avoids the regulatory headache of allocating common costs in a vertically integrated industry, and requires information only on the costs of the network facility. Where sufficient competition exists in the potentially competitive segments of the industry, vertically separating them from the non-competitive network segment may make it feasible to completely deregulate final prices while only regulating the price of the non-competitive component.

54. Besides ownership separation, other weaker forms of separation include accounting separation and 'functional' separation. However, these do not overcome the incentives of the incumbent to restrict competition in the competitive activities as it remains possible to strategically re-allocate costs and engage in other anti-competitive behaviour. Hilmer (1993) argues that the failure to make a full separation of ownership and control, despite liberalisation and privatisation, is the major reason why infrastructure reform in the United Kingdom (*e.g.* in the gas industry) has not produced the expected welfare gains. In spite of these difficulties, and presumably to reap the benefits associated with economies of scope, a number of countries use accounting separation as the regulatory instrument. Table 5 provides evidence of the extent of vertical separation in the electricity supply industry in a number of OECD countries.

[Table 5. Vertical separation in the electricity industry]

2.2 Regulatory issues in transportation industries

55. Regulatory reforms have been widespread in transportation industries. Air travel and road freight liberalisation in the United States became showcases for the overall reform movement: large efficiency gains, quality improvements, price decreases and output growth of deregulated transport activities became visible to policy-makers and public opinion worldwide (see Part 1 above), and inspired further reform initiatives in other countries and industries.

56. In the past, to fully exploit supposed scale economies (Box 2) and avoid perceived destructive competition,[44] governments restricted new entries and price competition, either in the form of economic regulation of private firms, or through public provision of services by government-owned monopolies. As from the 1970s, though, economic research increasingly questioned the actual overarching presence of scale economies in these services,[45] and highlighted the uneven presence of natural monopoly phenomena

44. The "destructive" competition argument claims that, without regulation, too many firms would seek to enter in an industry. The resulting fight for market share would lead to either too many entrants preventing minimum efficient scale from being obtained, or to the demise of all but one of them - the one that attains the largest market share by achieving the lowest unit costs. According to this argument, either process is wasteful of resources: a regulator should ensure that only one firm enters the industry and others do not seek to displace it (see, Breyer, 1982).

45. Harris (1977); White (1979); Caves *et al*. (1984); Oum and Zhang (1995); Kessides and Willig (1998); Liu and Lynk (1999).

in different segments of the transport industry - in low-traffic vs. high-traffic routes, and in infrastructures vs. service operations.

Box 2. **Scale and network economies in transportation industries**

Economies of scale in transportation industries manifest themselves in a variety of different ways:

- *Economies of fill* due to operation fixed costs. They result from indivisibilities in vehicle operations, and imply that marginal costs of additional seats or passengers on an aircraft or train are negligible.

- *Economies of hauling* due to tracking fixed costs. These are a specific form of fill-economies absent in air but important in rail transportation and result from decreasing costs of adding capacity to an individual hauling operation. The engine power, energy and crew necessary for a longer and heavier train are not commensurate with the additional wagons which have been added (a train of 40 and a train of 60 wagons have similar trackage costs).

- *Economies of density* due to route fixed costs. They derive from route-specific infrastructure indivisibilities (such as terminal, track, and route maintenance fixed costs) and generate decreasing costs for adding new services/new capacity on existing routes.

- *Economies of stage length* due to terminal fixed costs. Constant departure and arrival costs generate decreasing costs per distance of operation. These result from the high fixed costs of fuel for take-offs and landings, fixed airport charges, fixed air traffic control charges, and the immobilisation costs of aircraft and crew on route-ends.

- *Economies of network reach* due to network fixed costs. They result from the constant costs of operating a network, such as logistics, planning and management investments, and generate decreasing costs for servicing additional points.

57. The findings pointing to the sustainability of competition in certain segments of the transportation industry have been instrumental in creating consensus for transportation reforms more generally, including air transport,[46] initially in the United States and then in the United Kingdom, Continental Europe and other countries. Table 6 reviews the five most far-reaching transportation reforms in OECD countries during the past two decades, together with their renewed economic assumptions and objectives.[47]

[Table 6. Five main transportation regulatory reforms in OECD countries]

58. Most OECD countries have initiated reforms in the air sector, albeit mainly on a domestic and regional basis only. International aviation routes remain regulated by a web of bilateral air agreements, which impose different regulatory rules by route, governing entries, route access, capacity and fares.[48] Even more liberal Open Sky agreements constrain the entry of third-party carriers, prohibit the continuation of international flights into domestic routes, and limit ownership changes. The uneven

46. The special role that economic research has played in changing the intellectual paradigms of policy makers is discussed in Derthick *et al*. (1985).

47. The table does not attempt at exhaustiveness. Only farthest reaching programmes from large OECD areas are included. Reforms in smaller economies (New Zealand's air and rail, Australia's air, Sweden's rail reforms), or reforms still in their early steps (Japan's rail privatisation and air liberalisation initiatives, EU's rail initiative) also need to be mentioned.

48. For a detailed description, see Gonenc and Nicoletti (2000).

liberalisation of domestic-regional and bilateral-international markets is an important characteristic of the air sector.

59. In railways, reforms have been limited and concerned mainly the freight business. Some countries, notably the United States and the United Kingdom have significantly liberalised access of infrastructures to multiple providers (the starting reform initiatives at the EU level are discussed below).

60. Transportation reforms have raised new regulatory issues, often because inherited infrastructures have proven inadequate and have failed to adapt to the requirements of new entries and service competition.

61. The traditional vertical organisation of the regulated transport industry took two forms: railway infrastructures follow a pattern of vertical integration with public-owned or regulated private service companies; airports are usually government facilities providing access to public-owned or regulated private service companies through long-term arrangements with their governing agencies. In either case, major investment decisions are taken and funded as central or local government *policy* decisions, and infrastructure supply was rarely a fully self-financing activity. This inherited institutional setting often resulted in a mismatch between the supply and demand of infrastructures after regulatory reforms had been implemented. Incumbents and new entrants had no formal assurance of access to the required types of infrastructures at economic prices. In order to alleviate the resulting bottlenecks, additional regulatory reforms have aimed at encouraging the adjustment of capacity to demand and its allocation to most efficient users, while at the same time preventing the use of market power and the distortion of competition in downstream services (Morrison and Winston, 1989; Meyer and Menzies, 1999). These regulatory issues are addressed below by focusing on air and rail transportation.

2.2.1 Infrastructure bottlenecks in vertically integrated services (Rail)

62. After the liberalisation of rail passenger and/or freight services, OECD countries faced two options for ensuring the fair and equal access of all competitors to the natural monopoly railtrack networks: open access or vertical separation.[49]

Open Access

63. In the US rail reform, competing railway companies have ownership and control rights over their own railtrack and other fixed facilities, but have to give open and equal access to their competitors.[50] As regulations permit all sorts of contracts, a variety of company-to-company arrangements have been designed, and regulators and courts are solicited in case of *ex post* commercial conflicts, of which there have been several.[51] The complex and information-intensive demands that "Open Access" can put *ex post*

49. European Conference of Ministers of Transport (1996, 1998); OECD (1998*a*). For a general discussion of the costs and benefits of those two options, see Table 4, Section 2.1.

50. There is only one sizeable passenger railway in the United States, which is government-owned , and which operates by purchasing trackage rights (access rights to railtrack network) from private integrated freight companies. Amtrack owns no more than 750 miles over the total routes it services.

51. Efficient infrastructure pricing (see below) may be relatively easy to implement in this flexible setting. Basic difficulties concerning information asymmetries on final consumers' demand elasticities nevertheless remain. This setting also permits the so-called "efficient component" type of pricing formula, whereby an integrated carrier can offer access to its infrastructure to a new entrant, at a price that generates the same profit as what it would earn from performing the new entrant's service itself. This creates flexibility in the sharing of gains from innovations between new entrants and incumbents, and allows start-ups with

on the regulatory and judicial system may indeed have persuaded other countries to opt for vertical separation, a solution which eliminates all risk of judicial uncertainties and litigation at the outset of a difficult reform process.

Vertical separation

64. In Europe, vertical separation of infrastructures and services is seen as a necessary step for rail reform[52] in order to give competing service companies equal access rights to infrastructures at non-discriminating charges. In turn, infrastructure providers can in the future concentrate on maximising revenues from infrastructure supply, focusing on improving the value of their facilities for all service intermediaries, without being constrained by the business strategies of their former service affiliates.[53] Incentives for monopolistic pricing within these infrastructure monopolies will have to be checked by regulatory supervision.

65. Two potential shortcomings of vertical separation need to be recognised: First, economies of scope deriving from the co-ordinated planning of service and infrastructure innovations become more difficult to exploit - unless a fully reliable long-term contracting system is in place. Second, the application of "demand-differentiated" optimal pricing for infrastructures may become more difficult if the provider cannot obtain direct information about final consumers' differing demand elasticities. Vertical separation is nevertheless indicated in the presence of strong historical and cultural interdependency between service and infrastructure branches of former monopolies. Interdependency may survive in the form of vertical collusion at the expense of third parties and isolating the two business lines from each other ("ring fencing") may be the only feasible configuration.

66. The EU policy (EC, 1991) foresees successive steps for vertical separation, starting from a simple, and admittedly insufficient, accounting separation of infrastructures and services within railway monopolies.[54] Then, the separation of infrastructures as an individual division of railway companies is recommended. Further steps are the clearer separation of infrastructures as stand-alone subsidiaries, and their fuller autonomy as independent firms. The privatisation of the independent infrastructure firms is an ultimate step taken until now only by the United Kingdom. Table 7 summarises the present variety of national arrangements governing the vertical relations between rail infrastructure and services.

[Table 7: Vertical relations between rail infrastructure and services]

2.2.2 Infrastructure bottlenecks in government-controlled facilities (Air)

67. Whereas for the rail mode infrastructure issues are mostly about competitors' access to existing facilities, for the air mode the most pressing difficulties are about a shortage of capacity (under current

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efficiency-enhancing concepts to approach and work with infrastructure owners (Kessides and Willig, 1999).

52. Actual liberalisation of rail services has not yet been launched in Europe, except as a result of policy reform in individual countries. Europe-wide initiatives aim at preparing reforms, by engineering the separation of infrastructures and services on community railways, (European Commission, 1991, 1995). See European conference of Ministers of Transport, 1998.

53. For an analytical discussion, see Corts (1999).

54. A 1998 European Commission Communication considered accounting separation insufficient since it "leaves incumbent railway undertakings closely linked to infrastructure managers which control access". See also Biggar (2000).

regulatory arrangements).[55] Bottlenecks in OECD airports already emerged at the turn of the 1980s. In the 1990s, liberalisation brought lower fares and higher demand growth, which abruptly exacerbated the congestion phenomenon.[56] A large number of national and international airports have found it increasingly difficult to accommodate additional aircraft movements in the peak periods of the day, and for some of them, of the year. Bottlenecks are projected to become more serious in the next decade:[57]

- Imbalances are compounded by social pressures regarding surrounding communities' noise and safety concerns.

- Any new (Greenfield) airport projects also entail heavy road and rail investments which need to be co-ordinated with urban planning.[58]

- Congestion of air space around airport zones is also rising, while current air traffic control systems are generally not effective enough to make full use of runway and terminal capacities, especially in Europe where air space is fragmented. The economic issues raised by a shift to a new vintage of air traffic control technology,[59] the co-ordination of national control systems and the financing of the newly needed investments are as yet little addressed (International Civil Aviation Organisation, 1998).

- Budgetary pressures and policies to reduce government provision of services are inducing central and local authorities to seek private sector participation to the funding and management of additional airport investments,[60] while generally aiming at maintaining their prerogatives on the policy choices concerning airport location and capacity (Kapur, 1995).

68. Governments address air infrastructure bottleneck problems through three types of policies: Administrative management of infrastructure scarcity, congestion pricing of airport slots, and privatisation of new capacity development.

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55. General Accounting Office (1996); Federal Aviation Administration (1999).

56. See OECD (1997*a*); Gaudry and Mayes (1999); Bass (1994). Congestion phenomena are met in many infrastructure areas where access is not subject to market pricing. It is found every time service demand, notably as a result regulatory reform, increases more rapidly than infrastructure supply (*e.g.* truck and car access to roads, telecommunication companies' access to airwave spectrum etc.) However, the subject has been most thoroughly analysed and discussed in the context of airport runway bottlenecks.

57. In the United States, total scheduled passenger enplanements, estimated to be 630 million for 1997, are expected to increase to around 1 billion in 2009. Meeting this growth would require the equivalent of 10 new airports similar in size to Chicago O'Hare, Dallas/Forth Worth or Atlanta Hartsfield (ACI, 1998). In Europe, the Association of European Airlines has estimated that in order to meet the forecasted 6 per cent annual growth in passenger traffic, 88 per cent of the airports larger than 5 million annual passengers will need to build additional runways or terminals by 2005.

58. Airport connections to high-speed urban and inter-urban rail networks are a new development in multimodal transportation - for passengers and freight. It creates new planning interdependencies between air and rail infrastructures and land development plans.

59. New - and basically available - air traffic control technologies would permit a denser utilisation without compromising on safety (Walker, 1999).

60. "Airports have been underbuilt. Optimal investment calls for many more runways at congested airports or, when this is not feasible, the use of capacity-enhancing technology such as ground positioning satellites. Many economists, myself included, have resisted private sector involvement and held out hope. I have come to believe that infrastructure inefficiencies will persist unless managing authorities face some competitive discipline" (Winston, 1999).

Administrative management of scarcity (slot co-ordination)

69. Faced with bottlenecks in their busiest airports, and not in a position to remain on the sidelines[61], most OECD governments have managed scarcity through administrative means: they limit air traffic in busy airports and allocate rationed landing and take-off capacity through policy decisions (OECD, 1998). The pioneering initiative was taken by the US Department of Transportation *High Density Rule* in 1968, which required carriers wishing to land or take off during restricted periods to obtain a special authorisation, commonly referred to as a "slot". In the European Union, a 1995 Council Regulation defined a detailed procedure for airport slot allocation in congested community airports (EC, 1995*a*). The main elements are essentially similar to those in the United States.[62] In congested international airports outside the United States and Europe, a slot co-ordination mechanism has been in place for a long time under the aegis of the International Air Transport Association (IATA). In bi-annual "international slot allocation conferences", which have been typically dominated by incumbent carriers of IATA, airlines examine and decide co-operatively required route-level changes in slot allocations. One-to-one slot exchanges (slot barters) are authorised during these conferences, but this barter mechanism does not guarantee that capacity is allocated efficiently (Grether *et al*., 1989).

70. In all three instances of slot co-ordination, the authorities recognise the "historical" rights of incumbents, and "grandfather" these rights to them. Redistribution of old and new slots generally involves some positive discrimination in favour of new entrants.[63] However, new administrative measures aiming at this objective (use-it-or-lose-it rules, lotteries etc.) play a limited role in practice, as incumbents continue to use most of their grandfathered slots. Table 8 summarises the situation concerning the concentration of incumbents' slots in 12 large international airports.

[Table 8. Airport slot concentration in twelve large airports]

Congestion pricing

71. Congestion appears either when the property rights are not well defined, or when mutual trading and contracting is excluded. In air transportation, it reflects the absence of a freely clearing market for airport utilisation (Starkie, 1998; Demsey and O'Connor, 1999). Governments have sometimes attempted to promote a measure of peak-load charging and congestion pricing in airport use, in order to remedy the absence of a market mechanism.

72. *Peak load charging* adjusts landing and take-off charges to variable demand levels at different times of the day. It applies to spot airport operations, each unit of landing and take-off being treated as a different service. It sets a target charge for each time of the day in anticipation that this price will adjust the market demand to available supply. If the charge is not set at the right level such *ex ante* charging may lead

61. Non-involvement is the standard policy response to road traffic congestion. It has been impossible in aviation because of more serious safety concerns, but also because, in contrast with the road business, affected parties are highly concentrated and politically influential airlines.

62. A significant difference, though, is that the US 1985 revision to the High Density Rule allowed slot-holders to sell, trade or lease their domestic slots, after a prescribed minimum period (see below).

63. In 1998, The EU Commission gave the green light to the alliance between Lufthansa and SAS on condition that the airlines sold off a substantial number of slots so as to facilitate the entry of new competitors on certain routes between Germany and Scandinavia.

to welfare losses. As the price elasticity of demand by air carriers is in general low,[64] full market clearing necessitates in practice extremely sharp variations in airport charges.

73. *Congestion pricing of slots* applies the same principle as peak load pricing, but with the important difference that airlines obtaining a slot get the equivalent of a long-term service contract (as opposed to a spot contract for a landing). By putting all available slots to the market and authorising price adjustments, the free pricing of slots is in principle more instrumental than peak-load charging in equilibrating supply and demand; but, in the absence of appropriate *ex ante* regulation or *ex post* competition policy measures, this also authorises the concentrated appropriation of slots by individual airlines. The long-term character of rights makes them tradable on secondary markets.[65] These markets measure the capitalised value of slots, helping airlines and airports in their network design, service planning and facility investment decisions.[66] As a consequence, slot trades create in principle a comprehensive market mechanism whereby slots are allocated to their most effective uses (see Box 3).

64. Demand elasticity is very low because airport operations are a "derived demand" from final travel demand.

65. Slot "trades" are slot transfers between airlines against payment and have been permitted in the United States since 1985. Slot "barters" are mutual exchanges of slots between airlines, with in principle no monetary payment, and have been authorised in the international operations of IATA airlines, and more recently in Europe. In the absence of a full-blown market for slots, differences between trades and barters are less stringent in practice, as pecuniary or in-kind payments, impossible to control for regulators, often accompany barters.

66. Airlines' slot rights are not their formal property rights. They are, in principle, government assets and are lent to airlines as an administrative concession. However, stock markets and other investors value slots as if they were proprietary airline assets, on the ground that any unexpected moves by governments to regain control of them would be politically difficult, or else contestable in courts.

Box 3. **Pricing of airport slots**

At present, no country and no airport has a primary market for issuing new slots to airlines. By contrast, secondary markets for slots emerge when airlines are allowed to sell or barter their slots. Although property rights associated to slots are never defined in rigorous legal terms, markets find ways to delineate and shift them between users when slot transferability is made possible. There are informal secondary markets for slots in certain national and international airports (CERNA, 1998), but they remain relatively thin relative to the total stock of available capacity in each airport. There are indivisibilities in slot trades: an airline needs to acquire a minimum number of slots in at least two airports for any meaningful entry to a business.

