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IN NETWORK INFRASTRUCTURE INDUSTRIES

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FOREWORD

Many transition economies have network infrastructure industries that are underdeveloped and inefficient in comparison with those typically found in OECD countries. Extending and up-grading these industries in transition economies requires significant levels of investment. In order both to attract and optimise the use of investments, transition economies have been keen to draw on Western experience and advice. Three principal issues have been of particular concern: the costs and benefits of greater competition; restructuring to create the desired level of competition; and the design of stable, equitable regulatory systems that enhance efficiency.

The OECD’s Centre for Co-operation with Economies in Transition (CCET) has responded to requests for advice in reforming network infrastructure industries by offering assistance on issues relating to the telecommunications sector in several transition economies. It has also held two conferences on network infrastructure industries, both convened in Budapest and organised by staff in the Competition and Consumer Policy Division of the Directorate for Financial, Fiscal and Enterprise Affairs.

This document is a record of the second conference*, held in May 1995, which covered the electricity, oil and natural gas, and telecommunications sectors. The conference provided a detailed examination of competition and regulatory issues for delegates from industry, competition agencies and regulatory bodies in the Czech Republic, Hungary, Poland, and the Slovak Republic. Emphasis was placed on the need for transparent and predictable regulation that encourages efficiency and investment, as well as the creation of independent regulatory bodies to help ensure effective enforcement of regulations.

The CCET gratefully acknowledges the valuable role played at the conference by panellists from: AUS Consultants Ltd.; the European Bank for Reconstruction and Development; the European Commission; the International Energy Agency; the Italian Autorita Garante della Concorrenze e del Mercato; the United States Department of Justice (Antitrust Division); the United States Federal Energy Commission; and the World Bank Group.

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Salvatore Zecchini
OECD Deputy Secretary-General
Director of the CCET

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INTRODUCTION

The conference on competition and regulation in network infrastructure industries, held in May 1995, was designed to assist Czech, Hungarian, Polish and Slovak officials charged with supervising or regulating their countries' telecommunications, electricity and natural gas sectors. It was also intended to help competition authorities interested in enhancing the efficient operation of those same four sectors. This publication records some of the conclusions and lessons drawn from the conference, making them available to officials in other countries undergoing a transition from centrally planned to market driven economies.

Each sector – electricity, oil and gas, telecommunications – was the subject of a separate seminar, which was divided into four half-day sessions. Each session began with one of the participating countries explaining the context (i.e. structure, ownership and regulatory system) of its industry and then identifying current issues and problems where the advice and opinions of the expert panel were requested.

Discussions at the conference reflected considerable variation across sector and country. There were nevertheless some important recurrent themes in the advice given by panellists. It was repeatedly stressed that:

-- regulatory bodies should be financially and politically independent, i.e. not subject to the direct influence of either the government or the regulated entities;

-- regulatory decision making ought to be as predictable and transparent as possible in order to minimise investor risk; and

-- regulatory systems should encourage innovation and efficient operation.

Two other common themes were the advisability of: (1) limiting the number of exemptions granted to regulated sectors from the normal application of a country's competition law; and (2) making appropriate vertical separations in hitherto unified industries in order to promote efficiency enhancing competition. Finally, in every seminar there was some discussion of rate rebalancing, i.e. the need to re-think extensive cross-subsidisation and universal service obligations. Without such rebalancing, consumers will continue to make their decisions on the basis of prices that are a poor reflection of underlying costs, and new competition will either be stunted or distorted.

The remainder of this document consists of three seminar summaries and three background papers commissioned for the conference. Please note that unless otherwise stated, facts mentioned in the summaries and background papers refer to the time of the Conference (May 1995) rather than the date of publication.

Additional copies of this general distribution document can be obtained, without charge, by writing to the OECD, Competition and Consumer Policy Division, 2 rue André-Pascal, 75775 Paris CEDEX 16, France (Fax number: (33-1) 45 24 96 95).
Czech Republic

Context - structure, ownership and regulatory system

A single company, CEZ a.s., generates 80 per cent of the electricity used in the Czech Republic and also owns and operates the transmission grid. CEZ was transformed into a joint stock company in the first wave of voucher privatisation with about 68 per cent of the shares owned by the state. Eight distribution companies have been formed. The state currently owns 80 per cent of the shares, but it is planned that 34 per cent will be transferred to municipalities and 20 per cent to foreign investors. There are no current plans for further restructuring or privatisation of these companies, although the Ministry of Economic Competition (MEC) has prepared a draft plan, for discussion purposes, to separate the transmission and generation functions of CEZ. CEZ is the largest business enterprise in the Czech Republic, and is considered profitable and financially stable, at least on a current basis.

A new Energy Act became effective at the beginning of 1995. The Ministry of Industry and Trade (MIT) is responsible for regulation of the operations of the sector. The Ministry of Finance regulates the prices, based on recommendations submitted by MIT. In other respects the Act does not specify the method of regulation or conditions of access to the network. Several decrees implementing the Act are in preparation or planned by MIT, including decrees on regulation, dispatching and authorisation to do business.

The MEC has on occasion considered conduct by CEZ and the distribution companies under the abuse of dominance provision of the antimonopoly law, including on one occasion the refusal of CEZ to transmit imported power to a domestic purchaser.

The current prices to households are approximately 60 per cent of the price to other customers on a unit basis. It is planned that household prices will rise 10 to 15 per cent per year until 1999, when there will be parity between the two classes of customers, thereby ending the subsidy to households.

Current issues and problems

The Czech delegation identified the following issues that are currently under consideration:

-- structure of the industry in the long run, including whether to separate generation from transmission and in generation, the optimal number of sellers;

-- short run objectives, assuming CEZ remains dominant and vertically integrated;

-- price structure as between different classes of customers.
**Advice by the panel**

1. **Managing the transition period**

   There appear to be no current plans to restructure CEZ for the purpose of introducing more competition into the industry. It seems to have been decided that the status quo should prevail for the next few years for several possible reasons: Substantial new investment will be required, and it is thought that CEZ will be able to generate much of the necessary money internally. The method or style of regulation has not been determined, and currently the Ministry of Finance is not proactive in this area, instead reacting to proposals from MIT. There must be additional thought given to this subject. Also, the readjustment of household and industrial prices should be complete by 2000. The panel stressed that in this situation, where there will be little competition from within, the ability to import should be liberalised. In this regard, the countries of Central and Eastern Europe appear to be especially well situated to engage in trade in electricity, and such an option should be more actively explored.

2. **Optimal structure in generation**

   The experiences of several countries were examined, and it was apparent that no single structure is necessarily preferred. When power generation was reorganised in Belgium, three existing generators were merged into one generator, which controls about 80 per cent of domestic capacity. Four generators exist in the Netherlands. When the industry was deregulated in the U.K., the monopoly generator was split into three, two of them privately owned, although there is a general feeling in the U.K. that there is insufficient competition in generation today. In France there is a single generator. The structure of the generating sector, together with other organisational aspects of the industry such as legal and regulatory structure, depends on the government's overriding goals for the system, and the panel suggested that the authorities begin to address these broader issues.

3. **Economies of scale**

   Available information suggests that economies of scale will not drive decisions about the structure of the electricity industry. Minimum efficient scale at the power plant level is thought to be at the 200-400 MW range, and some predict that it may fall further as technology improves. Efficiencies at the firm level, however, involving acquisition and use of finances and management, for example, may be larger. Less is known about that issue. Economies of scale in distribution are also thought not to be large.

**Hungary**

**Context - structure, ownership and regulatory system**

Hungary currently has installed generating capacity of 7,300 megawatts, distributed approximately equally among nuclear, coal and oil and gas. The former Hungarian Electric Works Trust has been reorganised into two levels of ownership (joint stock companies), the network and central management at one level and generation (eight power plants) and distribution (six regional distribution and supply companies), separately controlled by Hungarian Power Companies Ltd. (MVM Rt.), at the other. Plans for privatisation are in preparation, with sales of minority interests in several of the joint stock companies possibly occurring in late 1995.

Operational regulation of the electricity sector is conducted by the Hungarian Energy Office (HEO), established in August 1994. Regulation is to accomplished through several instruments, including...
ministerial decrees, operational licenses and operational regulations and rules. Preparation of some of these instruments was underway in 1995. The HEO also has responsibility for consumer protection functions in the electricity sector. The HEO prepares price recommendations, which are submitted to the Ministry of Trade and Commerce, which promulgates prices with the consent of the Ministry of Finance. Price regulation is on a rate of return basis. By law prices must fully reflect costs, including “the return of justified investments.”

The competition law is enforced by the Office of Economic Competition (OEC). Natural monopolies are exempted from the coverage of the law. Under the law the OEC must be consulted concerning draft laws that affect markets. Its recommendations, while not binding, are often accepted.

**Current issues and problems**

The following issues were noted in the discussion:

-- restructuring and privatisation of the industry, including separation of the generation, transmission and distribution functions; the role of imports;

-- the regulatory regime, including independence of the HEO, the proper role of the government and transparency of regulation; and

-- principles of pricing -- rate of return vs. other methods, and if rate of return, how to accurately determine costs.

**Advice by the panel**

1. **Restructuring of the industry**

Privatisation should proceed, and the three functions -- generation, transmission and distribution should be separated. Currently all new producers must first offer their output to distributors, and only if it is declined may they sell directly to customers. This unnecessary barrier to entry should be eliminated. Also, the transmission company has the exclusive right to engage in imports and exports, a monopoly that should be eliminated. Imports should be permitted to play an important role in the market.

2. **Regulatory Structure**

It appears that currently regulation is heavily influenced by political considerations. Decisions are not predictable or transparent. To attract private investment, however, regulation should be more certain, transparent and independent of the government. Two specific issues were discussed: the need for the terms of licences currently being granted to producers and distributors to be subject to regulation and modification subsequently, and the extent to which regulation should attempt to influence the choice of fuel in generation. At present, the government dictates the use of locally-produced coal, which is relatively expensive and dirty. In general the government should not be involved in fuel selection. The regulatory environment should be designed to encourage new, private entry that is more efficient and cleaner, and imports where they are economically advantageous.
3. **Price Regulation**

Again, more transparency is required. Cost-based pricing is problematic, where in an emerging market economy true costs are difficult to determine. An alternative would be to rely on prices observed in other countries in similar circumstances. Currently it is the case that average electricity prices in Hungary are relatively low compared to Western countries, but they have a relatively greater impact on users, particularly individuals. Redressing this imbalance will be difficult, and cannot be accomplished immediately. To the extent that higher prices adversely affect households, however, some form of direct subsidy to the poor is the preferred method of dealing with the problem.

**Poland**

*Context - structure, ownership and regulatory system*

Almost all of Poland's electrical generating capacity (currently 32 000 MW) is fuelled by either lignite or hard coal. Currently there is excess capacity of almost 33 per cent, due substantially to the economic recession and to higher prices in the period since the transition from a planned economy. The situation of excess capacity is considered temporary, however. The efficiency of the system is low; much of the assets are relatively old and of inefficient design. The predominance of coal as fuel means that the facilities are highly polluting; very significant investment in pollution control will be required.

Electricity prices have risen since 1990, but are still considered to be approximately 45 per cent below the level required to fund necessary capital expenditures in the near term. Cross-subsidisation of households by industrial customers has diminished, but still exists. Further price increases to households are considered problematic, given the already high cost of energy in Poland relative to total household budgets.

Poland began restructuring its electricity industry in 1989. Five regional power utilities were broken up into 32 generating and 33 distribution enterprises. In 1990 the Polish Power Grid Company (PSE) was created as a Treasury joint stock company. PSE operates the transmission grid and has responsibilities for the dispatching function, imports and exports and management of the wholesale market. All distribution companies were corporatised in 1993 and all combined heat and power plants (CHP) in 1994. No assets, however, have been privatised to date. The first attempt at privatisation, involving the Krakow SA CHP plant, has stalled.

The industry is governed by the Energy Management Act of 1984, enacted in the former planned economy and not appropriate to the current situation. The Ministry of Industry and Trade (MoIT) manages the industry and defines industry policy. Prices to the consumer are set by the Minister of Finance. Internal transfer prices are set by MoIT.

A new energy law has been drafted, but at the time of the conference, had not been enacted. The draft energy law envisages an Energy Regulatory Authority ("ERA"), which would be set up as a central state administrative organ (i.e. would not have the power to issue secondary legislation) and managed by a president, appointed and removed by the President and Council of Ministers. It would be financed from the state budget instead of from licence fees. The ERA would issue, withdraw or modify licences, monitor compliance with the licence conditions and levy fines for violations, exercise development control, be involved in settling disputes between consumers and energy enterprises, and play a role in setting prices. The draft law specifies that the rules for setting prices would be set out in an ordinance formulated by the MoIT and the MoIT would continue to have responsibility for formulation of national energy policy.
Current issues and problems

The Polish delegates identified several pressing issues:

-- Ensuring both financial and political independence for the ERA.

-- Deciding on the method of regulation, including whether it should be done through detailed ordinances issued by MoIT, leaving to the ERA the task of implementing them, or by more active intervention by the ERA. The latter would require a much larger and more sophisticated staff, and bigger budget for the ERA.

-- The method of price regulation, e.g. rate of return, price cap or yardstick. Current thinking favours rate of return.

-- Separation of the wholesale function currently conducted by PSE from management of the transmission grid.

-- Re-formulating the many, diverse generating companies into fewer, larger units.

-- Relationship between regulation and the Antimonopoly Law.

-- How to move forward in privatisation. The three important participants -- the government (owner), the managers and the employees -- have different, often conflicting interests, and are pulling in different directions.

-- Enlightened planning and resource management in the context of a non-vertically integrated industry.

-- How quickly to attempt to meet the strict environmental standards prevalent in Western Europe.

Advice by the panel

The panel congratulated the Polish delegation for their presentation and for the fact that the Polish authorities have obviously given substantial thought to the issues involved in the restructuring and regulation of this industry. Poland appears to be farther along in this process than many other countries in transition, although a great deal obviously remains to be done.

1. Method and style of regulation

There is obviously no one best approach. The overriding need, especially for countries in transition like Poland, is to attract the large-scale private investment. This requires reducing the regulatory risks facing investors, which in turn requires providing the regulatory authority with a degree of autonomy, as well introducing transparency into the regulatory process. While the regulator should be relatively autonomous, it should not be perceived as unstable or unpredictable. For the newly-created regulatory authority this may mean that the overriding concepts and rules, such as the pricing principles, should be set by the government or the legislature. The regulator would then implement them.
2. **Relationship to the antimonopoly law**

The demarcation between regulation and competition, and hence the precise applicability of the antimonopoly law, can be unclear. In the U.S., for example, the regulatory scheme allows a significant degree of competition. The regulated price, in effect, is a competitive one. Where that is the case, the competition law should apply. The general rule in the U.S. is that the antitrust laws apply where there is regulation, unless there is an explicit exemption in the regulatory legislation, or where their application would not permit the regulatory scheme to work.

3. **Resource management and pricing**

Vertical integration is not necessary for enlightened resource management. Integrated resource planning (IRP), a popular subject in every country currently, involves setting the correct price signals to promote efficient decisions by both the demand and supply sides. This is difficult enough in any country, but especially so in countries in transition, where existing prices do not accurately reflect costs. Nor is it likely to be possible to move quickly in that direction. Subsidisation of the residential customer cannot be eliminated quickly. It is difficult to price pollution externalities. Poland should carefully consider whether expensive retrofitting of dirty, outdated assets is justified. It may not be the wisest course to try to meet the most stringent environmental standards in the near term. Solutions other than retrofitting existing plant, such as investment in new gas facilities, may be preferable. The Polish industry is apparently under-invested in lignite, which is substantially cheaper than hard coal, but moving away from coal also impacts employment in the country.

4. **Industry structure**

Poland has progressed substantially in determining the ultimate industry structure. It has adopted generally the U.K. model. The industry is to be non-vertically integrated. The natural monopoly element, the transmission grid, will be government-owned for the foreseeable future. PSE's wholesale function will be gradually phased out, permitting distributors and large consumers to contract directly with generators. There will be consolidation of the 33 generators, possibly a difficult task and a vital one, taking into account the need for competition in this function.

**Slovak Republic**

**Context - structure, ownership and regulatory system**

The current generating capacity is approximately 6,900 megawatts, small in comparison to Poland, Hungary and the Czech Republic. Approximately 47 per cent is provided by nuclear facilities, 26 per cent from fossil fuels, most of which are imported, 17 per cent from hydro facilities and 10 per cent from co-generators. Estimates are that consumption will increase about 2 per cent annually in the next several years, compared to growth in GDP of 4 to 5 per cent annually. Historically, about 15 per cent of the electricity used in what is now the Slovak Republic came from the current Czech Republic.

Much of the fossil fuel generating plant does not meet current environmental standards, and there are safety concerns with some of the nuclear facilities. The Ministry of Economy is currently planning new hydro capacity of about 200 MW, and there are tentative plans to replace some of the old fossil plants with combined cycle gas plants. Construction of a major new nuclear facility is underway, but financing for completion of the project is not assured. This project is vital to the Slovak electricity industry, as it would replace some of the older and less safe nuclear plants.
The Slovak Republic has not progressed significantly in restructuring or privatising its electricity industry. The state-owned electricity company, which accounts for about 90 per cent of the electricity generated in the country (the balance comes from industrial co-generators) has been transformed into a joint stock company, SE, a.s., which controls both the generating capacity and the transmission grid. It is intended that three regional distribution utilities will corporatised as well. There are no current plans for privatisation of these enterprises. Partial ownership may be sold to private investors, with the majority interest remaining with the government.

The Ministry of Economy (MoE) is responsible for the operational regulation of the sector, while the Ministry of Finance (MoF) regulates the prices and has responsibility for the financing of SE’s operations. MoF has submitted for approval a new tariff policy that would attempt to allocate costs more accurately among different types of customers and adjust tariffs accordingly. Subsidies would be provided for poor households. Currently, however, rates for households are substantially below costs. The MoF is considering a plan to establish a new regulatory authority that would have responsibility for all natural monopoly sectors. These plans are quite tentative, however, and the size of the projected staff is very small.

The Antimonopoly Office (AMO) has articulated its view that the energy sector should be restructured to permit more competition, as well as to provide for greater transparency in regulation. The AMO proposes that generation be separated from the transmission grid, to permit competition in generation. The AMO prepared proposed legislation that would reorganise regulation of natural monopolies in the Slovak Republic into a single, independent regulatory body. The proposal was rejected, however.

Current issues and problems

The delegates from the Slovak Republic identified several important current issues:

-- providing sufficient new generating capacity to meet anticipated growth in demand, and more pressing, to replace inefficient and polluting plant;

-- restructuring tariffs to eliminate the cross-subsidy of residential customers;

-- deciding on the organisation for a new regulatory authority, one that might be responsible for several sectors, including electricity, and designing a regulatory system that provides for greater transparency and certainty for investors;

-- introducing, in the longer run, more competition into the sector, which would require separating generation from the transmission grid.

Advice from the panel

1. New capacity or imports?

Given the relatively small size of the Slovak Republic and its electricity demand, serious consideration should be given to the alternative of increasing imports instead of building new, expensive generating capacity that would itself require imports of base fuels. The Slovak delegates indicated their
willingness to consider that alternative, but current planning is to import no more than 20 to 25 per cent of requirements.

2. **Structure of regulatory body**

Regulatory regimes in other countries were briefly discussed. In the U.S. and Canada, there are separate regulatory authorities for energy, including electricity and oil and natural gas pipelines, telecommunications and transport. Where a body has responsibilities in more than one sector, however, functions at the staff level are usually specialised. At the state or provincial level, the regulatory authority may have responsibility for all sectors, including trucking and water. In Western Europe, on the other hand, it is more common for regulation to be conducted at the ministry level. Portugal is undertaking a reorganisation of its electricity industry that may be a model for transition from central planning to a competitive regime. Initially the generators will operate pursuant to long term contracts with the grid company. A separate planning body will be created to make decisions about structure and capacity. New entry will be on a competitive basis, however, ultimately resulting in the operation of a spot market in supply to consumers.

3. **Interface between antimonopoly law and regulation**

In some countries, particularly the U.S., antimonopoly enforcement and regulation of natural monopolies do co-exist. Unless the applicable law specifically exempts a particular sector or activity from the antimonopoly laws, those laws apply to the extent that they do not unreasonably interfere with the necessary regulation. Thus, the restructuring of the telecommunications industry in the U.S. was accomplished under the antimonopoly law, and not pursuant to regulation. Likewise in the European Commission the competition directorate has authority to review certain transactions in regulated industries, including, in particular, mergers that are above certain size thresholds. In both the U.S. and European Union (EU) countries, regulation and competition are considered to have the same purpose. The purpose of regulation is to produce to the maximum extent possible the results that would occur under competition, if competition were possible.
Czech Republic

Context - structure, ownership and regulatory system

The Czech natural gas industry is conducted by a set of state-owned enterprises comprising a sole transmission and storage company, Transgas, and eight distribution companies enjoying regional monopolies (except for some larger industrial customers directly supplied by Transgas). Only 4 per cent of the gas consumed in the Czech Republic comes from domestic sources, the rest is imported from Russia (supplemented in emergencies with supply from Ruhrgas). Some efforts are being made to diversify import sources, but these are hampered by commitments to use the national transmission network to ship Russian gas to Western Europe. At the moment Transgas is the only company holding a licence to import gas.

Transgas earns considerable transit fees by transmitting Russian gas to buyers in Western Europe. Those fees are currently being applied to subsidise household consumers who buy gas at prices set below import costs.

The privatisation of the eight distribution companies began through including 15 per cent of their shares in the second wave of voucher privatisation. Interestingly, 20 per cent of the shares in the distribution companies are being reserved for foreign investors and 34 per cent for the municipalities. Transgas will continue to be state-owned until at least the year 2000, when a minority of its shares may be sold to the public. That timetable is linked to planned termination of household consumption subsidies. Prices to households are scheduled to increase by at least 10 per cent per year over this and the next four years. That rate of increase could be accelerated if there are favourable developments in real wages.

Regulation, other than price regulation, of the natural gas sector is carried out by the Ministry of Industry and Trade ("MIT"). Its regulatory powers are effectively enhanced as a result of an agreement with the National Property Fund whereby MIT effectively exercises the state's ownership rights in Transgas and the distribution companies.

As regards prices, MIT submits proposals to the Ministry of Finance which has the power to set maximum prices at which Transgas sells gas to the distribution companies and the latter resells to final consumers. The Ministry of Finance follows a cost of service approach to setting prices, except for the subsidised household sector. Currently prices are uniform across the eight distribution company regions and are not subject to seasonal adjustments.

The current Energy Act does not address third party access to either the national transmission grid or to the distribution companies' networks.

The Czech competition statute grants the Ministry of Economic Competition ("MEC") the power to review privatisation projects which will create monopolies or dominant firms (greater than 30 per cent market share). As of 1994, MEC has not opposed any privatisation’s in the energy sector. It has also not conducted any important proceedings against the natural gas companies. MEC is investigating however various complaints from municipalities regarding their being forced to help finance the construction of gas mains.
Current issues and problems

The Czech delegates sought and received advice in four areas:

1. Principles of regulation

The current Energy Act appears to favour cost-based regulation, but the Czech delegates wished to know whether price caps or some combination of cost-based regulation and price caps would be advisable.

A panellist pointed out that good cost information is basic to cost-based regulation. To obtain such data, one requires an accounting system which produces accurate current cost data and provides assistance in estimating the value of the installed capital stock and its rate of depreciation. It is also necessary to have some means of determining what constitutes a fair return on investment.

A cost-based regulatory system is particularly difficult to administer during periods of high inflation. A price cap system, such as allowing maximum prices to increase at the rate of inflation minus some estimated productivity factor, has two important virtues. First, it automatically adjusts for inflation. Second, it can provide strong incentives to improve productivity and to reduce costs. The second advantage requires however that the government be able to make a credible commitment to maintain the price cap formula for a sufficiently long period of time. Unfortunately, it can only do that if it is reasonably confident that initial prices are set close to full economic costs, and that future productivity gains can be reliably estimated.

The first few attempts at price cap regulation, in the U.K. for example, were based on very rough guesses concerning realisable productivity gains. Most of the guesses were bad and favoured the companies.

A noticeable problem with cost of service regulation is a tendency towards over-capitalisation. To some extent that problem can be solved by using benchmark or yardstick regulation. Essentially this requires comparing monopoly service providers in dimensions where they face roughly similar situations. Doing this gives the regulator a means of better determining what are truly justifiable costs. Incidentally, there is no need to confine comparisons to companies within the same country.

Cost of service regulation can become very burdensome, as U.S. experience clearly shows. A panellist pointed out however that this is due to procedural safeguards (e.g. full hearings etc.) which are appropriate because regulation amounts to government action reducing the value of private property. Another panellist added that detailed procedures have the advantage of producing transparent, consistent decisions. It can therefore be argued that despite the associated delays, procedural safeguards reduce investment risks, hence the rate of return that investors require and the rates consumers are charged.

Two summary points were stressed as regards choosing the right regulatory system:

-- be wary of doctrinaire statements by experts on what the answer should be; and

-- avoid mechanistic application of some price formula.

A Czech delegate commented that they did not wish to adopt a system as complicated as that found in the United States. He went on to point out that regardless of the regulatory system eventually chosen, the first step is to improve available accounting data and to insist on an accounting separation
between regulated and unregulated activities. He also commented that once companies are earning a profit and accounting systems become more reliable, there may be advantages in adopting a light-handed, efficiency-inducing regulatory system.

A panellist gave an example showing that incentive schemes are much more effective means to raise efficiency than pressure exerted in the course of standard cost of service regulation, i.e. arguments over what constitutes justified costs and what capital investments are truly required. U.S. experience also suggests that it is feasible to design incentive schemes so that if truly excessive profits result, they have to be shared with consumers. Admittedly that reduces incentives somewhat, but it also reduces the political risks inherent in incentive schemes.

2. Problems specific to regulating prices charged by the distribution companies

A panellist noted the inefficiencies inherent in uniform gas pricing, i.e. not taking account of cost differences related to seasonal consumption patterns, end use and geographic location. If the idea is to ration gas use in a way that imposes minimal social hardship, perhaps gas prices should be raised most for customers who could easily switch to other energy sources, or conserve gas by using more efficient appliances. For example, prices could be raised most for city dwellers using gas for cooking (these are high-cost customers in any case, so that provides another rationale for raising the prices they pay). This of course runs counter to the policy one would follow if the objective were simply to reduce the economic inefficiencies occasioned by the need to cover the high fixed costs involved in gas distribution. If economic efficiency were the only objective, customers who are least able to shift to alternative energy sources should be asked to pay a disproportionately larger part of the fixed costs (i.e. Ramsey pricing).

Two panellists again touched on the importance of setting prices that communicate true economic costs to consumers even if this means significant hardship for certain consumer groups. The best way to take care of the latter problem is through targeted subsidies rather than by setting low prices for all consumers.

3. Should the regulated companies be permitted to raise their prices at the same time as they are paying dividends? What constitutes a fair rate of return?

Panellists pointed out that investors must be allowed to make reasonable returns on their investments and to receive dividends. Otherwise, they simply will refuse to invest and networks will neither be maintained nor upgraded and extended. All forms of regulation practised in the West envisage allowing investors to make an adequate rate of return and to receive dividends.

It was recognised that there will be major political problems if investors are permitted to make an excessive rate of return, as happened for example with British Gas in the early years of price cap regulation. Once again, it is essential to base any regulatory system on accurate cost data.

A Hungarian delegate asked how regulators go about deciding what is an appropriate rate of return. In response, a panellist alluded to various theoretically correct ways to estimate the proper rate of return, e.g. discounted cash flow; capital asset pricing models etc. Though sound in theory, these methods are extremely difficult to apply. U.S. experience suggests that rather than fostering endless debates among expensive specialists, it might be better to start with the interest rate investors could earn by buying government bonds and to add something like 2 to 4 per cent. The additional premium is required because investments in building network infrastructures are inherently riskier than investments in government bonds. A band rather than a fixed risk premium should be employed because there could be differences in
risk faced by various utilities. Whatever the premium the regulator initially favours, it would be wise to take account of feedback from the affected interests (both companies and consumers) before finalising it.

The U.S. Federal Energy Regulatory Commission ("FERC") used to employ a government bond rate plus risk premium approach but was forced to abandon it. What seemed like an inflexible rule was very difficult to defend in the context of rate hearings which were supposed to ensure a fair rate or return in each specific case. Moving in the opposite direction, Canadian gas regulators have recently adopted the government bond rate plus a premium system.

Unfortunately, there is a basic circularity involved in trying to set an appropriate risk premium. In regulated sectors, capital investments are made for longer periods of time than rates are typically set for. The principal risk facing investors is that the regulator will in future alter the permitted rate of return. In the worst case scenario, the regulator might even set prices below the sum of current costs, depreciation, and an adequate return on investment. The circularity arises because in estimating investor risk, the regulator is seeking to predict its own future behaviour. All manner of elaborate statistical techniques are unable to solve that basic problem.

A panellist with extensive consulting experience in countries other than the U.S. confirmed that estimates of acceptable rates of return are in the end rather ad hoc and pragmatic despite extensive use of economic modelling. Interestingly, cross-country comparisons often enter into debates over what the rates of return ought to be.

Despite all the fights over allowed rates of return in the U.S., differences across utilities are actually rather small, and roughly related to obvious differences in the degree of investor risk. For example, if the main customers are operating in a declining industry, the allowed rate of return would tend to be higher than if the main customers were relatively affluent residential customers.

Another panellist stated that allowed rates of return in the U.S. are among the lowest in the world. Other countries could usefully look at earned rates in the U.S. as a minimum benchmark rate of return.

A Czech delegate wanted to know whether regulators are held responsible for errors in setting an appropriate rate of return. A panellist noted that the regulator is not individually responsible, but rulings can be challenged in court. It should also be noted that in the United States, regulated utilities can raise rates prior to obtaining regulatory approval. However, they are required to refund excess monies collected if a lower price increase is eventually approved.

4. *Price discrimination across customers, what it is and why it has both positive and negative aspects*

Price discrimination occurs when price differences across customers or classes of customers are not fully justified by differences in costs incurred to serve them. Any monopolist who can prevent customers from reselling to other customers will have a strong profit incentive to charge higher prices to buyers less likely to reduce consumption as a result of those higher prices. Monopoly owners of natural gas pipelines presumably have that opportunity and would take advantage of it if regulators so permitted.

Price discrimination is naturally very unpopular with those who are charged the higher prices. At the same time however, it is economically efficient to permit price discrimination in natural monopoly situations (i.e. declining unit costs over the whole range of feasible outputs) if the state cannot or will not subsidise the natural monopolist and if the latter's profit rate does not rise above a level barely sufficient
to leave the enterprise owner indifferent between remaining in business or investing his capital elsewhere. The challenge for regulators is to balance economic efficiency concerns against other factors such as harm to particularly vulnerable consumers. A panellist illustrated the practical advantages of price discrimination with an example drawn from day-care for children. It could happen that if a new day-care centre were required to charge all parents the same amount per child cared for, it would find that it would never have enough clients to cover all its costs. This problem could be overcome however if it charged higher income parents more and lower income parents less. Both sets of parents would be better off with that solution than with having no day-care centre at all.