Slot pricing has been discussed for more than three decades (Vickrey, 1969), but its practical applications have been limited. This partly reflects policy makers' hesitations over the full implications of market-clearing infrastructure pricing. First, the "market domination risks" have been debated, incumbent airlines assumedly gaining via slot trades an instrument to build market power. Incumbent airlines might have incentives to "hoard" (buy and accumulate slots without using them, in order to hinder new entries). Available research shows that this did not happen in the US market, though - and regulatory remedies are available against it. However, incumbents may "value" slots more than do new entrants, and hence accumulate and use them through a normal market process. If this is the case, the question is if asymmetric valuation originates from the genuine network economies of incumbents, or from their opportunities for building market power.[1]

Another concern of policy makers is that if infrastructure access was governed by market-clearing prices, the value of slots is likely to increase sharply in most airports - for instance, by an estimated factor of 3 at Heathrow. This would make a number of regional and commuter services on smaller planes unprofitable. Although this re-balancing would reflect the end of the current cross-subsidies between various classes of aircraft,[2] political implications are particularly difficult to handle (Morrison, 1986; Stiglitz, 1998). This is why different classes of slots are established in certain slot-co-ordinated airports, where slot trades are allowed only within slot categories, slots earmarked for a given category of service not being utilisable for another type of service (Borenstein, 1998).

Transportation economics predicts that, by revealing information on the social costs of congestion, access pricing produces in principle signals on desirable capacity extensions (Vickrey, 1969). However, this mechanism works only if facilities providers own access rights (rarely the case in the airport business) and capacity supply is competitive - otherwise there would be incentives for facility providers to ration capacity through monopolistic pricing (Nasser, 1998).

Hence, the non-commercial, government-agency driven supply of airport infrastructures has prevented the utilisation of access price signals for directly stimulating capacity extension. Capacity decisions have generally not been guided, or only indirectly, by the revenue or profit maximisation potential of airport services.[3]

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1. Available research hint at the possibility of both phenomena.

2. Cross subsidies exist because airport charges are settled according to weight of aircraft, while air movement costs are independent of it. This implies cross subsidies from large to small airplanes.

3. When it is the main source of funding for the construction of an airport, funding from private bond markets create a measure of correspondence between airport revenues and capital costs.

74. *Privatisation* of airport services and allocation of access rights to airport owners would be needed to guide the extension of capacity according to market signals. This is taking the form of corporatisation of public airport entities, private concessions, and more exceptionally outright privatisation. Table 9 reviews the present patterns of airport ownership and financing in OECD countries.

[Table 9. Airport ownership and financing in OECD countries]

75. Airports can be corporatised and privatised as individual entities or as metropolitan or regional systems, but there is a trade-off between economies of scope and benefits of competition. The weight of the evidence suggests that in the world's largest metropolitan areas, competition between individual airports is feasible (Doganis, 1992). Also, large airport hubs are increasingly competing with each other as transit platforms in competing long-haul route networks (Chataway, 1993).

76. Modern regulatory tools such as RPI-X regulations may be used to supervise privatised airports in the absence of competition between airports.[67] In the case of concessions, contract periods need to be decided according to the role assigned to concession owners in new capacity development: given the long economic lifetime of airport investment, franchises may need to be at least as long.[68] Close commercial relations (long-term contracts, bond-holdings, equity-holdings) between privatised airport operators and incumbent air carriers need to be regulated and subject to open and fair access rules by third parties. This objective may conflict with traditional exclusive relations between specific airlines and airports.[69]

77. International experience shows that privatised airports tend to become joint-service businesses offering an increasing range of "land-side" services, on the basis of economies of scope with passenger transit functions,[70] and that the private sector is generally more innovative than government agencies. Airports' incentives to seize these opportunities are related to their organisation forms and ownership structures (Table 10).

[Table 10. Revenue diversification in public and private airports]

2.3 Satisfying non-economic objectives in a competitive environment

78. Network industries such as telecommunications, energy, water, rail, and postal services, are often required by governments to undertake non-commercial activities, usually referred to as "public service obligations" or "social objectives". They fall into two broad categories. Firstly, there are obligations to provide the basic service (*e.g.* telephone service, electricity, gas, etc.) to all who request it at a uniform (or 'affordable') price, even though there may be significant differences in costs of supply ('universal service' or 'carrier of last resort' obligations). Secondly, there are community service obligations (*e.g.* the provision of public telephone boxes), or special concessions to consumers who are deemed to be in need of some form of support (*e.g.* low user and lifeline tariffs, or the supply of special apparatus for the disabled). The extent of these public service obligations varies across OECD countries. While the following discussion concentrates on service obligations in the telecommunications sector most arguments apply to other sectors as well. Table 11 provides some examples of universal service obligation (USO) requirements in the telecommunications industry.

[Table 11. USO requirements in the telecommunications industry, 1996]

67. This is effectively utilised in the rate-regulation of privatised BAA airports in the London area.

68. The Australian airport privatisation has innovated by offering 50 year-long leases, and additional 49-year lease options to franchised private operators.

69. Federal Aviation Administration (1999) provides a review of the potential forms of collusion between airports and airlines in the deregulated environment, and suggests safeguards. The Australian 1996 Airports Act explicitly limits to 5 per cent the participation of carriers in the capital of airport companies.

70. Hotel accommodation, leisure, shopping, sports, conferencing etc.

2.3.1 Funding universal service obligations and competition

79. Public service obligations inevitably imply that prices are not sufficient to cover some marginal costs. Historically, these obligations have been funded through the use of cross-subsidies. However, funding social and universal service obligations through distortions in the tariff structure is often at odds with efficient pricing, the promotion of competition and can encourage inefficient entry.[71]

80. In some countries, popular concern over the threat to universal service and other social obligations, sometimes encouraged by incumbents, is a central factor impeding market liberalisation. However, there is growing empirical evidence, at least in telecommunications, that these obligations are not threatened by competitive entry. For example, Hausman *et al.* (1993) find that increased economic efficiency from a re-balancing of tariffs in the United States did not lead to decreased penetration rates.[72] In addition, Maher (1999) estimates the cost of local access to the telecommunications network in one of the major states in the United States and finds that, contrary to public opinion, de-averaged cost-based rates at the local level also do not threaten USO.[73] In light of the growing evidence that re-balancing of prices has increased efficiency without the resulting loss in penetration rates, a number of OECD countries have undertaken some re-balancing, see Figure 6.

[Figure 6. Tariff re-balancing in fixed telephony, 1990 and 1998]

81. Though now more cost reflective, the tariff structure of British Telecom (BT) in the United Kingdom continues to involve cross-subsidies *e.g.* there is a requirement to set geographically uniform tariffs and to offer a 'low-user' tariff. BT therefore keeps incurring a loss on serving some users, particularly those in remote areas.[74] However, Oftel (1995*a*), the industry's regulator, found that BT did not face an undue burden as a result of its obligations as the universal service provider. The New Zealand Ministry of Commerce and Treasury (Ministry of Commerce, New Zealand, 1995) also found that the compensation to be paid to carriers for meeting these obligations is small.

82. Table 12 describes various funding mechanisms for USOs in telecommunications. Not all countries have one and both the presence and lack of a funding mechanism raises incentive issues that need to be considered. The United Kingdom, Sweden, Finland, and Japan are examples of countries where the cost of meeting these obligations has to be met by the incumbent. A common way of funding obligations is through interconnection tariffs, (*e.g.* Canada, France, New Zealand) but this can run counter to the objective of promoting competition. For example, public service obligations funded through interconnection fees can result in access charges that not only deter entry but also prevent more efficient existing competitors from surviving (Baumol, 1999). Furthermore, contributions through access charges or

71. Inefficient entry occurs due to possibilities for "cream-skimming" that arise from product prices that are above costs due to distortions in the tariff structure. Cross-subsidies can flow from competitive to non-competitive activities (*e.g.* prices for long-distance telephony subsidising the cost of local access) or can arise from uniform tariff structures even though there may be significant differences in costs of supply (*e.g.* geographically uniform electricity transmission charges).

72. In fact, they find that penetration actually increased and resulted in part from the combined effect of higher monthly basic access charges and lower long-distance prices that arose from re-balancing.

73. The author finds that moving to de-averaged (*i.e.* non-uniform) rates based on geographical differences in costs is feasible, since even in the low-density rural areas this would imply a fixed monthly rental fee of approximately $20.

74. Oftel (1995*a*) estimated the gross costs of these social obligations to be between £60m and £40m (Armstrong, 1997). The Australian Bureau of Transport and Communications Economics estimated the cost of similar obligations in 1989 to be approximately A$250 million; and Lewin and Kee (1997) estimated the cost of the USO in the United States to be $1.65 billion in mid 1997.

geographically uniform tariffs can lead to inefficient bypass (Vogelsang and Mitchell, 1997).[75] Such concerns led to new approaches in the United States[76] and the United Kingdom where, after 1996, British Telecom interconnection charges no longer contain allowances for the imposition of cross-subsidies in its retail tariff.

[Table 12. Funding USOs, 1999]

83. Not reimbursing the incumbent for the cost of social obligations puts the universal service provider at a disadvantage in a competitive regime. In Australia, therefore, these costs are shared amongst carriers in proportion to their share of 'eligible revenue' so that no one carrier is disadvantaged. In the United Kingdom, Oftel also originally considered a similar approach to funding these social obligations (Armstrong, 1997). While this approach is more efficient than funding through cross-subsidies in the tariff structure or through interconnection charges, this policy only partially overcomes the funding problem.[77]

84. Hausman *et al*. (1993) find that in the United States further efficiency gains are likely to arise if cross-subsidies to basic local exchange access are eliminated and long-distance prices lowered. As this implies higher basic monthly rental fees, they argue that these changes need to be accompanied by a targeted subsidy programme for low-income households. Maher (1999) also argues for the use of direct transfers and the removal of cross-subsidies since distortions in the tariff structure only lead to inefficiencies by inducing the wrong incentives. If the concern is about the impact on low-income households, alternatives to cross-subsidies include direct cash transfers to consumers or direct subsidies to operators serving remote rural areas at prices below costs or meeting other social obligations. The latter approach is increasingly being considered as a way to fund public service obligations in air and rail transport services.[78] While the fiscal burden would be greater, it helps make the cost of meeting such obligations more transparent. Policy makers are then in a better position to judge whether or not social service obligations should be retained in liberalised markets.

85. Hence, the maintenance of universal service and carrier of last resort obligations need not, and should not, impede greater competition and improved cost-based pricing. While competition can impact unfavourably on the affordability of universal service obligations (*e.g*. by limiting the ability of recovering these costs through the tariff structure), there are alternative mechanisms that are more cost-effective than cross-subsidisation or interconnection charges. For example, where firms can be compensated directly or if costs are shared amongst carriers in proportion to their profits, universal service obligations can be maintained in an increasingly competitive environment. In addition, regulators can also use auctions in which firms bid to supply USOs at the lowest cost, thereby minimising the subsidy from the government.

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75. Note that inefficient bypass is a problem not only in the telecommunications industry, but also occurs in the electricity and gas industries, where it is again motivated by distortions in the tariff structure.

76. USOs in the United States were previously financed through averaging across geographic areas and a surcharge on charges for access. Since these arrangements often led to inefficient bypass, each telecommunications carrier now contributes on an 'equitable and non-discriminatory' basis to the provision of universal service. This method however continues to involve a continuation of partial subsidisation through the tariff structure.

77. The problem arises since contributions are based on revenues and not profits. For example, if the incumbent were to break-even before contributing to the fund then it would operate at a loss after contributing to the fund since contributions are based on revenues. However, the problem with using profits as the basis for contributions is that profits are inherently difficult to measure.

78. The US "Essential Air Service" program for small communities utilises this approach. The European Union has adopted and recommends a similar policy for funding public service obligations in regional air transport.

Competition, therefore, means that non-economic social obligations may need to be provided and funded in non-traditional ways.

2.3.2 Safety and environmental issues

86. Debates about how to preserve and enhance the safety and environmental performance of liberalised industries revolve mostly around nuclear energy and transportation sectors, where safety and environmental risks are perceived to be highest. Without aiming at a detailed analysis, this section gives an overview of some relevant analytical research and empirical facts. It deals mainly with the safety and environmental impacts of air transportation liberalisation, with a special focus on the two-decade long experience of the United States.

Safety

87. Safety is a major component of service quality in transportation. Economic analysis and practical experience show that desirable safety levels in transportation may not be attained through market mechanisms alone, because of i) imperfections in the safety information of users (travellers), ii) distortions in the safety incentives of carriers under limited liability, and iii) the third-party effects of transportation accidents (Savage, 1999). In these circumstances, maintaining an adequate level of safety in the newly competitive transportation sectors is a leading policy concern (Oster *et al*., 1992; General Accounting Office, 1996*a*).

88. Contrary to widely publicised warnings about deterioration of safety under competition, transportation reforms generally seem to have been accompanied with a clear improvement in safety performance. Statistical analyses of the US air transport industry, including "before/after" comparisons of various safety indicators as well as multivariate regressions, support this conclusion (see *e.g*. Olster *et al*., 1992, Rose, 1992). Similar observations apply to US rail reforms, although the underlying statistical material is less elaborate. In drawing policy conclusions from these experiences, the respective roles of long-term technological trends, market and competition incentives introduced by reforms, and the impact of enhanced safety regulations must be highlighted.[79]

89. Regular improvement in safety is a long-term trend in international air transportation, reflecting progress in aircraft engine reliability, better pilot and flight engineer training, and accumulated experience with maintenance.[80] At the international level, International Civil Aviation Organisation (ICAO) regulations concerning pilot qualification, aircraft airworthiness and maintenance have played a prominent role.[81] The US Federal Aviation Administration's strengthened certification rules for the so-called "commuter" carriers in the year of reforms improved their safety performance.[82] New rules have

79. The simultaneity of these changes with reforms makes the statistical analysis of their respective impacts difficult.

80. In the international market, the number of fatal accidents per 1 million commercial flight departures declined from 4.44 in the decade 1957-1966 to 3.09 in 1967-1976, and from 2.37 in 1977-1989 to between 1 and 1.50 in the first half of 1990s. In the US alone, the figure evolved from 1.7 in 1965, to 0.43 in 1975, and 0.25 in 1995.

81. For instance, the US Department of Transport has recently initiated an international programme checking the actual application of ICAO regulations in the foreign countries whose airlines offer air services to the United States, as a way to improve safety in the US air space and airports.

82. Commuter airlines have grown rapidly after liberalisation - in new hub-and-spoke networks - and, was it not for their sharp safety improvement, the positive overall trend in the US industry's safety performance

contributed to making new entrant airlines credible in the market, by partly compensating for the reputational effects which favour large-size incumbents.[83]

90. Empirical analysis has suggested that liberalised air travel markets penalise "carrier at fault" accidents[84] via falling demand for their services, for up to two months; lowered share prices and up to 15 per cent higher insurance premia (Morrison and Winston 1989; Rose 1992; Savage 1999 and 1999*a*). However, these market reactions are not by themselves penalising enough to generate safety disciplines which may replace public safety regulations - at least in the short to medium term.

Environment

91. Environmental impacts of regulatory reform have been a concern primarily in the context of energy and transportation. Impact research shows that the main external effects of transportation are: engine gas emissions, noise emissions and traffic congestion (Royal Commission on Transport and Environment, 1994 and 1997). Transport services are often subject to special taxes, such as fuel taxes and professional licence fees. However, these taxes are rarely based on (and in proportion to) external effects, and are generally applied at different rates in different transportation modes. Therefore, they generally do not bridge the gap between the social and private costs of transportation across modes, introducing distortions in the modal distribution of transport output. These problems precede regulatory reforms by several decades, but may have been exacerbated by them: lower transportation costs and fares raised demand and output, increasing the social costs of gas and noise emission, and congestion (Royal Commission on Transport and Environment, 1994).

92. Both noise emissions and gas emissions at airports (but not in-flight) are regulated by ICAO-defined noise and gas emission standards, supplemented, in many OECD countries, by more demanding national or regional rules. A topical issue in emission regulation discussions concerns the in-flight gas emissions, which are presently unregulated.[85]

93. Economic instruments could usefully supplement, or replace, these command-and-control regulations. For example, aircraft fuel is currently exempt from tax in most countries[86] and there are now recurrent proposals for its introduction. It would be preferable if such introduction were co-ordinated internationally to avoid creating distortions in the taxing of global externalities by the airlines of different countries. As well, given opportunities for international flights to re-fuel when fuel is cheap, co-ordination

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after deregulation could not have been maintained. The number of commuter-carrier fatalities per billion passenger miles (with five-year moving averages) declined from 26 in 1977 to 16 in 1980, 10 in 1982, 5 in 1988 and 2 in 1994, attaining a safety level not out of proportion with mainstream jet carriers.

83. Recent statistical analyses show that the safety performance of new entrant airlines remains below market averages. The Federal Aviation Administration (FAA) has decided to focus its safety inspections more purposefully on this group of carriers. Travel markets do not seem to penalise new entrant airlines for their lower safety performance, but the persistence of market confidence might be contingent upon the success of FAA actions in restoring safety performance.

84. In the United States, air accidents are categorised after a prompt review by the National Transportation Safety Board as either "carrier at fault" or "no carrier at fault" events. A standard analysis of the diagnosed causes of the accident is made public.

85. Atmospheric effects of aircraft engine emissions are important but more complex to analyse than for road engine emissions. Exhaustion gas impacts differ according to the altitude of aircraft; different emissions (CO_2, NO, etc.) having different effects on the different layers of the atmosphere.

86. Sweden is an exception, having introduced an airport fuel tax in 1989.

would seem to be called for. As environment concerns, including climate change, put upward pressure on energy costs to other transport modes, the non-taxation of aircraft fuel becomes an increasingly important distortion.

94. Another potential economic instrument relates to noise pollution. Governments could impose airport-specific variable noise taxes, and authorise tradable noise emission permits for different periods of the day.[87] In reviewing the mandatory rules of the US Airport Noise and Capacity Act (ANCA) of 1990,[88] a recent analysis suggested that this regulation's benefits of approximately $5 billion for airport neighbours fall short of its $10 billion costs in additional equipment, while an economically optimal airplane noise tax would have generated net social benefits of approximately $200 million (Morrison, Watson and Winston, 1998).

95. Deploying such economic instruments may have distributional implications (ECMT, 1994). In aviation, measures like air-fuel and noise taxes may have the same effects as congestion pricing. They may change the relative costs of operation on certain routes *e.g.* short haul vs. long haul, or at different times of the day, making some of the previously available low-cost services commercially unsustainable. On the other hand, regulatory instruments also have distributional impacts which, however, are frequently more opaque than those resulting from the use of economic instruments.

87. Tradable noise permits in specific airports and periods of the day may facilitate a more flexible allocation of available noise tolerance - to the airlines valuing them most. These permits may give positive incentives to noise-reducing airlines, by permitting them to commercialise their "noise savings".

88. Adopted in 1990, ANCA mandated the elimination of certain (the so-called ICAO Chapter II) aircraft at all US airports by the end of 1999, because of their noise effects. The European Union took a similar approach, by banning Chapter II aircraft from European airports by 2002.

3. PRIVATISATION

3.1 Public enterprises and privatisation in the OECD

96. Historically, state ownership of business enterprises was used to further public policy objectives in competitive economic activities and a substitute for (or a complement to) arm's length regulation in activities thought to be characterised by market failures. Regional and industrial policy goals and employment creation were deemed easier to reach through direct state intervention in business activity rather than through market mechanisms or a system of subsidies to private sector enterprises. Similarly, especially in European countries, regulatory objectives such as quality of service, price controls and universal service were thought to be more easily implemented by state-owned utilities than through regulatory schemes.