Hungary

(Context - structure, ownership and regulatory system)

At present the Hungarian natural gas system is conducted by seven state-owned companies. The most important of those is MOL Rt, a vertically integrated production and transmission company enjoying a monopoly in both those activities. The other six companies are regional distributors enjoying indefinite exclusive territories (except for competition by direct sales from MOL Rt).

The majority of the shares in the distribution companies are scheduled for sale to private interests in 1995, but the state will retain a golden share in each. MOL Rt will eventually be privatised, after the distribution companies, but the state will retain 25 per cent of its shares.

Hungary took an important step towards greater competition in the natural gas industry when it passed in 1993 a statute governing the exploration, production, storage and transportation of natural gas. Under this law, concessions can be granted assigning territories for the exploration and development of natural gas wells. The law also provides that mining contractors who construct pipelines and storage facilities are required to permit third party access to them. In addition, domestic gas producers will enjoy the right of third party access to MOL Rt's transmission grid, but there is no such right as regards access to the six distribution companies’ pipelines, i.e. producers cannot compete for final buyers. There are no third party access rights provided for imported gas, and the state is a monopsonist in purchasing/bartering for such gas. A significant and increasing proportion of Hungarian gas needs are satisfied by imports chiefly from Russia.

Large customers are supplied both by the six regional distribution companies and directly by MOL Rt. A quarter of the latter's sales are made directly to large customers. The situation of the distribution companies is rendered still more precarious by their having universal service obligations despite having no assured supplies of gas and being subject to price regulation.

The prices of alternatives to gas and electricity, including coal and coal products, oil, and propane-butane, have all been liberalised since 1991. Their prices increased rapidly and are now close to world levels. This is not the case for gas and electricity prices which are still regulated.

The Hungarian Energy Office ("HEO"), set up in August 1994 with similar responsibilities in both electricity and gas, presents price proposals to the Minister of Trade and Commerce which has the power to set prices, subject to the consent of the Ministry of Finance. After 1 January 1997, the HEO will be the sole price regulator. By statute, maximum gas prices are to be set at a level sufficient to cover all justifiable costs, including those related to environmental protection, plus a profit sufficient to ensure long term operations. Price discrimination, i.e. differences which are not cost justified, across customer groups is prohibited.
In addition to its price control and consumer protection functions, the HEO is charged with issuing, monitoring and enforcing the licences required by gas producers, transmission companies and distributors. Moreover, it exercises policy functions in the area of energy safety and conservation plus the division or merger of licence holders. HEO decisions can be appealed before the administrative court.

On 1 January 1995, there was a 50 per cent increase in the prices households pay for gas. This constituted an important step towards ending costly cross-subsidisation. At present, household prices exceed industrial prices but still fall short of full economic costs.

The Office of Economic Competition (“OEC”) has the right to be consulted on all legislation affecting markets, but some of its functions as regards natural gas, merger review for example, are exercised by the HEO.

Current issues and problems

There were several pressing problems identified by the Hungarian delegates:

--- A significant difference in price between domestic and imported gas, i.e. domestic gas is priced below imported gas.

Essentially, MOL Rt is operating a cross-subsidisation scheme whereby the losses it makes on selling imported gas are covered by profits on domestic gas sales. This of course will make it difficult to foster true competition in the supply of domestic gas since that would undermine MOL Rt's power to continue the cross-subsidisation.

--- Retail prices are currently below full economic costs and this plus the lack of stable, transparent regulation is holding back privatisation.

--- Should MOL Rt continue to be vertically integrated.

--- How to ensure fair competition between MOL Rt and the distribution companies.

--- What is the proper role of HEO.

Advice by the panel

The above issues and problems were dealt with under four broad themes:

1. **What to do about the gap between domestic and imported gas prices?**

The basic recommendation was to eliminate the price gap, so as to avoid inefficient use of domestic gas. This will inevitably drive up prices paid by final consumers. To reduce the political problems associated with such increases, especially those associated with giving windfall gains to foreign owned producers, perhaps a tax should be levied on domestic gas production. Some of the proceeds could be used to compensate clear cases of hardship among final consumers.

If prices paid to domestic producers cannot immediately be raised to world prices, there should at least be an announcement of a firm intention to eventually do so.
2. How should MOL be restructured?

It would probably be best to separate the operation of the national transmission network from the other functions MOL Rt currently has. At a minimum, there should be an accounting separation in order to generate accurate transmission cost data that could be used in setting third party access charges.

3. Problems with the distribution companies

Privatisation will clearly give the distribution companies an incentive to lower their costs, but privatisation will not proceed unless potential buyers believe the distribution companies can be operated at a profit. This requires an assurance that regulated prices will be set at economic levels. Private investors would also be interested in the distribution companies having the right to by-pass MOL Rt's transmission system, i.e. to purchase directly from gas suppliers through pipelines not owned by MOL Rt. Such rights would have to be structured so as to discourage inefficient by-pass.

Another desired reform would be to require standardised accounting by the distribution companies so that whoever is setting maximum prices for the distribution companies would be able to compare claims regarding justifiable costs, i.e. undertake yardstick regulation.

4. How to regulate a single supplier?

There are a great many different approaches to regulating a single producer in natural monopoly situations. Many of those are cost based, hence plagued with problems related to estimating true costs. Considering the accounting difficulties that Hungarian regulators would be faced with in imposing cost based regulation, it might be better to investigate costs and prices in similar jurisdictions where cost-based regulation is working reasonably well. Based on that information, a benchmark price could be established and price-cap regulation introduced. Perhaps a dual system could be used - price-cap regulation for existing services and customers, and cost-based regulation for new ones.

Poland

Context - structure, ownership and regulatory system

At present the state owned Polish Oil and Gas Company ("POGC") has a monopoly on exploration, production, storage, transmission and distribution of natural and manufactured gas. Poland has some natural gas of its own, but relies for 60 per cent of its supply on Russia.

The sector is currently regulated, except for prices, by the Ministry of Industry and Trade ("MoIT"). Gas prices are slated to be liberalised at the beginning of 1998. Until then they are being set by the Ministry of Finance. The draft energy law calls for a separate regulator, but fails to give it the financial and staffing framework it would require to be a truly independent regulator. The industry is also subject to the Polish antimonopoly law. The Antimonopoly Office won a court decision in 1993 directing that POGC divest itself of its exploration, production and construction activities, but this decision has yet to be fully enforced. There have been many complaints to the Antimonopoly Office that POGC is unlawfully requiring transfers of various distribution assets in exchange for agreeing to supply gas.

Between December 1989 and June 1994, gas prices have increased 33 times for industrial users and 36 times for households. At the moment, industrial prices are much closer to costs than is the case for
household prices. Industrial prices in 1995 are scheduled to rise by the rate of inflation; residential prices by 10 per cent above the rate of inflation.

The government currently has the conflicting roles of policy maker, regulator and owner. Privatisation would remove one of those conflicts but at the moment it is proceeding rather slowly especially as regards POGC’s transmission pipelines.

The electricity and natural gas sectors are being advised by the European Union financed Energy Restructuring Group ("ERG") which works with the MoIT and employs both Polish and foreign specialists. It is closely involved in elaborating a new energy law and pricing policy for Poland.

Current issues and problems

The Polish delegates mentioned a large number of issues and questions:

-- how to secure the investment needed to expand and modernise the network;

-- the need to alter the energy balance in favour of greater use of natural gas and the associated problem of assuring the new storage capacity needed to boost the use of gas for heating;

-- how to enhance energy security, i.e. reducing dependence on Russian gas;

-- how to raise prices to cover full economic costs, i.e. how to deal with the social and political issues that would arise because of such increases¹;

-- what to do about uncollectibles - state-owned companies in particular have been resisting paying their gas bills;

-- how to restructure POGC so as to encourage efficient third party access to the system, keeping in mind the need to preserve proper safety standards in the transmission and distribution of gas²;

-- why the energy regulator should be independent and how that can be ensured.

There has been considerable debate concerning the regulatory independence issue. At the time of the seminar, the draft energy law envisaged an Energy Regulatory Authority ("ERA") to be set up as a central state administrative organ (i.e. would not have the power to issue secondary legislation) and managed by a president, appointed and removed by the President and Council of Ministers. It would be financed from the state budget instead of from licence fees. The ERA would issue, withdraw or modify licences, monitor compliance with the licence conditions and levy fines for violations, exercise development control, be involved in settling disputes between consumers and energy enterprises, and play a role in setting prices. The draft law specifies that the rules for setting prices would be set out in an ordinance formulated by the MoIT.

A Polish delegate noted that although the draft law does not grant an optimal level of independence to the ERA, the mere setting up of a regulator separate from the MoIT is a victory and it was won by compromising on the independence issue.
Advice by the panel

The above issues and problems were dealt with under four broad themes.

1. **Alternate gas supplies and the possibilities for head to head gas competition, i.e. rival pipelines**

Various developments including the YAMAL project and some projected pipeline interconnections make the question of security of supply much less pressing. In future, Poland may be supplied gas from the North Sea or the Maghreb countries as well as from its traditional Russian supplier, i.e. it could benefit from pipeline to pipeline competition. Significant foreign investment will be required to make this possibility a reality for Poland.

2. **Regulatory independence**

Investors naturally want regulation to be as consistent and transparent as possible, and both are facilitated by regulatory independence. Panellists recognised however the need to take political realities into account and begin simply with setting up a regulator separate from the MoIT. That is a significant first step that can be built on later. In any case, two policy issues require resolution before the regulatory scheme becomes a crucial issue: the industry structure, i.e. how and when will POGC be broken up; and the timing and extent of privatisation.

There was some concern that if POGC were broken up, the distribution companies would not be able to learn quickly how to contract for gas supplies. The panel argued from U.S. experience that this should not prove to be an insurmountable problem especially since marketing companies might be created to help with the new functions. In addition, the ERA should stand ready to assist in the contracting process by providing standard form contracts, reviewing contracts and helping settle disputes. At first the ERA might even be required to approve the contracts. Increasing latitude could be given to the parties as they accumulate contracting experience.

3. **Pricing issues including social aspects**

It is clear that to encourage efficient consumption and investment, gas prices must reflect full costs. It is also clear that quickly adopting such prices would create severe hardships for residential customers, especially for those whose incomes have fallen or failed to rise with inflation. Theoretically the ideal solution would be to allow prices to rise to full costs and directly compensate from the government budget, consumers who simply cannot afford them. That solution may not be available to cash strapped governments. In addition, since money has a way of disappearing on the way from taxpayers to low income consumers, perhaps it would be better to set up a government agency with the power to forgive energy bills. Obviously this is easier to do when there is a state-owned, vertically integrated gas monopoly. Nevertheless there are examples in the United States of regulators requiring privately owned companies to subsidise services to poor people in their assigned territories. It is also clear that private companies in many if not all countries are subsidising certain classes of users, e.g. those who use gas solely for cooking.

The critically important point is that consumers must be given correct price signals; i.e. required in the first instance to pay full economic costs for commodities they consume. There is plenty of evidence from the U.S. and Canada, that consumers will take the steps necessary to conserve on gas use, only if they have a clear incentive to do so.
If direct subsidies to needy groups are rejected and cross-subsidies continue to be used, it is important to ensure that they be transparent and clearly directed to the group intended to benefit. This provides another good reason to restructure the gas industry away from a vertically integrated monopoly.

4. **Third party access**

Discussion of this issue began earlier in the seminar with a question from a Polish delegate concerning the need for regulation to enhance competition. The panel noted the paramount need to adopt a proper industry structure. If there is a full separation of production, transmission and distribution roles, third party access should not be much of a problem. Companies confined to transmission or distribution functions would have no real incentive to discriminate across alternative suppliers in terms of granting them access to the network. The British experience of simply privatising an integrated monopoly was cited as an example to be avoided. Though the U.K. provided for third party access in 1982, it took eight difficult years to achieve much in the way of actual access.

The hope behind introducing third party access is that regulation will be confined to the natural monopoly sectors of the industry, i.e. the transmission and distribution networks. Competition among gas producers would be relied on to lower prices and improve quality of service significantly to final customers. However, if the transmission or distribution companies are vertically integrated, they will have the power and incentive to distort competition and to manipulate things so that their profits show up in the unregulated rather than regulated sector. Combating such developments constitutes a real nightmare for regulators.

It is often feared that third party access and competitive gas supply will produce chaos and undermine security of supply. U.S. experience provides a good example of why those fears may prove groundless. In January 1994 when a particularly severe cold snap hit the U.S., the gas industry with its significant degree of third party access found and delivered the necessary extra supplies. At the same time, the vertically integrated electricity industry experienced massive problems. A logical deduction from this experience is that independent competitive gas suppliers may have greater incentives to reliably supply their customers than do vertically integrated electricity monopolies.

A Polish delegate questioned the worth of encouraging third party access when Poland depends so heavily on a single country with a single gas company. In response, the panel reiterated the need to develop alternative supplies and noted as well that allowing third party access to the Polish network is an essential part of encouraging such alternatives.

**Slovak Republic**

**Context - structure, ownership and regulatory system**

At present the Slovak Republic’s natural gas industry is conducted by a state-owned, vertically integrated monopolist (“SPP”). This company is organised into three divisions charged with gas transit (transmitting Russian gas to buyers in the Czech Republic and Western Europe), gas transmission and storage, and distribution (i.e. the low pressure local networks). There are plans to commercialise SPP in 1995 and perhaps, after a minimum of three years, to sell some of its shares to private interests. Only about 4 per cent of the gas consumed is domestically produced, and Russia is the sole supplier of imported gas. There are plans to expand capacity of the main transit pipeline and to diversify suppliers, i.e. other NIS, Norway plus perhaps Iran.
Under current laws as well as the draft Energy Act expected to be passed before the end of 1995, the Ministry of Finance has extensive price control power over natural gas. It rules on what constitutes economically justifiable costs and determines what are reasonable profits. It also has a role in screening new investments because it decides which of those are effectively included in the rate base.

The substantive regulation of the natural gas sector is undertaken by the Ministry of Economy. That includes appraising proposed investments in the sector. Under the proposed Energy Act, the Ministry of Economics would retain its considerable regulatory powers and would exercise them primarily through licensing the various parts of the industry.

SPP is currently using its substantial transit fee revenues to subsidise selling gas at less than its import price. Residential users, accounting for about 20 per cent of sales, are enjoying the greatest degree of subsidisation and are paying gas prices 43 per cent below those charged to industrial consumers. Despite the low prices, there is a considerable problem with unpaid bills.

The Ministry of Finance is proposing to end the cross-subsidy enjoyed by the household sector, generally increase prices to cover full economic costs, and employ seasonal pricing. It is also advancing measures to protect consumers in very weak positions, e.g. pensioners.

The Slovak Antimonopoly Office ("AMO") has argued for greater unity, clarity and transparency in the regulatory process, as well as for an independent regulator. The AMO considers these to be necessary in order to secure adequate investments in the sector. The AMO also recognises that the current total vertical integration makes it easy for SPP to exclude both domestic and foreign competition. In law the AMO has the power to fill in various gaps in the regulation of the sector largely through using the abuse of dominance provisions in the country's competition law. However, in the past two years there were no such decisions affecting the natural gas sector.

**Current issues and problems**

The Slovak delegates sought and received advice on three specific issues:

1. **How to deal with non-payment of bills**

   If the distribution companies are ever going to be sold to private investors, ways will have to be found to enhance their potential profitability. Increasing prices will be very difficult because of political problems. Lowering costs also presents problems because existing management has little incentive to do so. That leaves resolving the non-payment problem as a crucial first step.

   The panel made two basic suggestions regarding non-payment problems. The first was to work with the relevant political authorities to design an acceptable policy whereby non-paying customers are cut off. The second, applying only to residential customers, was to set lower prices for customers who must be served, but cannot afford full prices. (The assumption appeared to be that state budgetary problems ruled out making direct subsidies to such customers.)

   A Slovak delegate questioned the wisdom of cutting off non-paying industrial customers who though profitable are technically insolvent because they are unable to collect on their own accounts receivable. In response, a panel member acknowledged the significant difficulties involved in cutting off an industrial customer, i.e. the ensuing politically sensitive job losses. One way to reduce the scale of this problem would be to have the gas supplier enter into a more complex contract with large buyers. Instead
of simply charging them a standard fixed tariff, the gas supplier could set a price which is sensitive to the price the customer receives for his output. For example, an electricity company selling a great deal of its base load to an aluminium producer could link the tariff to the price the customer receives for aluminium ingots. This is what happens in some cases in the U.S.

Insofar as the government prevents the gas company from cutting off non-paying industrial companies, it is making the utility act as a bank of last resort plus a kind of social welfare agency. It is also indefinitely postponing privatising such utilities.

A Slovak delegate mentioned that given the incidence of non-payment, the price charged for gas is somewhat irrelevant. This opinion was not shared by at least one panellist who argued that even in situations of wide-scale non-payment it still makes sense to charge prices which cover full economic costs. Such prices send the proper signal to both consumers and potential investors concerning the appropriate level for the long-term price of gas. It also ensures that buyers who can afford to pay are forced to do so. Any subsidies required should be targeted to truly needy buyers. This is far better than subsidising everyone through charging a price below costs.

2. The role of the regulator and whether it should be independent or not

The panel argued that regardless of the system adopted, one of the regulator's top priorities should be to extract reliable cost information from the companies. Without such data, regulators are operating in a sort of vacuum. Moreover, privatisation is a near impossibility.

A panellist reiterated a point made several times in the seminar - that regulators who are independent of government departments are more likely to adopt the kind of transparent, consistent decision-making essential to win the confidence of private investors, both domestic and foreign.

3. Should the transit and other transmission businesses be separated, and should the transmission activity in general be split off from distribution?

At the moment the subsidies enjoyed by industrial and especially residential consumers are covered by transit fees charged on gas flowing to the Czech Republic and Western Europe. A desire to maintain the directness and simplicity of the current subsidisation scheme appears to be the main obstacle in the way of separating the transit and domestic transmission businesses, or the transmission and distribution functions. This provides then further reasons for ending the subsidies.

As long as transmission and distribution activities are carried on by the same entity, large customers will be denied the benefit of competition between a suitably regulated transmission company and their local distributors. In addition, a single transmission and distribution company implies that the distributors are under common ownership which in turn makes it difficult to apply efficiency enhancing yardstick competition.
Notes

1. At the time of the Seminar, the draft energy law stated that prices were to be set so that regulated sellers were able to cover their costs. It also provided that price differences across customer groups had to be cost justified. This implied a movement away from past high levels of cross-subsidisation favouring residential customers. The continuing practical policy question is how fast to accomplish this transition. There would appear to be a need to directly compensate groups especially hard hit by significant price increases.

2. The draft energy law proposes to give the energy regulator a responsibility to encourage competition.
SUMMARY OF THE TELECOMMUNICATIONS SEMINAR

11-12 May, 1995

Czech Republic

Context - structure, ownership and regulatory system

Under Act No. 265/1991 on the competence of the Czech Republic in price control authorities, the Ministry of Finance regulates the tariffs of domestic telecom services and the Ministry of Economy regulates the price of international telecommunications services. Price regulation in telecommunications was designed to meet several criteria:

-- not hamper changes in price that depend on changes in cost;
-- eliminate, as much as possible, cross-subsidies;
-- gradually change prices to reflect cost;
-- provide for the optimal mix of internal and external financing of the estimated 100-300 billion crowns that must be invested over the next five years in the development and modernisation of the telecommunications network.

The change in the overall level of regulated prices, for "essential services," would be equal to the change in the producer price index minus between 1 and 2 percentage points, for each year until 2000.

The producer price index (PPI) was used instead of the consumer price index (CPI) because the PPI is more stable than the CPI in the Czech Republic and because the correlation between SPT Telecom's costs and the PPI is closer than between costs and the CPI. Implementation of this pricing policy from 1995 to 2000 should ensure the availability of more than 75 per cent of the financial resources needed for financing the adopted telecommunications development programme. It will also provide for a reasonable rate of return on investments in SPT Telecom.

The period 1995-1996 is a transition period leading to price cap regulation. On 1 April 1995, prices increased on average by 7 per cent, but the monthly flat charge increased by 33 per cent and international tariffs fell by an average of 7 per cent. A further average 3 per cent increase in prices is expected in 1996. As of 1997, telecommunications prices will be regulated by a price cap. Under the current regulatory regime, applicable from 1997 to 1999, prices are regulated based on the index of prices of industrial producers, lagged by one year. This index will be adjusted by X, which is tentatively set to be between -1 and -2. Whereas in most other countries the X factor in a price-cap regime in the form RPI-X is the expected annual efficiency gains, in the Czech Republic the X factor is much smaller. The index will also be adjusted by a Z factor, which will reflect changes in the external economic environment (taxes and exchange rates). The value of both X and Z will be set for each year by the Ministry of Finance in the second half of the preceding year. There will be sub price-caps for monthly connection fees, local calls and inter-city calls.

Interconnection fees will be set, first, in negotiations between the two operators. If they cannot reach an agreement, the Ministry of Finance will set the interconnection fee so that each operator will get the proportion of the total price that corresponds to its share of the costs of providing the service.
SPT Telecom has an almost absolute monopoly in the market. New entrants have been invited to enter certain selected local networks alone or in co-operation with SPT Telecom. These areas cover 10 per cent of the Czech national territory but contain only about 5 per cent of subscribers.

In mid-1995, there were about 21 lines per 100 population. By contrast, in 1990 there were only about 15 lines per 100 population.

In early 1994, SPT Telecom was transformed into a 100 per cent state-owned joint stock company. As of mid-1995, 26 per cent was privatised through vouchers.

Advice by the Panel

1. Transparency

It was noted by the panel that the value of the Z factor in the price cap regime will be set by the Ministry of Finance to reflect, in an unspecified way, changes in a variety of economic conditions, e.g., taxes and exchange rates. It will not be set in a really transparent manner, which may diminish the commitment value of a price-cap regime.

2. Price caps

The panel noted that price caps may not be a panacea and that perhaps regulators should think about other price control mechanisms for certain services. Situations can change, resulting in changes in the optimum regulation, so that flexibility may sometimes be valuable.

3. Tariff changes

A panellist noted that, in the past, there was a long lag time between when SPT Telecom proposed a tariff change and when it got permission for the change. He asked whether the price-cap regulation would guarantee that SPT Telecom would actually be able to change its tariffs as costs change. The reply was that the previous delays were due to the political problems of raising certain tariffs.

Hungary

Context - structure, ownership and regulatory system

In 1990, the Hungarian PTT was divided into three parts, Hungarian Telecommunications Company (Matáv RT), Antenna Hungaria Company (broadcasting) and Hungarian Post. Matáv RT, granted a monopoly in long distance and international public switched telecommunications services until 2002, has been partly privatised, with approximately 65 per cent of the stock retained by the state and the remainder owned by Deutsche Telekom, Ameritech and others. According to Government Decree 1111/1994, the State Assets Managing Company may sell the state’s shares and in any event will submit the shares for listing on the Stock Exchange in 1996. Antenna Hungaria has monopoly rights for public television and radio broadcasting and is a licensed operator of satellite communications and leased-line services. The three enterprises are regulated by the General Inspectorate for Communication (GIC).
The Telecommunications Act, passed by Parliament on 23 November 1992, and the Frequency Management Act, passed in 1993, provide the legal basis for the regulation of the telecommunications sector. An important feature is that the roles of network operator and service provider are distinct.

The market for terminal equipment has been liberalised. Further, the Ministry of Transport, Communications and Water Management (MTCWM) has decided to grant the following concessions:

- 54 territorial concessions to new public switched telephone network (PSTN) service providers;
- national concessions to two PLMN service providers;
- national concessions to two paging services;
- national and regional concessions for civil service broadcasting.

A concession approach was chosen for legal reasons, but in addition the exclusive rights have significant value and were used to entice foreign investors into Hungary. The concession agreement is a mixture of a contractual and a regulatory relationship. For example, either party can initiate renegotiation provided certain conditions are met. However, there are large penalties for non-fulfilment of the concession obligations. One issue is the appropriate term of concessions; according to the Concession Act, the maximum length is 25 years.

In 1993, seven partly foreign-owned consortia received concessions for local telecommunications services in 18 telecommunications districts. In 1994, sixteen new local PSTN service providers, formed by local municipalities and foreign investors, entered into concession contracts with the Government. There are two GSM and one analogue cellular wireless licensees.

Tariffs for the public switched network services are regulated according to a price cap tied to the Producer Price Index (PPI), subject to a provision that applies only if the forint devalues by more than five points more than the PPI increases. From 1 January 1994, the aggregate tariff basket has been subject to a PPI + 0 per cent cap; subscription fees, PPI + 5 per cent; local calls and band 1 call charges, PPI + 7 per cent; and long distance and international call charges, PPI - 4 per cent. Pursuant to the concession contract, the tariff regulation is subject to revision after three years. At current levels, long distance and international traffic subsidises local traffic.

At the end of 1994, the public switched network had a density of 16 lines per 100 population. Over the past few years, the annual growth rate in subscriber lines has exceeded 14 per cent.

Current issues and problems

The Hungarian delegates identified several pressing issues.

- Ensuring the independence of the telecommunications companies laboratories, considered to be among the best equipped, and staffed with the best experts in the country.

- Since the early 1950s, there has been an Eastern Bloc frequency allocation for broadcast radio. It is incompatible with the Western frequency allocation. Switching over would be extremely costly.

- The GIC has a very restricted number of engineers and must rely upon experts in a private company, Matáv, one among several in a competitive environment, for help in writing
technical recommendations. As the former monopoly service provider, Matáv still has the best qualified people.

-- Hungary is determined to enter the European Union. The creation of an appropriate legal framework as well as the amendment of a number of acts and decrees are required.

-- Contract negotiations between Matáv and some local concessionaires have been protracted.

-- Some companies have infringed Matáv's exclusive right over international telephone calls. The response has not yet been formulated.

-- Cross-subsidisation among competitive and non-competitive services is forbidden under the concession contracts. To establish control, it is necessary to have a reliable, transparent accounting system which separates the individual elements of both revenues and costs. The task is not easy, particularly in view of the relatively high common costs in the sector.

Advice by the Panel

1. International call-back services

This issue arises in many countries because of their heavy reliance on international revenues for their telecommunications operations. However, as international communications are always subject to international agreement, it is for Hungary to decide the terms imposed on the exchange of international traffic, while at the same time recognising that the management of this issue is enormously important for the economy of any country. Call-back services come into being where there is a serious imbalance in collection rates between countries. They are not a new phenomenon, but their automation and commercial promotion is new. The existence of call-back services should cause one to consider the long-run sustainability of a system where the tariffs are very much higher than the costs of providing the service, given the availability of modern technology that can be used to circumvent the system. Countries may also reflect on the costs of high international charges to business operations in the country concerned. Those countries which have lower collection rates gain in international competitiveness and firms consider telecommunications tariffs in making their location decisions.

The OECD is advocating a reform of the whole international accounting system to be much more realistic and cost-based. In that process, the question of call-back has to be addressed.

2. Bypass

In response, a Hungarian participant replied that, while there are some imbalances in the collection rate between different countries, the greatest problem created by the call-back services is that the return calls are not routed via the originating international gateways but via private circuits that are illegally interconnected with the public network.

Replying, the panel said that, of course, having set up a regulatory regime it should be enforced. On the other hand, where technology enables illegal bypass, in the long run one cannot maintain tariffs above the actual cost of providing services. Across the world, there has been a meltdown of tariffs, particularly tariffs charged to large commercial users and financial centres, because it is so difficult to trace what is actually going on in international circuits with modern technology. Indeed, where domestic
3. Rate rebalancing

The existence of cross-subsidies from long distance and international telephony services to local telephony and the existence of bypass implies a need for rate re-balancing. The changing technology is going to frustrate efforts at preventing bypass. Indeed, international telecommunications is the wrong market in which to try to raise revenues through high price because it is the market with more elastic (price-sensitive) demand. It would be much more efficient for a given level of revenue to be generated from more inelastic portions of the market. In the long-run, rebalancing the rates is the only sustainable policy. It is very difficult to maintain a balanced system just by regulation and law.

4. Concession vs. regulation

There are three basic options for regulating a utility industry: liberalisation, regulation, and concessions. Under liberalisation, entry is not restricted by the government. Where liberalisation is practical, it should be chosen even if the government continues to regulate tariffs. Under regulation, the conventional choice, a limited number of operators -- typically one -- and a regulatory body, which controls that operator, are established. Under the third option, concessions, licenses, typically exclusive, would be granted within a particular area.

In a sense, the concession option involves competition for the market rather than competition in the market. That is, there is competition for the right to operate a concession. The key difference between regulation and concession is that, in the former, the relationship between the regulator and the operator(s) is constantly renegotiated whereas, in the latter, a contractual relationship exists between the grantor and the holder of the concession and it is difficult or impossible to change the terms of that relationship. This is due to the fact that the winner of the concession must give to the state, in the form of an up-front concession fee, a substantial portion of the profits which are associated with the activity. Therefore, if the regulator subsequently intervenes in the process and changes the rules, then the fundamental contract between the two sides will have been breached. This clearly limits the scope for concessions; a number of requirements must be met for the concession arrangement to be practicable. These include that: the contract can be written in sufficient detail that it will not require many amendments over its duration yet remain adequately flexible to accommodate technological change; there is an appropriate enforcement procedure; and there is public acceptance of the terms of the concession so that social and political pressures do not overturn the concession agreement. It should be noted that concession holders will be unwilling to make substantial long term investments unless their concession agreements grant long-term exclusivity.

It may be difficult to change from one holder of a concession to the next, i.e., the initial holder may influence the government to maintain its concession for longer than optimal through, among other things, its willingness to invest in new development. Hence, for at least some of the panel, concessions were better seen as a transitional arrangement.

5. Cross-subsidies

Difficult regulatory issues arise when an enterprise holding a concession wishes to enter a liberalised market because there are often common costs in serving the two markets. The regulator will probably have to perform a detailed assignment of costs which will inevitably involve a degree of arbitrariness. This argues for transparency, so that everyone concerned can see what the decision is, but...
there may be legitimate business reasons for a more opaque approach. It may take ten to fifteen years to develop a "good" cost separation regime, but in the meantime it can be done by interim steps.

**Poland**

*Context - structure, ownership and regulatory system*

The framework for the telecommunications sector is provided in the Communications Act of 23 November 1990, effective January 1991. The Act:

-- separated regulatory and operational functions;
-- created Polish Post (state public utility enterprise) and Polish Telecommunication, Joint Stock Company (Telekomunikacji Polska S.A. or "TP S.A.");
-- created new administrative bodies for spectrum management (National Radiocommunications Agency) and supervision of the telecommunications network (National Telecommunications Inspection);
-- allowed private network operators and service providers;
-- created an Office of the Government Plenipotentiary for Rural Telephony at the Ministry of Post and Telecommunications;
-- permitted TP S.A. to operate without a license from the Ministry;
-- permitted free entry by domestic or foreign investors in investment, operating and service provision in local networks;
-- limited foreign capital participation in the long-distance network to 49 per cent;
-- prohibited foreign capital participation in international telecommunications;
-- limited foreign capital participation to 33 per cent in sound and television broadcasting;
-- allowed telecommunications operators to set their own prices, except for those services of a "public service" nature and international services;
-- specified that an operator of a public service telecom network cannot refuse to connect another telecom network and that operators are to agree on interconnection terms and fees.

The Ministry of Posts and Telecommunications (MPT) is the highest level of state administration in the telecommunications sector. It is responsible for guidelines and development programmes, controls and supervises the organisational units under its responsibility and exercises owner's rights of TP S.A. While the Minister acts both as a regulator and owner, TP S.A. also has a supervisory body consisting of representatives from the Antimonopoly Office, the Ministry of Finance and some persons from outside the MPT such as the previous Minister of Posts and Telecommunications. The Government Plenipotentiary for Rural Telecommunications prepares development programmes for rural service to eliminate the gap between rural and urban access to telephony. The State Telecommunications Inspection (PIT) supervises telecom network operation, keeps comprehensive records of network lines and telecom equipment and collects fees from licensed operators. The National Radiocommunications Agency, an organ of the MPT, supervises frequency usage, networks, lines and radiocommunication installation.

There are about 5 million subscribers to public telecommunications services in Poland. Given that the population of Poland is 38.5 million, the penetration rate is about 13 per cent. There is a waiting list for telephone subscribers of over 2.4 million.

Polish Telecommunication, Joint Stock Company (Telekomunikacji Polska S.A. or "TP S.A."), 100 per cent owned by the state, is the main operator of the Polish telecom network. TP S.A. has a legal monopoly to provide international telephone and telegraph services and a *de facto* monopoly in the long
distance telephone network and services. It does not manufacture terminal equipment or build the
network. All other operators except certain government ministries must obtain a licence from MPT.

More than 100 firms have been granted licences by MPT. The majority of licenses concern the
construction of the public network and the supply of services, mainly telephony. Licences cover various
geographical areas, from local communities to telecom districts up to the size of voivodships. The number
of planned subscribers varies from 2 000 to 800 000. In practice, the new concessions have been niche
operations to bring telecommunications to single areas. In mid-1995, about 50 000 subscribers -- about
10 per cent of the total telecom market -- had been connected through new concessions to private operators
in local areas. Licences have also been granted to non-public operators such as data communications
networks, the analogue cellular network GSNMT, with about 46 000 subscribers, a VSAT network and
local area paging systems. As of mid-1995, only a few licensees had begun operating.

Operators set their own prices except for services having a "public services" nature and
international services. The latter are set by agreement between TP S.A. and MPT. The former may be set
using a price cap mechanism. However, a pre-condition for introducing an effective price cap regime is an
accounting system that allows costs to be separated and allocated to activities. As TP S.A. had not yet
provided adequate cost information to the Ministry, no price-cap regime has been implemented as of mid
1995. Some loan agreements are conditioned on the development of an adequate cost accounting system.

In practice, the control of tariffs charged by TP S.A. has fallen to the Antimonopoly Office
(AMO) because TP S.A. has a monopolistic position in telecommunications markets. In two cases the
AMO has ordered a lowering of tariffs and changes in the tariff structure proposed by TP S.A. In 1993,
TP S.A. was prohibited to charge excessively high prices and to discriminate against some groups of
telephone subscribers. As a result of this decision, the charge for a "unit" was decreased and the scheme to
introduce night rates for only one-third of telephone subscribers was abandoned until it could cover the
whole country. This latter was recognised as being discrimination in a universal service. In 1994 the
AMO intervened again ex officio when TP S.A. had introduced a price increase which perpetuated the
existing structure of prices. The price structure constituted a barrier to access to the local market for other
service providers because they could not cross-subsidise as TP S.A. can.

Investors are interested in investing or providing services in long-distance and international
markets because the tariffs there are very high. By contrast, investors' interest in local networks and
services -- where there are no regulatory restrictions on entry -- is much lower. There is no mechanism to
compensate for the cross-subsidies for local calls received by the incumbent from long-distance and
international calls.

If the price level and price structure were adjusted to the average values in the OECD's European
Member countries, and further adjusted for Poland-specific factors such as general price levels and per
capita purchasing power, this would imply inter alia decreasing the level of tariffs, changing the ratio
between local and long distance (over 100 km) usage charges from the present ratio of 1:18 to
approximately 1:12 or less, and increasing the fixed charges at a faster rate than user charges. As of mid-
1995, tariffs for long distance services had been lowered and fixed charges on local calls had increased in
line with inflation. According to OECD estimates, the revenue per line in Poland is about US$350. By
contrast, the average in OECD countries is over US$800.
Current issues and problems

Key issues for discussion included the following:

-- The separation of regulator from owner through the creation of an independent regulatory body. As of mid-1995, the Ministry was the regulator and administrator of the sector, and simultaneously exercised owners' rights and, in legal terms, functioned as the general assembly of this company. An independent regulatory body should have no direct links with the public monopolistic operator. To whom such a regulator should be subordinated and how it should be financed are matters for discussion.

-- The implementation of price regulation. According to the Telecommunications Act, MPT is authorised to impose maximum prices on national calls. As of mid-1995, the Ministry has not introduced this regulation and it seems that a more efficient formula of price control, perhaps a price cap system, may be in order.

-- Maintain protection against abuse of monopolistic position, i.e. charging highly excessive prices and imposing an anti-competitive structure of telephone charges.

-- Regulate interconnection and set up a negotiating process. The new draft amendments to the Telecommunications Act address this. The regime must permit fair competition for the marketplace and be flexible enough for a variety of interconnection scenarios.

-- Regulate quality of service and meet the universal service obligation. Currently, universal service provisions are to be stipulated for each operator. Operators can refuse to provide services if the customer does not comply with the operator's regulation.

-- Consumer protection. Generally customers lack itemised billing and information about tariffs and off-peak allowances.

-- Increase penetration of the network. In Poland in mid-1995, there were 13 telecommunications subscribers per 100 inhabitants. In rural areas, there were 5 subscribers per 100 inhabitants.

-- Rate rebalancing.

Advice by the Panel

1. Creation of an accounting system

The panel endorsed the view that an accounting system whereby the operator's costs are separated according to activity is a pre-condition for the introduction of an effective price cap regime.

2. Separation of regulator from owner

The panel felt that it is very important to separate the regulatory and operational functions in order to assure a fair policy development in this sector. This is a precondition for private investment in the sector. Investors want transparent, known rules before they invest. In order to create these conditions, it is best to separate the regulator from the incumbent operator and to separate the regulator from the Ministry,
so as to create better insulation from political changes. The panel noted that there will be no entry unless potential operators have some assurance of the pricing regime they will face and the pricing regime enables them to operate profitably fairly early. Profitability is difficult to predict since the level of costs is not a given; rather, enterprises use new technologies in clever ways and they may find innovative ways of increasing the market size.

3. Interconnection

Interconnection is a means of increasing the penetration ratio, introducing competition and increasing efficiency. Conversely, a poor interconnection policy can delay or make impossible all of the foregoing.

Even a comparatively simple interconnection can cause problems. The accounting rate system for international phone calls is essentially an example of interconnection. It is comparatively simple because the two operators are not in competition with one another. One is originating the calls, the other is terminating the calls, so they are complementary rather than substitutes. But even changes in this system are difficult to negotiate.

The situation is more complicated in domestic telecommunications markets because typically the two interconnecting operators compete in the final market. In this situation, the incumbent has two sets of incentives to raise interconnection charges: to derive profits through selling services and to raise the competitor's costs. In the early stages of competition, interconnection fees can sometimes be on the order of 60-70 per cent of total revenues. Even a small change in interconnection charges can make the difference between the competitor's business being profitable and being unprofitable.

In order to get the benefits of an integrated telecom system, each operator should be obliged to offer interconnection to other operators. This is sometimes expressed as the "any to any principle". That is, any subscriber should be obliged to call any other subscriber regardless of operator. The process of negotiating interconnection terms and conditions should begin with negotiations between the parties with as many of the features of the interconnection arrangement as possible being solved by agreement. In many cases, all operators must be brought together to try to establish some general principles for standardisation and interfaces and so forth.

There should not be discrimination in terms of quality of service. That is, the incumbent operator should not provide a poorer service to interconnecting operators. On the other hand, it is tempting for the incumbent operator to do precisely that.

An issue is the extent to which interconnection services should be unbundled. Should you try and break down all the possible services which one operator can provide another and require each operator to make available each service individually? For example, should you allow a competing operator to interconnect at any point at the local exchange, at the main switching exchange, or elsewhere? The opinion amongst most regulators in systems where competition has become established seems to tend toward supporting more unbundling. But this approach has costs. One of these is the increased complexity in pricing interconnection.

It seems that most regulators are adopting the view that the only basis upon which satisfactory interconnection arrangements can be made for the long term is on the basis of transparent accounting. That is to say, either the dominant operator or possibly all operators have to be required to present their accounts in a particular form in order to establish the cost basis for interconnection. This is what happens
in the United States and the United Kingdom. It may, therefore, be necessary for the regulator to specify
the accounting principles which have to be followed.

Precisely how should interconnection be priced? The background paper by Mark Armstrong and
Christopher Doyle sets out alternative bases for pricing. But all the proposals made in that paper are cost
based. They start from the presumption that the regulator or the operator has access to detailed
information relating to the incremental costs of particular activities and then the issue becomes how should
those costs be marked up to take account of, for example, imbalances in the tariff structure, or to promote
entry, etc. The important issue is what to do in the interim period when you are trying to establish a basis
for interconnection pricing and you don't actually have the detailed cost data. One approach is to use an
engineering model of a telecommunications network to estimate incremental costs. An approach which is
clearly wrong is to say that the interconnecting operator should pay x per cent of the tariff. If the tariff is
distorted then the results will be distorted. In addition, the choice of x, which determines the success of
entry, would be chosen in a purely arbitrary way.

Slovak Republic

Context - structure, ownership and regulatory system

Slovak Telecom, a state-owned enterprise, is the only supplier of voice telephony (except
mobile), telegraph, telex and postfax in the Slovak Republic, and is the operator of the public networks.
As a state enterprise, it is economically independent of the state budget. Slovak Telecom has about
15 360 employees, i.e., about 15.28 employees per 1 000 main telephone lines. Private companies and
joint-venture companies are active in mobile networks, data networks and paging. For example, Eurotel, a
joint venture between Slovak Telecom (51 per cent), US West and Bell Atlantic provides mobile telephone
services and public packet switched data network services. IBM has the license to operate the data
transmission network. The market for terminal equipment was liberalised in 1991. At current tariffs, local
services are subsidised by long-distance services.

Density in the Slovak Republic in mid-1995 was about 19 mainlines per 100 inhabitants and was
expected to be about 20.5 by the end of 1995. The goal for 2000 is 35 mainlines per 100 inhabitants.

The Telecommunications Act dates from 1964, and was amended in 1992 and 1993. The
amendments established the Telecommunications Office and other regulatory bodies and allowed, for
example, the issuance of licences for additional telecommunications operators. In mid-1995, a new
Telecommunications Act was being prepared. It is intended to harmonise the Slovak law with that of
European countries and to reflect current views on telecommunications policy. Also in mid-1995, a new
law on prices in natural monopolies was being drafted.

The regulatory system in the Slovak Republic has four levels. The Ministry of Transport Post
and Telecommunications (MTPT) is responsible for state policy and is the regulatory body for public
network, public services and international tariffs. The Ministry specifies the rights and duties of organs of
state administration of telecommunications, defines the relationship between operators of telecom
networks and service suppliers, grants, amends and removes licences for the operators of the public
telecommunications network and suppliers of telecommunications services of public interest, proposes
tariffs (for voice services and those services and operations where there is an exclusive right) to the
Ministry of Finance (MoF), and manages the frequency allocation. Third party access to the public local
loop and public long-distance network is conditioned on a license from MPTP. In addition, MPTP is the
founder of Slovak Telecom.
The Telecommunications Office regulates those parts of the sector that are not regulated by MTPT, including type approvals and the control of telecom installations connected to public networks. If private telecom networks are connected to the public networks, e.g., to provide liberalised services, the Telecommunications Office grants, amends and withdraws licenses and permissions for such operators. The Telecommunications Office is also responsible for consumer protection in the sector. The director of the Telecommunications Office is appointed by the Minister and its budget is part of the MPTP budget. The regional telecommunications offices are often the first administrative step, especially for consumer complaints regarding over-charging and for state inspection of telecommunications and radio communications.

The Ministry of Finance receives recommendations regarding domestic tariffs from the MTPT and makes the final tariff decision, except in the case of tariffs for mobile services provided by Eurotel, which are not regulated. Act No. 127/1991 on pricing competencies and Act No. 526/1990 on the calculation of justified costs and adequate profit, along with other executive regulations, set out the framework of competencies of the Ministry in the regulation of prices, price control, tariff control, tariff conditions, setting up rules for price negotiations, and the code of practice for the calculation of economically justified costs and adequate enterprise profit. Furthermore, these acts and regulations determine those goods and services for which the maximum tariffs are determined.

The main governmental objectives in the telecommunications field are to increase the telephone penetration rate and improve the quality and scope of services through modernisation of the network. The first steps toward achieving these objectives were to separate state administration from commercial activities. This was done after 1991. There is a desire to create fully free markets in mobile networks and all other services except voice services.

**Current issues and problems**

Several issues were identified by the Slovak participants:

-- Preparation of the draft telecommunications bill to be harmonised with practice in the European Communities. It will require telecommunications services to be provided in a non-discriminatory, liberal environment and will lead to the use of franchises in order to develop an efficient and modern network.

-- Preparation of a new license for Slovak Telecom. The state enterprise has a license from the former federal ministry but, in view of the changed objectives, the license needs to be revised in terms of quality indicators and areas of exclusivity. It is anticipated that Slovak Telecom will retain exclusive rights in providing voice telephony and some other services, but it will have to compete in other services. Hence, its license should reflect anticipated competition in these areas.

-- Transformation of Slovak Telecom. At present, as a state enterprise, Slovak Telecom lacks the legal framework to undertake some of the activities necessary for it to develop the telecommunications sector. It is anticipated that it will be transformed into a 100 per cent state-owned joint stock company.

-- Liberalisation of services. Full liberalisation of mobile telephony services depends upon freeing some frequencies. It is anticipated, though, that one or two GSM licenses will be sold in 1996. An important issue is how to fulfil the terms of the agreement between the
former federal ministry and US West and Bell Atlantic, while at the same time increasing competition in mobile telephony. Data transmission will be fully liberalised.

-- Interconnection. As services are liberalised, the issue of interconnection will arise. To date, because only Eurotel is connected to the public network and it is 51 per cent owned by Slovak Telecom, the issue has not arisen. The current license for Slovak Telecom includes an obligation to interconnect. The new license will have more detailed interconnection specifications.

Advice by the Panel

1. **Tendering to gain information**

   Eurotel, the joint venture between Slovak Telecom, US West and Bell Atlantic, has some rights under an agreement with the former federal ministry. At the same time, there is a wish to increase competition in the market for mobile telephony. The panel suggested that requiring Eurotel to bid -- as an "automatic winner" in view of its pre-existing and still valid license -- was a means of gaining information. Eurotel has knowledge about the markets and their future development in the Slovak Republic. Hence, in evaluating Eurotel's proposal, the Ministry can gain useful background information. At the same time, one must consider the effects on future investment if the successor ministry does not fully comply with the agreement entered into by the former ministry. That is, future investors may come to doubt ministry promises if previous decisions can easily be overturned, and this doubt can chill further investment.

2. **Tendering may create discriminatory terms**

   If there is a tender resulting in a licence being awarded to the highest bidder, and another firm is later granted a free licence to compete, the result will be a distorted competition. The decision about how subsequent licenses will be allocated needs to be settled before the tender is set up. In addition, both service providers should be allowed to start offering their products at the same time. The panel did not address the question of what to do if one firm is prepared to offer its services before the others are prepared.

3. **Tendering may redefine the terms of competition in a market**

   A tender could be set up so that enterprises bid in terms of what price they will charge customers rather than in terms of what amount they will pay for the license. With such a tender for the second license, the incumbent's prices will probably be under-cut. In contrast, where there are only two licensees and they have bid to pay a license fee, the effect on price of granting a second license is unlikely to be as dramatic. Revenues raised by the state would be smaller under the method linking licences to planned consumer prices. Nevertheless, this is a good mechanism for developing wireless technologies on a substantial scale because the resulting lower prices mean the services cease being luxury items and become more mass market telecommunications options.

4. **Auctions of spectrum**

   While there is no experience in the countries participating in this conference with auctioning the use of electromagnetic spectrum, there has been experience in other countries. For example, the United States recently held large auctions for spectrum and New Zealand has held an auction, although there are
some questions about the efficiency of the latter auction mechanism. There are proposals in a number of Latin American countries, e.g. Argentina, to have auctions for allocating some of the spectrum. Bidders are considered on the basis of the fee that they will pay for the use of a portion of the spectrum. In other bidding processes, bids are evaluated on the basis of, for example, the efficiency of the use of the spectrum, the meeting of technical standards, the proposed use of equipment and on whether the company would establish manufacturing plants for the equipment in the tendering country. Bidding for a license fee is a very transparent, straightforward way of getting efficient operators on the market and for raising money for the government coffers.

5. **How many mobile telephony operators is "enough"**

Experience in OECD countries has shown that a third mobile operator induces not only lower prices, but quicker growth in the network, and that a distinct advantage for telecommunications development is obtained by introducing a third operator into mobile communications. Countries that are in the process of setting up tenders should think about the possibility of not limiting themselves to two operators, but instead selling three licenses. This seems to be sustainable and to produce a much more dynamic market for mobile services. Finally, if mobile operators use different technologies with different cost structures, then they are less likely to collude to keep prices high.

6. **Tariff rebalancing**

Few countries have substantially rebalanced their tariffs. Many retain unbalanced tariffs because of user pressure to retain cheap local services. One issue in rebalancing involves local versus long-distance tariffs. Another issue involves fixed fees versus usage charges and whether fixed fees should reflect the fixed costs of providing access to the telecommunications network. Over 1990-1994 in OECD countries, the general trend has been for fixed charges to increase and usage charges to diminish, and for local charges to rise while long distance charges fall.

In some countries, especially in the United States, as the tariffs for long distance and international calls declined, the quantity of calls increased by so much that the companies made more profits than they had made when tariffs were higher. Further, technical change has reduced the unit cost of calls, including local calls, so that tariff rebalancing does not imply as large an increase in the cost of local calls as it had initially implied.

In designing a tariff rebalancing scheme, one should focus first on the objective: is it the intention to be revenue-neutral, revenue-adjusted neutral or profit-neutral? Once the objective is defined and one has some notion of the relevant elasticities, then in theory the tariffs can be rebalanced. Note that unbalanced tariffs are a serious source of inefficiency in the system precisely because a high price is usually applied to the elastic market and a low one to the inelastic market. This is just the opposite of what a policy based on economic efficiency would require.

The effect of rebalancing can be to induce entry into the provision of basic local service. In the United Kingdom, the removal of cross-subsidies enabled cable providers to begin providing telecommunications.

Where the price of local service is kept low, there is a cross-subsidy from the other services. Where there are few local lines, the part of the population connected to the local network tends to be the wealthier members of society. Typically, the users of long distances services are businesses. Hence, the effect of the cross-subsidy from long distance to local services is for businesses to subsidise the wealthier members of society. To the extent that businesses have as their customers all members of the population
and businesses pass on the extra cost of telecommunications to their customers, the argument that local tariffs must be kept low in order to aid poorer members of society does not apply.

The rebalancing between fixed fees and usage charges can have the effect that some residential users connected to the network can no longer afford to be. Therefore, countries may wish to have a differentiated tariff scheme, whereby some customers are charged a lower monthly fee in return for higher usage fees.

7. Fee for "jumping the queue"

One panellist suggested that, where there is a shortage of lines and users must wait a long time to be connected to the network, one might consider an auction of some of those lines. Then, users who highly value rapid connection -- likely, businesses -- would pay a high one-time connection fee which may offset some of the tariffs charged users who do not value timely connection so highly. In countries where this has been practised, it has revealed a quite high willingness to pay for connection. On the other hand, it does not directly reduce the waiting lists.

8. International telecommunications

The prices of international calls are determined by international agreement and it is proving extremely difficult to get a general agreement to reduce international prices towards the underlying costs. If prices are not near costs, then there is entry by call-back services. One must reduce accounting rates towards the underlying cost level and ensure that there is end-to-end competition on international routes on a reciprocal basis before there can be a truly competitive international environment. In the long term, this will benefit economies more than keeping international prices high.

The accounting rate is the rate which the two administrations at each end agree to charge each other. The collection rate is the rate they actually charge their users. Typically, collection rates are not close to and are certainly not below accounting rates. Within Europe, the accounting rate is set by collective agreement and depends only on distance. Countries with more outgoing calls wish for the accounting rate to be lower; countries with more incoming calls wish for the accounting rate to be higher. An improved agreement on accounting rates requires an agreement on swapping traffic. Under the current system of accounting rates, calls may be routed halfway around the world in order to find the cheapest route.

9. Alternative technologies

Where there are under-served areas, a country might explore other technologies for serving them. For example, there is a technology that is basically like a rural radio-based telephony service, where the "local loop" is provided via radio and the local system is connected to the rest of the network via cable. It is not the best grade of service but it at least begins to give service to those areas that would not otherwise have it and to the extent that a country can roll out service to under-served areas it can move more quickly to tariff-rebalancing.
THE ECONOMICS OF ACCESS PRICING

Mark Armstrong and Chris Doyle

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1. Introduction

The electricity and gas supply industries, telecommunications, water and railway services are industries involving transportation and distribution networks. For example, the network in the railways industry is comprised of earthworks (tunnels, bridges, etc.), track, signalling and stations. In the gas supply industry the network consists of high pressure national pipelines and regional distribution links. In the electricity supply industry the network consists of a hierarchy of successively higher voltage transmission links. In the water industry the key components of the network are sewerage networks and delivery and storage facilities for water. In telecommunications the network is a mix of transmission media and switching centres.

In each of these industries some parts of the network exhibit natural monopoly characteristics, that is to say it would be inefficient for more than one firm to construct parts of the network. In the electricity and gas supply industries it is generally recognised that local distribution and national networks are natural monopolies. In the rail context, it would not be desirable in all except the busiest routes for there to be two or more pairs of tracks between stations. In telecommunications, historically at least, the local distribution networks have been natural monopolies. Finally, in the water and sewage industry virtually the entire distribution network is a natural monopoly. When competition exists in other parts of these industries, rival firms will often need to gain access to these “bottleneck” facilities. For example, long-distance telephony is regarded as being potentially competitive, but the firms competing in this sector require access to subscribers in the local exchange areas, the largely naturally monopolistic sector. Similarly, rival gas suppliers need access to the distribution network in order to serve their customers.

The aims of regulation

Where competition has been introduced into network industries, the existence of bottlenecks often calls for the regulation of the terms of access. As with regulation more generally, the aims and objectives of regulators concerning access pricing are varied and sometimes contradictory. These include:

Allocative efficiency

The economic benefits of having retail prices close to marginal (or incremental) costs are well known. In most markets this is achieved by means of effective competition. In industries characterised by firms with market power, however, there is often a need for intervention by regulators. Since the access charges which rivals pay will be a crucial determinant of the prices they offer consumers, the control of access charges can be used as an effective instrument, albeit indirect, for steering prices towards costs.
**Productive efficiency**

Another important aim of regulation is that production should take place in the most cost-effective manner. Ideally, services -- or inputs to services -- should be provided by those firms with the most efficient means with which to do so. Moreover, regulation should ensure that **economies of scale** are not lost by excess entry into some markets. Since access charges will influence the form and degree of entry which takes place, they will be a powerful tool for achieving this aim. If **productive efficiency** were the sole objective of regulation then access charges should be designed in such a way that entry in a market takes place if and only if that entrant is more efficient than other firms.

**The promotion of competition**

Many regulatory bodies are required by their constituent statutes to promote competition. The reasons for this include a recognition that competitive markets are a powerful means by which to obtain the above two objectives. In addition, effective competition brings the benefits of product diversity, increased customer responsiveness and technological innovation. Finally, though, it may be because of the fact that regulation cannot always be relied upon to carry out its aims successfully that competition has some long-run advantages. For instance, regulators are often in an unequal battle with monolithic “incumbent” firms who may be able to influence the regulatory process. Because of this view, it could well be that regulators will choose to encourage entry beyond the level which is implied by considerations of short-term notions of productive efficiency, and to this extent it could be in conflict with the second aim above. Since the amount of entry will be a decreasing function of the level of access charges, the regulator can use low access charges as a means to encourage competition.

**Fairness and social obligations**

The desirability of **allocative efficiency** notwithstanding, pricing policy in regulated industries has been influenced heavily by notions of “fairness” or equity. These are illustrated by the prevalence of geographically uniform prices for services which have non-uniform costs and by the provision of some services which are not “economically viable”. While it is not obviously “fair” to charge two consumers the same for a product whose supply to one consumer uses more scarce economic resources than supply to the other, for political or other reasons such policies seem likely to be important for the foreseeable future. Because of this, and because these loss-making activities are rarely funded by direct state subsidies, **incumbent firms** are required, in practice, to fund these services by cross-subsidies from elsewhere. In these cases great care must be taken to ensure that entry into an industry does not take place only in profitable markets which leave the incumbent unable to finance its social obligations.

The interaction of access charging policy with social obligations is perhaps the most contentious aspect of policy in this area. The telecommunications industry in the U.K. provides an example where this has resulted in much controversy. The regulator Oftel operates a policy which allows the incumbent (British Telecom) to fund its social obligations through a component added onto the fully allocated cost of providing the various access services. This component is known as the “access deficit contribution” and it is based on the relative profitability of British Telecom's different retail services. In the course of pursuing this policy several difficulties have arisen, including complaints from the buyers of access services competing against British Telecom about the cost of the universal service obligation and controversies surrounding the methods used for calculating the profitability of British Telecom's individual services.
Finally, it is worth making the point that regulation in general, and access regulation in particular, is likely to be more effective and more credible if it takes place at arm's length of the government of the day.

The vertical structure of the industry

Access pricing cannot be discussed in detail without considering the vertical structure of the particular industry. There are at least five possible industry structures:

(i) integrated monopoly, where a single firm supplies all services;
(ii) structural separation with liberalisation, where there is competition in the non-bottleneck sectors and the bottleneck provider does not operate in the competitive markets;
(iii) vertical integration with liberalisation, where there is competition in the non-bottleneck sectors but the bottleneck provider is permitted to operate in these areas;
(iv) accounting separation, which is similar to (iii) except that the bottleneck provider is required to keep separate accounts for bottleneck and competitive services, and;
(v) joint-ownership, where bottleneck provision is undertaken by a firm owned jointly by firms in competitive markets.

In all cases, because of the presence of monopoly power over vital inputs, access terms will need close scrutiny. The crucial difference between (ii) and (iii) is that no matter what access price regime is chosen under structure (ii), firms in competitive markets are all symmetrically placed (there is a “level playing field”) whereas this is no so with vertical integration. Because of this point, with vertical integration access price regulation needs to be more carefully designed in order to guard against possible anti-competitive conduct by the bottleneck provider. This paper, like most of the literature on the topic, will therefore be chiefly concerned with the analysis of access charges when there is vertical integration with liberalisation.

The plan of the paper is as follows. In the next Section we discuss structural issues in greater depth, and we consider the setting of access prices in all industry structures other than that of vertical integration. In Section 3 we discuss three approaches to determining access charges when there is vertical integration. The analysis is extended in Section 4 to allow for such complicating factors as product differentiation, entry assistance, more complex access charges and the possibility of bypass. Concluding comments are in Section 5. A glossary of technical terms is provided in the appendix.

2. Vertical Structure

In this Section we describe in more detail some of the economic issues related to the pricing of access that arise in each of the above listed five possible industry structures.

Integrated monopoly

This case is trivial as there is only a single firm in the industry and the problem of bottlenecks is entirely internalised. The setting of access prices is equivalent to choosing transfer prices within the same firm and the regulator's prime concern should be the choice of the monopoly's final product prices (or to find ways to encourage competition into the industry).
**Structural separation with liberalisation**

The setting of access charges in this case is relatively straightforward. Competition in the non-bottleneck sectors will, to a greater or lesser extent, ensure that retail prices approximate the firms' costs of providing services. Since an important part of their costs is the charge they pay for bottleneck services, retail prices will be an increasing function of these access charges. If access charges can be freely chosen then ideally they should be fixed so as to ensure allocative efficiency: retail prices should equal the total marginal cost of the services (including the cost of bottleneck services). If competition between retail firms is imperfect, then they will set their prices above their costs to some extent, and so the ideal access charge should be correspondingly set below its marginal cost in order to offset the retail mark-up. However, in all realistic cases, because of decreasing costs, a policy of setting access charges at or below marginal costs of access would not allow the bottleneck provider to break even. If direct subsidies to the firm are not possible, setting the access charge equal to the average cost of providing access is the next best option. In any event, with vertical separation it is only the direct cost of providing access that is relevant for the correct choice of access charge.  

**Vertical integration with liberalisation**

Vertical integration with liberalisation in practice means that the firm operating the bottleneck facilities competes against other firms in the competitive markets. In such cases there is an obvious danger that the bottleneck provider will set access charges which make entry unprofitable. There are two natural situations to consider: the unregulated and regulated final product market.

**Unregulated final product market**

It seems intuitive that in order for there to be a “level playing field”, rivals should face the same cost of access as does the integrated firm. In other words, the access charge should equal the marginal cost of providing bottleneck services. However, this argument is not so clear cut.

Suppose there is a single (potential) entrant and an integrated firm, and that firms compete by choosing prices (so-called Bertrand competition). Suppose the unit average and marginal cost of the bottleneck service is $c_B$, the entrant's average and marginal cost of providing a unit of final service is $a + c_E$, where $a$ is the access charge, and the bottleneck provider's cost of providing a unit of final service is $c_B + c_I$. The charge $a$ is fixed by the regulator. Suppose further that $c_E < c_I$, so that the entrant is the more efficient firm in the competitive sector.

Even if $a > c_E$, would it ever be in the integrated firm's interest to undercut the entrant and retain a monopoly position? The answer is no, because if the firm is to retain its monopoly, it must charge a price less than the entrant's cost ($a + c_E$). Anything higher and the price can be undercut by the entrant. Therefore, with this strategy the most profit the integrated firm can make is $(a + c_E - c_I - c_B)$ per unit. On the other hand, if it offers a price just above the entrant's cost $(a + c_E)$, the entrant will undercut this price and take the whole retail market, and the integrated firm will make a profit of $(a - c_B)$ per unit from the selling of access. Since $(a - c_B) > (a + c_E - c_I - c_B)$, its profits are maximised by allowing the more efficient firm to serve the market: the playing field is in no sense “tilted” against the entrant by the regulator choosing any particular value for $a$.