97. According to some estimates, at the beginning of the 1980s state enterprises accounted for more than 10 per cent of GDP in most OECD countries outside North America and Japan which had strong traditions of arm's length regulation and administrative guidance, respectively. By the end of the century widespread privatisation policies, which were often preceded and supplemented by the corporatisation of public enterprises,[89] left only a few countries with a significant share of state enterprises in the activities covered here (see OECD, 1999).[90]

98. In many countries, the scope of the public enterprise sector (*i.e*. the number of industries in which public enterprises are present) was also very wide, covering the utilities (such as water, gas and electricity supply), telecommunications, most transport modes as well as banking, insurance and even some manufacturing industries. Until the 1990s, privatisation concerned mainly public enterprises operating in competitive industries (such as banking, insurance and manufacturing), but during the 1990s privatisations have increasingly concerned the utilities, telecommunications and transportation (Figure 7). Nevertheless, public enterprises are still very common in these sectors, while public control persists also in some competitive industries (Figure 8). Government provision remains a dominant feature of education, health and other public services (such as local public transport, garbage collection, etc.), which however fall outside the scope of this review.

[Figure 7. OECD privatisation proceeds in selected sectors, 1990-1998]
[Figure 8. Sectoral distribution of state-controlled firms in the OECD, 1998]

89. Corporatisation involves a change in the legal status of the public enterprise, subjecting it to private company law. The New Zealand government pioneered this approach to public enterprise reform in 1986.

90. Megginson and Netter (1999) cite various data sources suggesting that the overall weight of the public enterprise sector in the OECD area may have declined from around 10 per cent to below 5 per cent since the end of the 1970s.

3.2 Privatisation and regulatory reform

99. Privatisations were generally motivated by two main factors:

- A reassessment of the role of government in the business sector, with a considerable narrowing of the scope for public enterprises (Table 13 summarises the key factors influencing the scope for public ownership);[91] and

- The wish to enhance managerial incentives in privatised enterprises and sever the link between managers and politicians, thereby lowering the deadweight costs associated with managerial slack and influence-seeking activities.[92]

[Table 13. Key factors influencing the scope for public ownership]

100. Public finance considerations (*i.e.* raising government revenues by selling public assets) were another factor driving privatisations in the early phases. In some cases, revenue considerations were at cross-purposes with the achievement of efficient outcomes in those industries concerned by privatisation, especially where insufficient attention was paid to the market power of the firms being privatised.

101. The experience of OECD countries shows that privatisation needs to be accompanied by reforms that adjust the regulatory environment to the operation of the former public enterprise as a private business (see Part 2 for more detail). These include i) ring-fencing the non-competitive segments (*e.g.* through vertical separation) and exposing to competition the competitive segments of its activities; ii) equipping the regulator with the powers and the resources needed to stimulate cost efficiency, keeping market power under control and monitoring the quality of the products provided by the privatised firm;[93] and iii) ensuring that market regulation is consistent with the objective of making the corporate governance framework as efficient as possible.

102. More generally, as suggested by privatisations in new Member countries, the change in incentives spurred by the transfer of ownership rights can have maximum impact on efficiency and consumer welfare only if contractual arrangements can be designed and adequately enforced, corporate governance mechanisms work efficiently and the private sector environment is relatively free from political influence (Williamson, 1999; Rider, 1994; Zecchini, 1997; Frydman and Rapaczynski, 1997).[94] In

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91. In the past two decades, property rights and public choice analyses have confined the scope for public enterprises to those (relatively rare) situations in which a) the unobservable quality characteristics of a product are significant and cannot be monitored (*ex post*) at arm's length; b) product or process innovation is not essential; and c) competition and consumer choice are weak and reputation is unimportant (Hart *et al*., 1997).

92. The influence of the allocation of control rights over the firm on managerial incentives is stressed by Shleifer (1998). The implications of privatisations for the ability of pressure groups to influence managerial decisions are illustrated by Boycko *et al*. (1996) and Bennedsen (1998). Foster (1992) describes the pressures exerted on the management of former public enterprises in the United Kingdom; OECD (1994) describes the channels of political influence over state holdings in Italy.

93. In many OECD countries this has involved taking away regulatory powers from the incumbent and/or the creation of new (horizontal or sector-specific) regulatory authorities having a statutory independence from the government. See Part 4 for a discussion of political and institutional issues in regulatory reform.

94. Johnson and Shleifer (1999) stress the role of regulation in ensuring the stability of the new system of property rights resulting from privatisations in transition countries. They compare the outcomes of economic reforms in Poland and the Czech Republic, where two different approaches to financial market

some cases, administrative reform is also needed in order to ensure an orderly and successful privatisation process, although the experience of OECD countries (such as Italy and Mexico) suggest that relatively small government agencies or structures can sometimes ensure that the sale of government assets is transparent and rapid (Shirley, 1994; Goldstein and Nicoletti, 1996).

103. While experience shows that for privatisation to be successful, the (broadly defined) regulatory framework needs to be reformed, privatisation can in turn make market-oriented regulatory policies easier to implement. The most extreme case is the transformation of transition countries from command-and-control to market economies. This would have been unthinkable without the redistribution of property rights and the injection of new human capital in management that followed mass privatisations and the sale of formerly government-owned enterprises to outside investors. But even in well-established market economies, privatisations of state monopolies may be essential to increase competitive pressures. New entry is unlikely in a market that features a state-owned incumbent with a soft budget constraint, because the incumbent can credibly deter entry through predatory pricing.[95] Privatisation may also enhance competitive developments through the horizontal or vertical unbundling of some of the activities owned by the former state monopoly and their separate sale to different private investors.[96] An example is the electricity industry, where in the absence of (at least partial) horizontal unbundling new entrants are unlikely to rapidly outgrow former state monopolies after the liberalisation of the generation segment.

104. Electricity and airports also provide examples of industries in which the regulation of non-competitive segments can be made more effective by horizontal unbundling through privatisation. The monitoring of cost-efficiency of electricity distribution and airport companies can be greatly facilitated by the existence of several independent companies operating at the local level, because the methods of yardstick competition can then be applied.[97]

105. Furthermore, privatisations may also make competition policy easier to implement. The recent experience of OECD countries indeed abounds with examples of vertically-integrated public enterprises (sometimes sheltered from competition law provisions) which were found to abuse their dominant position in an upstream market to foreclose entry of new competitors in liberalised downstream markets.[98] Lott (1990) and Sappington and Sidak (1999) show that, under a variety of plausible settings, a public enterprise will have even stronger incentives than its private homologue to behave anti-competitively by raising rivals' costs and deterring entry.

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regulation were taken. They argue that the laissez-faire orientation of the Czech government was partly responsible for inferior economic outcomes.

95. For instance, in New Zealand competition in ferry services between the two islands only developed after the incumbent was privatized.

96. This is the approach taken in electricity generation by the United Kingdom, Australia and (in the near future) by Italy.

97. The wholesale privatisation of British Airport Authority has been criticised for missing the opportunity to introduce airport competition in the London metropolitan area and make yardstick regulation possible (see, Vickers and Yarrow, 1988; and Starkie and Thompson, 1985). The privatisation (underway) of the electric utility in Italy was criticised by the Italian competition authority for failing to activate forms of yardstick competition (*e.g.* in the distribution segment of the industry).

98. According to information contained in the OECD International Regulation Database, in 1998 public enterprises were exempted from competition law provisions in several OECD countries, either because they enjoy exclusive or special rights or because they are explicitly exempted.

3.3 Privatisation and performance

106. Empirical analyses of the effects of ownership on performance have generally focused on productive efficiency and profitability (often at company level), with only a few studies looking at the effects on prices and welfare. Work in this area has been complicated by the fact that, until recently, there were very few observations on pre and post-privatisation company performance. Early analyses focused almost exclusively on cross-sections of US companies operating in heavily regulated industries (such as the utilities) and rarely controlled for the influence on company performance of factors unrelated to ownership, such as the regulatory and market environment. Hence the early evidence on the relative performance of private and public enterprises (thoroughly reviewed by Boardman and Vining, 1989, and Domberger and Piggott, 1986) was largely inconclusive.

107. In the past decade, the quantity and quality of empirical data and research has improved. In particular, research has gone beyond the mere comparison between public and private (or privatised) firms to investigate the effects on company performance of different ownership structures, often taking advantage of the "natural experiment" represented by privatisation policies in central and eastern European countries.

108. The results of the recent studies reviewed here on balance suggest that, private (or privatised) companies perform better than public enterprises in terms of productive efficiency and profitability (Table 14). Similarly, Megginson and Netter's (1999) review of eighteen empirical investigations concludes that there is evidence supporting the comparatively better performances of private firms across a wide range of countries, industries and profitability and efficiency indicators.[99]

[Table 14. Synopsis of recent studies on the effects of ownership on performance]

109. Although the evidence on the better productivity and profitability performance of privately-owned firms is compelling in competitive industries,[100] evidence from Eastern European privatisations (see, for instance, Frydman *et al*., 1999) shows that the change in incentives improves performance significantly only under certain types of private ownership structures. Privatisation has only marginal effects on performance in the case of firms controlled by insider owners (former public managers and/or employees).[101] On the other hand, a recent analysis, based on the privatisation experience in the United Kingdom, brings evidence of a link between ownership structures, internal monitoring mechanisms and managers' incentives (Cragg and Dyck, 1999), showing that the sensitivity of management replacement to changes in financial performance as well as the frequency of management turnover both increase after

99. Although there is often little consistency between the definition of performance adopted by the different studies, a majority of them look at indicators of profitability (such as rates of return on assets), efficiency (such as multifactor or labour productivity) and cost-efficiency (such as cost per unit of revenue). In assessing profitability outcomes, most studies try to control for the companies' market power. Some studies also look at the effects of privatisation on employment (D'Souza and Megginson, 1999; Megginson *et al*. 1994; and Boubakri and Cosset, 1998), suggesting on balance that company restructuring before and after privatisation leads to stable or increasing employment.

100. Additional evidence on the beneficial effects of private ownership on performance in competitive industries is provided by Gonenc and Nicoletti (2000) who study the efficiency (at the industry and route level) of a large set of international air travel companies in 1996.

101. While on average the firms in the sample of Frydman *et al*. (1999) improve their performance after privatisation, improvements over time are significantly different from those observed in state-owned firms only when ownership rights have been transferred to large outside investors.

privatisation.[102] Thus privatisations appear to have provided more incentives to managers to improve performance in the United Kingdom.

110. The evidence is also suggestive of a better performance of private enterprises in industries with natural monopoly elements, but the results are less unequivocal. Pollitt (1997) reviews eight studies, of which three, all focusing on the initial stages of privatisation in the United Kingdom, report an inferior efficiency performance of the privatised utilities. More recently, Steiner (2000) found significant capital productivity advantages of private (or privatised) electricity utilities in a cross-section/time-series study covering 19 OECD countries over the 1986-1996 period. On the other hand, while D'Souza (1998) reports significant gains in the efficiency and profitability performance of 17 telecommunications companies privatised over the 1981-1994 period, Boylaud and Nicoletti (2000) are unable to find any independent effect of privatisation on efficiency performance in a cross-country/time-series study of the telecommunications industry in 21 OECD countries over the 1991-1996 period. These mixed results are unsurprising since not all the studies looking at the effects of privatisation on performance control for the influence of factors unrelated to ownership (such as the regulatory and market environment), which are likely to play an important role in determining efficiency outcomes in these industries.

111. Disentangling the effects of changes in ownership from those implied by stronger competitive pressures is a difficult task since privatisation and liberalisation often go hand-in-hand. For instance, there is some evidence that public enterprises implement restructuring efforts and, eventually, improve performance when hard budget constraints are imposed, preferential treatment is eliminated and previously sheltered markets are liberalised (see, for instance, Pinto, Belka and Krajewski, 1993, who find improvements in the performance of Polish public manufacturing enterprises after the 1990 reforms).[103] However, the evidence is difficult to interpret since these measures are often taken in advance of a privatisation. More convincing evidence is provided by counterfactual analyses comparing the performance of private firms with their hypothetical performance had they remained public or "natural experiments" in which a market is liberalised and some firms are privatised while other (similar) firms are not. Galal *et al*. (1992) provide an example of a counterfactual analysis identifying significant and positive effects of the ownership transfer on financial performance, efficiency and resource allocation.[104] An interesting natural experiment is the Mexican experience over the 1983-1991 period, which is analysed by La Porta and López-de-Silanes (1999): they find that, while the opening up of markets positively affected both private and public enterprises, those that were privatised bridged quickly the pre-privatisation performance gap with their industry-matched private homologues, while firms that were not privatised did not.[105] These results tend to confirm the conclusion that it is the combination of privatisation and product market competition that is associated with the best outcomes.

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102. Cragg and Dyck's (1999) analysis controls for progress in overall governance mechanisms over time, which otherwise might have biased their results.

103. There is also anecdotal evidence that the performance of public enterprises has improved in countries where public enterprises were corporatised.

104. The analysis of Galal *et al*. (1992) covers twelve privatisations in several countries and industries including firms operating in markets that were liberalised over the simulation period.

105. La Porta and López-de-Silanes (1999) control for both privatisation and liberalisation and find significant and independent effects of both policies on the financial performance and efficiency of a large sample of firms including more than 90 per cent of the firms privatised in Mexico over the sample period.

4. SELECTED POLITICAL ECONOMY ISSUES

112. Regulators have the power to generate and redistribute rents across various interest groups, for instance, by creating or preserving monopoly positions or by maintaining cross-subsidies in the tariff structure. Therefore, they may have incentives to use this power to gain or maintain support from their political principals. At the same time, regulated firms or the beneficiaries of regulation (such as user groups) have a strong incentive to attempt to "capture" the regulator (see Box 4 for an elaboration of this point). There is also a risk that regulators will use their discretion to expropriate producers, distorting investment incentives in the industry (see Box 5). These political economy considerations point to the need for careful design of regulatory frameworks.[106]

4.1 Regulatory capture and institutional design

113. Anecdotal evidence suggests that regulators can become "captured" and act in the interest of the regulated firms, especially in relatively concentrated industries.[107] For example, it has been argued that prior to deregulation the regulatory bodies for the road freight, telecommunications and airlines industries in the United States acted to restrict entry, to the detriment of consumers (Laffont and Tirole, 1993). Similarly, in several EU countries the European Commission found that regulatory bodies (often ministry departments) were delaying the implementation of liberalisation directives in telecommunications, electricity and railways. Firms in competitive industries (*e.g.* retail distribution and trucking) can also successfully organise to influence regulatory outcomes (Stigler, 1971). In several OECD countries, associations representing the interests of incumbents in the retail trade and road freight industries participate in bodies that take decisions concerning new entry and other regulatory issues (Boylaud, 2000). However, with the emergence of more powerful consumer groups and, in some sectors, the increase in the number of regulated firms, regulators are likely to arbitrate amongst a wider set of competing interests and not always in favour of the industry (Peltzman, 1976).

106. This part focuses mainly on the implications that the possibility of regulatory capture and regulatory "hold up" may have for the design of regulatory frameworks. Wider issues related to the optimal design of regulatory institutions have been analysed in OECD (1999*e*).

107. The examples provided below are only suggestive of capture because, in practice, the actions (or the lack of action) of a regulator may be determined by a number of factors, including the fear to disrupt existing arrangements and a genuine commitment to their policy mandate.

Box 4. **The capture theory of regulation**

Standard models of regulation often assume that regulators pursue a set of social objectives. In these models there is no difference between what regulators ought to do and how they actually behave. Even early on, however, this view of the regulator as a benevolent maximiser of social welfare was regarded as flawed, see Kahn (1971), Stigler (1971), Buchanan (1972), Posner (1971, 1974), and Peltzman (1976). The 'capture' or 'interest group' theory of regulation emphasises the objectives of regulators as rent-seeking, analyses the behaviour of the regulators in terms of maximising political support, and emphasises the role of interest groups (including regulated firms) in the formation of regulatory policy.[108] The risk of regulatory capture is higher when information asymmetries exist (Laffont and Tirole, 1993),[109] but regulatory capture is possible even under complete information as long as the organisational or transactions costs associated with preventing the regulatory outcome are large.[110]

Political economy considerations are also useful in interpreting regulatory reform. The larger the costs of regulation, the weaker the political sustainability of a given regulatory arrangement.[111] The overstepping of these bounds in many industries in the 1960s and 1970s probably encouraged the OECD-wide regulatory reform movement (as regards the experience of the United States, see Keeler, 1984 and Peltzman, 1989). Costs of regulation for regulated interests became excessive because i) procedures were increasingly cumbersome, partly due to the need to mediate between a growing number of conflicting parties; ii) pressures were exerted by regulated firms competing on activities that could not be regulated (*e.g.* service competition in air travel); and iii) entry into unregulated activities substituted for regulated ones (*e.g.* call-back or closed user groups telephone services, road vs. rail freight). Such pressures undermined the ability of regulated interests to extract rents from unorganised groups (Noll, 1999).

114. One of the tasks of institutional design is, therefore, to find ways to reduce the influence that interest groups have in regulation.[112] Many OECD countries aimed at limiting the danger of regulatory

108. In a more formal sense regulators (or politicians) can be seen as maximising their chances of being re-appointed (or re-elected), weighing differently the support of the various groups affected by regulation to reflect their relative importance or power. Interest groups, on the other hand, will influence government up to the point where the marginal benefit from regulatory favouritism is equal to the marginal cost of influence-seeking activities.

109. This is because interest groups have more power to influence the regulatory process in the presence of asymmetric information. For example, the regulator has more discretion, *e.g.* from the public, parliament or ministers, when asymmetries of information are strongest and regulation less efficient. Also firms have greater possibilities to distort information in the presence of asymmetries, and thus it becomes easier to 'capture' the regulator.

110 . For example, the power of an interest group to influence regulatory decisions will depend upon its stake and the costs of influence-seeking activities. The logic of collective action implies that for a given issue, the smaller the group, the higher the per-capita stake and the higher the stake, the greater are the incentives to affect the regulatory process (Olson, 1965).

111. While politicians usually give regulators some leeway to redistribute income through the regulatory process (with a concurrent cost in efficiency), this is sustainable only if the efficiency costs of regulation are low or the welfare weights applied by the regulator to different groups differ by a small amount (Keeler, 1984). The costs of regulation include the burden of regulatory compliance and the effects on the responsiveness of regulated firms to changes in technology, costs and demand (Noll, 1999).

112. However, if interest groups can bring new information about the regulator's or the firm's activities, then it may be desirable to increase their stakes in regulatory decisions. This can induce them to acquire information and make regulation more efficient. Constitutions and elections, as well as public hearings, also play a role in constraining the exercise of political self-interest. Another instrument that aims at limiting discretion in some countries is the duty of the independent regulator to promote competition, and to forego regulating where no longer necessary. However, delegating to regulators the powers to enforce market competition may create conflicts with authorities in charge of general competition policy and regulatory uncertainty for industry operators (OECD, 1999*e*).

capture by attempting to create regulatory institutions that are 'independent' of the executive branch of government (see Table 15 for a summary description of regulatory institutions in the OECD).[113] Making the regulator's status less dependent on political power limits the risk that private sector lobbies may use their political influence to affect regulatory decisions.[114] For instance, the United States has a long tradition of independent regulatory agencies and in the United Kingdom the creation of independent regulatory offices for the privatised utilities was seen as critical to overcoming the traditional problems of regulatory failure. Independent agencies were endowed with substantial regulatory powers (encompassing the promotion of competition, tariff setting and consumer protection) in many European countries, Australia and in some new Member countries. Often, government ministries keep a policy-making role in the industry (such as defining the entry regime or USOs), while independent regulators have a legal mandate to define and enforce detailed regulations.