Therefore, with this particularly vigorous form of competition, the principles of setting the access charge are no different than in the case of structural separation considered above. The access
charge should be set as low as possible to achieve allocative efficiency in the final product market. However, with other, perhaps more realistic, forms of competition (e.g. Cournot competition, or if firms are subject to capacity constraints) then level playing field arguments will resurface.

**Regulated final product market**

In many situations the integrated firm is dominant in the (potentially) competitive markets, and its retail prices, as well as its access charges, are regulated. This case is discussed in depth in Sections 3 and 4 below.

**Accounting separation**

Worries about a playing field tilted in favour of the integrated firm have led some regulators to suggest and implement a policy of “accounting separation” for such firms to remedy this problem. In this case the firm is required to report separate accounts for its bottleneck and competitive businesses. The primary benefit of such a policy is that it improves the information flows to the regulator, something that will improve the precision of the setting of desirable access charges, rather than as a solution to the problem in itself.\(^6\)

A possible secondary benefit stemming from accounting separation is greater competition in the industry. This may arise because where an integrated firm's costs are made more transparent due to accounting separation, entrants may have greater confidence in their profitability calculations. If this results in the cost of capital faced by an entrant lying below what it might otherwise have been, entry is likely to occur on a larger scale and therefore competition in the industry may be more intense.\(^7\)

**Joint ownership of bottleneck facilities**

The final configuration we consider is where the bottleneck services are provided by a firm owned jointly by some or all the firms in the industry. Such a system often exists in the case of gas transportation networks throughout the world. Without regulation, the way access prices are set by the jointly owned firm depends on the arrangements governing the management of the firm. One extreme case is where a single competitive firm has a majority stake in the bottleneck firm and hence can control its charging policy. This case is therefore very similar to the case of unregulated vertical integration, except that instead of the jointly owned firm maximising the sum of its profits from the competitive and bottleneck arms, it instead maximises the profits of the majority share holding competitive firm plus its share of the bottleneck firm's profits. Because of this difference, it is likely that the resulting access charge will be lower than in the case of unregulated vertical integration. Even so, regulation of access charges may still be required.

The other extreme case is where all competitive firms are symmetric, where they all own equal shares of the bottleneck firm, and where the management of the bottleneck firm sets the access charge in order to maximise the total profits of its parent companies (including their share of the profits of the bottleneck firm). The result will be that the access charge will be set so as to maximise the total profits of the industry. The way this would be done in most cases would be to set a high access charge in order to reduce output and increase the final product price, with the result that firms receive the bulk of their profits from their shares in the bottleneck firm. Again, it seems unlikely that access charge regulation can safely be abandoned.
As well as the above-mentioned drawbacks of joint ownership, it seems plausible that another effect of this system will be to discourage further entry into the “competitive” markets. In sum, there seems to be no good reason to think that joint ownership in itself is a good solution to the access pricing problem.

Integration versus separation

Whether integrated firms are desirable in a vertically related industry is one of the most fundamental problems in industrial economics. In a setting where the incumbent firm is regulated, the benefits of allowing integration are two-fold. First, there is the immediate point that there are likely to be economies of scope, to some degree at least, between the provision of bottleneck services and other, potentially competitive services. These economies could take a straightforward form in which some input can be used for two distinct activities (for instance, broadband cable can be used to deliver both telecommunications services and television services). Or there may be more subtle benefits of integration to do with network co-ordination, timetabling or service reliability. (This is not to deny that adequate co-ordination is possible with separation, but that to achieve it may involve additional costs.)

The second main benefit of allowing integration is that it avoids problems involved in drawing the boundaries of what activities are, or are not, permitted. Those problems may become more pronounced over time as technology develops. This has at least three aspects. First, firms may engage in socially wasteful attempts to extend their range of permitted activities, either with litigation (witness the continuing battle in the U.S. over what activities the regional Bell operating companies and the trunk operators can undertake in each others’ areas) or via regulatory hearings. Second, prohibitions may induce firms to invest in inefficient technologies to produce permitted close substitutes to prohibited services. For example, the ban on BT providing broadcasting services over its telecommunications network could cause the company to attempt to offer various “near-broadcasting” services (such as video-on-demand). Third, it may be that, over time, technological developments erode the original motivation for separation -- the natural monopoly aspects of certain services -- but the prohibitions continue to remain in place.

The case for allowing integration is somewhat buttressed by the fact that, if regulation is perfect -- in the sense that all information is available to the regulator, all aspects of anti-competitive behaviour can be adequately monitored and controlled, and that the regulator can always be trusted to act according to the public interest -- then there are no real advantages to separation. Perfectly informed and motivated regulators could simply calculate the socially optimal access charges given the cost structure of the firms and at the same time preserve the various economies of scope discussed above. However, there is little reason to be optimistic that regulation will take this ideal form, and when there is a danger of regulatory failure it is plausible that the costs of such failures will be greater in the case of integration than with separation.

One possible scenario could be where the bottleneck provider has various means with which to raise costs in the competitive sectors. (For example, a telecommunications operator could raise rivals' costs, or lower the quality of their services, by offering low quality or unreliable interconnection, or by requiring lengthy access codes. Or, in the rail context, the integrated firm might be able to arrange for rival operators to be given inconvenient slots in the track timetable.) While the regulator may be able to control many such tactics, it seems unlikely that all of them can be adequately controlled. However, the crucial point is that a separated bottleneck provider has little or no incentive to raise costs in competitive sectors, and indeed could well have incentives to eliminate such costs, whereas an integrated firm is likely to find...
it profitable to raise its rivals' costs where possible. Therefore, in this setting the costs of imperfect regulation will be greater when integration is allowed.

To summarise, there are undoubtedly several advantages to allowing bottleneck providers to operate in competitive sectors. If regulation is faultless then there are no real disadvantages to having this industry structure. However, in all realistic situations the decision over industry structure has to trade off the advantages of integration with the danger of various regulatory failures.

Finally, for political and policy credibility reasons, if it is thought desirable to restructure the industry it is better to do so prior to any privatisation.

3. Access pricing and vertical integration: three approaches

In this and the next section we shall describe access pricing in the context of a vertically integrated incumbent selling bottleneck services to a single entrant. (The discussion is easily generalised to more than one entrant.) In this section we assume that the entrant sells a product which is identical to that of the incumbent. In the next section we relax this assumption by introducing product differentiation. The assumptions we invoke allow us to characterise in a simple setting many of the key issues arising in the access pricing problem. We illustrate the principles using two hypothetical examples taken from the railway and gas industries.

In an ideal world regulation should ensure that there is perfect allocative and productive efficiency. This occurs when all prices -- including access prices -- are set equal to the minimum possible marginal (or incremental) costs of providing the various services. For if an access charge is set above the associated marginal cost, then firms buying access will choose to buy too little of it compared to the socially efficient outcome. However, a serious problem with this policy is that when firms in the industry have economies of scale and scope, pricing services at marginal or incremental cost will usually result in losses. In such cases, firms practising marginal cost pricing must receive subsidies in order to remain profitable. Such subsidies, though, cannot be funded without causing distortions elsewhere in the economy. For instance, virtually all taxes which raise government revenue cause prices somewhere in the economy to diverge from marginal costs. In the presence of such distortions, it would no longer be certain that marginal cost pricing of access constitutes an efficient policy. The economics literature concerning access pricing is still in its relative infancy. However, it has become clear that there are different competing methods for setting the price of access in a second-best world. In the following sub-sections we outline each of the main methodologies, highlighting their strengths and weaknesses.

**Access pricing for productive efficiency: the Baumol-Willig rule**

In this section we suppose that retail prices are fixed at some given level and concentrate on what would constitute appropriate access charges. We might imagine that price regulation takes place in a two-stage manner: retail prices are chosen first, then access charges are determined to maximise welfare given the retail prices. Because retail prices are fixed, consumer welfare and allocative efficiency are not affected by access pricing policy. Therefore, the appropriate welfare measure is that of the degree of productive efficiency alone, and the aim of the regulator is to minimise total production costs. In other words, in this section the aim is to describe access charges which ensure that entry occurs if and only if the entrant is more efficient than the incumbent firm.
To illustrate this we make use of a railway example. An incumbent, called State Railway (SR), operates a rail service including the route connecting towns A and B. The provision of the rail track is a natural monopoly. Let us suppose that an entrant, called Private Railway (PR), wishes to offer consumers train services between A and B. Because of the prohibitive cost involved, PR does not have any plans to construct a second track from A to B. Thus for PR to be able to operate the service in competition with SR, it requires access to SR’s A-B track.

Suppose that SR’s average incremental cost of operating the service A-B is $100. This cost can be divided into the cost of operating trains and the cost of operating the track. Suppose that train operating costs are $50 and the costs of track wear and tear, stations, signalling facilities, etc., make up the remaining $50. Suppose now that the price of the rail service A-B is fixed by regulation at a level $p = $250. The reason why price is set above incremental cost could be because the common costs of running a nation-wide network need to be covered, or because SR must fund loss-making services elsewhere on the network. Suppose that PR’s average cost for operating the service between A and B, given that it has the use of SR's tracks, stations and signalling facilities, is denoted by $c_{PR}$, so that PR is more efficient than SR in providing the rail service if $c_{PR} < 50$.

Suppose that SR’s access charge for the use of the track facilities A-B by PR is set by regulation at $a$. What choice of $a$ will ensure that entry takes place if and only if PR is more efficient? With $a$, PR’s total cost of operating the service is just $a + c_{PR}$ and so entry is profitable at the price 250 if 250 ≥ (a + c_{PR}) because PR can always undercut in price. In other words, entry will take place if and only if $c_{PR} \leq 250-a$. Since we wish entry to take place if and only if $c_{PR} \leq 50$, the regulator should ensure that (250 - a) = 50, i.e. the optimal access charge is 200.

This access charge greatly exceeds SR’s direct cost of providing access to the track, stations, etc., which is $50. If the access charge were to be set at $a = 50$, the result would be that PR would find it profitable to enter the market even if its own average costs were as high as 200. The result could easily be that inefficient entry takes place. Moreover, the incumbent loses the $150 (= $250 - $100) in profit which was being used to finance common costs or loss-making social obligations.

More generally, if the price of the service is $p$ and SR’s incremental cost of providing the competitive part of the service (i.e. the train service from A to B) is $c_{SR}$ then the optimal access charge is given by $a = p - c_{SR}$. This ensures (i) that entry takes place if and only if $c_{PR} \leq c_{SR}$, and (ii) that if entry does take place then SR continues to receive the contributions towards its common costs and/or loss making activities. The above access charge formula can be written in the form:

$$a = c_{track} + [p - c_{track} - c_{SR}],$$

where $c_{track}$ denotes SR’s incremental cost of providing track services (this was $50 in the above example). The first term on the right-hand side of the above is SR’s direct cost of providing access and the second term is SR’s profit contribution from operating the service itself, i.e. this second term is SR’s opportunity cost of selling access. In other words, we can write the above formula in the form:

$$\text{optimal access charge} = \text{direct cost of providing access} + \text{opportunity cost of providing access}.$$  

This expression is known as the “efficient component pricing rule” or the “Baumol-Willig rule”. It is perfectly possible that this second term is negative, in which case the access charge should be lower than the direct cost of providing access. This would be the case if the market was one in which the
incumbent firm was making a net loss, examples of which might include many rural rail and telecommunications services.

The Baumol-Willig rule ensures that the entrant PR is at least as efficient as the incumbent in the competitive sector. It is also worth noting that the Baumol-Willig rule ensures that the incumbent and the entrant compete on a level playing field. This is because each firm faces the same cost of access when proper account is taken of the opportunity cost of entry. However, suppose that the price $p = $250 is, for whatever reason, equal to the monopoly price. Although the Baumol-Willig rule continues to guarantee the right kind of entry, it does not resolve the problem of allocative inefficiency due to the fact that the final product price is above cost. In this setting it should be emphasised that allocative inefficiency should be addressed by the regulator when setting the incumbent's retail prices.

The Baumol-Willig rule has received considerable attention recently because of a legal battle that took place involving the incumbent and an entrant in the New Zealand telecommunications industry. The incumbent, Telecom New Zealand, sought to implement the Baumol-Willig rule when setting its access charges. The entrant, Clear Communications, objected to the access charges proposed and pursued a legal battle claiming that Telecom New Zealand's application of the Baumol-Willig rule (through the setting of an “access levy”) would be abusing the dominant position it held in the industry. The final court interpreted the Baumol-Willig rule as a proposition stating that: “in a fully contestable market, someone selling to a competitor the facilities necessary to provide a service that the seller could otherwise provide himself would demand a price equal to the revenues he would have received if he had in fact provided the service himself, “the opportunity cost”.

The legal battle over the alleged abuse of a dominant position culminated in New Zealand's highest court (which, for historical reasons, is the Privy Council in the United Kingdom) judging the question of whether the presence of actual or potential monopoly rents weakens the validity of the Baumol-Willig rule. As we argued above in the railway example, even if the retail price charged by the incumbent incorporates monopoly rent the Baumol-Willig rule nevertheless ensures that entry is efficient. In its judgement on the New Zealand dispute, the Privy Council agreed with this view by stating: "... the risk of monopoly rents has no bearing upon the question whether the application of the Baumol-Willig rule prevents competition in the contested area".

Trading off allocative and productive efficiency: Ramsey pricing

In the previous Section we discussed access pricing when the vertically integrated incumbent was offering a fixed retail tariff, a tariff which may not have accurately reflected the underlying costs. Because consumer prices were not affected by access pricing policy, the only issue was that of productive efficiency. Although this two-stage approach to pricing policy does reflect the way the regulatory processes often work in practice, this approach can be criticised as being ad hoc and inefficient. Why is it that the regulator does not choose both retail and access prices simultaneously in order to maximise welfare? Since the incumbent firm must at least break even, perhaps it is desirable to have higher access charges in order to enable the setting of lower retail prices. In other words, is it worth sacrificing a little productive efficiency to obtain a greater degree of allocative efficiency?

The previous Section contained another rather extreme assumption: namely, that entry was of the “all or nothing” form. While this may make sense when considering a particular rail route, in other contexts we would expect that entry would take only a fraction of the market, with a lower access charge (or a higher retail price) leading to greater market penetration by the entrant.
Take for example the following simple model of a gas industry. A dominant incumbent firm who owns the distribution network and who has supplies of gas. The final service is the supply of gas to consumers. A rival firm has access to its own gas supplies, but needs access to the incumbent's network to provide a final service. If the price of a unit of gas to users is $p$ and the access charge per unit for the use of the network is $a$, then the margin available to the rival is just $m = (p - a)$. Given this margin, the entrant will choose to supply a quantity of gas so that its marginal cost of obtaining gas supplies is just equal to $m$. Since the marginal cost of obtaining gas is likely to be increasing in the quantity of gas, the entrant's supply of gas to final users will be increasing in this margin $m = (p - a)$.

In the previous Section we considered access pricing policy for a given price $p$ and the aim was to ensure that productive efficiency was achieved. In this gas context, productive efficiency is achieved by ensuring that the entrant's and incumbent's marginal costs of gas supplies are equated. Since the entrant's marginal cost will be equal to $m$, productive efficiency will therefore be ensured when $m$ is set equal to the incumbent's marginal cost of obtaining gas supplies. In other words $a$ should be set equal to the retail price $p$ minus the incumbent's marginal cost of obtaining gas supplies. This is just the Baumol-Willig rule.

However, this sort of analysis ignores the fact that increasing $a$ beyond this level could enable the retail price to be reduced, thereby benefiting consumers. Optimal regulation should ensure that some combination of price $p$ and access charge $a$ is chosen so that the incumbent firm just breaks even. Since the incumbent firm's profit is increasing in both $p$ and $a$, raising $a$ naturally enables a lower $p$ to be feasible. A regulator concerned with consumer welfare would take this trade off into account. This will lead to an access charge which is higher than that set under the Baumol-Willig rule. The precise choice of the access charge will depend on (i) the benefits of reducing the retail price, which will depend on the elasticity of demand, and (ii) the effects of raising the access charge on productive inefficiency, which will depend on the elasticity of the entrant's supply.

This is a particular example of the more general problem of maximising total welfare given a break even constraint on an incumbent firm, the solution to which problem results in what are known as Ramsey prices. Although attractive in theory, Ramsey prices are rarely implemented by regulators. The two main reasons for this are (i) regulatory preferences for “fairness”, regardless of the costs, (see Introduction) have no explicit role to play in the setting of Ramsey prices, and (ii) the formidable information requirement needed to determine Ramsey prices. In particular the various demand and supply elasticities are often hard to determine in practice. As a result the Baumol-Willig rule, although having certain drawbacks, will be easier to implement than Ramsey prices. Another approach which is also relatively easy to implement, and which is by far the most common way of setting access charges, is to use one of the various “accounting” methods of calculation.

The “accounting” approach to access pricing

The accounting approach to setting of access and retail prices applies some method which allocates total costs, including common costs, across different services, including bottleneck services. There are various ways of doing this, which are discussed below, but once this has been done the procedure, roughly speaking, is to set prices equal to the allocated costs. In particular, access charges are set equal to the incremental cost of providing access plus the “appropriate” share of the common costs of the incumbent firm.

Although a large proportion of costs are easily associated with the provision of the different services, in these complex industries there will always be residual common costs. Typically these common costs include the costs of running the business in general, advertising and research and development. There
are various methods of allocating these common costs, which may include measures using output shares, revenue shares or incremental cost shares.\textsuperscript{17} Inevitably all of these will involve a degree of arbitrariness.

Economists have traditionally criticised these accounting approaches to pricing on the grounds that the mark-up over incremental cost is not based on any principle of efficient resource allocation. The Ramsey procedure, in contrast, involves setting mark-ups in such a way as to cause the least allocative inefficiency (or in the case of bottleneck services, to trade off productive efficiency against allocative efficiency in an optimal manner). What then accounts for the popularity of these accounting approaches? There are two possible explanations. The first is that accounting methods for setting access prices correspond to the regulator's (or the public's) conception of what is equitable. It is viewed as fair that all consumers of the incumbent's services -- including the consumers of bottleneck services -- should contribute towards covering the firm's common costs. Accounting methods are appealing in this respect because of their relative simplicity and familiarity. The second, as we have already mentioned, is the practical difficulty of establishing optimal, or even approximately optimal, mark-ups over incremental costs.

4. **Access pricing: other issues**

In the previous Section we discussed the issues in cases which were very simple. Having established some of the main determinants of access prices, in this Section we investigate the consequences of relaxing some of the assumptions applied so far. We look at product differentiation, the possible need to encourage entry, special features of electricity transmission pricing, more complex access charges and the possibility of bypass.

**Product differentiation**

We have thus far assumed that an entrant supplies services which are identical to those of the incumbent. This ignores one of the crucial benefits of competition, namely, increased consumer choice over the type of services available. In this Section we consider the modifications required if the entrant offers a service which is not identical to that of the incumbent. For simplicity we discuss this in the context of the Baumol-Willig rule.\textsuperscript{18}

This rule states that the cost of access should be set equal to the direct cost of access plus the opportunity cost of providing access. This rule continues to be optimal provided that the opportunity cost is appropriately defined. When the two firms' services are identical, each unit of service supplied by the entrant displaces exactly one unit demanded by consumers for the incumbent's corresponding service. Therefore each unit of access supplied to the entrant results in one less unit of the incumbent's service, and hence deprives the incumbent of the profit of supplying this service. The opportunity cost of providing a unit of access when services are identical is the profit that would have been obtained by the incumbent if it had provided the same unit of the service.

In the case where products are imperfect substitutes, competition no longer involves a strict one-for-one displacement of the incumbent's services. Instead each unit supplied by the rival does not cause a full unit's reduction in demand for the incumbent. Indeed, where services are not substitutes at all, then the competition results in *no* loss of demand for the incumbent.\textsuperscript{19} In such cases the opportunity cost of providing a unit of access is not the profit associated with supplying a unit of the service, but rather the profit associated with providing that quantity of service which is displaced by an extra unit of the entrant's supply. In particular, when they are not substitutes at all there is *no* opportunity cost incurred by the
incumbent. Therefore the Baumol-Willig rule should be applied ensuring that the opportunity cost term correctly reflects the degree of product differentiation between the two firms' services. The more the entrant's service is differentiated from that of the incumbent, the less important is the opportunity cost element of the formula. If the entrant's service is not a substitute at all for the incumbent's, the modified Baumol-Willig rule states that the access charge should simply be the direct cost of providing access.

It must be admitted, though, that the practical difficulties of implementing the Baumol-Willig rule in situations where there are imperfect product substitutes could be severe. In particular, the cross-price elasticity of the demand for the two firms' services must be known. Perhaps the best that can be managed in situations of this kind is to apply a rule of thumb that if services are not thought to be close substitutes, then opportunity cost considerations should not play an important role.

**Entry assistance**

Until now we have used an idealised model of competition. In particular, we have assumed that there exist no barriers to entry to the potentially competitive markets. In practice, a dominant incumbent often possesses competitive advantages that derive from its privileged position rather than its cost advantages or superior service. Of course, one way for a vertically integrated dominant firm to obtain competitive advantage over rivals is to deny them fair access to a vital bottleneck service, and the discussion up to this point has been concerned with finding regulatory solutions to that particular problem.

However, unfair access charges are not the only barrier that potential entrants can face. (We discussed this issue in Section 2, Integration versus Separation, above.) For instance, the incumbent may in some way manipulate the quality of the access offered to its rivals. (In the U.K., when Mercury entered the telecommunications market in the middle 1980s it complained to the regulator Oftel that its calls on British Telecom's network failed more frequently than did British Telecom's, together with several other problems with access quality.) Any firm with a history of monopoly enjoys the very substantial benefits of customer inertia. Moreover, entrants typically need to advertise their presence in a way that the incumbent does not. In addition to simple inertia, many customers incur actual costs in changing suppliers. For example, in the telecommunications context, it may be that a customer who decides to change operators must face the inconvenience of changing telephone number. As a result of these various advantages the incumbent firm's dominance may persist, even though there may be potential entrants which are more efficient in offering certain services, or which provide services which consumers prefer to those of the incumbent.

In some cases there are separate regulatory remedies for these advantages. For instance, in the telecommunications industry it may be feasible to introduce “number portability” (which would allow users to keep their number if they decide to change operator). However, as it seems unlikely that there are simple and effective solutions to all incumbency advantages, the question then arises: should access terms be set not only to allow efficient access to the bottleneck inputs, but also to help entrants overcome any remaining barriers to entry? For instance, if the incumbent has various ways of raising its rivals' costs which cannot adequately be controlled by regulation, should access charges be correspondingly reduced, even though this may entail some inefficiencies in access provision? The regulator may wish to set access charges in a way which encourages entry, even if it means sacrificing some productive efficiency. Such a policy may be desirable if consumers value the product diversity provided by new entrants, and to such an extent that these gains outweigh the resulting loss in productive efficiency. To do this the regulator would have to set the price of access lower than the level which would be optimal were productive efficiency the sole consideration.20

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Electricity transmission pricing

No matter which method is used to calculate access pricing (Baumol-Willig, Ramsey, etc.), a measure of the direct cost of access is a necessary ingredient. This is a difficult matter in the case of electricity transmission because of the complex interdependencies between inputs and outputs of power at different parts of the system. Consequently, the addition of new sources of supply on the network may have considerable, although not straightforward, consequences upon the costs of transmission in other parts of the network. The question then arises: to what extent should these secondary or indirect costs (for example, reinforcement of remote segments of the network) be attributed to particular suppliers in setting access charges? In the industry this issue is captured in the alternatives of shallow or deep pricing of access to the transmission network. Shallow pricing involves a new generator attached to the network simply paying the costs of connection from its sets to the nearest point on the grid. Deep connection would involve identifying the overall implications of the new supplier for the configuration of the network, and requiring the supplier to cover the cost of direct connection and of consequential reinforcement wherever that is necessary. From the standpoint of providing efficient entry signals, access charges based upon deep connection costs are more efficient.

More complex access charges

In this Section we consider three forms of access prices which are more complex than those discussed so far: peak load access pricing, capacity-based access charges and multi-part access charges.

Peak load access pricing

In network industries retail prices often vary within specified time periods. In particular, where output is not storable and where it is very costly to expand production capacity in the short run, retail prices are often higher in those periods when demand is likely to be higher. For example, railway operators usually set higher prices during the busy or “peak” morning period on weekdays. Because of capacity constraints, the marginal or incremental cost of serving the peak period is higher than that of the off-peak period, so varying prices is a way of achieving allocative efficiency. Such prices are known as “peak load prices”.

The three approaches to the access pricing problem that we examined in Section 3 can all be modified to allow for varying demands, varying retail prices and varying marginal costs. Typically, in each case greater efficiency can be achieved by also varying the price of access. We illustrate this by using the railway example introduced in Section 3 (Access pricing for productive efficiency: the Baumol-Willig rule). Assume that demand for the service between A and B has a known and regular peak at a certain point in the day. Let SR’s average and marginal cost of providing access during this peak be \( c^p_{\text{track}} \) and the average and marginal cost of access at all other times -- the off-peak -- be \( c^o_{\text{track}} \). Because of capacity constraints cost is greater in the peak period, that is \( c^p_{\text{track}} > c^o_{\text{track}} \).

In an ideal world where access prices are set equal to marginal costs, it is clear that the price of access in the peak period, \( a^p = c^p_{\text{track}} \) will be greater than that in the off-peak period, \( a^o = c^o_{\text{track}} \). If the elasticity of demand for the train service over A-B during the peak period is not too different from that in the off-peak period, the Ramsey pricing rule for access will also lead to an access price which is higher in the peak period. Most accounting approaches used to set access prices are also likely to result in the access price in the peak period being greater than that set in the off-peak period.
However, it is unclear whether access charges set according to the Baumol-Willig rule will be
greater in the peak period. Although the direct cost element of the Baumol-Willig rule will vary in the
natural way with the time of day, it is less clear cut how the opportunity cost element will vary. Applying
the Baumol-Willig rule will result in the access price in the peak period being greater than that set in the
off-peak period whenever the following holds:

\[ c_{\text{track}}^{p} + [p^p - c_{\text{track}}^{p} - c_{\text{SR}}^{p}] > c_{\text{track}}^{o} + [p^o - c_{\text{track}}^{o} - c_{\text{SR}}^{o}] \]

In general there is no reason to suppose that the opportunity cost element in the off-peak period,
the term in the square brackets on the right-hand side in the above expression, is lower than the
opportunity cost in the peak period. Indeed, if \( p^p - c_{\text{SR}}^{p} < p^o - c_{\text{SR}}^{o} \) holds, the off-peak access price will be
greater than the peak access price under the Baumol-Willig rule.

**Capacity-based access charges**

So far we have considered the setting of access prices based simply on usage. An alternative
method for setting access prices could involve some measure of network capacity. This alternative may
make sense in those network industries where a considerable proportion of the network costs depends on
use at times when the quantity demanded is close to network capacity. Telecommunications is an industry
where this is regarded as significant.22

Capacity based access charges involve the setting of rental charges, where the entrant gains
access to the incumbent's network through some predetermined share of capacity rented from the
incumbent. 23 A capacity based access charge alters the balance of risk in interconnection arrangements. A
usage based system places the burden of risk largely on the network provider (incumbent). For example, if
demand is lower than expected, it is the incumbent who will bear all of the costs associated with providing
unnecessary capacity. The implementation of capacity based access pricing, however, means that the
entrant shares some of the risk involved in providing network capacity. Since the typical entrant dislikes
uncertainty, it will probably take greater care in forecasting demand under a capacity based access pricing
system than it would under a usage based system. Furthermore, an entrant may be better informed than an
incumbent about the entrant's intended market. Where that is the case, capacity based access charges shift
some of the risk to the better informed party. The result should be some gains in efficiency.

Another possible benefit of capacity based access charges is that they allow buyers of access
services more flexibility over the setting of individual tariffs. Suppose an entrant into the
Telecommunications industry pays an annual rental fee \( R \) for \( x \) units of capacity in a local exchange. If
demand for the entrant's services (which may differ somewhat from those provided by the incumbent)
happens to be relatively low whenever demand for the incumbent's services is relatively high, and vice versa,
then the entrant will probably set low prices whenever the incumbent is setting relatively high
prices. Given the nature of the demands for the firms' services, the different pattern of prices may be
desirable. However, if we applied the Baumol-Willig rule as given in Section 3, the entrant may have less
discretion over the structure of its prices. This is because the Baumol-Willig rule leads to access charges
which reflect the incumbent's underlying tariff structure. If the access service is a considerable fraction of
the entrant's costs, as is often the case in the telecommunications industry, the entrant's prices will be
constrained to follow the pattern set by the incumbent. In some scenarios this possibility might provide the
entrant with a competitive advantage.

In practice, it is likely that a combination of capacity and usage based access charges will
provide gains in efficiency over and above those obtainable by applying usage based prices only. Access
charges that involve both usage and capacity components resemble multi-part tariffs, which is the focus of the next Section.

**Multi-part access charges**

Instead of having a fixed average price for access, we could alternatively allow the average price of access to vary. A simple example of this could be through adopting a two-part tariff, where the access price would include a fixed charge, say \( f \), and a price per unit charge equal to \( a \). If we let \( q \) denote the total amount of access purchased, it is clear that the average price of access is equal to \( f/q + a \). In our railway example there is an obvious two-part tariff which achieves productive efficiency, we simply set \( f = 200 \) and \( a = 0 \). However, this is a special case because in the example the entrant either produces the entire service in the competitive sector or remains outside of the industry.

In a more realistic situation where entry is more likely to vary in scale according to the size of the access charge, setting a marginal price of access equal to zero (that is \( a = 0 \)) will probably lead to an excessive amount of entry. In such a case productive efficiency would clearly not be achieved. To ensure productive efficiency is achieved we should set \( a \) according to the Baumol-Willig rule. A two-part tariff, however, allows the regulator to set \( f > 0 \) in such a way that enables a lower retail price \( p \) to be set. By an appropriate choice of \( a \) and \( f \), it is likely therefore that greater allocative efficiency will be achieved than in the case where the regulator can only choose \( a \).

Multi-part access tariffs, while possibly enabling greater allocative efficiency, clearly favour “large” buyers of access services. This is obvious in the two-part tariff example discussed above because the average price of access continues to fall as the amount of access purchased increases. Because they may discourage entry by smaller firms, multi-part tariffs may eventually produce industry structures that are less competitive than they would be under simpler access price systems. This means that regulators using multi-part tariffs may have to make a trade-off between short term allocative efficiency and long run productive and allocative efficiencies. Invariably this will involve a considerable element of regulatory judgement.

**Bypass**

Up to this point we have ignored a significant complicating factor, especially important perhaps in the telecommunications industry: the possibility that entrants may have the means with which to bypass the incumbent's supposed “bottleneck” facilities. It may be technologically feasible for entrants to provide their own access services, even if it is inefficient for them to do so. If access charges are set at a high level because of Baumol-Willig style opportunity cost considerations -- at a level much higher than the incumbent's own direct cost of providing access, say -- then this will give entrants an incentive to provide inefficient access for themselves. If this is an issue -- and there are signs that local network competition in telecommunications is becoming more viable, especially for high-value users -- then the setting of access charges will need to play off the dangers of low charges fostering inefficient entry into the “competitive” market and high charges encouraging inefficient entry into the “bottleneck” market.

To illustrate this trade-off we can extend and generalise the example that we used to discuss the Baumol-Willig rule in Section 3 (Access pricing for productive efficiency: the Baumol-Willig rule). Suppose that we have an incumbent firm which has an average incremental cost of providing a particular service of \( c_B^i + c_C^i \), where \( c_B^i \) is the incumbent's cost of providing the “bottleneck” part of the service and \( c_C^i \) is its cost of providing the “competitive” part of the service. (In Section 3, as above, we worked in
the context of the rail industry, and \( c^{B} \) was denoted \( c_{mb} \) and \( c^{C} \) was denoted \( c_{gc} \). Because of the need to cover the common costs of operating a nation-wide network or the need to fund loss-making services elsewhere, suppose that the regulated price \( p \) for operating the service is greater than its average incremental cost: \( p > c^{B} + c^{C} \). Suppose an entrant's average cost of providing the “competitive” part of the service is \( c^{E} \) (this was \( c_{rh} \) previously). Then when the entrant has no means of providing the bottleneck service for itself, and for a fixed price \( p \), we argued that the correct access charge was given by the Baumol-Willig rule:

\[
a = c^{B} + [p - c^{B} - c^{C}]
\]

Now suppose that the entrant can provide the bottleneck service for itself at an average cost of \( c^{E} \). Unlike the competitive service, it is natural to assume that the entrant is less efficient at providing this service: \( c^{E} > c^{C} \). (One reason why this might be so is that the incumbent has already invested in capacity for the bottleneck service -- the local telecommunications network, the gas transportation pipeline, and so on -- and that such investment is sunk.) The difficult case is where \( c^{E} \) is less than the above Baumol-Willig level of access charge (something that could easily happen if the opportunity cost term is large). In that case the entrant would opt for the socially inefficient route of duplicating the bottleneck service.

One policy response to bypass which merely duplicates existing facilities and is clearly inefficient would be simply to ban the entrant from providing its own access, and then to fix the access charge according to the Baumol-Willig rule. If feasible, this would be the best outcome: there would be no inefficient bypass and the entrant provides the competitive service if and only if it is more efficient at doing so. In many cases, however, for technological or political reasons a ban on entry may not be feasible to do this. For instance, it is hard to imagine how a prohibition on long-distance telecommunications entrants providing direct connection services to their customers could easily be enforced.

If such a ban is not feasible then productive efficiency cannot always be obtained by a suitable choice of access charge. For a given charge \( a \) the entrant will provide its own access whenever \( a > c^{E} \). If \( a \) is set according to the Baumol-Willig rule and \( a > c^{E} \), then there will be inefficient bypass (assuming as always that \( c^{E} > c^{C} \)). On the other hand, if \( a \) is set to eliminate this possibility (\( a < c^{E} \)) then there could well be inefficient entry into the competitive sector. In choosing \( a \) the regulator must trade off the inefficiency of the entrant providing the bottleneck (bypass) against the inefficiency of it providing too much of the competitive service. The result will inevitably be that the optimal access charge will be lower than the level proposed by Baumol and Willig.

5. Conclusion

We have looked at the economics of access pricing in the context of network industries and discussed how the regulation of access prices affects allocative and productive efficiency. In addition to these broad objectives, we considered the role access charges can play in affecting fairness and social obligations and the degree of competition in an industry. Policy towards access pricing was discussed in the context of five different industry structures. In particular, we discussed how a vertically separated industry differed significantly from that of a vertically integrated industry in terms of policy towards access pricing. For instance, an incumbent has more of an incentive to tilt the playing field in the case of vertical integration. This is the major reason why the case of structural integration is the focus of so much interest.

The case where an incumbent is vertically integrated was examined in detail. We illustrated three main ways to approach the access pricing problem. The first case derived optimal access prices when
productive efficiency is the sole objective of the regulator -- the Baumol-Willig rule. The second case highlighted the trade-off between productive and allocative efficiency -- the case of Ramsey prices. The two cases differed in that the optimal access price is generally higher under the Ramsey pricing solution, and also the informational requirements to implement Ramsey policies tend to be greater. Another solution to the access problem which also does not require too much information is to use some “accounting” method. We argued that this approach does not concern itself directly with either allocative or productive efficiency and is ad hoc in nature.

Having looked at the main ways of calculating access charges within a simple framework, we subsequently addressed some other issues. We considered the effect of allowing the entrant to supply a different service to that of the incumbent. In this case the access charge under the Baumol-Willig rule should be lowered to reflect the reduced opportunity cost. In an extreme case, where an entrant provides a completely different service to that of the incumbent, the access charge should reflect only the direct cost of access. We then noted that there might well be a need to encourage new entry through setting access charges below Baumol-Willig levels. We also discussed access pricing for the case of electricity transmission, the setting of access charges and the problem of bypass.

Furthermore, we examined three forms of access pricing more complex in structure than simple usage-based access prices. In industries where the good delivered over the network is not storable, and where expanding capacity in the short term may be prohibitively costly, peak load pricing was argued to be desirable. However, we remarked on how access prices calculated according to the Baumol-Willig rule may lead to off-peak access prices being higher than peak access prices. This apparent paradox arises when the difference between the incumbent's retail price and marginal cost is at its greatest in the off-peak period. Capacity-based access charges were discussed and two possible benefits of such access charges were highlighted. One possible benefit stems from a shift in the balance of risk in interconnection arrangements, and another is concerned with tariff flexibility. We argued that a combination of usage and capacity-based charges are likely to generate gains in efficiency above those obtainable by applying usage-based prices only. Finally, we mentioned some issues connected with the setting of multi-part access charges. We showed how such access charges could enable greater efficiency. However, multi-part access charges clearly favour “large” purchasers of access and this could make it more difficult for small firms to enter the industry.

In all the cases we have examined it is clear that the formulation of access charges requires detailed information about the incumbent's cost structure. In a complex network industry where an incumbent may sell hundreds of different services, the identification of the cost of producing each output will in practice be a formidable task. This is especially the case when technological innovation is rapid, as in the case of telecommunications. The imposition of social obligations on an incumbent further complicates information matters. Circumstances like these, which are all too common in network industries, call for considerable regulatory intervention. If regulation is poorly designed or inadequately enforced, the introduction of efficient competition into network industries could be jeopardised by the setting of incorrect access charges.
Notes

1. For a more in-depth discussion of vertical issues in the context of the British telecommunications, gas supply and electricity supply industries, see Armstrong et al (1994, chs. 5, 7, 8 and 9).

2. All terms which are highlighted the first time they appear in the text are defined in the Glossary at the end of the paper.

3. For more discussion of the conceptual issues surrounding social obligations and access pricing, see Armstrong and Doyle (1995). For a discussion of the practical difficulties arising in the U.K. telecommunications industry, see Oftel (1994a, especially chapters 3 and 12) and Oftel (1994b).

4. For more on vertical issues in regulated industries, see Armstrong et al (1994, ch. 5). For a discussion of the issues in the unregulated context, see Tirole (1988, ch .4) and Hart and Tirole (1990).

5. Matters are a little more complex if there is a danger of excess entry into the competitive markets. In many models of competition among firms having increasing returns to scale (e.g. Cournot competition with symmetric firms, each of which has a fixed cost of entry) there is a tendency for there to be too much entry from the point of view of social welfare -- see Mankiw and Whinston (1986). If this is perceived to be a real danger then it might be desirable to set access charges above the average cost of access in order to deter excessive entry.

6. The issue of cost observability is discussed in sections 3 and 4 in Laffont and Tirole (1994).

7. For more on accounting separation see Hardt and Stürmer (1994) and Oftel (1993, 1994b).

8. For more on joint ownership, see Hardt and Stürmer (1994), who also examine the case where the share of the bottleneck firm owned by competitive firms is endogenous (it is proportional to their output shares). See Hillman (1991) for a description of joint ownership in the oil pipeline context.

9. This is an instance of what economists call `the general theory of the second best'.

10. Analysis of how to ensure productive efficiency in rail networks using this kind of example can be found in Baumol (1983).

11. This rule was first applied to network industries by Willig (1979, especially pages 137-148), and to the case of the rail freight industry in the United States by Baumol (1983). For a more recent discussion see Armstrong and Doyle (1994), Baumol and Sidak (1994a, 1994b, especially chapter 7), Kahn and Taylor (1994) and Laffont and Tirole (1994, especially section 9).

12. A major shareholder in Telecom New Zealand is Bell Atlantic, a regional Bell operating company based in the United States. Bell Atlantic has recently proposed to set access charges in the State of Maryland using the Baumol-Willig rule. We return to this in section 4 below when we discuss entry assistance.

13. Let us consider the issue of dominance in the context of our railway example. Suppose that SR is not constrained by regulation in its choice of access charge. If PR is more efficient than SR, then SR would never find it profitable to block the entry of PR into the competitive sector. Indeed, SR can maximize profit by allowing entry and charging an access price equal to \( a = [p - c_{net} - c_{re}] \). If \( c_{re} = 25 \) this would result in \( a = 225 \) and lead to a transfer of rent from PR to SR. However, productive efficiency is not
compromised by the setting of this monopoly access price. The transfer of rent from the entrant to the incumbent could in practice inhibit entry and as a consequence diminish the role of competition in the industry. It is this latter case which may, in particular circumstances, constitute an abuse of a dominant position.

14. See page 8 in the proceedings of the Privy Council (1994).

15. See page 27 in the proceedings of the Privy Council (1994).

16. We have only touched upon the surface in this informal treatment. For more detailed analysis see Armstrong and Doyle (1994), Armstrong and Vickers (1995), and especially Laffont and Tirole (1994).

17. For a discussion see Brown and Sibley (1986), pp 44-51 and in the connxct of access pricing see Cave and Doyle (1994).

18. This is discussed in further detail in Armstrong and Doyle (1994). For a discussion on product differentiation in the context of fully optimal Ramsey pricing, see Laffont and Tirole (1994, section 6).

19. In the telecommunications industry, for instance, it is sometimes the case that entrants provide services requiring access to the incumbent's network, but which do not displace any demand for the incumbent's own services. Examples might include the provision of data services and, perhaps to a lesser extent, mobile services.

20. See Armstrong and Doyle (1994) for a theoretical justification for entry assistance. An example of access charges set so as to encourage entry local telecommunications can be seen in the State of Maryland in the United States. The incumbent, Bell Atlantic, proposed that access charges should be calculated according to the Baumol-Willig rule. The state regulatory body, the Telecommunications Division of the Public Service Commission, advocated instead that access charges should be based on what it termed the Dynamic Firm Interconnection Rate Model (DFIRM). It argued that the DFIRM is a way of setting access charges to stimulate competition by assisting entry into the industry: "a high interconnection charge as indicated by [the Baumol-Willig rule] would discourage entry and jeopardize the beneficial effects of competition. Therefore, the interconnection charge should cover long-run incremental costs which would include direct costs and make some minimal contribution to incumbent shared and common costs.” See Cimerman and Waldau (1994) pages 9 and 10.

21. See for example Bohn, Canaris and Schewpe (1984), and NGC (1992).


23. Such capacity based charges have recently been proposed by Oftel as potentially applicable to the U.K. telecommunications industry. See Oftel (1994a, chapter 14).

24. In this regard a two-part tariff is intuitively similar to the Ramsey rule for access pricing. The regulator is using \( f \) as a way of transferring income, in a non-distortionary manner, from the entrant to the incumbent, so that the latter can finance social obligations while setting a price for the final product which is closer to cost. The Ramsey rule, however, transfers income in a way that is distortionary, but in such a way that the cost of the distortion is minimized.

25. For further discussion on multi-part tariffs pricing see Oftel (1994a, especially chapter 14).

26. For a fuller discussion of how to set access charges when there is a danger of bypass, see Armstrong and Vickers (1995).
Despite the difficulties involved in calculating the cost structure of a regulated firm, regulators nevertheless often perform such tasks. In the U.K. telecommunications industry Oftel is currently considering the setting of access charges based on estimates it intends to make about British Telecom's long run incremental costs. However, Oftel has indicated that the implementation of mark-ups on the estimates of incremental costs based on the Baumol-Willig rule or the Ramsey formula are likely to present extra problems. To overcome these complications Oftel has expressed a preference towards using a rule of thumb based on equal mark-ups. See Oftel (1994a, especially chapter 4). A similar view to that of Oftel has recently been recommended in a European Commission report on network interconnection issues in the telecommunications industry, see Arnbak et al. (1994, especially recommendations 18 and 19).
Allocative efficiency -- The extent to which the economy’s finite resources are deployed across products and industries in a fashion so as to derive maximum benefit. An important condition is that prices reflect underlying costs.

Common costs -- The costs incurred in the supply of all or a group of services provided by a firm which cannot be directly attributed to any one service. Common costs arise from the existence of economies of scope.

Economies of scale -- Where the unit cost falls as the level of output rises.

Economies of scope -- These are present where the unit cost of a product is lower because the firm also provides other products.

Elasticities -- The price elasticity of demand gives the percentage change in quantity demanded of a product that would result from a given percentage change in its price. The price elasticity of demand is in almost all cases negative. However, when it is stated that a service has a low elasticity this refers to the absolute value of the elasticity. The cross-price elasticity of demand gives the percentage change in demand for one product that would result from a given percentage change in the price of another product. The cross-price elasticity of demand is positive where two products are substitutes, and negative where the two are complements. The price elasticity of supply gives the percentage change in the quantity supplied of a product that would result from a given percentage change in its price. The cross-price elasticity of supply gives the percentage change in quantity supplied of one product that would result from a given percentage change in the price of another product.

Incremental costs -- These arise as a result of the provision of the “increment”. The definition of an increment varies according to the context in which it is used. In many cases increment refers to a new product. However, sometimes increment is used to mean the cost of supplying an extra unit of output, in which case it is identical to the term marginal cost.

Incumbent firm -- A firm that typically once held a monopoly position in an industry which has since been opened up to competition.

Interconnection -- A situation where two or more firms in the same industry join together their networks. The price charged for using interconnection facilities is more generally referred to as the access price.

Marginal cost -- The cost of supplying an extra unit of output.

Natural monopoly -- This is said to arise when the cost of supplying the entire market demand for a product is minimised by having a single firm in the industry.

Opportunity costs -- The return that is foregone by employing resources in their current use rather than the most valuable alternative use.

Peak load pricing -- A method for pricing goods and services which are not easily storable and for which demand varies by time period. Prices for individual time periods are set so as to use the capacity provided as fully as possible at all times, subject to every price covering at least the marginal costs.
**Productive efficiency** -- This occurs when each firm in the industry carries out its activities at minimum cost and when activities are distributed between firms such that industry-wide costs are minimised.

**Ramsey prices** -- The prices that maximise allocative efficiency in situations where the presence of economies of scale and scope make prices equal to marginal cost unprofitable. The Ramsey price for a product with a low elasticity of demand includes a larger mark-up over marginal cost than a product whose demand is more elastic. Such mark-ups therefore reflect the relative willingness to pay of consumers and minimise the loss in allocative efficiency occurring because prices exceed marginal costs.
Bibliography


FRANCHISE AUCTIONS IN NETWORK INFRASTRUCTURE INDUSTRIES

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PART I - INTRODUCTION

This paper evaluates franchising as a tool of government to be employed in network infrastructure industries. It begins in this Part by considering the varieties of franchising arrangement that can be used in operating infrastructures and supplying services to the public. Part II of the paper (Sections 2 to 5) discusses the successive stages which are involved in franchising, in the light of general principles and practical experience in Europe, the Americas and elsewhere. These stages are: service specification, the allocation of franchises, enforcement of the franchise contract, and termination and refranchising. The two sections in Part III conclude the paper. Its section 6 summarises what can be learned from western experience about franchising in network infrastructure industries. Finally section 7 discusses the scope for franchising in economies in transition.

The emphasis of the paper is upon franchising of network infrastructure in the four industries in question (electricity, gas, railways and telecommunications). However, there is some discussion of the franchising of service provision. In addition, reference is made to experience in other industries when that experience is relevant to franchising issues in public utilities.

1. What is franchising?

Franchising is an arrangement whereby firms tender for the right to undertake certain activities under conditions of limited competition. The firm offering the successful tender then becomes the franchisee and enters into a franchise contract with the franchiser, which sets out the rights and responsibilities of each side (the scope of the activities to be undertaken, the price to be paid for services provided to the franchiser or sold to third parties, the duration of the arrangement, the quality of service, etc.).

Franchising is best illustrated by examples. Thus a government or regional or local authority might own a railway network and enter into a franchising arrangement with one or more firms which would run trains on that network in a manner specified in the franchise contract and thus provide service to the public. If the franchisees simply operated trains owned by the franchiser on the franchiser’s track, the franchisee would be a service provider. However, the franchisee might also buy or otherwise acquire rolling stock from a third party, in which case both franchiser and franchisee would contribute certain capital assets, although the basic infrastructure - the track - would be provided by the franchiser.

In other contexts, the franchisee might provide all the infrastructure under the terms of the contract. For example, a firm might enter into a franchise contract to build and operate a telecommunications network over a specified service area. Clearly instances of this kind, in which the franchise covers both the infrastructure and the running of services on it, differ from cases in which the contract covers only service provision.

In the commercial world, franchising is normally a form of marketing or distribution in which one party, the franchiser, allows another, the franchisee, to exploit a trade name, trade mark process or other resource in return for a fee. A well known example is the fast food restaurant business. A company like McDonalds allows local franchisees to benefit from its trademark, marketing, quality standards and reputation in return for a fee. Activities enjoying economies of scale, such as marketing, are carried out nationally or globally by the franchiser, while local operations, not enjoying economies of scale, are undertaken by franchisees.

While the aim of commercial franchising is normally the maximisation of profit, governmental franchising is typically distinguished by a different "public" purpose. The aim of the franchiser will often not be to maximise profits but to benefit consumers or the public, for example by franchising a firm to provide an efficiently produced and competitively priced public utility service. In the public utility sectors to be considered
in this paper (electricity, gas, railways and telecommunications), franchising is a means of introducing the rigours of competitive markets without having to inefficiently divide up the network at the heart of the industry. There are two quite different ways in which franchising can be used to introduce competition. In the first place, the franchiser could retain ownership of the infrastructure but franchise more than one operator to provide services using the infrastructure. An example might be the franchising of two or more train operators along a given route (segment of track). In this case, franchising permits direct competition between firms - competition in the market. In the other case, franchising extends to the infrastructure itself and takes the form of competition for the market.

The industries featured in this paper have elements which are commonly considered to be "natural monopolies", i.e. the network infrastructures which it would be highly inefficient to duplicate. Firms can bid for the exclusive right to provide and operate such infrastructures, and if appropriate arrangements are adopted, they will be built, operated efficiently, and profits which might otherwise accrue to a private monopolist will either be captured by the Government in the form of franchise fees or returned to customers in the form of lower prices.

Franchising thus has considerable potential to encourage private sector investment in public utilities and to ensure that such assets are used effectively for the benefit of the customer. However, franchising is often a highly complex process which, because it typically involves the franchiser and a single franchisee, has significant elements of bilateral monopoly. It is clear that once a monopoly franchisee has been chosen and the franchise contract concluded, the competitive process is finished until either the contract is terminated or it reaches its end. Normally, the franchiser will be reluctant to incur the costs of terminating the contract, and this may give the franchisee some bargaining power. Even at the end of the contract period, the incumbent franchisee may have advantages over other bidders for a new franchise, arising from its better knowledge of the industry or from reluctance on the part of the franchiser to accept the disruption associated with a change of supplier. Much of the subsequent discussion in the paper analyses the circumstances in which difficulties of this kind are likely to arise and identifies the set of circumstances in which franchising is likely to be suitable in the area of public utilities.

1.1 Types and forms of franchising

This section discusses in more detail the various forms which franchising can take, and some of the options for implementing it.

Integration versus separation

Franchises may be used to divide industries vertically so that separate operations are made of, for example, infrastructure establishment, maintenance, operation, marketing, etc. Alternatively, franchising may involve high levels of integration. Thus in the French water industry, two types of franchise contract are distinguished - the "concession de service public", in which the franchisee finances initial establishment of the infrastructure, and the "affermage contrat" in which a public authority finances initial establishment of the infrastructure, and the "affermage contrat" in which a public authority finances the initial establishment (Guyot, 1993).

Franchises may also achieve horizontal separation, with each franchise serving a particular area. The combination of these two forms of separation is particularly appropriate where the franchiser undertakes an activity characterised by economies of scale, while franchisees carry out locally based activities at a different cost-minimising scale. Much commercial franchising exploits this distinction, with the franchiser providing the brand name and franchisees operating local outlets. The system of rail regulation operating in the UK is of the same kind, with track separated from train operation - although in this case franchising is undertaken by a third party.
Operating (service provider) franchises

With an operating franchise contract the responsibility for maintenance, and investment in infrastructure remains with the franchiser, or perhaps some other appointed government body, and the franchisee bears operating cost risk and (some of) the revenue risk. From an agency perspective the franchisee is the agent for the utility's operating decisions and the franchiser the principal. But as far as maintaining the viability of the infrastructure is concerned, the franchiser is the agent and the public the principal. Clearly, there is ample room for conflict between the public body/franchiser as principal in regard to operating decisions, and as agent in regard to investment decisions. The conflict is whether to invest in the infrastructure with a view to improving service or to resist spending and endeavour to get better performance from the franchisee. This can give rise to opportunism on the part of the franchiser, and in this case we would expect franchisees to be aware of this.

On the other hand, the property right in an operating franchise rests with the franchiser. Thus "free riding" incentives are more pronounced with operating franchises. The franchisee has little incentive to treat the utility's assets with care and is tempted to claim that the facilities are inadequate to provide the quality of service required. Although often in the best position to determine infrastructure investment requirements, the franchisee is not responsible for such decisions.

So what are the circumstances in which an operating contract might be chosen? Operating contracts can provide an adequate franchising solution when it is more appropriate for the franchiser to carry the associated investment risk, or when the economies associated with the infrastructure diverge from those associated with its operation. This is frequently the case with utility networks, where the natural monopoly component is the infrastructure (and possibly also its operation) while down stream operations (providing services), involve fewer scale economies. In such cases the "efficient" split is not to divide the utility into several vertically integrated companies but to maintain the network infrastructure in larger blocks (possibly one) than the operating companies - as in the case of railways in Britain.

Where the expected future investment and maintenance cost of infrastructure are very uncertain it is usually desirable for the franchiser to bear a significant portion of the associated risk. This is especially so in long-term franchising where the rules for valuing assets at the end of the franchise period are open to doubt. Some form of operating franchise may also be preferable when the sheer size of the infrastructure and expected investment are so large that few if any qualified bidders will be attracted to the auction.

Operating franchises enable the scale of each franchise to be smaller, thus increasing the number of franchises. This can facilitate "yardstick competition". It also increases the likelihood that an operating firm will have more than one franchise. This brings into play a reputational factor which has been found to be significant in guarding against opportunistic behaviour on the part of the franchisee; a franchisee reneging on a contract will suffer elsewhere.

Investment (infrastructure) franchises

Investment franchises exacerbate the consequences of demand side risk on the franchisee because debt repayments are independent of revenue. They also lessen the free riding incentives that tend to exist with operating contracts. This is because the investment franchise assigns a higher level of "ownership" of the facilities to the operator. Putting aside for the moment asset valuation problems which arise at the end of a contract period, investment and maintenance expenditure should be more efficient in investment than in operating franchises since both the decision to invest and the incentive to invest reside with the same party.

Problems arise, however, because "ownership" of the facilities only lasts as long as the franchise contract. As the end of the contract period approaches, the franchisee's incentive to invest declines. Investment
in infrastructure is therefore likely to be cyclical, rising during the early years of a franchise, and declining as the contract period comes closer to its end.

Several strategies can be employed to limit the variation in the cycle. Punishment clauses for declines in quality of service can have this effect. The problem is also mitigated if franchisees believe that the franchiser is committed to "fairly" valuing the relevant facilities at the end of the franchise term (see Baron and Besanko, 1987). This point is discussed further in Section 5.3.

*Incremental versus big bang franchising*

Industries may be moved from public to private sector by means of incremental franchising, or the whole sector may be put out to tender at the one time. The arguments mostly favour progressive franchising. Present British experience suggests that one advantage of the incremental approach lies in the increasing ease with which overbidding can be identified as franchising progresses. The franchiser, rather than having to cope with a flood of applications on the basis of little experience, has the opportunity to deal with smaller numbers of tenders and to do so whilst developing a feel for a credible set of proposals and promises. Renewals are, moreover, staggered (if franchises are of standard duration) and incrementalism thus eases administration and makes for continuity.

Incrementalism is the current strategy in the UK rail sector. Thus the Franchising Director plans in 1995 to allocate six of the 25 franchises that will be created from the national BR passenger rail network. A further seven franchises will be allocated in 1996. This strategy also builds on a further advantage of a rolling programme of franchise awards - it gives time for a pool of potential bidders to build up and staggers bidding costs.

Progressive franchising also offers a response to problems of uncertainty. At the time that a franchise system is introduced, there are likely to be few if any firms which have had direct experience of operating a complete utility or network of the type being put to tender. The sheer financial size of the individual franchises will tend to restrict the number of serious bidders. There is uncertainty about demand and cost factors and also about regulatory commitments - especially the danger that a new government may refuse to be bound by earlier agreements. In the case of rail franchising in Argentina, such political uncertainty about the new government's commitment to the process, probably explained the initial lack of interest in the tender. There is also the risk that technological innovation will result in the unexpected depreciation of the franchisee's investments in facilities. (See Section 5.3 for further discussion of these points.)

Moreover, uncertainty will result in a greater variance in the value of bids, raising the likelihood that the winner will be afflicted by the "winner's curse". Since auctioned franchises will go to those firms making the highest bids, there will be a systematic tendency for the winner to have made a mistake in assessing the value of the franchise. A sophisticated bidder would be alive to this possibility in making its bid. This issue is considered further in Section 3 below.

All of these factors are likely to lead to a restricted number of franchise bidders. A key task of the franchiser is therefore to reduce the level of uncertainty amongst potential bidders. Letting franchise contracts out gradually can greatly reduce bidder uncertainty. The first franchises let will almost certainly be heavily discounted. Once operations begin, uncertainty declines. An operator starts to get a better understanding of cost and demand conditions, and of the mind of the regulator, and it becomes apparent to the market that the franchisee has obtained a good deal. As information about earlier franchises becomes available, bidders for subsequent franchises will suffer less uncertainty, and - other things equal - the bidders will be larger in number and their bids significantly less cautious. (There may, for this reason, be arguments in favour of mandatory disclosure by franchisees of their financial results.)
Despite the advantages of sequential franchising there could be situations where it is rendered uneconomic because of significant complementarities and/or economies of scale or scope between franchised operations. To allow bidders to gain bundles of franchises in order to capture these advantages, franchises should be auctioned together - preferably not in a simultaneous single round auction, but in a way that allows bidders to shift to alternative groupings if their original bundle proves to be too expensive (see McMillan, 1994). This flexibility is an essential element in auctions of spectrum in the US in 1994 and 1995 (see Cramton, 1994).

Besides sequential franchising there is another way in which potential bidders may become better informed, namely through the use of open auctions or, less perfectly, post-bidding disclosure of bids. These techniques are especially useful when one of the bidders already operates a franchise. Because of its experience, such a bidder will bring valuable and private information to the auction. An open auction results in some indirect sharing of that information, hence produces a more competitive auction and higher average bids. Post hoc disclosure of bids will have a similar educational effect. Unfortunately, open auctions or post hoc disclosure of bids both share an important potential drawback - they could help enforce agreements to set bids above the competitive level, hence make them more likely.

1.2 Alternatives to franchising

Where improving the performance of utilities is the aim, a broad range of alternative approaches has been suggested and adopted in different parts of the world. The more cautious of these simply involve corporate restructuring. But franchising entails much more fundamental change, as do the competing alternatives of privatisation with regulation and deregulation.

Restructuring within the public sector

In many countries, public utilities have traditionally been run as government departments, often operating on the same legal basis as departments providing public services such as health and education. In many such cases, decisions have been taken or are under consideration to turn the relevant assets over to a newly created public corporation, managed by a board of directors which is responsible to the appropriate Ministry or Department. The new corporation is obliged to prepare appropriate accounts (typically a balance sheet and profit and loss account) for its owner - the Government. Corporatisation is often accompanied by restructuring of the activities into new management divisions, more appropriate to a commercial organisation.

While corporate restructuring of this kind is likely to be desirable as a first step, it has limitations. Maintaining the assets in public ownership may result in a lower incentive to improve efficiency than would be found in privately owned companies. Scope for continuing government interference for political motives will still be present. And the enterprise will have no access, or limited access, to private capital markets, at home or overseas. Moreover, simple corporate restructuring will not do anything to introduce competition into what had formerly been government monopolies - either competition in the market or competition for the market.

Privatisation and regulation

Privatisation of publicly owned organisations has been widespread over the past decade in the UK and elsewhere. It has affected both organisations which operate in competitive markets and those that operate in monopoly markets. In the case of state owned firms operating in competitive markets, there has been a growing belief that government has no place operating such businesses. This is because the incentives provided by state ownership are thought to hinder the operation of the firm. Managers of state-owned companies are typically responsible to "owners" whose agendas are tainted by short-term political considerations. Examples of loss making activities are common.
In monopoly industries, or at least in the natural monopoly networks of such industries, the arguments for privatisation are less obvious. In principle, public ownership enables state-owned monopolies to pursue the objective of welfare maximisation. With privatisation, this objective is replaced by one of profit maximisation. If consumers are not to be exploited by the monopoly, then privatisation must be accompanied by regulation.

Although the change in ownership alone is thought to improve the operating efficiency of a monopoly, the overall outcome is ambiguous. Thus it is often claimed that "the privatisation of firms with market power tends to improve internal efficiency, but at the risk of worsening allocative efficiency unless some of the effects of profit seeking behaviour are held in check by... regulatory constraints." (Vickers and Yarrow, 1988, p. 8).

It should also be borne in mind that regulation has considerable costs. These include the costs of running the regulatory agency or department as well as the often larger indirect costs imposed on the regulated firm of responding to regulatory interventions.

**Deregulation/liberalisation**

Deregulation of an industry is often undertaken where competition is thought to be feasible. For example, electricity generation has always been potentially competitive, but in the past regulation prevented it. In telecommunications, direct competition between operators has been made easier by technological developments.

Deregulation is almost always associated with enabling competition to develop. As such it is frequently combined with privatisation, since state ownership in a deregulated market is an exceptional state of affairs.