[Table 15. Regulatory setting in OECD countries: the case of telecommunications, 1998]

115. Independent regulators may sever the link with politicians, but they do not eliminate the danger of capture by the regulated industry.[115] For example, the 'revolving-door' phenomenon where regulators leave to take jobs in the industries they regulated (or joined the boards of companies they privatised) indicates that it is very difficult in practice to establish regulatory independence.[116] Although complete independence may not be attainable in practice, desirable requirements may include i) providing the regulator with a legal mandate (covering also the cases and procedures for overruling its decisions); ii) ensuring that it is structurally separated and autonomous from the government; iii) defining a multi-party process for its appointment (*e.g*. involving both executive and legislative bodies); iv) protecting it from arbitrary removal (*e.g*. through fixed terms); v) defining its professional standards and adequate remuneration levels; vi) designing a reliable source of funding (*e.g*. industry fees).[117] Table 16 describes how OECD countries have implemented some of these principles in telecommunications.

[Table 16. Independence of regulatory institutions: the case of telecommunications, 1998]

116. While most countries have opted (at least in some industries) for the 'independence' of regulatory functions to minimise capture, institutional design differs across the OECD. The main patterns are: i) several sector-specific regulators, as in the United States (at the federal level) and in most European countries; ii) an all-purpose regulator that cuts across all regulated industries, as in Australia and many US states; or iii) the exclusive reliance on the application of the general competition law (so-called 'light-handed' regulation), as in New Zealand.

117. The case for multiple industry-specific regulators rests on the reduction of information asymmetries. Separation of regulators increases the total amount of available information and limits the amount of private information that each regulator can use, thereby curbing regulators' discretion to engage

113. Another line of argument not developed here is that politicians grant agencies independence especially when this can help shift the blame for politically difficult policy decisions onto agencies (Fiorina, 1982).

114. This risk is particularly high in the case of public utilities, whose list of customers is practically identical to the voters' list (OECD, 1999*e*).

115. Moreover, if independence is poorly designed, it can generate concerns for a lack of democratic accountability.

116. While post-employment restrictions would be one way of solving this problem, these could complicate the task of finding a regulator with appropriate managerial expertise.

117. OECD (2000) discusses requirements for regulatory independence in the telecommunications industry. See also Smith (1997).

in socially wasteful activities (Laffont and Martimort, 1999). Separate agencies also allow for the use of yardstick competition by which to compare the behaviour of different regulators, especially in related industries such as gas and electricity, thus reducing asymmetries of information (Neven *et al*., 1993). However, sector-specific regulators may be more easily captured by the industries they regulate and, in addition, regulatory inconsistencies across industries can induce distortions in the investment of the regulated firms, especially when the activities concerned by inconsistent regulatory enforcement are substitutes (*e.g*. road, rail and air transport; electricity and gas; post, telecommunications and broadcasting) (Helm, 1994). Additional arguments in favour of an all-purpose regulator are regulatory efficiency considerations (*e.g*. economies of scale in information collection, avoidance of wasteful duplications, lower administrative costs) as well as a lower probability of capture, because of the higher transaction costs involved for interest groups.[118]

118. A more direct way to reduce information asymmetries is to increase the transparency of regulation and the regulatory reform process for the public. Public information on the social welfare consequences of regulatory deviations constrains regulatory capture (Noll,1999). Increasing availability of economic research on the welfare effects of regulations has improved such transparency, and has been instrumental in building coalitions for regulatory reforms (Derthick *et al*., 1985). The demonstration effects of international reform experiences play a similar information role, illustrating the opportunity costs of regulatory status quo in non-reforming countries. Effective institution building against regulatory capture may include mechanisms for producing internationally comparative information on the costs and benefits of alternative regulatory arrangements.[119]

119. Institutions specifically serving the aims of market-oriented reform at the policy level may also be useful, especially in view of the fact that the greatest impediment to enhanced competition in many key sectors of the economy are restrictions imposed by government laws and regulations. In this respect, the experience of the National Competition Commission in Australia is particularly illuminating. This Commission was set up at the federal level to bolster within both the federal and state governments the federal policies aimed at promoting market competition, by reviewing and amending laws and regulations unnecessarily restrictive of market mechanisms (see OECD, 1999*e*).[120]

4.2 Regulatory risk and the design of regulatory mechanisms

120. Apart from the problem of "capture", too much discretion by regulators also increases the "regulatory risk" faced by regulated firms, with potentially adverse effects on regulatory outcomes.[121] For instance, while re-setting price caps in between review periods or disallowing capital investments from the

118. Because all-purpose regulators mediate interests of several industries at once, capture by any single industry may be more resource intensive than with an industry-specific regulator. Moreover, decision-making bodies in all-purpose regulatory institutions are less likely to have the kind of in-depth knowledge of the industry that would make them particularly valuable later on as employees or lobbyists for the regulated firms (OECD, 1999*e*)

119. International benchmarking has played an increasing role in regulatory reform in the Netherlands and Australia (see, for instance, Productivity Commission, 1999).

120. The monitoring role of the National Competition Commission was enhanced by the possibility to condition federal transfers to the states (compensating for the loss of revenues from privatised state-owned companies) on a positive assessment by the commission of the regulatory review process implemented by the states (Fels, 1999).

121. This is the under-investment that occurs in the classic hold-up problem arising from firm-specific or relationship specific investment (Hart and Moore, 1988)

rate base can be justified *ex post* on economic or distributive grounds, the risk of such regulatory moves can have undesired consequences for the investment of the regulated firms (see Box 5).

Box 5. **The hold-up problem**

If a firm makes sunk-cost investments, this may expose it to a problem of *ex-post* opportunism on the part of the regulator. For example, once a firm has made a fixed (and sunk) capital investment, the regulator sets the price. However, the firm recognises that the regulator has an incentive to set price equal to marginal cost *ex-post*, because this is the static first-best outcome given that investment is sunk. *Ex ante* (before the investment is undertaken), therefore, the firm expects to make a loss equal to the sunk investment since it will not be able to recover these costs *ex post*. The result is investment by the regulated firm below the socially optimal level. However, regulators and firms interact on a repeated basis, therefore the extent to which the regulator can engage in opportunistic behaviour is limited.

There are other sources of regulatory risk. For example, future policies towards liberalisation can also affect investment. If a firm believes there is a chance that there will be free and effective entry at some point in the future, then this can remove the incentive for the firm to engage in sunk investments since it may not be able to recover the costs of these investments once the market is liberalised (Armstrong *et al.*, 1994). Other sources of regulatory risk include changes in environmental policy or the possibility that the regulated firm will be subject to some kind of restructuring.

This suggests the need for 'political regulatory design' incorporating safeguard mechanisms pre-empting the political responses that interest groups may provoke as information becomes available concerning the outcomes of the policy (Baron, 1995). If the regulator could commit to a particular price before the firm's investment decision, then he should set the price such that the firm recovers its total costs, i.e. so that there is average rather than marginal cost pricing. This effectively constitutes giving the firm a "fair" rate of return on its investment. Greenwald (1984) provides a discussion of how such a commitment - which may be a constitutional or legal requirement of regulation - can safeguard investors against *ex-post* regulatory opportunism, while at the same time giving the regulator flexibility to respond to changing circumstances. Much depends upon the political, legal, and institutional framework, and on the way capital assets are measured and on what constitutes a 'fair' return.

121. Regulatory mechanisms should thus be designed to limit regulatory risk. For example, statutory or legal requirements upon regulators to ensure that firms can finance their regulated activities can reduce the risk of regulatory expropriation and avoid a possible source of investment distortions, thereby increasing social welfare.[122] At the same time, *ex-ante* provisions for profit sharing between price-capped firms and customers may sometimes help to reduce political pressures to rescind the price cap system in the event of unexpectedly high rates of return (Baron, 1995). Such provisions have been used in the United States in designing price cap policies for access charges to local telephone networks. Another safeguard against the hold-up problem is the possibility for regulated firms to seek the judgement of competition authorities and/or of courts.[123] Finally, other instruments include increasing the openness of regulatory decision making and of corporate reporting. While confidentiality may limit the amount of commercial data that can be published about competitive activities, this does not apply to regulatory reasoning and principles (*e.g.* regarding the cost of capital or the determination of network access terms) or to naturally monopolistic activities.[124]

122. At the same time, these legal requirements may not provide sufficient incentives for firms to reduce their costs and can lead to x-inefficiency in the use of capital.

123. However, Helm (1994) reports that this safeguard mechanism has not worked properly in the United Kingdom.

124. See Armstrong *et al.* (1994).

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TABLES AND FIGURES

Tables

Figures

Table 1. **Product market liberalisation and performance**

A. Effects on growth and the macroeconomy					
Author	***Country/period***	***Explanatory variable***	***Performance variable***	***Effects found***	***Method***
Reported in van Bergeijk and Haffner, 1996:				Positive, GDP increases by (%):	
Emerson et al., 1988	EU medium-term	Implementation of Single Market (excluding trade-related measures)	GDP	4.1	Simulation
Industry Commission, 1995	Australia long run	Deregulation (implementation of the Hilmer report)	GDP	5.5	Simulation
Lipschitz et al., 1989	Germany annually	Deregulation	GDP	0.3	Simulation
Van Sinderen et al., 1994	Netherlands annually	Deregulation	GDP	0.5	Simulation
OECD, 1997	*8 OECD countries long-run:*	Regulatory reform in electricity, air travel, road freight, telecommunications and retail distribution	GDP	Positive, GDP increases by (%):	Simulation
	United States			0.9	
	Japan			5.6	
	Germany			4.9	
	France			4.8	
	United Kingdom			3.5	
	Netherlands			3.5	
	Spain			5.6	
	Sweden			3.1	
Goff, 1996	United States 1950-92	Index of regulatory intensity	GDP	Negative (GDP decreases by 0.9% annually)	Econometric
Koedijk and Kremers, 1996	11 EU countries 1981-93	Index of strictness of product market regulation	GDP per capita growth	Negative	Descriptive
			TFP growth	Negative	
			Labour productivity growth	Negative	
Gwartney and Lawson, 1997	115 countries	Index of degree of economic freedom	GDP per capita	Positive	Descriptive
			GDP per capita growth	Positive	
Dutz and Hayri, 1998	52 countries 1986-95	Index of pro-competitive policy environment	GDP per capita growth	Positive	Econometric
Edwards, 1998	93 countries 1980-90	Indexes of openness to trade	TFP growth	Positive	Econometric

Table 1. **Product market liberalisation and performance (continued)**

B. Effects on labour market					
Author	***Country/period***	***Explanatory variable***	***Performance variable***	***Effects found***	***Method***
Reported in van Bergeijk and Haffner, 1996				Positive, employment increases by (%):	
Emerson et al., 1988	EU medium term	Implementation of Single Market (excluding trade-related measures)	Employment	1.2	Simulation
Industry Commission, 1995	Australia long run	Deregulation (implementation of the Hilmer report)	Employment	0.4	Simulation
Lipschitz et al., 1989	Germany annually	Deregulation	Employment	0.6	Simulation
Van Sinderen et al., 1994	Netherlands annually	Deregulation	Employment	0.1	Simulation
OECD, 1997	8 OECD countries long-run	Regulatory reform in electricity, air travel, road freight, telecommunications and retail distribution	Employment	Nil	Simulation
Goff, 1996	United States	Index of regulatory intensity	Unemployment rate	Positive (unemployment rate increases by 0.3%)	Econometric
Nicoletti et al., 2000	19 OECD countries 1982-95	Indexes of strictness of product market regulation	Employment rate	Negative	Econometric
	19 OECD countries 1982-95 9 manufacturing industries	Indexes of strictness of product market regulation	Wages	Mixed, predominantly positive	Econometric

Table 1. **Product market liberalisation and performance (continued)**

C. Industry and firm-level effects					
Author	*Country/period*	*Explanatory variable*	*Performance variable*	*Effects found*	*Method*
		Air travel			
Haffner and van Bergeijk, 1997	Netherlands	Intra-EU liberalisation, reform slot allocation	Prices	Decline by 4%	Simulation
OECD, 1999a	United States	Domestic liberalisation of entry and prices	Prices Efficiency Quality	Decline by 33% Increase by 15% Unclear	-
OECD, 1999b	Mexico	Partial liberalisation of prices and entry	Prices Quality Employment Efficiency	Unclear Unclear Increase	-
Evans and Kessides, 1993	1000 routes United States 1986-88	Demonopolisation Airport dominance	Prices	Negative (but number of competitors irrelevant) Positive	Econometric
Borenstein, 1992	United States	Domestic liberalisation of entry and prices	Prices	Mixed (short-haul increase, long-haul decline)	Descriptive
Grimm and Milloy, 1993	Australia	Domestic liberalisation of entry and prices	Prices Quality	Negative Positive	Descriptive
Gonenc and Nicoletti, 2000	21 OECD countries, 1996	Liberalisation of entry and prices, competition	Efficiency	Positive	Econometric
	100 busiest international routes, 1996	Liberalisation of entry and prices, competition	Prices Efficiency	Negative Unclear	
		Road freight			
Haffner and van Bergeijk, 1997	Netherlands	Liberalisation of cabotage, driving periods	Prices	Decline by 1%	Simulation
OECD, 1999a	United States	Liberalisation of entry and prices	Prices Efficiency Quality Employment	Decline by 75% (TL) and 35% (LTL) Increase Improvement Increase by 16%	-
OECD, 1999b	Mexico	Liberalisation of entry and prices	Prices Quality Employment Efficiency	Decline by 37% Improvement Increase by 5% Increase	-
Ying and Keeler, 1991	56 firms United States 1975-83	Liberalisation of entry and prices	Prices	Decline by 25% to 35%	Econometric
Hoj et al, 1995	Australia	Liberalisation of entry and prices (1950 and 1960s)	Prices Quality	Negative Positive	Descriptive
	Canada	Liberalisation of entry and prices	Prices Quality	Negative Positive	Descriptive
	France	Liberalisation of entry and prices (1979 and 1989)	Prices	Negative	Descriptive
	New Zealand	Liberalisation of entry and prices (1983)	Quality	Positive	Descriptive
	United Kingdom	Liberalisation of entry and prices (1968)	Quality	Positive	Descriptive
McKinnon, 1996	United Kingdom (1987-1990) United States (1970-1978) New Zealand (1984-1987) France (1987-1990)	Road haulage deregulation	Prices	Decline by 25% Decline by 12-25% Decline by 25% Decline by 15%	Descriptive
Winston, 1993	United States	Liberalisation of entry and prices	Consumer welfare	Gain of 16 billion of 1990 US $	Ex-post assessment
Yamauchi, 1995	Japan	Liberalisation of domestic road haulage	Consumer welfare	Gains between 2.5 billion and 8.2 billion of 1990 US $	Simulation

Table 1. **Product market liberalisation and performance (continued)**

C. Industry and firm-level effects *(continued)*					
Retail distribution					
Haffner and van Bergeijk, 1997	Netherlands	Liberalisation of entry, shop opening hours and zoning	Prices	Decline by 2%	Simulation
Hoj et al., 1995	22 OECD countries, 1990 8 OECD countries, 1960-90	Large outlet restrictions	Average size Outlet density	Negative Positive	Econometric
Centraal Planbureau, 1995	Netherlands	Liberalisation of shop opening hours	Employment Turnover and price	Increase 15000 jobs (11000 full time equivalent) Moderate effect	Simulation
Civildepartement, 1991 (Pilat, 1997)	Sweden	Liberalisation of shop opening hours	Prices	Fall by 0.6 per cent	Simulation
IFO (Pilat 1997 - OECD,1997)	Germany	Liberalisation of shop opening hours	Employment	Increase 1.3 per cent (full time equivalent)	Simulation
OECD, 1997	Japan	Revision of the LSRS (Large Store and Retail Store) law	GDP deflator for the distribution sector	During 1992 and 1993, the GDP deflator for the distribution sector fell by 2 per cent each year	Descriptive
Telecommunications					
Majumdar, 1993	40 firms US 1973-87	Deregulation	Efficiency	Increase	Data Envelope Analysis
Haffner and van Bergeijk, 1997	Netherlands	Liberalisation	Prices	Decline by 18%	Simulation
OECD, 1999a	United States	Unbundling, liberalisation	Prices Quality Employment	Decline in long distance rates Improvement Nil	-
OECD, 1999b	Mexico	Liberalisation of long distance and local service, regulatory reform	Prices Quality Employment Efficiency	Decline in long-distance by 22% increase in local Unclear Increase by 50% Increase by 46%	-
OECD, 2000	Korea	Liberalisation of long distance and local service, regulatory reform	Prices Quality Employment Efficiency	Decline in long-distance by 50-60%, in mobile by 20% Improvement Increase by 25% Increase by 27%	-
Van Cuilenburg and Slaa, 1995	24 OECD countries 1989-92	Liberalisation of local and long distance	Innovation	Positive	Econometric
Gruber and Verboven, 1999	15 EU countries, 1984-97	Number of competitors	Mobile penetration	Positive	Econometric
Gort and Sung, 1999	9 firms United States 1952-1991	Competition	Efficiency	Positive	Econometric
Ying and Shin, 1993	46 firms United States 1976-87	ATT unbundling	Efficiency	Positive	Econometric
Oum and Zhang, 1995	United States, 1951-90	Competition	Efficiency	Positive	Econometric
Boylaud and Nicoletti, 2000	23 OECD countries, 1991-97	Liberalisation, competition	Prices Efficiency Quality	Negative Positive Positive	Econometric

Table 1. **Product market liberalisation and performance (continued)**

C. Industry and firm-level effects *(continued)*					
Author	***Country/period***	***Explanatory variable***	***Performance variable***	***Effects found***	***Method***
		Electricity			
Comnes *et al.*, 1996	US 1987-94	Liberalisation	Prices	Nil	Econometric
Estache and Rodriguez- Pardina, 1996	Argentina 1992-95	Regulatory Reform	Prices Efficiency	Decline Increase	Descriptive
Hope *et al.*, 1993	Norway 1991	Unbundling, TPA, Pool	Prices	Decline	Descriptive
Haffner and van Bergeijk, 1997	Netherlands	Liberalisation, unbundling, TPA	Prices	Decline by 11%	Simulation
Steiner, 2000	19 OECD countries	Liberalisation, unbundling, TPA, pool, consumer choice	Prices Efficiency	Negative Positive	Econometric
		Rail freight			
OECD, 1999a	United States	Liberalisation of tariffs, shipping and exit	Prices Efficiency Quality Employment	Decline by 50% Increase Improvement Decrease by 41%	-
OECD, 1999b	Mexico	Horizontal unbundling, regulatory reform	Prices Quality Employment Efficiency	Decline by 7% Improvement Unclear	-
Wilson, 1994	United States	Liberalisation of tariffs, shipping and exit	Prices	Decline by 30%	

Table 2. **Network industries featuring both competitive and non-competitive segments**

Sector	Activities which are usually non-competitive	Activities which are potentially competitive
Railways	Track and signalling infrastructure	Operation of trains and maintenance facilities
Electricity	High-voltage transmission and local electricity distribution	Electricity generation and supply
Telecommunications	Local residential telephony or local loop	Long-distance telephony, mobile telecommunications, and value-added services
Gas	High-pressure transmission of gas	Gas production and supply
	Local gas distribution	Gas storage
Water	Distribution of water and wastewater	Water collection and treatment
Air services	Airport services such as take-off and landing slots	Aircraft operations, maintenance facilities, and catering services

Source: OECD Secretariat.

Table 3. **Price regulation in network industries, 1999**

	Electricity	***Telecommunications***		***Railways***	
	Transmission	*Mobile*	*Fixed*	*Passenger*	*Freight*
Australia	cost-based	price cap	price cap	..	..
Austria	..	no regulation	discretionary[1]	..	..
Belgium	cost-based	price cap	price cap	..	no regulation
Canada	cost-based	no regulation	price cap	cost-based	..
Czech republic	..	no regulation	price cap	price cap	no regulation
Denmark	cost-based	..	price cap	price cap	no regulation
Finland	cost-based	no regulation	no regulation	no regulation	no regulation
France	cost-based	no regulation	price cap	..	no regulation
Germany	cost-based	price cap and cost-based	discretionary[1]	no regulation	no regulation
Greece	no regulation	..	price cap	..	..
Hungary	..	..	price cap	price cap	..
Ireland	no regulation	no regulation	price cap	some regulations	some regulations
Italy	price cap	no regulation	cost-based	cost-based	cost-based
Japan	cost-based	some regulations	price cap	cost-based	cost-based
Korea	..	discretionary[1]	discretionary[1]	cost-based	cost-based
Mexico	..	..	price cap	price cap	price cap
Netherlands	no regulation	no regulation	price cap	price cap and cost-based	no regulation
New Zealand	..	..	price cap	..	..
Norway	price cap	cost-based	cost-based	..	no regulation
Poland	..	no regulation	price cap	price cap	price cap
Portugal	cost-based	no regulation	price cap	cost-based	price cap
Spain	cost-based	no regulation	some regulations	no regulation	no regulation
Sweden	no regulation	..	cost-based	price cap	no regulation
Switzerland	..	..	price cap (trunk)	no regulation	no regulation
Turkey	..	price cap	discretionary[1]	price cap	price cap
United Kingdom	price cap	..	price cap	price cap	no regulation
United States	cost-based	no regulation	price cap	..	..

1. Tariff approval.

Sources: OECD International Regulation Database; OECD 2000); Steiner (2000).

Table 4. **Key factors influencing the choice between vertical separation and integration**

	Factors favouring vertical separation	**Factors favouring vertical integration**
Economies of Scope	Weak or no economies of scope between the competitive and non-competitive activities.	Strong economies of scope between the competition and non-competitive activities.
Regulated firm has private information regarding costs.	Information about costs is difficult to obtain because of the use of internal transfer prices to shift costs and profits around an integrated firm. In addition, information about costs in the competitive component is difficult to obtain, making the prevention of anti-competitive cross-subsidisation difficult.	Information about costs on the non-competitive activity is readily available and access prices can be reasonably efficient using available information. Cost information in the competitive activity is easy to obtain and can be used to prevent anti-competitive cross-subsidisation.
Regulated firm has private information regarding demand elasticities, capacity, or quality.	Efficient pricing requires exploitation of private information of incumbent, which it can conceal. Incumbent can conceal capacity or quality of the service. Efficient pricing may require auctions of the capacity of the non-competitive component.	Capacity and quality are readily verifiable.
Institutional and Legal Context	Incumbent firm has wide scope for using legal and regulatory process to delay or obfuscate. The legal environment is supportive of long-term contracts.	Institutions are effective at controlling the incentives on the incumbent to delay or obfuscate. The legal environment is relatively weak in protecting long-term contracts.

Source: OECD Secretariat.

Table 5. **Vertical separation in the electricity industry**

	Vertical integration (generation through supply)	Generation and transmission
Australia	mixed	separate companies
Austria	..	..
Belgium	integrated	integrated
Canada	integrated	integrated
Denmark	integrated	accounting separation
Finland	unbundled	separate companies
France	integrated	integrated
Germany	unbundled	accounting separation
Greece	integrated	integrated
Ireland	mixed	accounting separation
Italy	integrated	integrated
Japan	mixed	integrated
Netherlands	mixed	integrated
New Zealand	mixed	separate companies
Norway	unbundled	separate companies
Portugal	mixed	accounting separation
Spain	mixed	accounting separation
Sweden	mixed	separate companies
United Kingdom	unbundled	separate companies
United States	integrated	accounting separation

Source: Steiner (2000).

Table 6. **Five main transportation regulatory reforms in OECD countries**

	Description of reforms	**Economic fundamentals (assumptions and objectives)**	**Observed impacts**
US Air reform, 1978-1981	Full liberalisation of entries and fares in domestic air routes.	No risk of natural monopoly, no risk of destructive capacity and price competition in the main domestic air routes.	Many new entries, differenciation of fares according to service class, overall decrease of travel costs, hub-and-spoke reorganisation of networks. Subsequent market consolidation and lesser fare decreases in hub-dominated routes.
US Rail reform, 1982	Full liberalisation of entries and fares in domestic rail routes. Integrated (infrastructure/operation) companies give open access to competitors.	Services are potentially competitive, infrastructures are natural local monopolies to be opened to competitors under regulation. Services are commercially sustainable if socially valuable - or otherwise decline.	Rail passenger transportation shrunk radically: only one government-owned carrier remained in operation. Rail freight services strongly grew in certain markets, declined in others, and consolidated into a more concentrated market structure.
UK Rail reform, 1993	Privatisation of railtrack infrastructure as a regulated monopoly, passenger services franchised for 8 years to private bidders.	Service markets are not potentially competitive but can be open to challenge through periodical bids. Infrastructure is a regulated natural monopoly which can be developed without vertical links to services.	120 new railway companies (20 main passenger service companies) were formed. Fares and productivity increased according to terms of franchising contracts, often giving rise to larger-than-anticipated profits, provoking renegotiations with the regulator. Contracts between rail players (between infrastructure and services) are also being redesigned.
EU Air reform, 1993-1997	Full liberalisation of entries and fares in intra-European air routes, for "community carriers".	European air service markets are potentially competitive, supply rationalisation can develop in the European internal market.	Certain fare decreases and new entries on certain routes, but at a much lesser extent than anticipated. Airport slot bottlenecks constrained entries, and existing bilateral agreements (with non-EU countries) have constrained network optimisation.
International "Open Sky" Air Agreements, 1991-1999	Bilateral liberalisation agreements between governments, allowing designation of multiple carriers, capacity and fare freedoms, and traffic rights to third-countries.	Main international air routes are potentially competitive, and competition can develop without open access to domestic (cabotage) routes.	Significant capacity increases and fare decreases on bilateral routes. Market concentration and alliances limited these price movements.

Source: OECD Secretariat.

Table 7. **Vertical relations between rail infrastructure and services**

	Infrastructure and services	Notes
Australia	Different state regimes	
Austria	Accounting separation	
Belgium	Accounting separation	
Canada	Integrated	
Czech Republic	Accounting separation	Infrastructure a separate division of service operator
Denmark	Separate companies	
Finland	Separate companies	
France	Separate companies	Infrastructure independent, but managed and maintained by service operator
Germany	Accounting separation	Open access provisions
Hungary	Accounting separation	
Ireland	Integrated	
Italy	Accounting separation	Infrastructure a separate division of service operator
Japan	Integrated	
Korea	Integrated	
Netherlands	Separate companies	Infrastructure subsidiary of service operator
New Zealand	Integrated	
Norway	Separate companies	
Poland	Accounting separation	
Portugal	Separate companies	
Spain	Accounting separation	Infrastructure a separate division of service operator
Sweden	Separate companies	
Switzerland	Accounting separation	Infrastructure a separate division of service operator
Turkey	Integrated	
United Kingdom	Separate companies	
United States	Integrated	Open access provisions

Source: European Conference of Ministers of Transport, 1998, and OECD International Regulation Database.

Table 8. **Airport slot concentration in twelve large airports**
(Percentage shares)

	Incumbents	1997/1998[1]
Chicago O'Hare	AA+UA[2]	82
New York JFK	AA+Delta+TWA[2]	83
Roma	Alitalia	70
Frankfurt	Lufthansa	60
Copenhagen	SAS	55
Amsterdam	KLM	52
Milano	Alitalia	50
Zurich	Swissair	50
Paris	Air France	42
Vienna	Austrian	41
London Heathrow	British Airways	38
London Gatwick	British Airways	25

1. 1997 for Europe and 1998 for the United States
2. The competitive structure of the United States air market, and the absence of national flag carriers, justify the calculation of the slot concentration data as an aggregation of "main incumbents" in each airport (two in Chicago and three in New York).
AA: American Airlines, UA: United Airlines, TWA: Trans World Airlines.

Source: CERNA (1998), The Economist (1997).

Table 9. **Airport ownership and financing in OECD countries**

Australia	Public corporation[1]
Austria	Public corporation[2]
Canada	Public corporation[3]
Czech Republic	Government department
Denmark	Joint public/private venture (including concessions)
France	Regional government ownership[4]
Germany	Public corporation
Greece	Government department[5]
Hungary	Government department
Ireland	Public corporation
Italy	Joint public/private venture and regional government ownership[6]
Japan	Government department[7]
Mexico	Government department[8]
Netherlands	Public corporation
New Zealand	Public corporation
Norway	Public corporation
Spain	Public corporation
Sweden	Government department
Switzerland	Regional government ownership[9]
Turkey	Government department[10]
United Kingdom	Private ownership[11] Joint public/private venture (including concessions)
United States	Regional government ownership[12]

Notes :

1. Certain airports are managed under long-term (50 years) concessions to private operators, which have an option to extend their contracts for an additional 49 years period.
2. Recent floating of 50 % of shares of Vienna international airport.
3. One terminal of the Toronto airport privatised through long-term concession.
4. Local chambers of trade and industry manage the airports.
5. Recent addition of a terminal in Athens through a build-operate-transfer contract.
6. Rome is 50 % private; Genoa, Florence, Naples and Turin airports are managed under long-term concessions to joint public-private companies.
7. Osaka Kansai airport was recently built as a joint public-private partnership.
8. Recent extension of Mexico City airport through a build-operate-transfer contract.
9. Recent floating of 50 % of shares of a newly created operation company at Zurich airport.
10. Recent extension of Istanbul airport through a build-operate-transfer contract.
11. BAA (London area airports) was privatised as a metropolitan system. Recent share floatation by Liverpool and Birmingham airports. Belfast international airport was privatised in 1993 as a management and employee buy-out.
12. All airports (with the exception of Washington National and International airports which are federal facilities) are under local government ownership.

Source: Kapur (1995), OECD Secretariat.

Table 10. **Revenue diversification in public and private airports**[1]

	Airside as % of total revenues [2]	*Landside as % of total revenues* [3]
Government department	70	30
Public Corporation	50	50
Regional government owned[4]	36	64
Public-private joint venture	62	38
Private	43	57

Notes :
1. Sample of 40 international airports: 7 private, 6 public-private joint-venture, 10 regional-government owned, 8 public corporation, 9 government departments.
2. Include: landing fees, passenger charges, ground handling fees, cargo handling, fuel and oil concessions.
3. Include: duty-free shopping, catering and restaurants, car parking, car rentals, hotels, banks.
4. Regional government owned airports include major US airports.

Source: Kapur (1995).

Table 11. **USO requirements in the telecommunications industry, 1996**

	USO requirements
Australia	Requires that standard telephone services, including services for the disabled, public payphones and prescribed carriage services are reasonably accessible, independent of geographical location, on an equitable basis.
Canada	Requires that telephone services be provided to all who can pay for it, but customer access and usage charges are not required to be maintained at a uniform level across the country.
Finland	Dominant operator must serve all customers in their territory.
France	Obligation to provide quality telephone services at an affordable price.
Japan	Requires uniform and regulated charges for local calls and customer access.
New Zealand	The Kiwi Share Obligation on TCNZ:- • mandates maintenance of the option of free local calls for residential customers, but tariff packages incorporating charges for local calls may be offered as an optional alternative; • prohibits real increase in residential customer access charges, subject to no "unreasonable impairment" of the overall profitability of the TCNZ's subsidiary regional operating companies. • requires the ordinary residential telephone service to be made as widely available as it was at 11 September 1990; and • obliges TCNZ to maintain rural customer access charges at rates no higher than the standard residential rental. The Obligation does not extend to public payphones.
Sweden	Telia is obliged to provide telephone services between fixed points to all regardless of where they live at an affordable price.
United Kingdom	The USO requires: • a connection to the fixed network able to support voice telephony and low speed data and fax transmission; • the option of a more restricted service package at low cost; and • reasonable geographic access to public call boxes across the UK at affordable prices.
United States	Local Exchange Carriers (LECs) must average call prices for a given distance across their entire service areas, regardless of differences in costs. They must give customers in remote areas access to telecommunications services that are "reasonably" comparable to services provided in urban areas at charges which are "reasonably" comparable. Services must be provided at concessional rates to libraries, educational and health facilities and low-income customers. There is no legal requirement for LECs to install and maintain public payphones.

Source: Productivity Commission (1999), Appendix E.

Table 12. **Funding USOs, 1999**

	Funding mechanism
Australia	The costs of the USO must be shared among carriers so that no one carrier is disadvantaged. To this end, the costs of the USO are shared in proportion to carriers' shares of "eligible revenue". After obtaining the consent of participating carriers, the Minister may specify another cost-sharing mechanism.
Canada	Carriers are required to contribute to the USO requirement through a Portable Contribution Subsidy. The Subsidy is an explicit toll levied on all long-distance traffic carried on the local telephone network. The funds are distributed to all local carriers based on subsidy requirements per residential Network Access Services or equivalent by rate band.
Denmark	If it is proven that a deficit exists in the provision of universal service, the regulator will collect a contribution from fixed voice telephony service providers on the basis of turnover.
Finland	There is no specific universal scheme and as such universal service costs are not borne by other market participants. Incumbent must meet all universal service costs.
France	A national universal service fund was established in 1997. Net cost of overall geographic supply will be compensated by interconnection surcharges until 31 December 2000 at the latest.
Japan	Designated carriers must bare the cost of the USO's provision which are funded by geographically uniform access charges and by long-distance charges. Funding of the USO is to be reviewed in 2000.
New Zealand	Kiwi Share Obligation is met by TCNZ through surcharges on its interconnection rates. Public disclosure of Kiwi Share costs are required from January 2000.
Norway	The incumbent operator bears USO costs based on its licence requirement.
Poland	Establishment of a USO fund is predicted in the draft of new telecommunication law.
Spain	Telefonica has been designated the dominant operator required to fund universal service until the end of 2005.
Sweden	There is no specific universal scheme and as such universal service costs are not borne by other market players. Incumbent must meet all universal service costs.
Switzerland	Universal service licence granted on a periodic basis by tender. If a need for funding is noted, the granting authorities (ComCom/OFCOM) can impose a fee on companies with a licence.
United Kingdom	BT is responsible for the provision of the universal service obligation but the cost of the obligation is not re-imbursed.
United States	Each telecommunications carrier that provides interstate or intrastate telecommunications services must contribute, on an equitable and non-discriminatory basis, to the provision of universal service. Kingston Telecom is also responsible for the provision of universal service.
European Union	The European Commission permits, but does not require, the establishment of cost-sharing arrangements to finance USOs. It reports that nine Member States (from a total of 15) have decided either that the costs of the USO do not constitute an unfair burden on the provider or that the costs of establishing a fund are not justified. The rebalancing taking place in Europe, to the extent that it has reduced constraints on cost recovery, may have reduced the burden on incumbents.

Source: OECD (2000); Productivity Commission (1999), Appendix E.

Table 13. **Key factors influencing the scope for public ownership**

Internal factors					External factors			Preferred ownership structure
Incentives		Transaction costs			Market structure			
Presence of non contractible quality[1]	***Innovation***	***Agency costs***	***Deadweight of influence-seeking activities***	***Legal and institutional environment***	***Product market competition***	***Reputation***	***Capital market (corporate governance)***	
Limited	Important	The cost are lower than in public firms	The cost are lower than in public firms	Developed	Strong	Important	Developed	***Private***
Extensive	Unimportant	The cost are lower than in private firms	The cost are lower than in private firms	Underdeveloped	Weak	Unimportant	Underdeveloped	***Public***

1. The quality of a product is said to be non-contractible if it cannot be determined in an *ex ante* contract between the regulator and the producer.

Source: OECD Secretariat.