In some markets the introduction of competition can lead to problems if externalities play an important part and information is lacking. This may provide an argument for franchising, rather than simply liberalisation of entry. The clearest examples of this fall in the transport sector, where competition in, for example, bus services may lead to needless pollution and congestion. The laying down of new networks may also cause inconvenience, in the form of road works and consequent obstructions to pavements. Such costs should be set against the potential benefits of liberalised entry.
PART II - ELEMENTS OF FRANCHISING
GENERAL ISSUES AND PRACTICAL EXPERIENCE

2. Service specification

Adequate service specification is important in franchising (a) as a basis for competition in the bidding process and (b) to set down benchmarks for evaluating bids (Williamson, 1976; Domberger, 1986). If the franchiser fails to specify the subject matter of the bid with precision then uncertainties will result, costs of bidding will be increased and applicants will be discouraged. Similar problems will arise if the franchiser defers specification until after the franchise is to be awarded or retains discretion to alter the specification post the award.

Problems of specification diminish in so far as variations in the quality of service are absent or are deemed to be immaterial and are accordingly discounted. Where, on the other hand, service variation is extreme and extends across a wide range of aspects, difficulties might be expected to arise.

Franchising in transport sectors generally might be expected to involve relatively few specification difficulties because dimensions of service quality are relatively few and measurable. The UK Secretary of State's guidance to the Franchise Director of Railways indicates that service levels specified in franchises should look to: frequency and capacity; service availability (throughout the seven day week); provision of through services by fast trains; intermediate stations served, and journey time. Some complications may be anticipated, however, in sectors such as rail where desegregation is pronounced and specifications have to provide for high levels of co-ordination between different participants in providing the service.

Where service specification involves the making of judgements, the advantages of franchising may be called into question. A supposed strength of franchising lies in its allowing private sector providers to be the judges of consumer and market preferences. Insofar as service specification involves the making of judgements by franchise authorities, and insofar as the franchise authority selects the best menu of services for the consumer, this advantage of franchising diminishes and franchising approximates to a system of regulation.

2.1 Specification, flexibility and change

A general difficulty in service specification arises from tensions that exist between the need to lay down a precise description of the service to be provided by the successful bidder and the need to allow for flexibility and scope for innovation after the award of the franchise. One response to this problem, as suggested in the UK Secretary of State's guidance to the rail Franchising Director is so far as possible to specify quality by means of a framework allowing flexibility and in terms of desired outputs - in order to leave operators "as much freedom as possible for responding innovatively to passengers' demands."

As Armstrong, Cowan and Vickers argue, franchising works best for straightforward products that involve low sunk costs, such as supplying licence plates for taxis, but in sectors such as the utilities, conditions are very different:

"A complete contract would be immensely complex and extremely difficult to write, monitor and enforce.... Indeed it would be very hard for the government to commit not to vary some contract terms as events unfold. Much more likely, then, is some kind of incomplete contract that leaves a number of aspects to be resolved..... But this is effectively just what regulation involves - a continuing task of contract monitoring,
enforcement and renegotiation. Thus in circumstances of any complexity, franchising does not do away with the need for regulation.” (Armstrong, Cowan and Vickers, 1994, p. 126).

2.2 Risk allocation

Risk allocation is a key component of the franchising process. In some cases the franchisee’s net revenues are virtually predetermined. In others they may be subject to considerable uncertainty. Rail franchising in the UK involves inter alia, regulatory oversight of access charges and agreements (by the Rail Regulator) as well as supervision of fare adjustments (by the Franchise Director).

A further consideration in allocating risks is the degree of control over costs that a franchisee enjoys. Franchisees may be wary if asked, as in rail, to bear revenue risks (with regulatory constraints), yet have around two thirds of their costs fixed by mechanisms beyond their control. In terms of incentives (to bid and operate) it may be appropriate to allocate risks with an eye to those who are able to affect the relevant costs and risks. Capacity to take risks is also a factor for proper consideration as is the balance between risks taken and potential rewards and the capacity of a party to sustain setbacks without experiencing financial problems occasioning disruption. In a desegregated industry there is a case also for risk sharing in a manner that ensures that all parties stand at least to share in the costs of any of their own shortcomings.

Where franchisees bear revenue risks and revenue has to be divided between different operators, technical difficulties may arise. Thus in many transport systems an impediment to franchising is the lack as yet of an efficient mechanism for recording passenger journeys and allocating revenues within an integrated ticketing system.

2.3 Integration and Separation

As noted, problems of specification increase insofar as an operation is vertically separated. Within an integrated system problems of co-ordination are dealt with through a central command structure. Where there is vertical separation, a complex network of contracts substitutes for the command structure. Such contracts in an efficient system, have to force providers to internalise the costs of their own sub-optimal performance. This can be done by providing, for example, that in a rail context the infrastructure company would compensate the train service franchisee for track failures according to a pre-specified scale that is based on service disruption and losses of revenue. The terms of such contracts can, in theory, provide full compensation and create optimal incentives throughout the system. In practice there may be high costs involved in writing, monitoring and enforcing contracts that cover all contingencies (where these cannot be anticipated, added uncertainties affect the system). Where such contracts are used, providers, moreover, may adopt rigid, rule-bound practices that lead to inefficiencies. Again, bidders who anticipate such problems might be expected to reduce their bids accordingly. The costs to consumers or the public purse (depending on the mode of franchise allocation) will be greater in a system of franchising that is based on vertical separation than one in which an integrated operation is franchised. The case for franchising a vertically integrated system may also be strong where there is a need to encourage a franchisee to make complementary investment in infrastructure and operating equipment.

Vertical separation, nevertheless, has been employed in complex utilities (for example, in the Swedish railway industry), and is said to bring a number of advantages. First, it allows potentially competitive parts of an operation to be isolated and made the subject of effective franchising regimes. Second, it paves the way for developing a stable of potentially competing operators and, third, it reduces the difficulties faced by potential competitors to a vertically integrated incumbent where the latter controls access to (and the quality of) the infrastructure or network.
In the final analysis the competitive advantages of vertical separation have to be balanced against the superior co-ordination and incentives to invest that are associated with integrated systems. In effecting this balance the costs of the uncertainties and contractual controls encountered in vertical separation should not be underestimated - particularly in a complex sector such as rail.

2.4 Price controls and competition

Specifying the regime of price control may be approached in a number of ways. Pricing freedom may be allowed in a competitive market. In non-competitive sectors, prices may be fixed by the franchiser or pricing limits may be imposed.

Much depends here on the franchising philosophy adopted and the priority given to encouraging competition. As above, the following broad approaches to franchising can be contrasted.

-- Competition For the Market: Consumer benefits are gained by offering an exclusive or protected market and by using a system of competitive bids to serve these. Promises made in bidding are then enforced and detailed service specifications used to protect consumers.

-- Competition For and Within the Market: Competitive bids to serve are employed and promises of service are enforced but the service may be defined flexibly and the right to serve the market is not exclusive. Guarantees concerning protection from competition are limited or absent. An incremental approach to competition may be adopted.

Examples of the first approach are encountered in the water industry and of the second approach in some transport applications. As an example of the latter, the UK Railways Act 1993 (Section 4) seeks to combine franchising with competition but the Franchising Director may give exclusive use of the infrastructure to a franchisee if he judges this to be necessary for expeditious franchising of the service.

The UK Office of the Rail Regulator (ORR), in the Consultation Document on Competition for Railway Passenger Services (1994), has suggested that proposals for moderating competition should be justified by reference to the potential financial exposure of the franchisee, the saleability of franchises, and the consequent effect on funds available to subsidise loss-making services if competition reduces the value to the franchisee of profitable services. Such proposals, moreover, should analyse how the transition to a fully competitive regime would be affected (p 10).

The general problem of uncertain specification of potential exposure to competition is summarised in the above consultation document:

"At the time at which they make bids, franchisees are unlikely to have reliable information about the extent of the competition they might face and the impact of competition on the finances of their franchise. In such circumstances, they are likely to err on the side of caution, discount the risk excessively and thus reflect less than the full value of the franchise in their bids." (p 12)

In response to the problem, the Rail Regulator considered means of laying down in advance the degree of exposure each franchise might face. The following steps, could be adopted:

Identify the contestable rail markets in each franchise.

-- Agree a definition of the market for such purposes.
-- Lay down the share of revenue that might be competed for in contestable markets.

-- Adjust the sums available to the Franchising Director to subsidise loss-making services accordingly.

-- Conduct periodic reviews of rights of exclusivity.

Such an approach offers a way to reduce uncertainty but it may involve considerable administrative burdens.

A further problem may arise where several franchisees are allowed to compete in a market. Each may attempt to free-ride on the marketing activities of the others and, as a result, sub-optimal marketing may ensue. In certain contexts, therefore, exclusive franchises may be allocated so as to maximise the incentive on the franchisee to promote the service or product efficiently. Similarly, exclusivity may encourage the vigorous pursuit of quality more than a scheme in which there are problems of free-riding. Exclusive franchising may also be advantageous if there are scale effects. Thus in the transport sector competitive ticketing and timetabling may produce a lower quality of service than an integrated network and other aspects of service quality may be reduced because co-ordination is lacking. It is worth noting that experience in Sweden, the USA and Argentina in the rail industry is with exclusive franchises, and competition in the UK rail industry will be limited for many years.

2.5 The franchise term

The duration of a franchise affects, amongst other things, the incentive to bid for the franchise, the continuity and quality of the service offered, infrastructure investment and the effectiveness with which the franchiser holds the franchisee to promises given during the competition for the franchise (Williamson, 1976; Domberger, 1986). In specifying the term two main issues arise, first, the extent of the term itself and, second, whether there should be provision made for adjusting or "rolling" the franchise term.

On the term itself, it is usual to effect a trade-off between factors such as saleability, continuity and investment-enhancing on the one hand, and enforcement of quality of service levels on the other. Where large sunk investments are involved in an operation, a long term franchise may be necessary to combat incentives to under-investment. Under-investment in infrastructure would not be a problem if a displaced incumbent could be accurately compensated for investments made during the franchise term (for example, by providing that the franchiser will repurchase assets at fair market value). But some investment activities are not readily measurable. Accounting choices (for example, asset depreciation rates) are contentious and there may be considerable sunk costs involved in planning and implementing large scale investment projects. This suggests that where franchise terms are short (in comparison with the lives of relevant assets) these will prove expensive in terms of subsidy even if there is competition in the bidding process. The disadvantage of long-term contracts (as indicated in the French water industry) is that incumbents become difficult to remove, new entrants are discouraged and franchising turns into a scheme of regulation. Against this, the long-term contract may encourage service innovation by offering a longer period in which to recoup the costs of innovation. (Section 5.1, which deals with incumbent advantage at contract renewal, provides further discussion of this issue.)

UK rail operator franchises are likely to be offered for seven years or a little longer. In the rail industry around the world franchise terms vary from one year up to 30 years. In the French water industry franchises normally last between 10 and 20 years.
Experience to date indicates that franchisers in some sectors put a high premium on continuity and are happy to roll franchise contracts forward. Foster has argued that franchise renewal has tended to become automatic, as was generally the case with public utility franchises throughout most of the nineteenth century, and as has been the case with cable television franchises in the United States (Foster, 1992, p 202; Zupan, 1989b).

One possible benefit of rolling contracts is that the system puts franchisees under pressure (because rolling forward is discretionary) but reduces contracting costs. However, such discretion may open the way to corruption.

3. Allocating the franchise

As franchising involves a once-only competition for the market in each round, it is critical to choose appropriate allocation rules. This section discusses alternative procedures for allocating franchises, including the qualification process (if any), information availability, issues relating to the number of competitors, the choice of allocation criteria and the form of auction or tendering.

3.1 Prequalification

Should entry into the franchise competition be restricted to "approved" categories through a pre-qualification process? Pre-assessment can be seen as a means of achieving greater precision in the franchise allocation criteria insofar as all bidders will have passed a worthiness hurdle. Such a process is used to establish bidders' credentials. Those that can show sound financial backing and an array of skills which appear likely to enable the firm to operate the franchise within the contract specification, should be permitted to bid. But does preselection then enable precise criteria to be used in deciding the winner? The simpler the licence being franchised and the more complete the contract, the more specific the criteria can be. However, even for a simple franchise such as a cleaning contract, the franchiser will want to refer to any other information it possesses whenever two or more bidders submit close to identical bids. On balance, prequalification does not appear to be capable of making the subsequent selection process automatic.

It is tempting to believe that pre-setting precise allocation criteria will add certainty and transparency to the franchising process thus increasing its efficiency and lowering associated administrative costs. In the case of complex franchises however where contracts are necessarily incomplete, becoming over-precise about the allocation criteria involves a danger that bidders will include details in response to estimates of what the franchiser wants to hear rather than as part of integral and "calculated" bids. Such bids will be made with the expectation that parts of the contract will be renegotiated at some time and therefore detailed aspects of the contract will be up for renegotiation. Bidders will include the precise details requested by the franchiser, not because they are able to specify exact performance details, but because the franchiser has requested them.

3.2 Number of competitors and collusion

A particular worry in utility franchising is that bidding numbers may be so small that a real competition is not possible. French water franchises often attract a handful of bidders. In the case of cable television in the United States, the average number of bidders per franchise was four or five (Zupan, 1989b).

For major utilities, there must be a real concern about obtaining an effective number of competitors. The franchiser must therefore make great effort to attract serious bidders. In general terms, the best way to do
this is to reduce the associated uncertainties. But what is the optimal number of bidders for each franchise? As discussed below, it will depend on the particular circumstances in each case.

The greater the uncertainties felt by potential bidders, the fewer we expect the number of bidders will be, the lower will be the final contract price and the more likely it will be that post-contract renegotiation problems will run into problems. A jam in the flow of information can result in unnecessary asymmetries between bidders and increase the likelihood that the highest bidder is not the bidder with the highest value (Myerson, 1981).

Reducing uncertainty can also lead to a decrease in the variance of bidder's valuations, with the result that bidding is more aggressive and the expected revenue going to the seller increases. If the seller holds information about the true value of what is being auctioned, it will be in her interest to provide it to the bidders (Milgrom and Weber, 1982).

There are at least three key areas where information is vital. Firstly, a relatively robust contract must be finalised. Secondly, interconnection rates or charges for access to an essential facility need to be finalised and perceived as such with equal certainty amongst bidders, and lastly, commitment to a specified regulatory strategy is required. At the very least this strategy must entail regulatory commitment to "fairness" if bidders are not to shade their bids and, in the case of an investment franchise, refrain from undertaking "efficient" investments.

A contract which is over-specified given all the uncertainties surrounding the operation of the utility will be seen as weak and thus encourage "gaming" by bidders, precipitating post-contractual opportunism predicted by Williamson (1976). Similar predictions would seem to hold whenever the franchise contract was under-specified. The contract serves as a signal to bidders about the competence of the franchiser/regulator and her imperviousness to gaming. Part of this process requires that access pricing to essential facilities be finalised and known to all bidders. In many utility industries access costs will comprise the largest single outlay of the franchisee. In railway franchising for example, it has been estimated that access costs will be approximately 60 per cent of an average rail franchisee's total costs.

Another key variable determining the number of bidders is the cost of bidding. Typically, bidders will bear their own costs. The more complex the franchising process, the fewer the number of bidders in equilibrium. These issues have been analysed by Canoy and Waterson (1991), who show the introduction of bid preparation costs can have a major effect on bidders' equilibrium strategies, as well as upon the number of bidders. In certain circumstances, there may be a case for subsidising bid preparation costs. But this should normally be confined to subsidies to "small" firms, and even these should bear some of the bidding costs.

Actual estimates of bidding cost are hard to come by. As regards cable television, estimates range from between US $5 and US $15 (1984 prices) per home passed (Zupan, 1989a). Some bids for broadcasting franchises in the UK in 1991 are said to have cost £1 million to prepare. The time required to allocate rail freight franchises in Argentina ranged from 13 to 24 months. For commuter rail franchises in and around Buenos Aires the consortia that qualified spent most of 1992 preparing technical and financial proposals (Kohon, forthcoming).
3.3 Single dimensional franchise allocation schemes

All franchising allocation processes involve comparison of (qualified) bids. This may be a single or a multi-dimensional process. This section analyses single-dimensional procedures, while the next section reviews "menu auctions".

Bidding on price per unit

One option is to introduce bidding on price per unit, the scheme recommended by Demsetz (1968). Under the assumption that the auction is vigorously contested, there is a single output and information asymmetries play no part in determining the spread of bids, bidders will bid their average costs at each stipulated output level. Under these assumptions price per unit auctions identify the firm with the lowest average cost.

This type of auction has both advantages and disadvantages. The advantages are that the process extinguishes monopoly rents; it identifies the most efficient producer and where the output is a clearly identifiable single product it makes for easy identification of the franchise winner. On the debit side however, Telser (1969) noted that a price equal to average cost does not result in a welfare optimising level of pricing or output. That is of course at Qf where P=MC (Figure 1). But at this level of output and pricing the firm will not be covering its costs. The suggestion from the recent game theoretic literature on regulation is that the auction winner should then be paid a subsidy in exchange for price and quantity levels indicated by P3 and Qf (see, for example, Baron and Myerson, 1982 and Laffont, 1994). But this requires the authorities to know the firm's marginal cost. In practice, however, where potential franchisees typically have little experience in the utility they are bidding to serve, they are likely to be very uncertain about what their own costs are, and therefore unable to communicate them to the franchiser even if subject to an incentive to do so.

Where multi-part pricing is relevant or the utility produces multiple products/services, it becomes much more uncertain which bidder is offering the best deal. Moreover, in these circumstances the price rigidity implied by a price per unit franchise is highly likely to become inefficient as demand and technology change over time.
Figure 1

Bids could be expressed in terms of a (weighted) average price of outputs which varied over time. This form of price control is known as the price cap or RPI-X (rate of price inflation - some estimated comparative productivity improvement factor) regulation, where prices are required to change by X% in real terms in each of a pre-specified number of years - say five. The franchisee thus has an incentive to reduce costs in this period because it will not suffer a consequent diminution of revenues. The alternative is cost-plus (rate of return) regulation, which offers much weaker cost reduction incentives. It should be noted that controlling a weighted index rather than individual prices permits more price flexibility and thereby addresses one of the key criticisms of the "price per unit" form of franchise bidding. However, weighted index bidding requires prospective franchisees to have a greater understanding of demand conditions than they might be expected to have, and there is also the problem as to determining the index and its weights.

**Bidding in terms of lump sum payments**

Under this system, potential franchisees specify in their bids the amount they are willing to pay as a lump sum in return for the franchise. In a natural monopoly sector, where scale economies are such that least cost production is by a single firm, awarding a franchise to the firm that bids the highest sum will not correct for the inefficiencies of monopoly pricing and output decisions. Unregulated, the winning firm will set its output at the level where the cost of an additional unit of service (marginal costs - MC) equals the increase in revenue resulting from expanding sales by one unit (marginal revenue - MR). It would therefore price at $P_1$ (Figure 1) with output $Q_{m}$. Without additional controls on prices this form of
franchise bidding has only a distributional effect as the expected stream of monopoly rents would be capitalised and paid to the franchiser.

As a rule, bidding in the form of lump sum payments should be based on known regulated prices. However, this form of franchising suffers from price inflexibility. Bidders would want to know the regulated prices before they determined their lump sum bids. If regulated prices were uncertain, bids would be shaded. Moreover, if prices are to be specified prior to the auction, the franchiser will have none of the bidding information upon which to form a view as to the likely winner's production costs. Yet this information is required, along with estimates of demand, to determine price.

**Bidding for the lowest lump sum subsidy**

In this form, franchisees compete in terms of the lowest lump sum subsidy they are prepared to accept in return for undertaking a loss-making operation.

If before franchising, the market was already supplied by a public enterprise, the regulator/franchiser may decide that the former prices must be maintained. This was the method chosen to allocate commuter service rail franchises in Argentina. The initial controls on price would be eased in return for improvement in service quality. Bids were accepted or rejected according to the quality of their business plan, and a strict prerequisite had to be met to get to this stage.

The result of bidding for the lowest lump sum subsidy to provide a pre-set output level will depend upon the number of bidders. Suppose, as in Figure 2, that the marginal and average costs of the franchisee (MC\(_f\) and AC\(_f\)) are lower than those of the public provider (MC\(_p\) and AC\(_p\)). Neither the public operator nor the franchisee can break even, but it is still thought worthwhile to operate the service because it is associated with a beneficial externality (or displaces a service with a detrimental externality). If the franchisee were the only bidder, it would undercut the public operator's subsidy by the minimum amount necessary, maintain a price fractionally below P\(_p\), and earn a profit close to the area P\(_f\)P\(_p\)XZ, where P\(_f\) = P\(_p\) - (AC\(_p\) - AC\(_f\)) (Dnes, 1993). With many bidders, in contrast, the winning lump sum franchise bid required would be lower than the public subsidy by an amount approximately equal to the efficiency saving generated by the franchising process. Thus with an output specification of Q\(_p\), the same area as above (PP\(_p\)XZ) would be removed from the previous subsidy level.

Because the franchisee's costs are lower, the optimal level of provision of the service, assuming a constant marginal externality, is higher with a franchisee than with a public operator - say Q\(_z\) instead of Q\(_p\) in Figure 2. However, the authorities are unlikely to know enough about demand or the subsequent behaviour of the franchisee to attain such an outcome using a lump sum subsidy. If internalising externalities is an important aspect of utility pricing, franchising on the basis of a lump sum subsidy tends to perform poorly.
3.4 Menu auctions and quality hurdles

For the purposes of letting some franchise contracts, the franchiser may choose to allow competitors to specify their bids in terms of more than one dimension - typically in terms of price and quality of service. The franchiser then makes a choice from among the combinations on offer, and the quality and price conditions embodied in the franchise contract. The term "menu auction" for such procedures was introduced by Bernheim and Whinston (1986).

Figure 2

Allowing multiple bidding on a mix of quality of service and price/lump sum variables can provide useful information to the franchiser/regulator, which can be used if renegotiation becomes necessary once the franchisee begins operations. The main drawback of this type of franchise is that (i) it can be more difficult for the franchiser to identify the winning bid and in this case the process may lack transparency and encourage corruption (this has been a problem in a number of transport applications); and (ii) unless carefully managed, menu bidding might signal greater gaming opportunities to bidders. Auction theory notes that where relevant information is dispersed amongst bidders, introducing multiple factors as decision variables in an open auction reduces uncertainty, as private information is made public. The franchiser’s revenue thus goes up (see Milgrom and Weber, 1982; McAfee and McMillan, 1987).
3.5 The form of the auction

The value of a franchise to a company depends upon the difference between its revenues and costs over the franchise period. Companies will make their own cost estimates and will project revenues on the basis of expectations regarding demand. These circumstances tend to make the auction more of a "common value" one (in the sense that competitors are projecting the same underlying economic variables) rather than a "private values" one (such as the auctioning of a family heirloom, valued quite differently by the bidders). The distinction is an important one because in the common value case a bidder can seek to draw inferences from other bidders' valuations of what is a resource with the same underlying potential for all of them; whereas in the private values case differences in bid can be attributed to differences in tastes.

Assuming that each franchise contract will be auctioned separately, it is possible to envisage a number of methods by which the auctions might be conducted. These include (i) "public" or "oral" auctions in which the auctioneer successively announces prices until a buyer is found in and (ii) "sealed bid" tenders. Public auctions may be either English - in which prices are successively raised until only one bidder remains - or Dutch - in which the price is successively lowered until the object is bought by the first bidder. Sealed bid tenders award the object to the highest bidder either at the price offered by that bidder (a first-price tender) or - more rarely - at the price offered by the second highest bidder (a second-price tender).

In deciding how to auction a franchise the regulatory agency will normally seek to devise a procedure which maximises revenue, subject to any constraints on quality. One of the major findings of auction theory is that in the private values case where bidders are risk-neutral, all four models (Dutch and English oral auctions and first and second-price sealed bid tenders) yield the same price on average, and hence the method of auctioning makes no difference. (It may seem paradoxical that the first- and second-price sealed bid auctions produce the same result on average, but clearly bidders' behaviour will be different in each case.) In addition, the more bidders there are, the higher the expected revenue, as bidders are led by the pressure of competition to bid right up to their own true valuation of the object on sale rather than seeking to maintain some profit in the expectation that few other bids will be forthcoming. With few bidders, by contrast, each company will bid the least it feels it can get away with.

However, as we have seen, franchises are not usually examples of the private values case. Bids are not determined exclusively by their private tastes but depend upon (possibly different) judgements about potential revenues and costs. This may lead to the phenomenon earlier referred to as the "winner's curse" whereby the highest bidder mistakenly over-valued the franchise. Logically, however, a sophisticated bidder would realise this danger and bid less aggressively, though as before and for the same reasons, the more bidders there are, the higher the expected price. The seller can reduce anxieties about the winner's curse by publicising any information available about the franchise. This reduces bidders' uncertainty and encourages them to bid closer to their true expected value than would be the case if they had poorer information and were more anxious about overbidding.

The key result from the common value model, provided the bidders are risk-neutral, is that the various forms of auction produce different average levels of revenue, because they yield different information to each bidder about other bidders' valuations. The English auction yields the most information, and hence the highest expected revenue, because any bidder can observe all other bidders' behaviour. Next is the second-price sealed bid tender, which exploits the valuation of at least one other bidder. Finally, the first-price sealed bid tender and Dutch auction furnish no information, and thus leave bidders most fearful of the winner' curse. When bidders are risk-averse, however, the ranking is less clear-cut. The English auction still yields more revenue than a second-price tender, and the equivalence of Dutch and first-price tenders is preserved. But the first-price tender may now yield higher revenue than an
English auction. Note that risk aversion introduces considerable complexities. For instance, buyers may prefer a procedure (for example, a first-price tender) which yields a higher expected revenue to the seller, to another (for example, a second-price auction) if their payment is more certain in the former than in the latter case (see Matthews, 1987).

In any case, drawing conclusions about the form of the auction from theoretical considerations alone is not only difficult but also potentially misleading. The results are normally based on a given population of bidders, yet in practice the number of bidders will itself be affected by the views which interested parties form about the likely outcome. As we have noted, increasing the number of bidders increases expected revenue. If a method of auction is adopted with (other things equal) a lower expected revenue, then, more bidders may enter and restore that revenue to its original value. In the absence of clear-cut theoretical results, it may be desirable for a regulatory agency choosing a procedure for franchise auctions to adopt the form which appears to be normal for the auctioning of equivalent objects - on the argument that private sellers will have chosen the method which maximises revenue. This implies rejection of the Dutch auction and of second-price tenders, which are rarely used. It is also noticeable that whereas private values auctions (for example, of works of art) or auctions involving many lots of roughly equivalent quality (for example, farmers' markets) are frequently oral, common value idiosyncratic objects (such as government contracts or broadcast franchises or rights to exploit natural resources) are usually sold by sealed tender.

Before leaving the simplest case, there is one further aspect of the auction process which has a bearing on the revenue. Suppose the seller can break potential bidders down into identifiable classes, characterised by different costs. Suppose for instance that incumbents have lower costs than other bidders. Then the agency can discriminate between classes of bidders by stating a willingness to accept a lower bid from a non-incumbent or non-publisher- contract if it falls within a given range of the highest bid by an incumbent or publisher- contractor. The aim of this device is to extract the benefit of the incumbent's cost advantage - because of its handicap, the incumbent will have to bid higher than it would otherwise have to in order to secure the licence. Of course if the handicap is set too high, the result will be inefficient. The procedure may in any case be hard to justify on equity grounds and be impracticable for that reason.

The possibility of accidental overbidding has been noted. But overbidding may occur "deliberately" if the winner believes it can renegotiate terms afterwards. The issue of enforcement is addressed in the next section.

4. Enforcement

Holding franchisees to their promises is essential if franchise allocations are to be seen as fair and if the virtues of competing for the market are to be reaped. Since, however, franchise specifications may incorporate flexibility and may grant franchisers a degree of discretion in the enforcement function, franchisers will commonly fulfil regulatory as well as purely enforcement roles - thus franchisers will often be involved in mandating aspects of the operation.

4.1 Information and monitoring

A first aspect of enforcement is the collection of information by the franchiser. Present franchise contracts routinely impose conditions concerning the supply of data on issues that are relevant in evaluating the quality of the service delivered and the extent to which promises of performance are being fulfilled.
However, franchisers routinely monitor service quality as well as review the data supplied by the franchisee. In transport franchising the monitoring of quality might be expected to be less problematic than in some sectors since performance and service quality is to a significant extent measurable in hard data (on, for example, volumes, revenues, services not operated, punctuality, lost mileage and reliability). Where service quality assessments are more complex and involve the judgements of the franchiser, then in addition to the information collecting and monitoring techniques already described, franchisers may find it useful to carry out more formal periodic reviews.

4.2 Sanctions

Presently-established franchising schemes give franchisers a number of sanctions for potential use. The following are common:

-- Power to give directions.

-- Notice of non-compliance and warnings: Franchisers who find franchisees in breach of contract conditions usually have powers to issue notices, specify the breach and give warnings concerning the implications of continued failure.

-- Regulatory powers: Franchisers may, on repeated failures of compliance, be able to direct franchisees to submit operational plans to the franchiser for approval, in advance of implementation.

-- Fines: Franchisers usually have power to exact fines (up to a specified maximum sum) from franchisees who breach the terms of their contracts. Performance bonding involves the franchisee in depositing a sum of money as a bond for good behaviour.

-- Reductions in the franchise term.

-- Suspensions.

-- Revocation: Franchisers generally have powers to revoke franchises after rights of representation and due process have been recognised. Grounds for revocation usually include: breach of contract conditions; failure to act on directions or formal notices; the franchisee becoming a disqualified person under a relevant statute; insolvency; supply of false information; change in ownership such that the franchisee would not have been allocated to the new owner; ceasing to be a fit and proper person to hold the franchise; or failure to pay specified fees.

Franchisers are sometimes alleged by commentators to be in a weak position to sanction franchisees because there is a danger of lack of continuity of service. This will vary from sector to sector, but the franchiser can seek to mitigate the problem by seeking help from other franchisees. The latter may step in to provide temporary service in a neighbouring area in which the franchisee's contract has been revoked. Other franchises will often be keen to co-operate with the franchiser in the hope of demonstrating their ability and willingness to expand their franchised operations. Similarly, in some sectors potential entrants to the market may be waiting in the wings eager to show their mettle.
Franchisers sometimes have had to engage in extensive negotiations with franchisees concerning not merely the specification of contractual conditions but also the adaptation of those conditions to changed circumstances. Changes may even necessitate regulatory responses from the franchisers and occur under a number of headings:

-- The market: This may provide greater or lesser degrees of competition for the franchisee and, in turn, the appropriate levels of franchise specification and regulation may vary. In the rail sector uncertainty concerning exposure to competition is a problem now being wrestled with.

-- Access: If the terms and the prices of access vary over time then the franchiser may have to act to control such variations (if this is possible) or may have to make allowances in holding the franchisee to promises made in a different context.