Table 14. **Synopsis of recent studies on the effects of ownership on performance**

Author/Year	Industry	Country/Period	Explanatory Variable	Performance Variable	Effects Found	Method
Fully or largely competitive industries						
Eckel, Eckel and Singhal, 1997	Air (British Airways)	UK 1987	Privatization	Stock Value	Positive	Descriptive
Gonenc and Nicoletti, 2000	Air	27 OECD countries 1996	Private vs. Public	Efficiency	Positive	Econometric
Dewenter and Malatesta, 1998	High information	63 firms 1981-93 cross-country pre/post privatization	Privatization	Profitability Efficiency	Positive Positive	Descriptive
Boardman and Vining, 1989	Miscellaneous	500 largest non US firms 1983 cross-country	Private vs. Public Corporatisation	Profitability Efficiency	Positive Positive	Econometric
Boubakri and Cosset, 1998	Miscellaneous (utilities included)	79 firms 1980-92 developing countries pre/post privatization	Privatization	Profitability Efficiency	Positive (higher in non-competitive industry)	Descriptive
Button and Weyman-Jones, 1992	Miscellaneous	Survey of 9 DEA studies, United States and European firms	Private vs. Public	Efficiency	Positive	Descriptive
Claessens *et al, 1997*	Miscellaneous	706 firms Czech 1992-95	Privatization	Tobin's Q	Positive (but especially if large investors)	Econometric
D'Souza and Megginson, 1999	Miscellaneous (utilities included)	85 firms 1990-96 OECD and developing countries pre/post privatization	Privatization	Profitability Efficiency	Positive (higher in non-competitive industry)	Descriptive
Frydman *et al.,* 1998	Miscellaneous	128 firms East Europe 1990-93 matched sample with privatized and public firms	Privatization	Profitability Efficiency	Positive (but only if outside investors)	Econometric
Galal *et al.,* 1992	Miscellaneous (utilities included)	12 firms cross-country	Privatization	Welfare	Positive	Counterfactual
La Porta, Lopez de Silanes, 1999	Miscellaneous (utilities included)	218 firms Mexico 1992 pre/post privatization matched sample with privatized and public firms	Privatization	Profitability Efficiency	Positive	Econometric
Martin and Parker ,1995	Miscellaneous	11 UK Firms 1981/88 pre/post privatization	Privatization	Profitability Efficiency	Mixed	Econometric
Megginson *et al.,* 1994	Miscellaneous (utilities included)	61 firms 1961-89	Privatization	Profitability	Positive	Descriptive
Pohl *et al.,* 1997	Miscellaneous	6300 firms East Europe 1992-95 cross-country matched sample with privatized and public firms	Privatization	Efficiency	Positive	Econometric
Vining and Boardman, 1992	Miscellaneous	500 largest firms Canada 1987	Private vs. Public Corporatisation	Profitability Efficiency	Positive Unclear	Econometric
Barberis *et al.,* 1996	Retail	452 firms Russia 1990	Privatization	Restructuring effort	Positive (but only if outside investors)	Descriptive

Table 14. **Synopsis of recent studies on the effects of ownership on performance (continued)**

Author/Year	Industry	Country/Period	Explanatory Variable	Performance Variable	Effects Found	Method
Industries with non-competitive segments						
Burns and Weyman-Jones, 1994	Electricity	UK 1981-93	Privatization	Efficiency	Positive	Data Envelope Analysis
Duncan and Bollard, 1992	Electricity	New Zealand 1987-92	Corporatisation	Efficiency	Positive	Econometric
Hawdon, 1996	Electricity	Developing countries 1988	Privatization	Efficiency	Positive	Data Envelope Analysis
Kwoka, 1996	Electricity	US	Private vs. Public Corporatisation	Prices	Negative Positive	Econometric
Newbery and Pollitt, 1997	Electricity (CEGB)	UK 1990	Privatization	Efficiency Environment Welfare	Positive Positive Negative	Counterfactual
Pollitt, 1995	Electricity	95 firms, 9 countries	Private vs. Public	Efficiency	Positive	Econometric
Steiner, 2000	Electricity	19 OECD countries, 1986-96	Privatization	Efficiency Prices	Positive Positive	Econometric
Yarrow, 1992	Electricity	UK 1990-91	Privatization	Prices	Negative	Counterfactual
Ramamurti, 1997	Rail (Ferrocarilla Argentinos)	Argentina	Privatization	Efficiency	Positive	Descriptive
Boylaud and Nicoletti, 2000	Telecommunications	23 OECD countries, 1991-97	Privatization	Efficiency Prices	Unclear	Econometric
Staranczack et al., 1994	Telecommunications	10 OECD countries, 1984-87	Private vs. Public	Efficiency	Positive	Econometric
D'Souza, 1998	Telecommunications	17 firms 1981-94 cross-country	Privatization	Profitability Efficiency	Positive	Descriptive

Source: OECD Secretariat. See bibliography for precise references.

Table 15. **Regulatory setting in OECD countries: the case of telecommunications, 1998**

Industry regulator		Competencies								Basis for the evaluation of the firm performance and costs
		Regulatory institutions	Division of regulatory responsibilities for licensing			Regulations on interconnection		Regulations on pricing	Regulations on service quality	
			Issuing licence	Oversight of licence requirements	Approval of Merger	Authorisation of interconnexion charges of operators with signifiant market power	Dispute resolution			
Australia	ACA (Australian Communications Authority) and ACCC (Australian Competition and Consumer Commission)	Independent tel. regulator Competition authority	X	X	X	X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers Independent review is conducted at the end of each price cap period
Austria	TKC (Telecom Control)	Independent tel. Regulator	X	X		X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
Belgium	BIPT (Belgian Institute for Postal Service and Telecommunications)	Independent tel. Regulator Competition authority Ministry	X	X	X	X	X	X	X X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
Canada	CRTC (Canadian Radio Television and Telecom. Office)	Independent tel. Regulator Competition authority Ministry	X (fixed) X (mobile)	X (fixed) X (mobile)	X X	X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
Czech Republic	CTO (Czech Telecommunications Office)	Independent tel. Regulator Ministry Other	X	X	X	No authorization	X (technical aspect) X (price)	X X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
Denmark	NTA (National Telecom agency)	Independent tel. Regulator Competition authority	X (mobile)	X	X	X	X	X	X	Information provided by the regulated firm Information on comparative performance and costs of firms
Finland	TAC (Telecommunications Administration Centre)	Independent tel. Regulator Competition authority Ministry	X	X	X	X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
France	ART (Autorité de la régulation des Télécommunications)	Independent tel. Regulator Competition authority Ministry	X	X	X X	X	X	X	X	Information provided by the regulated firm and an independent audit
Germany	Teg TP (Regulatory Authority for Telecommunications and Posts)	Independent tel. Regulator Competition authority	X	X	X X	X	X	X	X	Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same sector/market. Other
Greece	EETT (National Post and Telecommunications Commission)	Independent tel. Regulator Competition authority Ministry	X	X	X	X	X	X	X	
Hungary	Communication Authority	Independent tel. Regulator Competition authority Ministry	X	X	X	X	X	X	X	Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers

Table 15. **Regulatory setting in OECD countries: the case of telecommunications, 1998** (continued)

Industry regulator		Competencies								Basis for the evaluation of the firm performance and costs
		Regulatory institutions	Division of regulatory responsibilities for licensing			Regulations on interconnection		Regulations on pricing	Regulations on service quality	
			Issuing licence	Oversight of licence requirements	Approval of Merger	Authorisation of interconnexion charges of operators with signifiant market power	Dispute resolution			
Iceland	PTA (Post and Telecommunication Administration)	Independent tel. Regulator Other	X	X		No authorization	X	X	X	
Ireland	ODTR (Director of Telecommunications Regulation)	Independent tel. Regulator Competition authority	X	X	X	X	X		X	Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers
Italy	AGC (Autorita Garante nelle Communicazioni)	Independent tel. Regulator Competition authority	X	X	X	X	X	X	X	Information on comparative performance and costs of firms in the same sector/market
Japan	MPT (Ministry of Post and Telecom)	Competition authority Ministry Other	X	X	X X	X	X	X	No monitoring	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same market
Korea	MIC (Ministry of Information and Communication)	Independent tel. Regulator Ministry	X	X	X	X	X X	X	X	Information provided by the regulated firm and an independent audit
Luxembourg	ILT (Institut Luxembourgeois de Telecommunications)	Independent tel. Regulator				X	X	X	X	
Mexico	Cofetel (Commission Federal de Telecommunications)	Independent tel. Regulator Competition authority Ministry	X	X	X	X	X	X	X	Information provided by the regulated firm
Netherlands	OPTA(Independent Post and Telecommunications Authority)	Independent tel. Regulator Competition authority Ministry	X (fixed) X (mobile)	X	X	X	X	X	X	Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same sector/market
New Zealand	Commerce Commission : Competion authority	Competition authority Ministry Other			X	No authorization	X	X	X	Information provided by the regulated firm
Norway	NPT (Norwegian Post and Telecommunications Authority)	Independent tel. Regulator Competition authority Ministry Other	X	X	X	No authorization	X	X	X	Information provided by the regulated firm and an independent audit
Poland	Ministry of Post and Telecommunication	Ministry	X	X	X	X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same market

Table 15. **Regulatory setting in OECD countries: the case of telecommunications, 1998** (continued)

Industry regulator		Competencies								Basis for the evaluation of the firm performance and costs
		Regulatory institutions	Division of regulatory responsibilities for licensing			Regulations on interconnection		Regulations on pricing	Regulations on service quality	
			Issuing licence	Oversight of licence requirements	Approval of Merger	Authorisation of interconnexion charges of operators with signifiant market power	Dispute resolution			
Portugal	ICP (Instituto das Comunicacoes de Portugal)	Independent tel. Regulator	X	X		X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same market
		Competition authority						X		
		Ministry			X			X		
Spain	CMT (Commision del Mercando de Telecomunicaaciones)	Independent tel. Regulator	X (fixed)	X		X	X	X		Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same sector/market
		Competition authority			X					
		Ministry	X (mobile)						X	
Sweden	NPTA (National Post and Telecom agency)	Independent tel. Regulator	X	X		X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
		Competition authority			X					
Switzeland	ComCom (Communications commission) and OFCOM (Federal Office for Communications)	Independent tel. Regulator	X	X			X		X	Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same sector/market
		Competition authority			X					
		Ministry						X		
		Other				No authorization				
Turkey	Ministry of Transport and Communications	Competition authority								Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers
		Ministry	X	X			X	X		
		Other			.	No authorization			No monitoring	
United Kingdom	OFTEL (Office of telecommunications)	Independent tel. Regulator		X	X	X	X	X	X	Information provided by the regulated firm Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same sectors. Other
		Competition authority			X					
		Ministry	X	X						
United States	FCC (Federal Communications Commission)	Independent tel. Regulator	X	X	X	X	X	X	X	Information provided by the regulated firm and an independent audit Information gathered by the regulatory authority using investigative powers Information on comparative performance and costs of firms in the same sector/market Rulemaking procedures
		Competition authority			X					
		Other				X	X			

Sources: OECD International Regulation Database; OECD (2000).

Table 16. **Independence of regulatory institutions: the case of telecommunications**

Country/Regulator	Head of regulator appointed by	Term of office	Financing Source	Reports to	Decisions can be overturned by[1]
Australia: Australian Communications Authority (ACA)	The Governor-General	Not more than 5 years	Budgetary	Department of Communications and the Arts	None
Austria: Telecom Control (TKC)	The Government	5 years	Industry fees	Legislature (and Federal Ministry for Science and Transport)	None
Belgium: Belgian Institute for Postal Service and Telecommunications (BIPT)	The Minister of Telecommunications	6 years	Fees	No reporting responsibility except publishing an annual report	None
Canada: Canadian Radio Television and Telecommunications Commission (CRTC)	The Governor in Council	5 years	Fees	Department Industry Canada (and the Legislature)	The Governor in Council
Czech Republic: Czech Telecommunications Office (CTO): as a part of the Ministry of Transport and Communications	The Minister of Transport and Communications	Indefinite	Budgetary	Ministry of Transport and Communications	None
Denmark: National Telecom Agency (NTA)	The Minister of Research and Information Technology	Indefinite	Fees and budgetary	Ministry of Research and Information Technology	Telecommunications Complaints Board and Telecommunications Consumer Board
Finland: Telecommunications Administration Centre (TAC)	The President	Indefinite	Industry fees	Ministry of Transport and Communications	None
France: Autorité de la régulation des Télécommunications *(ART)*	The President (commissioners are appointed by the President and the Legislature)	6 years	Budgetary	Annual report to the Government and the Legislature	None
Germany: Regulatory Authority for Telecommunications and Posts (Teg TP)	The President	5 years	Industry fees and budgetary	Legislature every two years	None
Greece: National Post and Telecommunications Commission (EETT)	The Minister of Transport and Communications	5 years	Industry fees	Ministry of Transport and Communications	None
Hungary: Communication Authority	The Minister of Transport, Communications and Water Management	Indefinite	Industry fees	Ministry of Transport, Communications and Water Management	The Minister

Table 16. **Independence of regulatory institutions: the case of telecommunications** (cont.)

Country/Regulator	Head of regulator appointed by	Term of office	Financing Source	Reports to	Decisions can be overturned by1
Ireland: Director of Telecommunications Regulation (ODTR)	The Minister of Public Enterprise	Indefinite (can only be removed by the Parliament)	Industry fees[2]	Ministry of Public Enterprise	None
Italy: Autorita Garante nelle Communicazioni (AGC)	The Prime Minister (commissioners are appointed by the legislature)	7 years	Budgetary (plan to collect industry fees)	No reporting responsibility except publishing an annual report.	None
Japan: Ministry of Posts and Telecom (MPT)	-	-	Budgetary	-	None
Korea: Korea Communications Commission (KCC) (a semi-independent body in the Ministry of Information and Communication - MIC)	The President	3 years	Budgetary	-	None
Mexico: Commission Federal de Telecommunications (Cofetel) in the Ministry of Communications and Transportation	The President (by the advice of the Minister of Communications and Transportation)	Indefinite	Budgetary	No reporting responsibility except publishing an annual report.	The Minister or a representative designated by the Minister
Netherlands: Independent Post and Telecommunications Authority (OPTA)	The Minister of Transport, Public Works and Water Management	4 years	Industry fees	Annual report to the Ministry of Transport, Public Works and Water Management	None
New Zealand: Commerce Commission (competition authority)	The Minister of Commerce		Budgetary	(Outcomes monitored by the Government)	None
Norway: Norwegian Post and Telecommunications Authority (NPT)	The Government	Indefinite	Industry fees	Ministry of Transport and Communications	The Norwegian Telecommunications Appeals and Advisory Board. The Ministry of Labour and Governmental affairs (competition related matters)
Poland: Ministry of Post and Telecommunications	-	-	Budgetary	-	None
Portugal: Instituto das Comunicacoes de Portugal (ICP)	The Council of Ministers	3 years	Industry fees	Ministry of Equipment	The Minister

Table 16. **Independence of regulatory institutions: the case of telecommunications** (cont.)

Country/Regulator	Head of regulator appointed by	Term of office	Financing Source	Reports to	Decisions can be overturned by[1]
Spain: Comision del Telecomunicaciones (CMT)	The Government. Needs approval from the Parliament.	5 years	Industry fees[3]	Ministry for Development (General Secretariat for Communications)	None
Sweden: National Post and Telecom Agency (NPTA)	The Government	6 years	Industry fees[3]	Annual report to the Ministry of Transport and Communications	None
Switzerland: Communications Commission (ComCom), and Federal Office for Communications (OFCOM)	ComCom: the Federal Council OFCOM: the Minister	4 years Indefinite	ComCom: Industry fees OFCOM: Industry fees and budgetary	ComCom: Annual report to the Federal Council (Confederation's executive). OFCOM provides information on its management of the sector to the Ministry of Environment and Transport	None
Turkey: Ministry of Transport and Communications	-	-	Budgetary	-	None
United Kingdom: Office of Telecommunications (OFTEL)	The Minister of Trade and Industry	5 years	Industry fees	Ministry of Trade and Industry	Monopolies and Mergers Commission
United States[4]: Federal Communications Commission (FCC)	The President. Needs to be confirmed by the Senate	5 years	Industry fees and budgetary	Legislature	None

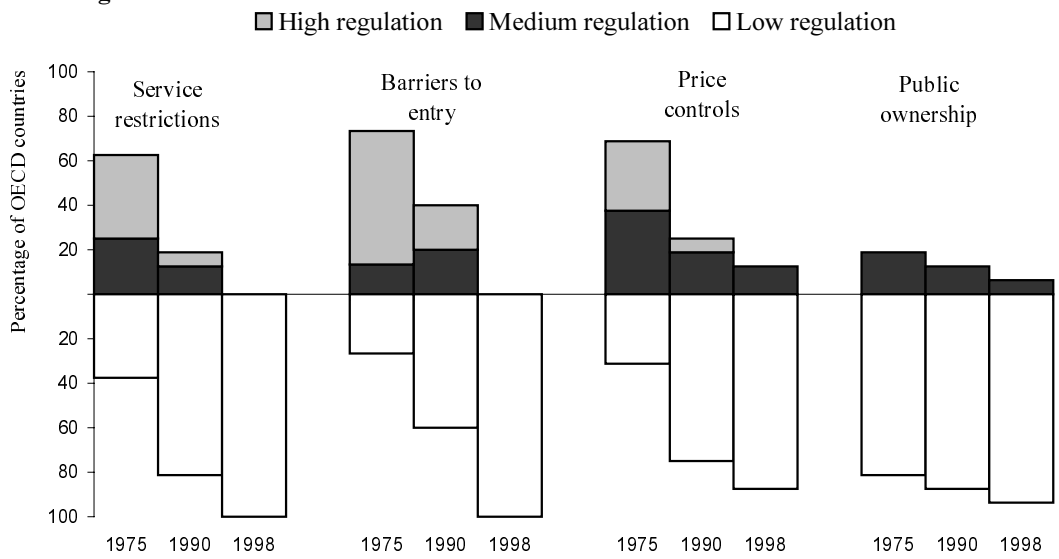
1. In the majority of countries, the independent regulator's decision can be overruled through a court decision. However, in many countries, while the court can nullify the decisions of the independent regulator, it cannot impose a new decision on the issue.
2. Periodical contribution by operators.
3. Periodical contribution by operators based on turnover.
4. Entries for the United States only reflect telecommunications regulation at the federal level.

Source: OECD (2000).

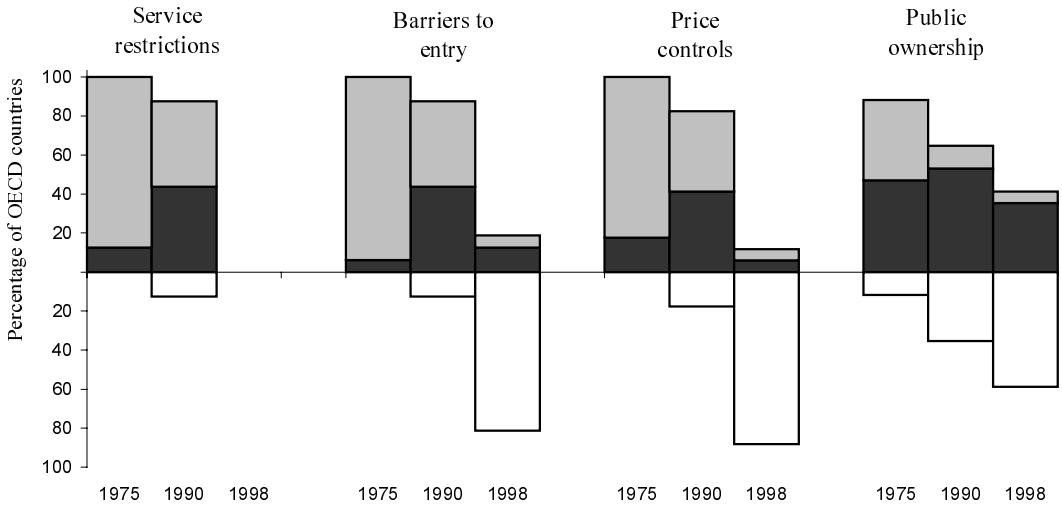
Figure 1. **Regulatory reform in OECD countries**

Fully or largely competitive industries

Road freight



Air passenger transport[1]



Notes : See annex for details on the construction of the indicators.

High regulation : Entry is restricted, public ownership is substantial and prices or services are set or approved by a regulatory authority.

Medium regulation : Some limited entry is allowed, public ownership is limited and businesses have some freedom to set prices or services.

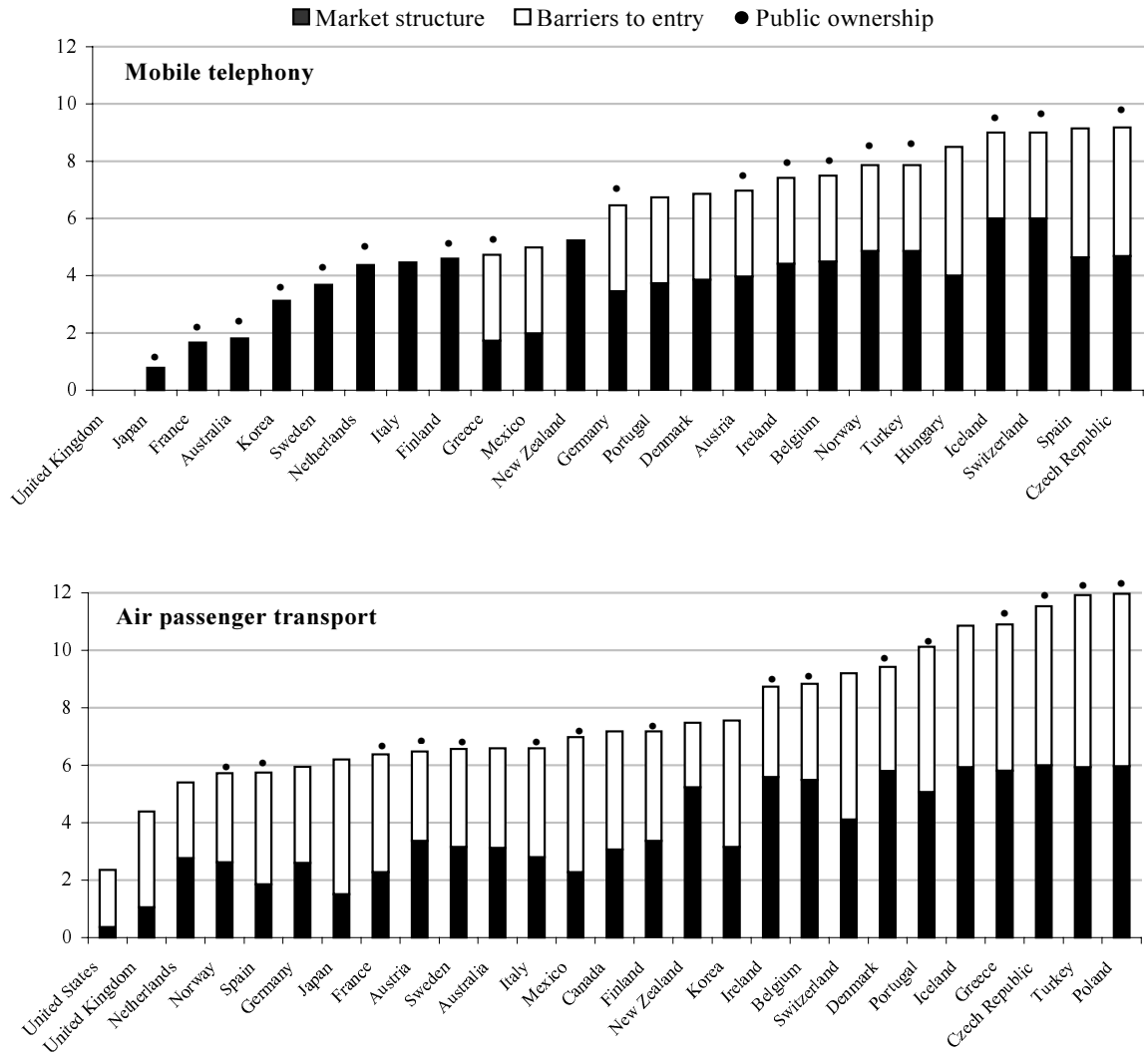
Low regulation : Public ownership is very limited and businesses are free to entry and have full control over prices and services they supply.

1. Domestic and regional routes.

Source: OECD, Regulatory reform, privatisation and competition policy, 1992; and OECD International Regulation Database.

Figure 2. **Regulatory and market environment in 1998**
Fully or largely competitive industries[1]

A. With fixed network elements



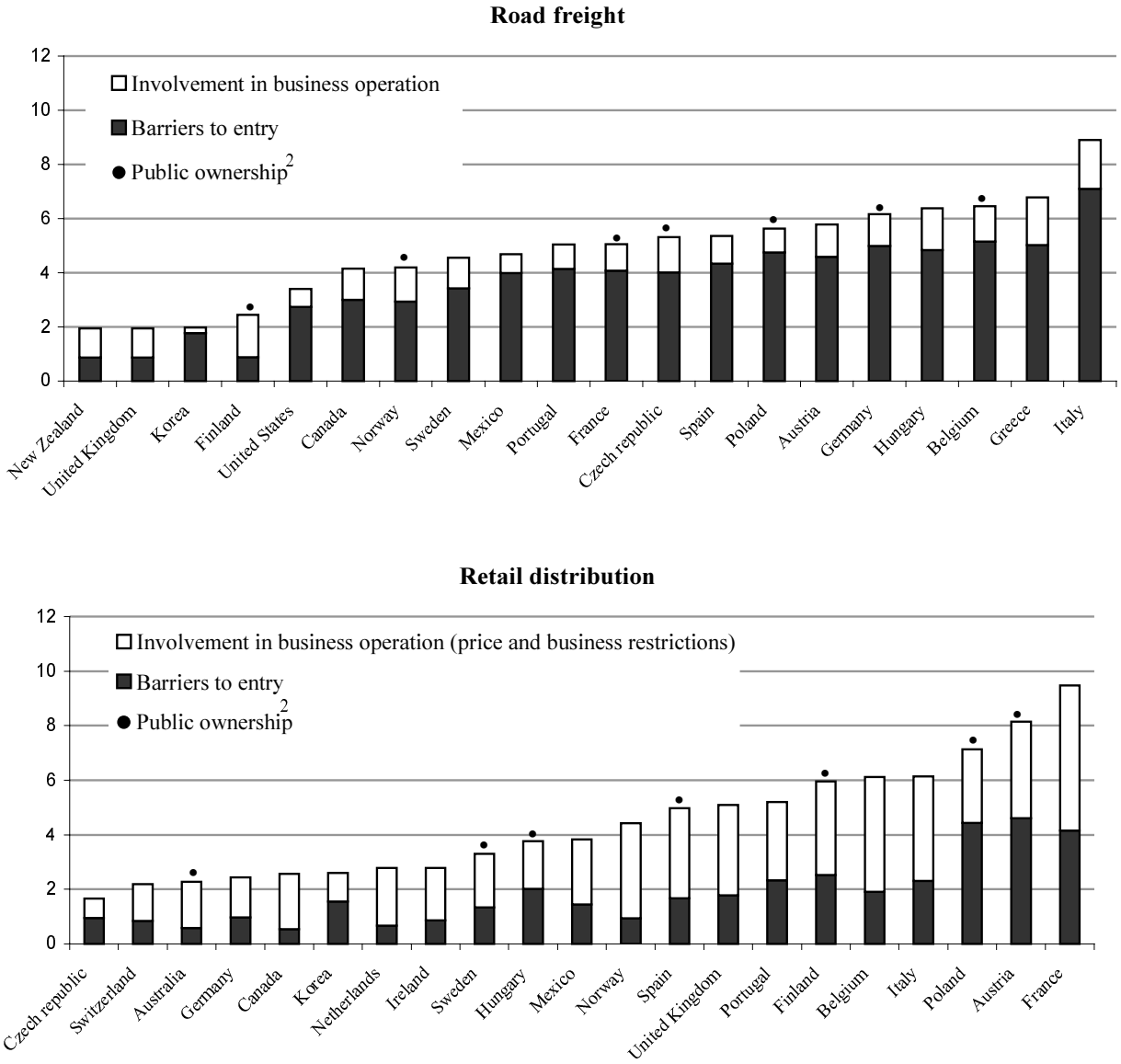
Notes: See annex for details on the construction of the indicators.
In mobile telephony, barriers to entry are defined as legal conditions of entry, while market structure is the market share of new entrants. In air travel, the indicator of barriers to entry summarises information about liberalisation of domestic and regional routes, the existence of open-sky agreements on international routes and flag carrier entrenchment, while the indicator of market structure summarises information about concentration of supply in domestic and international routes. Public ownership is indicated when the government owns more than 30 per cent of the shares in the PTO or in the largest carrier.

1. The indicators for air travel are computed by means of factor analysis; the indicators for mobile telephony are computed by simple average of their compoments. The scale of each indicator is 0-6 from least to most restrictive. Scores on the two regulatory areas are aggregated in an indicator with a 0-12 scale. For details on sources and methodologies, see Boylaud and Nicoletti (2000) and Gonenc and Nicoletti (2000).

Source: OECD International Regulation Database.

Figure 2. **Regulatory and market environment in 1998** (continued)
Fully or largely competitive industries[1]

B. Without fixed network elements



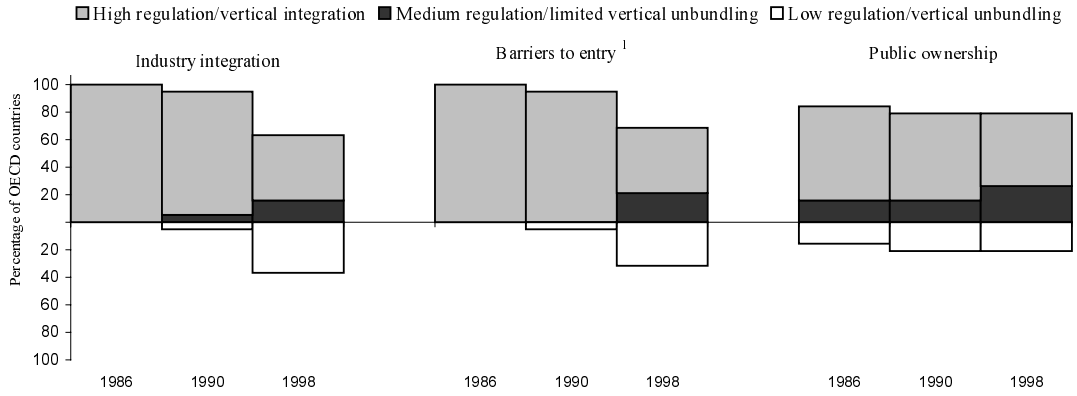
Notes : See annex for details on the construction of the indicators.
Barriers to entry include industry-specific administrative burdens, capacity limitations and participation of professional bodies in decisions concerning entry. In road freight they also include discriminatory provisions against foreign trucking companies and price restrictions; in retail distribution they also include special provisions concerning large outlets.
Involvement in business operation includes the use of command and control regulations (e.g. restrictions on driving periods, haulage, shop opening hours) and, in retail distribution, price controls.

1. Indicators are computed by means of factor analysis. The scale of each of them is 0-6 from least to most restrictive. Scores on the two regulatory areas are aggregated in an indicator with a 0-12 scale. For details on sources and methodologies, see Boylaud (2000).
2. At least one public-owned business in the industry.

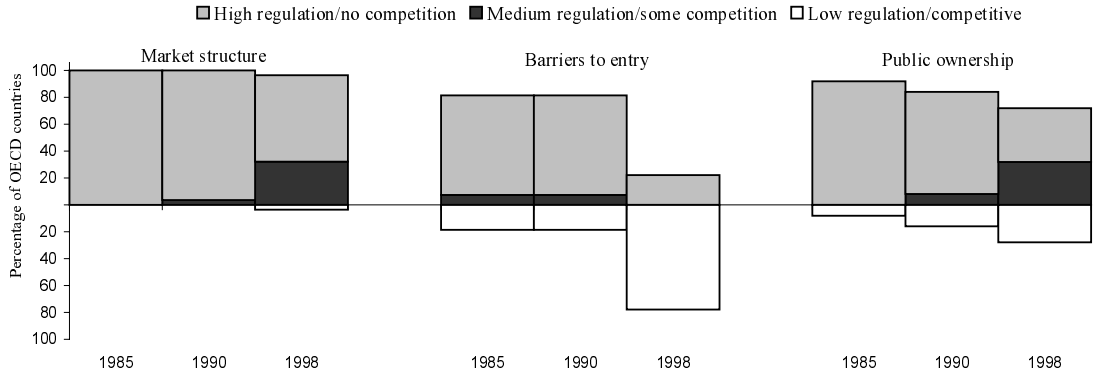
Source: OECD International Regulation Database.

Figure 3. **Regulatory reform in OECD countries**
Industries with non-competitive segments

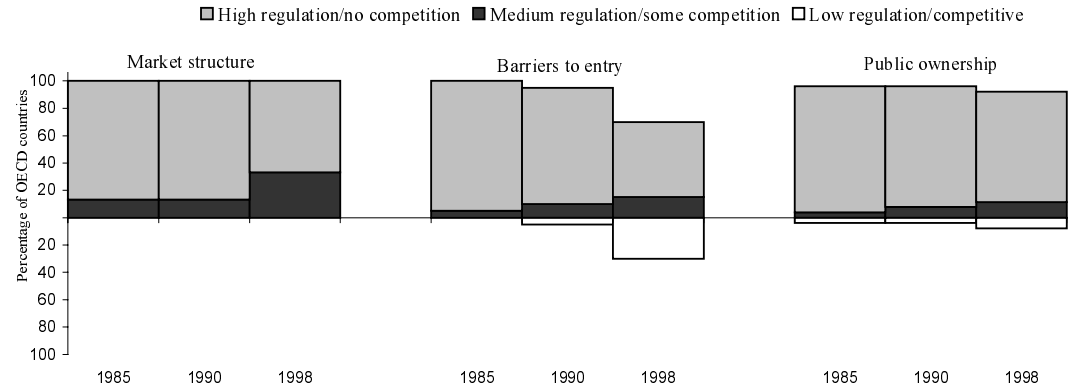
Electricity



Telecommunications[2]



Railways

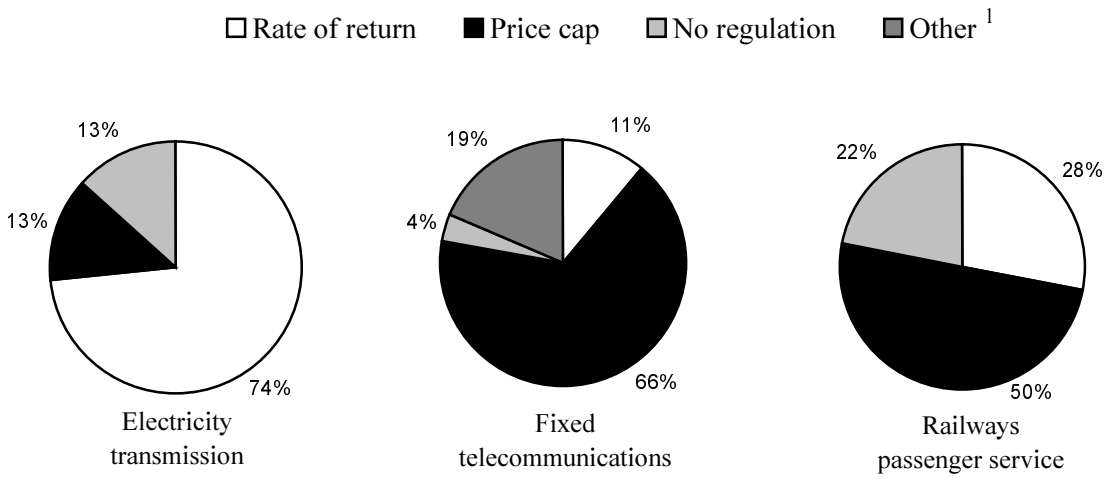


Notes : See annex for details on the construction of the indicators.
High regulation indicates that access to competitive markets is restricted and the supplier(s) of the good or service is (are) fully state-owned.
Medium regulation indicates that some limited market access is allowed and the supplier(s) is (are) partially private.
Low regulation indicates that market access is free and the supplier(s) is (are) private.
1. In electricity generation.
2. Fixed telephony: trunk and international.

Source: OECD International Regulation Database.

Figure 4. **Price regulation in industries with non-competitive segments, 1998**

Percentage of OECD countries falling in each category

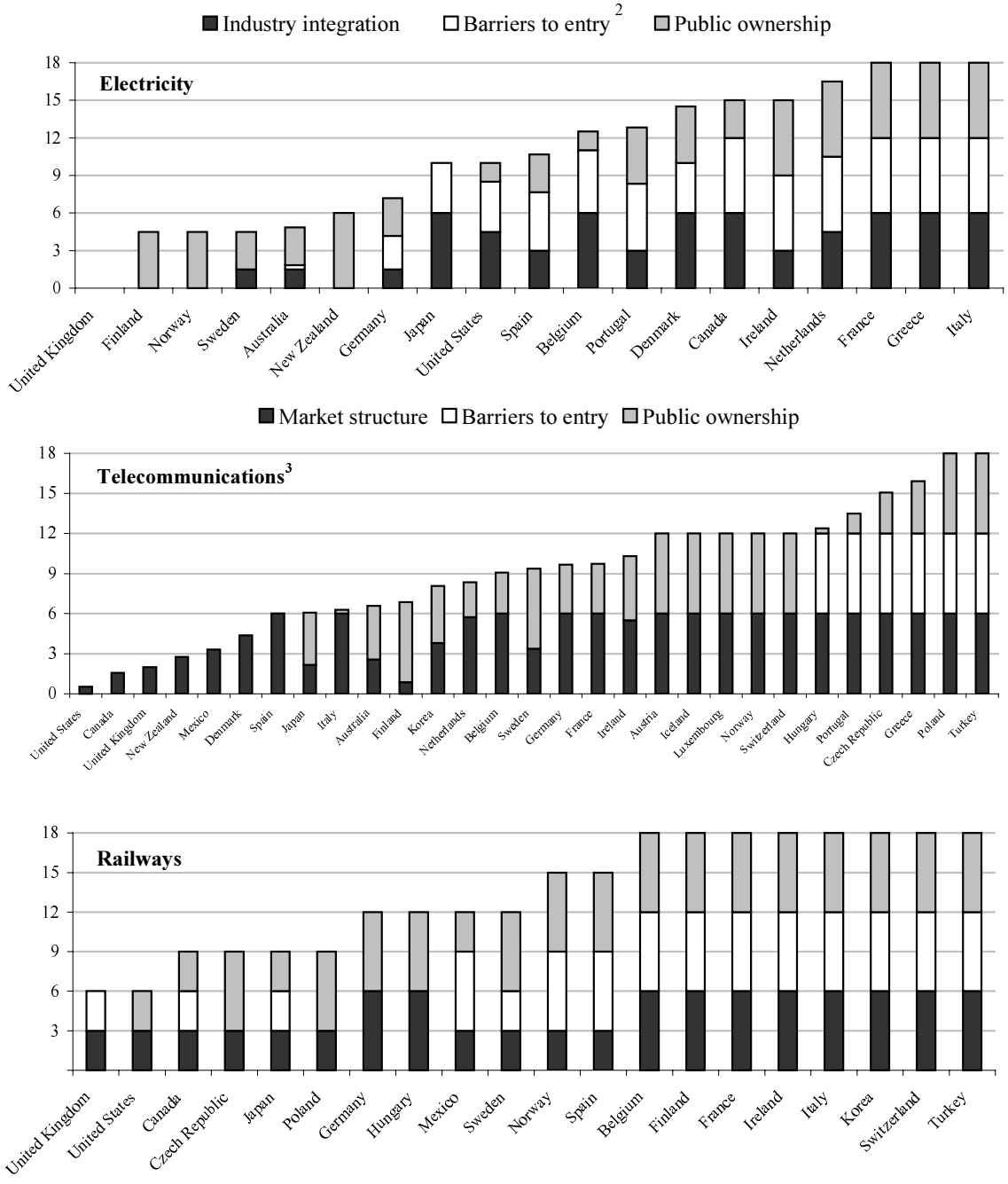


1. Including discretionary tariff approval.

Source: OECD International Regulation Database.