-- Regulatory/Governmental changes: Two kinds of problem may arise under this heading. First, the conditions under which franchising takes place may vary because a number of regulators are involved in one sector. Second, franchisers may operate under governmentally-imposed constraints. Enforcement has to adjust to both sets of circumstances.

-- Technological changes: These, as noted above, may demand a change of role in the franchiser from enforcer to organiser/regulator insofar as new advances change the nature of operations and have to be responded to in a co-ordinated fashion.

-- Legal innovations: New statutes or judicial rulings may alter market and regulatory conditions. Enforcement activity, again may have to adjust.

Franchisees will often seek to renegotiate contractual terms, fees paid or subsidies given - because they have overbid, made erroneous calculations or suffered genuine changes in their costs. In a sector such as rail where the costs of franchisees are to a large degree a product of regulatory decisions, the case for renegotiating may be strong and relatively easily evaluated. Where costs are market-determined, the franchiser may refuse to make concessions on the grounds that franchisees must bear the risks of miscalculation rather than shift these to taxpayers or consumers.

Calling the franchisee's bluff is unproblematic where replacing a franchisee presents few problems (as in bus services). It is more difficult when there is a shortage of alternative service suppliers or where there are problems of lack of continuity of service due to delays inherent in the particular substitution process.

Overbidding and renegotiation, it should be noted, may be held in check in some sectors by non-regulatory factors. Thus it has been argued that, at least in US cable television franchising, renegotiation rates have been very low (approximately 60 out of 3,000 contracts) and that reputation effects may constrain post-contract opportunism (Zupan, 1989c).

4.4 Interdependency

Enforcing franchisee promises becomes more difficult insofar as the franchisee is not responsible for all aspects of service provision or where service deficiencies flow from the actions of others. Thus if
several franchisees were to run trains on the same track, the trains of efficient operator A might be delayed by the breakdowns of inefficient operator B’s trains on the track ahead. (If one franchisee operates all the trains the costs and revenue effects of such breakdowns fall fully on that provider). Where operations are carried out by more than one franchisee and there is interdependency, contracts must be framed and enforced in a manner that encourages each franchisee to spend the socially efficient sum of money on maintenance (NERA, 1993). Similar problems arise when there is separation of train operation, track, signalling, etc. Thus the infrastructure provider's decisions may not take account of effects on train operators. Franchise contracts in such situations have to provide a complex network of compensatory provisions if all parties in separated operations are to bear the costs of their own failings. The administrative costs associated with such compensation schemes may be considerable.

4.5 Enforcement and incentives to efficiency

Franchisers who possess discretion, for example, to control price boundaries may wish to impose efficiency incentives on franchisees. Thus a system of price cap or RPI-X price regulation might be adopted, with X growing incrementally. This would inject a strong regulatory dimension into franchising and, as noted, would affect bidding. The negative effects of such a pursuit of incentives may, however, be reduced insofar as the limits of such devices are set out clearly in advance (for example, by stipulating a ceiling for X or a maximum increase within a specified period). Franchisees are discouraged not so much by rigour in controls as uncertainty.

As for incentives to invest, these will be greatest where the incumbent enjoys a high level of security in the franchise. If enforcement considerations demand a lack of security because there exist, for example, important variations in service quality, the appropriate response could be by way of desegregation. The solution may be to retain infrastructure provision in one set of hands, organised according to certain timescales, and to franchise out operational matters according to a shorter time frame. This is the strategy seen in UK rail franchising at present.

5. Termination and refranchising

5.1 Termination costs

One of the features that differentiate franchising from its alternatives, for example, privatisation of a monopoly, is that the competition for the franchise only confers rights on the franchisee to operate the utility for a specified period. The ownership of the utility ultimately remains in the hands of the franchiser or his agent. A competitive tender process can thus be repeated when the term of the franchise expires or if malperformance leads the franchiser to terminate the contract. This process of a periodic franchise renewal has been claimed as one of the strengths of franchising (Posner, 1972).

If we could condense Williamson's criticisms of franchising onto one element, it would concern the refranchising process. His view was that the incumbent advantages at refranchising were so considerable that no real competition could take place and as both the incumbent and franchiser understood these advantages, the incumbent would be afforded a good deal of leeway before the franchiser would terminate her contract for malperformance. Clearly Williamson's case study involving the City of Oakland's franchise of Cable television rights offers a forceful reminder that when designing the initial franchise the franchiser should seek to minimise incumbent advantages at refranchising (Williamson, 1976).
Williamson identified two aspects of termination costs which he predicted would lead to contract performance problems. Firstly, psychological costs on the part of publicly accountable officials in not wanting to attract attention to performance problems which would cast some doubt over their own role; and secondly, the cost of gathering and interpreting information including auditing costs, together with the costs of the quasi-judicial hearings and appeals that would need to take place prior to termination. These would provide a disincentive on the part of officials to represent consumers' interests vigorously.

Williamson did not, however, discuss the manner in which the leeway provided franchisees by these various termination costs may to an extent be counterbalanced by the potential costs of malperformance borne by the franchisee. Most utility franchising will involve the franchisee making highly specific investments for which there is a wholly inadequate second hand market. These investments may be partially stranded by opportunistic behaviour on the part of the franchiser, perhaps in response to the perceived malperformance of the franchisee.

Against this, however, an informational asymmetry applies between incumbent and franchiser. Having appointed the franchisee in the first place, the franchiser cannot be sure at the end of the franchise period how much effort the franchisee has put in. This also gives the incumbent an informational advantage compared with other competitors for the franchise; the incumbent may have certain knowledge of costs than its competitors. To the extent that the franchisee's costs or efficiency are improved through learning by doing, its information asymmetry compared with new bidders will be even greater.

In long-term utility franchise contracts the incumbent operator is usually expected to undertake a programme of investment to maintain the long-term viability of the utility. Depreciation methods designed to yield valuations at the end of a franchise period are notoriously difficult to define with exactitude, especially in industries characterised by changed technology, and maintenance expenditure undertaken during contract fulfilment is unobservable and open to manipulation.

All of these factors yield an incumbent advantages both during the term of the franchise and also when it comes to franchise renewal. In expectation of these advantages bidders will enhance their bids in relation to their expectations of their ability to renegotiate the contract once operations are underway. As Williamson puts it: "... adventurous bids will be tendered by those who are best suited or most inclined to assume political risks." (Williamson, 1976, p 86)

However, where a franchisee has more than one franchise, or is interested in acquiring other franchises, it will have horizontal reputational concerns. In industries with a large number of franchises, such as cable television in the USA and commuter rail franchises in and around Buenos Aires, a majority of consumers are served by operators holding multiple franchises. Evidence gained from franchisers in the UK and evidence from the USA, shows that track records are important to franchisers when assessing bids (see Zupan, 1989b).

Neither is refranchising a necessary component of franchise termination costs. Once the franchisee has been operating for some time, terminating its contract does not necessarily mean a refranchising exercise. The franchiser’s contingency plans may include a number of alternative options which in the short-term at least are significantly cheaper and quicker to implement than a refranchising exercise. These may include simply licensing a nearby operator/franchisee, or, vertical integration by the franchiser where this is practical.

There may be cases where opportunistic behaviour from either party is not effectively constrained by surveillance and contract enforcement. In such circumstances, and where other efforts to commit to an acceptable (regulatory) franchise relationship have failed or lack credibility (see Salant and
high impact retaliatory devices have been theoretically shown to lead to stable and a relatively optimal regulatory relationship. In the case of utility franchising this would entail a contract that armed both sides with relatively crippling retaliatory strategies such as regulating price down to marginal cost on the part of the franchiser/regulator, and cutting services to customers on the part of the franchisee.

5.2 Incumbent advantage at contract renewal

Sources of incumbent advantages at the stage of contract renewal centre on the asymmetric information held by the incumbent and the real advantages associated with learning by doing. The incumbent takes superior information into the auction process with the result that the level of competition is limited.

Auction theory suggests that there is a danger of the winning bidder not being the one with the highest valuation because the bidding competition will involve valuations drawn from different probability distributions (asymmetric bidders). In this case the optimal auction will introduce bias between bidders (see Myerson, 1981; McAfee and McMillan, 1987). Whether the bias is in favour of the incumbent as opposed to the leading entrant depends on the shapes of the probability distributions of the bidders. Further insight is provided by Laffont and Tirole who model the bias on the degree of transferability of the incumbent's investment assuming the investment is not wholly observable or verifiable (Laffont and Tirole, 1988, 1993).

Where investment is fully transferable, any cost savings resulting from investment by the incumbent are transferred to the replacement operator. But in this case the incumbent is not able to realise the social value of the cost reductions resulting from an investment. With some positive probability the expected returns on the investment will go to a new entrant, which leaves the incumbent with insufficient incentive to invest. It then becomes optimal for: (i) the franchiser to favour that incumbent at refranchising so as to improve its incentive to invest, and (ii) for the franchiser to tip the investment (debt) costs so that less is paid in the first period and more in the second, assuming the incumbent's contact is renewed.

In the case of investments being non-transferable the social value of the cost saving is internalised by the incumbent franchisee which therefore has on average a cost advantage.

It is therefore in the interest of the franchiser to favour higher cost bidders (prospective new franchisees). In this way the seller is able to extract some of the rent that would otherwise go to the incumbent.

Where substantial capital investment is required, an investment franchise appears to afford the incumbent a significant advantage where the investment is not transferable. When investments are transferable the franchiser must credibly commit to favouring the incumbent franchisee in order to improve the level of investment.

5.3 Asset Valuation/Information Issues

In addition to the normal requirements for the regulation of a utility, asset valuations must be determined whenever refranchising occurs. As opposed to the inequality of bidding positions associated with investments (including both non-monetary and non-transferable investments) asset valuation problems tend to boil down to the inadequacy of formal accounting to provide values that will be accepted
by all sides. Clearly the root cause of the problem is that information is imperfect and asymmetric and thus affords the players room to influence the version of “accounting” reality adopted. Investment in infrastructure and maintenance is not perfectly observable or verifiable and companies' accounts are not designed with franchising and regulation in mind.

For most firms financial accounting information is normally available only on a historic cost basis, although for most regulated utilities also on a current cost basis. Information may also be found in internal management accounts or in the form of investment appraisals. Whatever information is available needs to be made transparent to the relevant parties for it to be of use. This section addresses briefly three main types of accounting information that may be available and their advantages and limitations. The three types are not exhaustive and are: historic cost and current cost accounting information and forward looking economic information.

Historic cost accounts provide backward looking information which is not usually what is required by a franchiser seeking to set parameters for the utility’s future operations. Although historic cost accounts may be modified to take account of revaluations of assets, they do not deal systematically with inflation or technological progress. The problem may be aggravated in utility industries as infrastructure assets often have very long lives, leading to their useful economic value being well below historic cost.

Current cost accounting will attempt to give an up to date valuation of assets, based on "modern equivalent asset" approach to infrastructure valuation. Such information may provide a more appropriate means of valuation for firms primarily interested in future earning potential. The usefulness of current cost accounts depends on the validity of the valuation, but then that is true of all valuations. Its main disadvantage may be that it is not forward looking enough: the modern equivalent asset of today may be obsolete well within the lifetime of a putative investment. It could be argued that it is up to a prospective franchisee to make its own assumptions about developments in technology, although if the regulator felt it had a role to play, a third approach to financial information may be appropriate.

This third approach would be to assess the forward looking "economic" or incremental costs of the relevant part of the utility's operations for the period of the franchise. This may be tantamount to calculating the cost side of an investment appraisal and it may be that the regulator or the incumbent franchisee has imperfect knowledge of the obsolescence of existing assets and that such calculations should be left to prospective franchisees.

It would seem clear that it is the future that is of interest to franchisees and the challenge may be to decide to what extent the regulator or the incumbent can aid franchisees by providing robust financial information.

From the incumbent's perspective the rules governing asset valuation in circumstances when the future is uncertain are crucial to the return required in order to make the investment. If the incumbent bears all the risk of technological obsolescence it will require a higher rate of return on capital employed than if it faced no risk of technological obsolescence, say because the regulator provided a guarantee of a fair rate of return. Such an approach enables a new operator to pick up the sunk investments of the previous incumbent at their book value. But where there has been cost reducing technological development outside the utility, costs will exceed those of a technologically efficient operator. Under this scenario new technology will only be introduced as past investments are recovered. This is clearly an unsatisfactory situation.

One obvious alternative is for the previous incumbent to be paid in relation to some rule based on the value of the initial investment and for the newly appointed operator to pick up the assets based on
their modern equivalent value, the difference being the responsibility of the regulator. This simply offers a means for the incumbent to unload investment related risks onto the regulator. In principle the regulator could allow a higher rate of return on capital employed rather than pick up the bill for the difference in asset valuations, but in practice this would not seem likely since, (i) the regulator will have no idea what the actual trade-off might be, leaving itself open to gaming by the operator, and (ii) higher rates of return on capital employed are likely to run into political opposition.

5.4 Short-Term Franchising

The possibility of short-term franchising overcoming most of the problems associated with long-term franchising is raised by Posner (1972). His central claim in favour of short-term contracts is that they facilitate "adaptive sequential decision making". The idea is that because a franchise competition is never far away incumbents will choose to co-operate with the franchiser if and when unforeseen problems arise.

On the other hand, the incentives and opportunities for opportunistic behaviour by the incumbent are qualitatively little different than in the case of long-term contracts. Even short-term contracts cannot be fully specified. Moreover, at the refranchising stage the incumbent will still have advantages over other bidders, such as those obtained by "learning by doing", and the moral hazard, hidden action related information asymmetry and asset valuation problems which exist in the case of investment rather than operating franchisers.

Short-term franchising is not usually associated with investment franchises, i.e. where the operator is charged with the responsibility to invest in the infrastructure. In Sweden, for example, the franchising of secondary track passenger services placed no investment responsibilities on the private operator. Tracks remained the responsibility of BV and the rolling stock is leased from the regional authorities. Franchise terms were for three years. The Argentinian commuter rail franchises were for 10 years not 30 years as with freight franchises) and commuter service operators were not made responsible for the network or rolling stock.
PART III - CONCLUSIONS

6. Conclusions from western experience

The aim of this report has been to identify the circumstances which make franchising a practicable and desirable method of controlling economic activity, to compare the performance of franchising with other policies, notably deregulation, contracting out and monopoly regulation, and to evaluate alternative modes of franchising. This section summarises our previous discussion and sets out our conclusions on the three issues noted above.

6.1 Circumstances favourable to franchising

We have defined franchising as an arrangement whereby a course of operation is tendered by a franchisee in a competitive context. As a result, the franchisee bears at least some of both cost and revenue risks. Moreover, the franchiser and franchisee have a continuing relationship, with the former monitoring the latter in respect of quality of performance. The prospect of renewal also acts as a form of control. As a consequence, the franchise must operate for a finite period - not so long that the present value of any activities after its termination is negligible.

Thus, as distinct from competitive tendering or contracting out, the franchise relationship imposes some revenue risk on the service provider. In addition, significantly, a franchise service is provided to the public and not to the franchiser. As distinct from concessions or build-own-and-operate (BOO) or build-own-and-transfer (BOT) arrangements, the duration of the franchise is significantly less than the period of expected use for assets involved and not so long as to make the value of the asset at the end of the period effectively negligible.

As distinct from regulation, a franchise arrangement has the characteristic of an explicit contract, with the stipulation in advance (to a considerable extent) of the obligations of both sides. As a consequence, the franchiser lacks the powers often available to a regulator to vary the arrangements at will.

What characteristics of an activity make it apparently suitable for franchising? The previous discussion has identified a number of constraints and opportunities, which we now enumerate:-

-- Openness to competition for the market: The activity in question must be such that it can be undertaken ex ante by a number of potential franchisees. Without this characteristic, there will not be even potential competition for the market.

-- Restriction on competition in the market: If a franchise is to have any value, there must be a limitation on entry by unfranchised rivals.

-- Duration: the activity must be such that a franchise contract can be formulated for a period of time which allows further competition for a new franchise.

-- Specifiability of the service: The activity to be undertaken by the franchisee has to be capable of specification in advance if it is to form the basis of a competitive franchising process. Similarly, the uncertainties attaching to the activity have to be acceptable to those competing for the franchises and must not result in excess costs to the public purse or excessive prices to consumers. Major uncertainties are likely to relate to markets, access
prices, regulatory constraints and governmental influences. However, the activity need not be fully specified ex ante. If the allocation process is to be a multi-dimensional one, then other aspects, apart from price, need not be fully specified.

-- Allocation of risks: The contract must allocate cost and revenue risks explicitly between franchisee and franchiser.

-- Observability: It must be possible for the franchiser, at reasonable cost, to monitor adherence to the franchise agreements.

-- Enforceability: The franchiser must be able to hold franchisees to their promises. This demands either that franchisees post performance bonds (i.e., supply funds that the franchiser can keep if the franchisee fails to deliver), or that the franchiser be in a position to substitute an alternative provider without incurring unacceptable service interruption or transaction costs.

-- Transferability of assets: It must be possible for the franchiser to transfer, or to arrange the transfer, of relevant assets to each successive franchisee.

-- Valuation: In cases where payments are made in respect of the franchise, it must be practicable to establish its value. Note, however, that monetary transfers may be in either direction. Thus franchising is quite practicable for loss-making operations, as well as for extracting positive rents.

-- Market failure: In some areas unconstrained competition for the franchise may lead to market failure. Franchising may overcome this by appropriate specification of the service.

Note that these characteristics do not uniquely define the franchising arrangements in any particular case. We return below to consider choice of detailed arrangements within the general franchising framework.

6.2 Franchising and its alternatives

For the purposes of the network infrastructure industries which are the focus of this paper, the principal alternatives to franchising are regulation and liberalisation of entry, or a combination of both. By regulation we mean an arrangement in which entry is restricted possibly to a single firm, by licensing or some other means, and the service provider is constrained not by a franchise contract but by a command and control or incentive-based process. The liberalisation alternative will be more suitable for service provision rather than for building the necessary infrastructure. Telecommunications, discussed below, may provide an exception to that general rule.

In network industries, natural monopoly elements may prohibit the efficient development of competition. Where the industry is profit-making, franchising is an option to be set against privatisation and regulation. But one of franchising's strengths is that it permits competition for a loss-making market, in circumstances where it has been decided on externality or equity grounds that the service should be provided at a loss. Because tender prices can be negative, franchising may allow the service to go ahead, based upon supply by the most efficient operator.
In the case of natural monopolies, the choice will lie between franchising and regulation. To a degree the two tend to merge. As the duration of the franchise is extended, episodes of competition for the market arise infrequently, and the franchise contract inevitably becomes less complete, to take account of the broader range of uncertainties in supply and demand for the service and political and social objectives. In terms of our earlier discussion, the franchise comes closer to a loosely regulated concession. Indeed it is useful in this connection to recall that several writers (notably Goldberg, 1976) have defined regulation as a "relational contract" between the regulator as representative of consumers and the firm as a representative of its shareholders.

The case for franchising weakens and that for regulation strengthens where the preconditions for effective franchising are so poorly established that the benefits of a competition for the market cannot be achieved - where, for example, potential franchisees cannot be found in numbers sufficient to produce competitive bidding; where the activity cannot be specified without excess uncertainties; where franchisers are unable to monitor or enforce franchise contracts; or where substitution of poor performers is not possible. In such circumstances the franchiser is likely in any event to be forced to adopt strong regulatory methods to achieve its designated objectives.

Combining franchising and regulation may, moreover, produce the worst of both worlds. Competing for the market may be pointless where uncertainties exceed a certain level. The effect will be to regulate after selecting the regulatee in a highly inefficient manner. Thus, the unknowns attaching to anticipated regulatory actions combined with other uncertainties may distort bids in a way that imposes unacceptably high costs on the public or consumers of services. Under conditions of high uncertainty the regulation of service provider selected by a method other than by competitive bidding may prove more appropriate than franchising.

Finally, it has been noted above that in some instances the technology permits competition, so that the relevant alternative to franchising of one or a limited number of firms is likely to be deregulation and liberalisation of entry. To take an example from service provision, a passenger transport authority may have to choose between allowing any bus operator to provide service or franchising one or more operators on a particular route.

In such circumstances, the arguments in favour of liberalisation are likely to be strong. Although a number of economic models have been developed in which it can be shown that entry induces welfare reducing "destructive competition", such models normally require restrictive assumptions. If, however, free entry will produce an externality, such as traffic congestion, then the case for franchising is strengthened.

In the industries under consideration in this paper - electricity, gas, railways and telecommunications - it is only in telecommunications that there appear to be substantial possibilities for the duplication of infrastructure. Several OECD countries have liberalised entry into a range of telecommunications markets, including the provision of local, long distance and international infrastructures. There is preliminary evidence that such liberalisation has benefited customers, because the loss of any economies of scale associated with duplication has been outweighed by greater incentives for efficiency, better quality of service, innovative services and more flexible tariff patterns. In a country with a mature telecommunications system which has already achieved high levels of penetration, liberalisation may prove a more satisfactory approach than franchising. Section 7 of this paper discusses the extent to which franchising is an appropriate approach in economies in transition, which are typically characterised by an under-developed telecommunications network.
6.3  Choosing the franchising system

The previous section has summarised conditions in which franchising is likely to be both practicable and preferable to alternatives. In this section we summarise the empirical cases noted in the sections above and examine arguments for or against alternative modes of franchising, focusing in particular upon the nature of the franchise (investing or operating), the split of revenue risks between franchiser and franchisee and the duration of the franchise contract.

**Owning versus operating franchises and the issue of duration**

Table 1 illustrates the wide variety of franchising arrangements in effect. Some of them apply to ownership questions (public or private) with which this paper is not primarily concerned. However, the distinctions among the various franchising arrangements concern the extent to which the franchisee undertakes capital accumulation and the degree to which the franchisee assumes revenue risk. We therefore focus upon this issue.

In cases where capital intensity is low, the former issue does not arise. The classic example is terrestrial broadcasting. When television franchises were originally allocated in the UK in the 1950's a decision was made to locate ownership of the transmission mechanism with the regulatory authority (initially the Independent Television Authority, later the Independent Broadcasting Authority), precisely in order to strengthen the franchiser’s hand in dealing with franchisees. Moreover, the broadcaster's programming activity could effectively be dissociated from decisions about transmission. The latter was seen as being a natural monopoly, and in the circumstances of the time, it was natural for it to remain in public ownership. Subsequently, the transmission activity was privatised, but regional companies (or licensees as they became called) were prohibited from ownership of it. In the capital-intensive cable television industry, by contrast, the franchises are investment ones.

This illustrates the proposition that the situation becomes more complex when the capital assets in question are more central to the performance of the franchisee's functions. Among the industries considered here, this is clearest in the case of the water industry. In the case of transport, it remains possible to separate the operation of the infrastructure from the running of services. Similar separation is also technically possible in the case of cable TV, but it is believed that companies would be reluctant to make the required investments as pure "common carriers".

The key considerations relevant to the choice of owning versus operating franchises are the following:

In favour of an operating franchise:

-- the short franchise duration implies frequent rounds of competition;
-- no problems with asset transfer.

Factors against include:

-- weak incentives to look after assets;
-- weak incentive to choose cost minimising input combinations.
Factors in favour an ownership franchise are the reverse of the above:

-- it promotes efficient choice of technique;
-- avoidance of inefficient production.

Disadvantages of an ownership franchise are:

-- excessive incumbent's advantage at renewal;
-- relatively infrequent renewal;
-- asset valuation difficulties.

These considerations provide some basis for a priori remarks about relative benefits of each method in particular cases, and arguments of this kind can be supplemented by case studies. Broadly speaking, an operating franchise is likely to be more effective when:

-- available technical choices are limited;
-- the franchisee's use of the assets can be monitored, and negligence penalised;
-- idiosyncrasy of assets makes valuation difficult; and
-- the activity is relatively unintensive in the use of capital.
<table>
<thead>
<tr>
<th>Ownership of Infrastructure</th>
<th>UK Cable Television</th>
<th>UK Terrestrial Broadcasting</th>
<th>French Water A - Affermage</th>
<th>French Water B - Concession</th>
<th>UK Rail Transport</th>
<th>London Buses</th>
<th>Sweden Railways</th>
<th>Argentinian Freight</th>
</tr>
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<tbody>
<tr>
<td>Franchisee</td>
<td>Transmission</td>
<td>Franchiser</td>
<td>Franchisee</td>
<td>Railtrack</td>
<td>Not relevant</td>
<td></td>
<td>Public operators</td>
<td>Franchisee</td>
</tr>
<tr>
<td>Contracted Out</td>
<td></td>
<td>Franchiser</td>
<td>Franchisee</td>
<td>Rolling Stock Companies</td>
<td>Franchisee</td>
<td></td>
<td>Regional Councils</td>
<td>Franchisee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Franchiser</td>
<td>Franchisee</td>
<td>(ROSCOs)</td>
<td>(or Leased)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ownership of Other capital</td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Rolling Stock</td>
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<tr>
<td></td>
<td></td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Companies (ROSCOs)</td>
<td>Franchisee</td>
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<tr>
<td></td>
<td></td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Regional</td>
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<td></td>
<td></td>
<td>Franchisee</td>
<td>Franchisee</td>
<td>Public operators</td>
<td>Councils</td>
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<tr>
<td>Identity of Franchiser</td>
<td>Regulator (ITC)</td>
<td>Regulator (ITC)</td>
<td>Municipality</td>
<td>Municipality</td>
<td>Franchiser</td>
<td></td>
<td>Regional Councils</td>
<td>Independent State Body</td>
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<tr>
<td></td>
<td>10</td>
<td>10+10</td>
<td>10-20</td>
<td>20-30</td>
<td>7-10 (probably)</td>
<td></td>
<td>3</td>
<td>30+10</td>
</tr>
<tr>
<td>Duration of Franchise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-5</td>
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<td>(Years)</td>
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<td>3-5</td>
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<td></td>
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</tr>
<tr>
<td>Allocation Procedure</td>
<td>Cash bidding</td>
<td>Cash bidding</td>
<td>Menu</td>
<td>Menu</td>
<td>Cash bidding</td>
<td>Cash bidding</td>
<td>Menu</td>
<td>Menu</td>
</tr>
<tr>
<td>Degree of Competition</td>
<td>Growing</td>
<td>Growing</td>
<td>None</td>
<td>None</td>
<td>Varies</td>
<td>Limited</td>
<td>Varies</td>
<td>High (from freight)</td>
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<tr>
<td>in Franchise Market</td>
<td></td>
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<td></td>
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<td></td>
<td>road transport</td>
</tr>
</tbody>
</table>
An ownership franchise, by contrast, is likely to be more desirable in the following circumstances:

-- the industry is capital intensive;
-- substantial variation in choice of techniques makes efficient, well-informed investment decisions crucial;
-- assets are general purpose facilitating valuation at franchise termination;
-- abuse of assets is difficult to detect.

Revenue Risk

The next issue to be addressed is the allocation of revenue risk. We have argued at the outset (perhaps contrary to some writers) that some degree of assumption of revenue risk by the franchisee is inherent to the notion of franchising. Otherwise, the allocation mechanism falls into the category which we described as "contracting out". This has the effect of excluding London buses operating on a "gross cost" (see below) contractual basis from our definition of franchising, but not, of course, net cost franchising.

From an analytical standpoint, the key issues which should determine the allocation of risk between franchisee and franchiser are the relative capacities of both parties to manage such risks (or more generally, the degree of informational asymmetry between them) and the relative costs at which the parties can bear the risks.

To deal with the second point first, it is given that market risks in the relevant sector will have to be borne somewhere. Shifting them from one party to another does not eliminate them, but may place them with the party which has a comparative advantage in bearing them.

It is likely that a larger organisation will have access to capital at lower interest rates than a smaller company. This may be an argument for imposing risks predominantly on the franchiser or, as in the case of UK railway privatisation, upon other suppliers such as the rolling stock companies (known as ROSCOs) which will lease rolling stock to the franchisees (although it is instructive to note current disagreements about the length of the leases - the ROSCOs seeking to impose longer periods than the train operators wish).

This argument taken on its own might carry the implication that revenue risk should be borne predominantly by the (presumably larger) franchiser. There is evidence that the equity premium is inversely related to company size.

However, this argument is counterbalanced by the considerations noted above, relating to the controllability of risks or - more generally - the market information available to both parties. Typically, the franchisee, which deals directly with the customer base, will have a better understanding of local demand factors. Accordingly, it will be better placed to provide services which best meet customers' needs, and to manage risks by responding flexibly to local conditions. This does not rule out the possibility that the franchiser is the party best placed to undertake general market research. It does, however, suggest that a substantial part of the revenue risk should be borne by the franchisee.

The argument can be simply illustrated by bus transport. "Franchising" on a gross cost basis (with all revenues going directly to the franchiser) requires the franchiser to specify the routes and the timetable, in order to get comparable service cost tenders. Yet the franchisee may have a much better appreciation of local demand conditions. A gross cost contract thus runs the risk of perpetuating ossified
and inefficient timetables, which would be improved by a switch to a net cost basis, in which the franchisee keeps the revenues.

The optimal allocation of cost and revenue risks is thus likely to be determined by a balance of factors. Minimising the costs of bearing given risks is likely to imply that they fall predominantly upon the larger organisation, typically the franchiser. However, arguments concerning the controllability of risk imply that they should be assigned to the franchisee.

In practice, it is not difficult to design contracts which distribute risks between the two parties along a continuum. An example is provided by the contracts governing payments made by UK commercial broadcasters to the Treasury. It would have been possible to assign all revenue risks to the licensees, by requiring them to pay a fixed payment (either as a lump sum, or annually) irrespective of their revenues. In practice, however, the Broadcasting Act 1990 shares revenue risks. It requires licensees to pay a specified proportion (varying across licences) of their total qualifying revenue plus an annual fixed sum. The latter is indexed to retail prices, thus removing a further element of inflation risk (Cave and Williamson, 1991).

Much of the risk associated with original franchising can be expected to decline over time as operators settle into the business and a regulator establishes a record of commitment to fairness. It might be a good idea therefore to adopt an incremental approach to franchising. For example, one could begin with gross cost contracts and later move toward net operating cost or investment franchises as the uncertainties associated with a newly franchised market are dispelled.

6.4 Measuring the Efficiency Gains from Franchising

It has not proved possible to trace any studies dealing in a comparative way with the effects of franchising. Although compulsory competitive tendering has attracted a number of economists to calculate the effects of its introduction on costs (see Glaister and Beesley, 1990; Kennedy, 1994d; Domberger et al, 1986), these have been confined to cases where there is no assumption of revenue risk by the franchisee or contracting partner.

Moreover, the issues we are addressing in this paper are even less tractable than those involved in a cross section or time series analysis of variations in the regulatory framework. We are asking which of two or more new regulatory structures (none of them yet implemented) should be introduced in the case of a sector previously held in public ownership. This formulation was explicit in discussions of the future of the water and sewerage industry in Scotland (Scottish Office, 1992) and also in discussions of the appropriate framework for rail privatisation.