Figure 5. **Regulatory and market environment in 1998**

Industries with non-competitive segments[1]

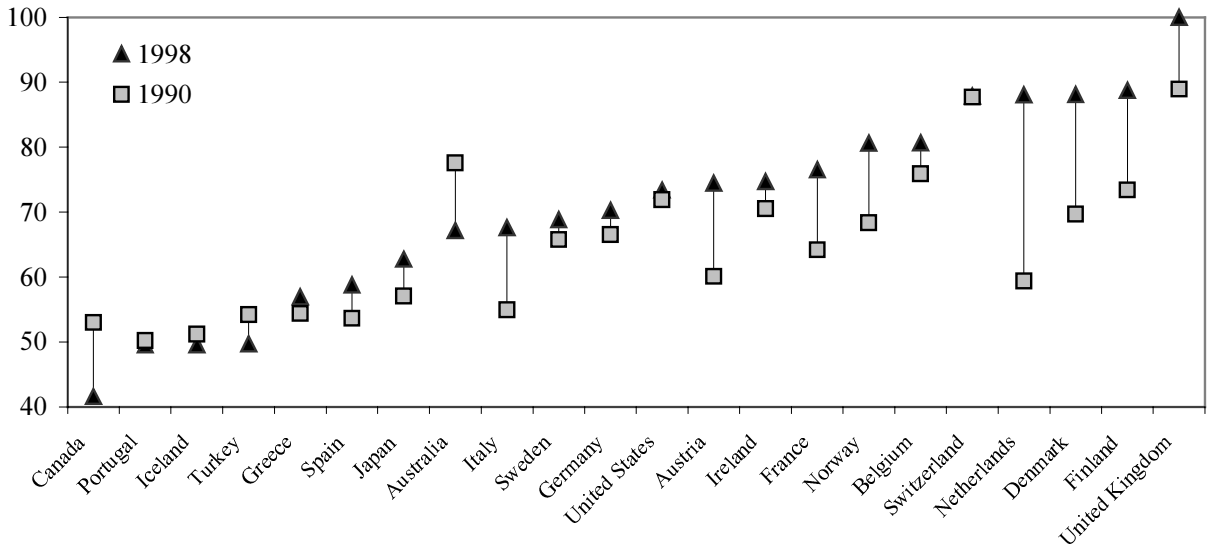


Notes : See annex for details on the construction of the indicators.

1. Indicators are computed by simple average of their components. The scale of each of them is 0-6 from least to most restrictive. Scores on the three regulatory areas are aggregated in an indicator with a 0-18 scale. For details on sources and methodologies, see Boylaud and Nicoletti (2000); Gonenc and Nicoletti (2000) and Steiner (2000).
2. In electricity generation.
3. Fixed telephony: trunk and international.

Source: OECD International Regulation Database.

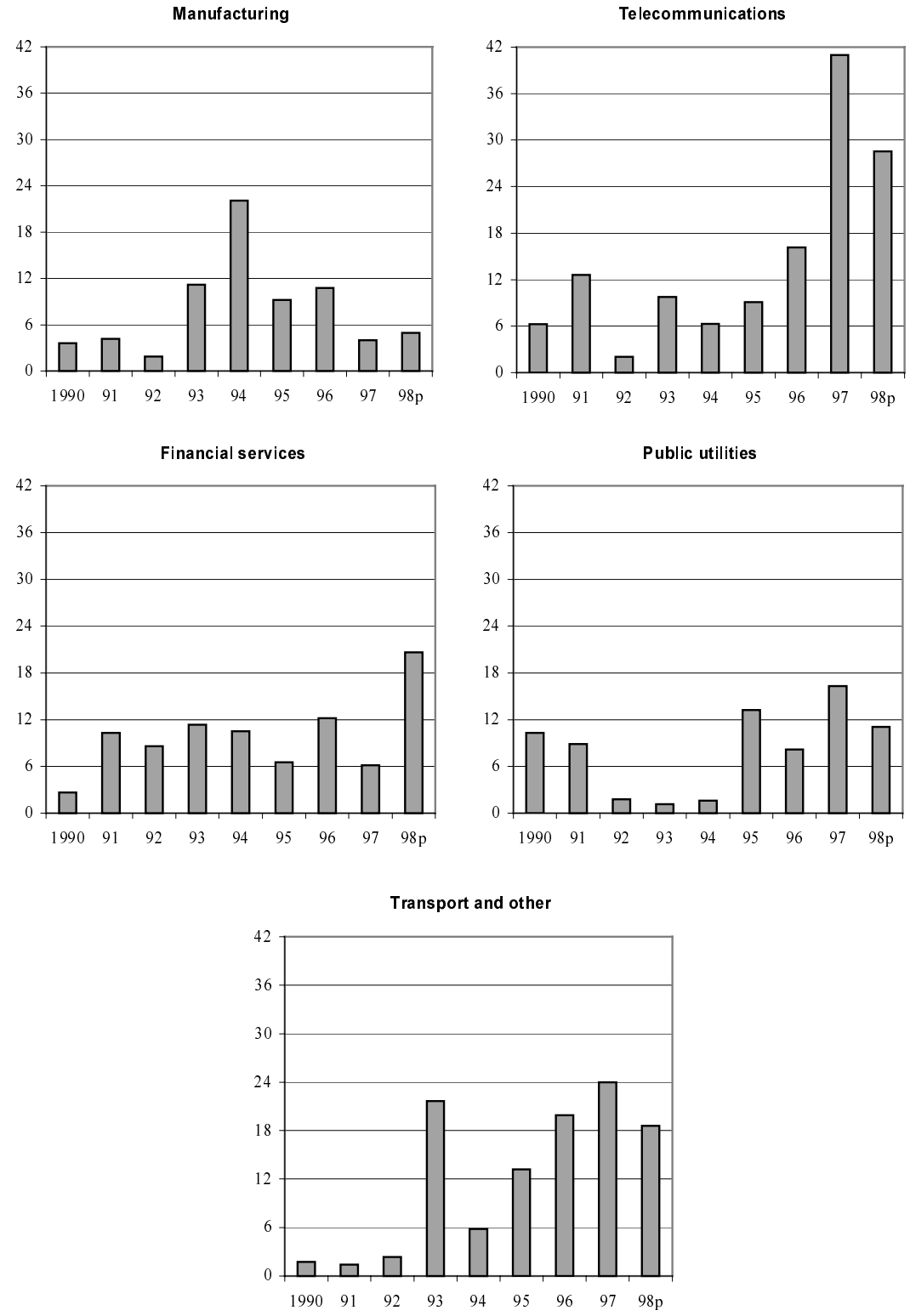
Figure 6. **Tariff rebalancing in fixed telephony, 1990 and 1998**[1]



1. The rebalancing indicator measures the distance of the tariff structure of a country from the tariff structure of the United Kingdom in 1998. The assumption is that the United Kingdom had achieved by 1998 a tariff structure more reflective of underlying costs than in other countries. The tariffs included in the calculations concern local service and long-distance service (at 27 km, 110 km and 490 km). An upward movement of the indicator means that the tariff structure has become more similar to the structure existing in the United Kingdom in 1998.

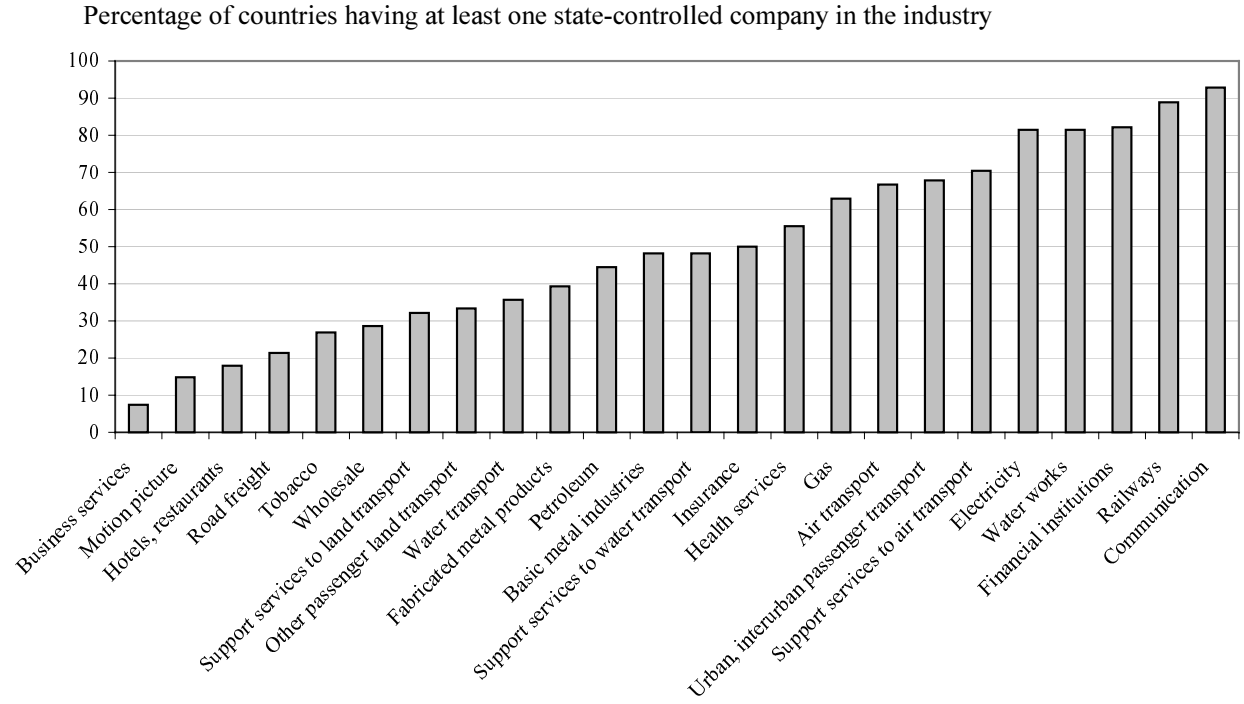
Source: OECD Secretariat.

Figure 7. **OECD privatisation proceeds in selected sectors, 1990-1998**
(US$ billion)



1998p = provisional data.
Sources: OECD from National statistics, World Bank and SBC Warburg.

Figure 8. **Sectoral distribution of state-controlled firms in the OECD, 1998**



Source: OECD International Regulation Database.

ANNEX

1. This annex describes the composition and data sources for the industry-specific regulatory and market structure indicators presented in Figures 1-3 and 5 of the main document. Tables A.1-A.3 and Figures A.1-A.2 provide details on the construction of the indicators for the market and regulatory environment in 1998 (Figures 2 and 5 in main document). Table A.4 provides the key for interpreting the regulation and market (or industry) structure taxonomy used in describing regulatory reform in OECD countries (Figures 1 and 3 in main document).

2. More details on the regulatory and market (or industry) structure indicators can be found in the following industry-specific analyses:

- Boylaud, O. (2000), "Regulatory reform in two competitive industries: road freight and retail distribution", *OECD Economics Department Working Paper* (forthcoming), OECD, Paris.

- Boylaud and Nicoletti (2000), "Regulation, market structure and performance in telecommunications", *OECD Economics Department Working Paper* (forthcoming), Paris.

- Gonenc and Nicoletti (2000), "Regulation, market structure and performance in air transportation", *OECD Economics Department Working Paper* (forthcoming), Paris.

- Steiner, F. (2000), "Regulation, industry structure and performance in the electricity supply industry", *OECD Economics Department Working Paper* (forthcoming), Paris.

- OECD (1992), *Regulatory Reform, Privatisation and Competition Policy*, Paris.

3. Sources used for constructing indicators concerning the railway industry include:

- OECD International Regulation Database.

- European Conference of Ministers of Transport (1998), *Rail Restructuring in Europe*, OECD, Paris.

- World Bank (1996), "Industry Structure and Regulation in Infrastructure: a Cross-Country Survey", *Private Sector Development Department Occasional Paper* No. 25.

Table A.1 **Public ownership in industries with fixed network elements**[1]

Scale	Air travel[2]	Telecommunications	Electricity	Railways[3]
0	(% of state ownership/100)*6	(% of state ownership/100)*6	Private	Private
1.5			Mostly private	-
3			Mixed	Mixed (public share above 50%)
4.5			Mostly public	-
6			Public	Public

1. Differences in definitions depend on the availability of data.
2. Largest airline.
3. Scale applied to infrastructure, passenger services and freight services separately. Scores on these three elements were aggregated using equal weights.

Sources: Boylaud and Nicoletti (2000), Steiner (2000), Gonenc and Nicoletti (2000), OECD International Regulation Database, European Conference of Ministers of Transport (1998).

Table A.2 **Barriers to entry in industries with fixed network elements**[1]

Scale	Air travel			Telecommunications	Electricity			Railways
	Open skies agreement	Regional liberalisation	Domestic liberalisation	Entry liberalisation index[2]	Third party access	Wholesale pool	Consumer choice (threshold)	Legal conditions of entry[3]
0	Yes	Yes	Yes	Competition	Regulated	Yes	0	Free
1	-	-	-	-	-	-	< 251 GW	-
2	-	-	-	-	Negotiated	-	< 501 GW	-
3	-	-	-	Duopoly	-	-	< 1001 GW	-
4	-	-	-	-	Single buyer	-	>= 1001 GW	-
5	-	-	-	-	-	-	-	-
6	No	No	No	Monopoly	None	No	No choice	Restricted
Weight :	Share of international services in total air services			-	1/3	1/3	1/3	

1. Differences in definitions depend on the availability of data.
2. Separate scores were aggregated for domestic long distance and international fixed telephony as well as for analogue and digital mobile services. Aggregation of fixed services and mobile services assumed equal wights for these sub-components.
3. Scale applied to passenger services and freight services separately. Scores on these two elements were aggregated using equal weights.

Sources: Boylaud and Nicoletti (2000), Steiner (2000), Gonenc and Nicoletti (2000), OECD International Regulation Database, European Conference of Ministers of Transport (1998).

Table A.3 **Market and industry structure in industries with fixed network elements**[1]

Scale	Air travel Market structure[2]	Telecommunications[3] Market structure[4]	Electricity Industry structure		Railways Market structure[6]
			Generation unbundled from transmission	Overall vertical integration	
0			Separate companies	Unbundled	Competition[7]
3	6-(H-Hmin)/(Hmax-Hmin)*6	6-(M-Mmin)/(Mmax-Mmin)*6	Accounting separation	Mixed	-
6			Integrated	Integrated[5]	No competition

1. Differences in definitions depend on the availability of data.
2. Herfindal index (H) of national supply of international services.
   Hmin = OECD minimum Herfindahl index
   Hmax = OECD maximum Herfindahl index
3. Separate scores were computed for domestic long distance and international fixed telephony as well as for analogue and digital mobile services. Aggregation of fixed services and mobile services assumed equal weights for these sub-components.
4. Market share of new entrants (M)
   Mmin = OECD minimum market share
   Mmax = OECD maximum market share
5. Includes accounting separation.
6. Separate scores were computed for passenger and freight services and subsequently aggregated using equal weights.
7. At least two service providers operating in the same geographical area.

Sources: Boylaud and Nicoletti (2000), Steiner (2000), Gonenc and Nicoletti (2000), OECD International Regulation Database.

Table A.4 **Regulatory reform in OECD countries**

A. Key for high, medium and low regulation categories

Fully or largely competitive industries (air passenger transport, road freight) [1]

Indicator	Regulation		
	High	***Medium***	***Low***
Barriers to entry	The number of firms is legally restricted	Substantial liberalisation has occurred but entry is not free	Liberalised entry
Price controls	Fares or rates are set or approved by the regulatory authority	The firm is given some but not complete freedom in setting price	The firm has complete freedom in setting price
Service restrictions	Routes, capacity and scheduling are set or approved by the regulatory authority	Firms are given some but not complete freedom in selecting services they supply	Firms have complete freedom in choosing the services they supply
Public ownership	The firm is either fully or majority-owned by the government	A publicly-owned firm is in competition whith privately-owned firms or the government has a minority stake in at least one or several firms in the market	Marginal public share or fully privately owned

Industries with non-competitive segments (railways, electricity, long-distance fixed telecommunications) [2]

Indicator [3]	Regulation or market/industry structure		
	High	***Medium***	***Low***
Barriers to entry ***Public ownership***	value > 4.5	<=4.5 and >=1.5	value < 1.5
Market structure or industry integration	value > 4.5	<=4.5 and >=1.5	value < 1.5

1. Indicator for 1975 and 1990 from OECD (1992). Indicator for 1998 from OECD International Regulation Database, Gonenc and Nicoletti (2000) and Boylaud (2000).
2. Indicators based on OECD International Database, Boylaud and Nicoletti (2000), Steiner (2000), *OECD Communications Outlook* (various issues). European Conference of Ministers of Transport (1998), World Bank (1996).
3. See Tables A.1 - A.3.

Table A.4 **Regulatory reform in OECD countries** (continued)

B. Coverage of indicators

	Electricity			Long-distance fixed telecommunications			Railways		
	Barriers to entry	Industry integration	Public ownership	Barriers to entry	Market structure	Public ownership	Barriers to entry	Market structure	Public ownership
Number of countries included:	19	19	19	27	28	25	18	15	26
Missing countries:	Austria Czech Republic Hungary Iceland Korea Luxembourg Mexico Poland Switzerland Turkey	Austria Czech Republic Hungary Iceland Korea Luxembourg Mexico Poland Switzerland Turkey	Austria Czech Republic Hungary Iceland Korea Luxembourg Mexico Poland Switzerland Turkey	Korea Mexico	United States	Czech Republic Hungary Mexico Spain	Austria Czech Republic Denmark Finland Iceland Korea Luxembourg Mexico New Zealand Norway Switzerland	Australia Austria Canada Denmark Greece Iceland Luxembourg Mexico Netherlands New Zealand Norway Portugal Spain Sweden	Austria Canada Mexico

	Air passenger transport				Road freight			
	Barriers to entry	Price controls	Service restrictions	Public ownership	Barriers to entry	Price controls	Service restrictions	Public ownership
Number of countries included:	16	17	16	17	15	16	16	16
Missing countries:	Belgium Czech Republic Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal Japan	Belgium Czech Republic Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal	Belgium Czech Republic Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal Japan	Belgium Czech Republic Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal	Belgium Czech Republic France Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal Japan	Belgium Czech Republic France Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal	Belgium Czech Republic France Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal	Belgium Czech Republic France Greece Hungary Iceland Italy Korea Luxembourg Mexico Netherlands Poland Portugal

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