We have therefore been obliged to rely above on first principles, combined with limited evidence taken from other franchised or regulated sections, to inform our judgement about the appropriate role for franchising. It is, however, possible to cite a limited amount of more or less systematic evidence concerning the effects of franchising in certain areas.

From the consumer's perspective, franchising does not appear to have resulted in levels of opportunistic behaviour by franchisee implied by Williamson's rather grim 1976 case study of cable TV in Oakland. Perhaps one reason for this is that franchising was generally accompanied by regulation, or in some cases what now appears to be effective levels of competition from other technologies. These include:
“ordinary free to receive TV and microwave pay TV. A story which points to effective levels of competition centres on the fact that in a number of areas in the US there was no franchising process at all. In these areas entry occurred faster with little overlap between operators. Although the basic tier rates were found on average to be slightly higher than the national average, the complete package was on average cheaper than the national average. Penetration rates were also very healthy” (Hazlett, 1986).

A comparison of concurrently struck renewal and new CATV contracts showed that only a limited level of opportunism tended to exist at renewal. Prices were generally similar although there was some evidence that pay tier prices were higher for renewal contracts (Zupan, 1989c).

Where substantial renegotiation was requested by operators it almost always occurred before the start of system construction and at a time when reappointment of another bidder would appear to have been a relatively costless option. In these cases it was claimed that new information about the viability of big city systems was the real cause (Zupan, 1989b).

Perhaps the best indicator that cable TV franchising has not been the disaster Williamson predicted is that of the 3,516 refranchising decisions that took place up to 1988, 3,509 of them reappointed the incumbent (Zupan, 1989b). In another study seven-eighths of policy makers told an interviewer that they would recommend their cable company to other communities (Zupan, 1989b).

An important factor here appears to be reputational effects, as over 95 per cent of all 45 million customers served by cable in 1988 were connected with multiple system operators.

On the downside, there is convincing evidence of agency problems leading to the inefficient use of cable resources. Non-price concessions have been found to account for 26 per cent of cable build costs and 11 per cent of operating expenses (Zupan, 1989b). Non-price concessions refer to such things as institutional networks (which account for 14 per cent of construction costs and generally remain idle), spending on community programming (which has little or no effect on demand) and excess capacity. The beneficiaries tend to be providers of local services such as the police, the fire brigade, hospitals, libraries and educational bodies. Thus spending is concentrated in the hands of individuals who have political influence.

There is also some evidence of post-contractual opportunism by appointed franchisees. Surveys show that officials perceive a greater level of opportunistic behaviour by cable companies which were awarded licences through a competitive bidding process, than where the franchise award did not involve a competition (Prager, 1990). Similarly construction delays were more likely to be reported in cases involving competitive bidding. As has occurred elsewhere (for example, London buses), lowest bid proposals are not always accepted. In fact CATV firms offering higher priced basic service have a better chance of winning than firms with lower price proposals. Such higher prices make it possible to target benefits to the politically influential, and may also yield the city higher tax revenues (Beutel, 1990).

Argentinian freight rail franchises have a similarity with cable TV in that after a period of operation it is now evident that they face stiff competition from another technology (trucking). While freight levels have almost recovered to 1990 levels, prices are 20 per cent lower than planned and the first franchised operator has not made a profit in its first three years of operating. In this light, post-franchising investment guarantees look like becoming a contentious issue. Most operators have not fully met their investment promises. The first of the freight franchisees has approached the Government seeking a reduction in its investment obligations. The others are naturally, watching with interest.
In the case of commuter rail services in and around Buenos Aires, which have only been operating since the beginning of this year, the number of employees has almost halved compared to 1993 levels and passenger miles are 33 per cent higher than at the same time last year.

Evidence from London bus franchising indicates that there have been significant declines in the cost of service. Compared with the fully allocated cost of the London Transport alternative, the average cost saving resulting from franchising was estimated at 20 per cent (Glaister and Beesley, 1990). However, there is agreement in the industry that one of the factors in this saving is the decline of wages, especially those of bus drivers. This part of the savings would more correctly be referred to as a transfer from employees to fare paying passengers and tax payers (a reduction in subsidies). But genuine productivity improvements also appear to have occurred.

Further, Kennedy (1994d) estimated a welfare balance of bus tendering allowing for that part of wage savings to be netted off as a transfer. He calculated the sum of resulting changes in consumer and producer surpluses with a lower bound of just under £60 million at current prices and an upper bound of £240 million. These figures take account of quality of service improvements such as through the extra mileage run implied by improvements in the quality and reliability of service.

Finally, there is strong evidence that Channel 3 licensees in the United Kingdom have made significant savings in the labour costs in the period immediately prior to and following the allocation of licences from 1993. Although a part of this may be due to the growth of independent programme making, there is little doubt that the tendering process promoted a major shake-out of labour.

There are thus grounds for supposing that franchising has the capacity to reduce costs (compared with public provision); it may also encourage attention to consumers' wants.

7. Implications for economies in transition

This section of the paper seeks to apply the analysis of principles and experience of franchising throughout the world to the special circumstances characterising economies in transition. As before, the emphasis is upon the electricity, gas, railways and telecommunications industries, and upon franchising the provision of infrastructure rather than franchising the service provider.

7.1 The starting point in network utilities

In most East European countries national networks were created from regional utility companies in the late 1940s and early 1950s. Because of their size and importance, public utilities became departments of Ministries or even constituted whole Ministries. The ruling ideology required that their services be cheap and available to all. However, only the first part of this injunction was fulfilled. Tariff structures typically favoured households so that residential consumption was constantly underpriced compared to industrial use, and cross-subsidisation of consumers became a permanent feature of the tariff structure. Moreover, tariffs in general failed to cover economic costs. This was sustainable due to the lack of a feedback mechanism between prices and investment. Consistent with general practice in these economies, investments were covered by the central budget through taxation without any reference to revenues raised by the utilities; the Planning Office's choices among new projects was not based on rate of return analysis but on administratively set output targets.
Prevailing economic doctrine and the needs of industrialisation resulted in separation of "productive" and "non-productive" activities within the economy. The former created wealth, while the latter consumed it. Giving preference to "material" production or "material" services was a characteristic feature of economic policy under central planning. Although most public utilities fell into the category of "productive" activities, some of them were considered less productive than others.

Energy industries (gas and electric utilities) were in a more advantageous position as they provided an input central to material production. But given the system of central allocation of investments, their development did not go beyond what was regarded as strictly necessary, creating bottlenecks and "black-outs" in periods of rapid growth. The transport and particularly the telecommunications industries suffered more from the rules of central allocation of investments, as planners first satisfied the requirements of "material production" and services only received residual financial resources.

An equivalent hierarchy of customers could also be detected within each sector. While network expansion in electricity or gas supply already showed some sign of preferential treatment of industrial or bulk consumers, the development of transport and telecommunication services made the distinction between industrial and residential consumers more directly. The standard statistical classification of activities separated passenger transport, for example, as a non-material service, from the transport of goods and material service. The chances of getting a telephone line were much better for an industrial than for a residential customer. These distinctions reflected the fact that the delivery of planned inputs and outputs constituted the fundamental priority of the command economy, not the satisfaction of consumer demand.

As a result, public utilities were relatively weak sectors in the centrally planned economies. Because of their low prestige, reflected in the investment allocation system, they were provided with fewer and fewer resources. The performance of the energy, transport and telecommunications industries lagged behind those of the market economies.

In many areas their relative backwardness became a major factor contributing to the inefficient use of resources.

At the same time, inflexible and relatively low tariffs led to excess demand, and the intensity of service utilisation was much higher in Eastern Europe than in the developed economies. The intensity of goods transport (measured in ton-km per unit of GDP) was substantially higher than in OECD countries. (OECD, 1991, p 26). The performance of the transport sector also influenced working capital requirements in the manufacturing sector. Reliance on railways for transportation hindered inventory minimisation and increased costs in all the countries of the region.

In telecommunications, too, Eastern Europe was and is at the bottom of the European league. The average number of exchange lines per 100 population is 43 in Western Europe. In the East it is between 10 and 20 per 100. Moreover, the networks also suffered from technological backwardness due to autarchic development. The lack of technology transfer eliminated competitive pressure, often raised costs and cut Eastern public utilities off from the rapid changes in technology in the West. The annual loss of GDP in Hungary due to the low level of telecommunications has been estimated as 4 per cent to 5 per cent of GDP (Major, 1992. p.78).

Thus severe shortages, poor quality of service and lack of investment characterised the public utilities as they entered the era of transition to a market economy. The next issue is to consider what options are open to them.
7.2  A case study: utilities in Hungary

It is useful for illustrative purposes to consider how one country, Hungary, has responded to the issue of introducing competitive or private sector elements including franchising, into infrastructure industries. Hungary is chosen simply because its experience is better documented and because it is acknowledged as being one of the leaders in introducing private elements into its infrastructure industries. (For a general discussion, see Ordover et al, 1994).

The 1992 Law on the Management and Utilisation of Entrepreneurial Assets Permanently Remaining in State Ownership placed responsibility for most state owned enterprises in the State Holding Company (AVRt), although water, buses and rail remain under the control of the Ministry of Transport, Communications and Water Management.

Arrangements for concessions are governed by a 1991 Act on Concessions, amended in 1992 and 1994. The Act covers concessions in the following sectors covered by this paper: railways, the basic telecommunications network and associated frequencies, transport and storage of products by pipeline, telecommunications services and railway passenger and freight transport. Concessions may be granted to both domestic or foreign persons, on equal terms. The Act specifies an open tendering process, and limits the period of the concession to a maximum of 35 years. Concessions may not be traded. A suitable legal framework is thus in place.

In practice, a variety of instruments have been deployed to reform infrastructure industry. These have included private participation through concessions (employed to develop a national highways system), deregulation of entry (in the road transport system), privatisation of subsidiary activities (such as catering on the railways), the sale of strategic stakes (in airlines and telecommunications) and franchising of infrastructure construction and operation (also in telecommunications).

Reviewing our sectors of interest in more detail, in electricity, a 1995 law introduces competition in the supply of electricity to the transmission company. Plans also exist to privatise power plants. In gas, some transfer of assets has been achieved through a partial privatisation.

The rail transport sector is characterised by losses, amounting to over 1 per cent of GNP. With demand declining substantially, it is likely that the railway will have to be reduced. A 1993 Railway Act permits private railways and establishes a legal framework for separating ownership and management of tracks and related infrastructure from passenger and freight services.

Telecommunications remains the most developed sector. In 1993, a 30 per cent share in MATAV, the monopoly fixed link operator, was sold to a German/American consortium for $875 million. The arrangement gives the strategic investor substantial management control through the company's operating committee. MATAV was awarded a 25 year concession for international and domestic long-distance services and for 29 of 54 service areas. This concession lasts until 2002.

At the same time, 25 local service areas were chosen for separate franchises. Bids were received for 23 of them, and in 1994 14 areas were awarded to companies independent of MATAV, four to MATAV with a foreign party and five to MATAV alone. Fees paid by the franchises amounted to $80 million, and the franchisees accepted substantial investment obligations. Fee agreements required that Hungarian shareholders provide 25 per cent of the equity, and this is presenting difficulties with the fund raising process.
In addition, two 15 year concessions for paging operators have been awarded to consortia including foreign investors. In the mobile field, a concession for analogue cellular telephony was awarded in 1990 to a joint venture between MATAV and US West, and in September 1993, 15 year concessions for digital mobile systems were awarded to two competing firms, for fees totalling nearly $100 million.

7.3 The role of franchising in economies in transition

On the basis of the account in this paper on the nature of franchising and of the condition of network utilities in economies in transition and the range of policies employed in one of them, what can be said about the contribution which franchising in network utilities can make in those countries? The conditions governing the applicability of franchising set out in Section 6 apply in general terms to economies in transition, but certain special features of the latter enhance the scope for franchising in a number of areas.

These features are the general backwardness of the utilities, the tight budget constraint to which economies are subject and (partly in consequence of the latter) the urgent need to promote foreign direct investment. The backwardness of the utilities in particular raises the potential returns to private management. The general advantages of private participation include increased efficiency arising from private infrastructure financing, management and operations. One of the key elements in this context is the access to commercial managerial and technical expertise which private participation may make possible. In the circumstances, typically it is foreign private participation which is required. This can be achieved in a number of ways, including the sale of strategic stakes. However, it can also be achieved through granting of franchises or concessions. Examples are provided by the substantial foreign participation in telecommunications franchises in Hungary, noted above.

One of the advantages of private participation is that it creates pressures to bring tariffs into line with costs. It was noted above that one possible advantage of franchising as a means of encouraging private participation is that it permits private sector involvement in infrastructure, financing of unprofitable services and thus expands the area of private involvement. For an economy in transition with a budget deficit, however, there will be strong pressures to minimise such subsidies and a franchising round may provide a means of doing so.

Turning now to the four industries in question, foreign experience suggests that railways and telecommunications offer the best opportunities for franchising. In the case of the energy industries, the use of franchising in western countries is limited or non-existent, although the use of build, own and operate, or build, own and transfer arrangements is common, especially in electricity generation. The probable reason for this is that electricity generation is both potentially competitive, and potentially profitable. Energy distribution systems should also be able to cover their costs, so that use of privatisation is a natural method of inserting private capital into the sector.

Railways, by contrast, offer a potentially more fertile ground (Ordover and Pittman, 1994). Typically, railway infrastructures in economies in transition are extensive; their expansion has been made necessary by the remarkably high transport intensity of production in most countries. Rolling stock is normally of poor quality, and this contributes to a level of service which tends to be inadequate overall. At the same time, railway traffic, especially in suburban and urban areas, may be a means of reducing congestion and can confer beneficial externalities.

There is thus an opportunity for the use of franchising in the railway industry, perhaps especially in the provision of urban or suburban services. Contracts might take one of several forms. In one form,
service operators would provide their own rolling stock, while in another the franchiser would provide not only access to the track but also to the rolling stock. In many cases, the tender would take the form of a bid for a lump sum subsidy or equivalent, because of the loss making character of the service. The franchiser would have to commit to a fare structure. Ideally, this would involve fare increases in many cases. It may be more palatable for such fare increases to be charged by private sector franchised operators, provided that they were accompanied by improvements in service quality.

In the telecommunications field, a rather different issue arises. A debate has recently raged about whether it is appropriate for economies to introduce immediate liberalisation of the sector, or whether it is appropriate to have an interim period of restricted entry. In the case of Asian low income countries, Smith and Stable (1994) argue that:

"new entry and other “bottom up” measures for private sector development are likely to become increasingly important in Asia's LICs, and they may become the prevalent means of closing the gap between demand and supply. They may take several forms: competitive franchises granted to independent telephone companies in designated areas, re-franchising of unserved or underserved areas of the country, capital provided by municipalities or the private sector through a Build-Transfer (BT) scheme, or a joint venture." (pp. xv).

The experience of Hungary, noted above, suggests that the same argument can be applied in economies in transition. The advantages of franchising other operators are several: it is a means of bringing in foreign expertise; the profitability of the sector creates an opportunity for enhancing budget revenues; contracts can tie down the franchisee to readily verifiable levels of network roll-out, and a trade-off can be made between speed of roll-out and network fees; price control can simultaneously be exercised if appropriate; and admitting franchisees creates favourable conditions for subsequent liberalisation of entry in the sector as a whole after the period of exclusivity has expired, as operators can then invade one another's territories. These considerations suggest that the telecommunications field is a potentially fruitful one for franchising.

However, there is no necessary reason why franchising should be confined to service provision in railways and the construction of telecommunications infrastructures. In a recent paper, two World Bank economists have argued that:

"Governments should expand the scope for competition in the market where possible, e.g. between electricity generators. Governments should also let firms bid for remaining natural monopoly franchises and other take-over bids." (Klein and Roger, p 14)

They suggest that allowing firms to operate in multiple jurisdictions will help to reap the full benefit of franchise bidding, because of reputational effects. They also note that as a result of recent deregulation in franchise opportunities, an international infrastructure industry is emerging, which comprises some 150 large firms. They prefer franchising bidding to traditional utility regulation, because of increased opportunities for competition which it promises. In addition, because franchising is a relatively "light handed" form of regulation, the impositions which it makes upon limited legal, economic and administrative resources are smaller than is the case with many other forms of regulation.

In conclusion, economies in transition appear to offer fertile ground for franchising. Some of their characteristics make them particularly suitable for it. In this final section, a number of options have been suggested but policy makers in all countries should use their ingenuity to review the broad range of possibilities available to them.
Notes

1. Laffont and Tirole assume initially that bidders are symmetric, but an investment by the incumbent confers on it an advantage ex post.

2. It is widely recognised however that there are serious difficulties in seeking to calculate the effects of changes in the regulatory and ownership structures of particular sectors. There are, for example, a range of studies comparing the productive efficiency of public sector and investor-owned companies providing the same service (see, for example, Caves and Christensen, 1980; Foreman-Peck and Milward, 1994; Berry, 1994). Equally, attempts have been made to evaluate the impact of privatisation within the same sector. (See, for example, Haskel and Szymanski, 1994 and Bishop and Thompson, 1994).
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ALTERNATIVE TELECOMMUNICATIONS INFRASTRUCTURES:
THEIR COMPETITION POLICY AND MARKET STRUCTURE IMPLICATIONS

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In OECD countries where the telecommunications sector has been liberalised, a variety of alternative infrastructures for the delivery of service have been developed in addition to the conventional fixed link telecommunications networks, operating either as monopolies or in competition. Examples are: the supply of telecommunications services by cable television operators; the use of infrastructures owned by other utilities (for example, electricity companies) to provide telecommunications services; and growing use of wireless technologies, some offering mobile service (for example, DECT, GSM, PCS), others providing radio access.

The availability of these new technologies naturally raises key problems for government policy. Should owners of existing infrastructures be entitled to add telecommunications to the services which they provide, in competition with the Public Telecommunications Operator (PTO)? Should wireless services be permitted, and if so, should their use be confined to currently unserved areas? Should existing fixed-link operators be allowed to offer wireless services? What effect will these policies have on the goal of attaining universal coverage? And what form of industry-specific regulation or competition policy is likely to achieve governmental goals?

This paper addresses these issues in the context of economies in transition. Section 1 sets out the cost structures of the relevant infrastructures. Section 2 identifies the range of regulatory and competition policies towards alternative technologies open to governments, and discusses how those policies have developed in OECD countries. Section 3 identifies the principal characteristics of telecommunications in economies in transition, and identifies the principal strategies towards competition from alternative infrastructures available to their governments. Section 4 examines the regulatory and competition policies likely to sustain the strategies identified above, in terms of such issues as institutional design, price control, interconnection arrangements and obligations to increase coverage. The final section contains conclusions.

1. Cost structures of alternative telecommunications technologies

The aim of this section is to give a stylised account of how the costs of alternative infrastructures compare with those of a conventional telecommunications network, both for the local loop and for long-distance transmission.

For local access, the traditional telecommunications network is characterised by a copper or co-axial cable connecting each subscriber to a loop linked to a local exchange. In some countries fibre is replacing copper in parts of the loop, in some cases for large business subscribers only, in other cases (such as that for BT customers in the UK) for customers with five lines or more. However, fibre is not generally used for access to the home. It should be noted that countries with larger amounts of fibre in the loop enjoy a better quality of service. Economies in transition may fall behind in quality if they are slow in installing it.

The configuration of fixed networks yields a cost structure which is geared towards sunk costs (the trenches and ducts representing about 40 per cent of the annualised costs of operation); heavily skewed towards fixed costs; and incorporating a relatively high component of non-traffic sensitive costs. The resulting network exhibits some economies of scale in numbers of subscribers: up to a limit, an equal proportionate increase in subscribers and area served will reduce unit costs. There are also substantial economies of density: connecting more subscribers in a given service area will lower unit access costs.

A cable television network providing telecommunications services will exhibit a similar configuration of costs (predominantly sunk, fixed and non-traffic sensitive), with the obvious but crucial
distinction that there is a major economy of scope: the trenches and ducts in the loop are common to both broadcast and telecommunications services. This applies whether the two services are electronically integrated in a single wire, or whether separate wires carry entertainment and telecommunications services. When a customer subscribing to one service chooses to have the other, there will be a limited additional cost of connection, which can be causally attributed to supply of the new service, but the bulk of capital expenditure will be joint between both services.

The existence of this economy of scope makes it impossible to allocate many costs on a causal basis to one service or the other. This is a headache for regulators, but obviously potentially advantageous to customers and the operator, to the extent that costs are reduced from shared use of facilities.

Similar advantages would accrue if another utility with a local distribution network (for example, a gas or - more plausibly - electricity distribution company) used its infrastructure to provide telecommunications as an additional service. Examples of this in the local loop are infrequent, so that little information is available about the structure of the incremental costs of telecommunications in such cases.

Compared with wire-based technologies, wireless telecommunications services exhibit a different cost structure. With a given allocation of frequencies, a wireless network requires three forms of investment: in a handset for the subscriber; in base stations transmitting to and from subscribers; and in (normally) wire-based network connecting base stations to one another or to the facilities of other operators.

The key difference is that initial fixed investment in a wireless system is much less than in a wire-based network. When traffic is low, base stations can be relatively distant from one another, without overloading the available spectrum. As traffic grows, more base stations are required, in order to split and reduce the size of existing call areas, thereby allowing the re-use of scarce frequency. There will be complicated trade-offs involving the cost and weight of the hand-set, the amount of spectrum utilised and the number of base stations. But compared with a fixed network, the long-run costs are weighted far more heavily towards the traffic sensitive category. Moreover, a relatively small proportion of capital investment is sunk, as both hand-sets and base stations can be sold and relocated. These characteristics apply both to mobile radio services, such as cellular or PCS, and to fixed radio access services, in which the subscriber's existing telephone is connected to an aerial on the roof which transmits to and receives from a base station.

Table 1 summarises the cost characteristics of the technologies described. Clearly, their relative costs depend upon the area served. Other things being equal, the substantial economies of density of wire-based services make them more suitable for use in highly populated areas. The costs of wireless technologies are broadly insensitive to density, within a range given by the technical parameters of the base station. However, these costings depend upon commercial and regulatory decisions. For example, the use of overground (pole-based) distribution can substantially reduce the costs of a fixed network, even in less densely populated areas.

The alternative technologies available for long-distance transmission can be described more briefly. Long-distance networks exhibit a common technology, the modern version of which is a fibre transmission network connecting digital exchanges, although copper transmission and analog exchanges also survive. Microwave transmission can be used in principle, but it is not generally commercially viable, except in conditions of scarce capacity. As a result, the principal "alternative technology" is to lay the transmission medium along some other infrastructure, for example, a railway network, canals or a high
voltage electricity transmission mechanism or grid. The savings are thus greater ease and lower cost of rolling out the network and (in some cases) freedom from the obligation to pay royalties to land owners.

Deriving comparative cost estimates for the alternative infrastructures is a complex process. Typically, it can be done only by constructing engineering economic models of the costs of serving different environments (see Calhoun, 1992; Reed, 1992; Cave et al, 1994, Annex). However, these estimates are highly sensitive to input prices, and labour costs in particular are considerably lower in economies in transition than in the majority of OECD countries.

Table 1. Cost characteristics of local access technologies

<table>
<thead>
<tr>
<th></th>
<th>Fixed link Telecommunications</th>
<th>CATV Network</th>
<th>Fixed Radio</th>
<th>Mobile Radio (e.g. PCS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed/variable ration</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Sunk/salvageable ratio</td>
<td>High</td>
<td>Medium*</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Traffic sensitive/non-</td>
<td>Low</td>
<td>Medium*</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>traffic sensitive ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economies of scale</td>
<td>Medium</td>
<td>Medium</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td>Economies of density</td>
<td>Large</td>
<td>Large</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td>Economies of scope</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Possibly**</td>
</tr>
<tr>
<td>Initial Investment</td>
<td>Large</td>
<td>Medium</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td>required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requires special hand set</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Assumes trench and duct costs shared between services
** With paging

Despite this, cost estimates from UK or US studies may give broad orders of magnitude of comparative costs, although they urgently need supplementation by studies based upon economies in transition. Available UK and US studies suggest the following conclusions. The cost per home passed of a CATV network exceeds that of a telecommunications network. However, the incremental cost of provision of telecommunications service by an existing CATV operator is a small fraction of the total cost of the provision of the same service by a telecoms operator. If the subscriber is already connected to the CATV system to receive entertainment services, the disparity is even greater. Thus it is cost-effective to use of CATV as an infrastructure to provide telecommunications services on an incremental basis.

Comparisons between fixed link and radio technologies are highly sensitive to the assumed environment. As a general rule, radio is more likely to be cost effective in low density areas and in serving subscribers who use the telephone for a relatively few minutes per day. Because of its less sophisticated technology, fixed radio access is cheaper than mobile networks such as PCS. Comparisons are, however, critically dependent upon the major investment cost - the price of the hand set or fixed radio terminal. Moreover, fixed radio access has not yet been tested in a commercial environment.
Figure 1 shows for illustrative purposes how annualised lifetime costs of underground copper and radio-based networks depend on subscriber density. The key feature is that, beyond a subscriber density in the region of one per square kilometre, radio-based costs are constant. Fixed link costs per subscriber, by contrast, decline very sharply at first, and continue to decline more slowly at high subscriber density. It is a matter for further study where the cross-over point occurs in economies in transition. However, rough adjustments made to studies based upon US and UK data suggest that the cross-over point is likely to occur at densities of the order of 200 to 800 per square kilometre. Moreover, technical developments in the field of copper distribution networks are likely to be exhausted, whereas cost savings in PCS networks are still likely to occur. It is thus reasonable to suppose that the comparative advantage of PCS networks will, over the next decade, extend to areas of higher subscriber density.

### Figure 1. Illustrative costs of wireline and wireless (PCS) systems

<table>
<thead>
<tr>
<th>Annualised cost per line</th>
<th>Copper 1995 &amp; 2005</th>
<th>PCS 1995</th>
<th>PCS 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
<td>1000</td>
<td>10000</td>
</tr>
</tbody>
</table>

Substrate density per square kilometre (log scale)

Studies of this kind, however, cost the construction of networks from scratch. If the essential infrastructure for an underground copper network, (the trenches and ducts) is already in place, then the further costs associated with a fixed link network will be substantially reduced, and the relative benefits of PCS diminished.

It is also important to recognise that the nature of fixed link networks will also change, with fibre being increasingly extended into the local loop, especially for business customers. While at present prices, fibre does not offer a lower cost per line than underground copper, world-wide developments in the next decade are likely to reverse this ranking, and developments in business demand are likely to make fibre essential in certain applications.

These tentative conclusions are brought together in Table 2 which indicates the author’s estimates of the least cost technologies for provision of the local loop in 1995 and projections for 2005 for the categories of subscribers indicated, on the basis of de novo construction.

Table 2 brings out in a clear way the possible crucial role of alternative telecommunications infrastructures. In conditions of line shortage, it seems certain that use of an existing CATV network to provide communications services is cost-reducing compared with construction of a new telecommunications network, provided that the CATV network is appropriately configured. But it is also likely that radio-based technologies have a major and increasing role to play in the development of telecommunications systems in economies in transition.
It is also important to note that the deployment of alternative infrastructures can confer considerable benefits on subscribers in the countries in question, and more generally upon their economic development. Radio-based technologies make it possible to roll out a network quickly, without the very considerable early investments associated with fixed link networks. They are equally applicable in urban and rural areas. These two characteristics make it possible to extend the coverage of the telecommunications network, both in terms of lines built and in terms of geographical areas served, much more quickly than is the case with fixed link networks. Their potential in meeting universal service goals is therefore considerable.

Equally, the development of alternative infrastructures creates immediate opportunities for the introduction of competition, not present when a country or a region is served exclusively by a single fixed link network. There is already evidence from several studies of OECD countries and elsewhere that the introduction of competition is associated with lower prices, higher quality of service and higher and faster rates of penetration (OECD, 1994; Baer, 1995). Although it is difficult rigorously to identify the cause and effect relationships in operation here, there is mounting evidence of the beneficial effects of competition in the sector. While it would be a mistake automatically to extend this conclusion to economies in transition, at the very least the development of alternative infrastructures creates opportunities for introducing competition which are not present in countries with a unitary telecommunications sector.

Table 2. Projected least-cost technologies for local loop

<table>
<thead>
<tr>
<th></th>
<th>City Centre</th>
<th>Urban</th>
<th>Rural</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - 1995</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>Copper</td>
<td>Copper</td>
<td>Copper</td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td>Fibre</td>
<td></td>
<td>Copper</td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td>Copper</td>
<td>Copper</td>
<td>Copper</td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td>CATV</td>
<td>CATV</td>
<td>Wireless</td>
<td>Wireless</td>
</tr>
<tr>
<td>B - 2005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>Copper</td>
<td>Copper</td>
<td>Wireless</td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td>Fibre</td>
<td>Fibre</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wireless</td>
<td>Wireless</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>Copper</td>
<td>CATV</td>
<td>Wireless</td>
<td>Wireless</td>
</tr>
<tr>
<td></td>
<td>CATV</td>
<td>Wireless</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fibre</td>
<td>Wireless</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Regulation of alternative infrastructures in selected OECD countries

The OECD countries exhibit a range of approaches towards the use of alternative infrastructures. The situation with respect to selected countries is shown in Table 3. This section elaborates on the Table by discussing particular examples.
Within the United Kingdom, with the exception of international telecommunications services, there is free entry into the market to build infrastructure and offer services. This liberalisation has operated since 1991, and followed a seven year period of duopoly. Since 1991, licences have been granted to about 50 telecommunications operators, and in addition approximately 60 cable operators have been licensed to provide telecommunications services. The policy has elicited proposals to provide service using a number of alternative technologies. In the long distance market, Energis has developed a network built upon the infrastructure of the United Kingdom’s electricity grid. A licence has also been issued to an operator proposing to use the banks of the canal system to lay long distance fibre.

In the local access market, the majority of cable companies in operation now offer telecommunications services, at rates which under-cut the tariffs of the dominant incumbent by approximately 10 per cent, in both access and usage charges. Subscribers to the company's broadcasting and telecommunications services typically receive additional discounts. In addition to these wire-based technologies, a number of firms have entered the market using fixed or mobile wireless technologies. From 1995, Ionica proposes to utilise a fixed wireless technology. Two PCS operators, which began operation in 1993 and 1994, are marketing services to residential and business customers as a substitute for a fixed link service. In particular, Mercury One-2-One offers free local calls at off-peak hours on its residential tariff, and one of its business tariffs offers calls from a specified address at rates which under-cut BT’s call charges.

Table 3. Regulation of entry using alternative infrastructures in selected OECD countries

<table>
<thead>
<tr>
<th>Competing Telecom Operators</th>
<th>CATV operators can provide telecoms services</th>
<th>Other utilities can provide local service</th>
<th>Fixed radio licensed</th>
<th>No. of mobile network operators</th>
<th>No. of PCS network operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Long distance International</td>
<td>Australia D D D</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>Finland C C C</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>France M M M</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Germany M M M</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Japan C C C</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>New Zealand C C C</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Sweden C C C</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>UK C C D</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>US PC C C</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

C) Competition  
D) Duopoly  
M) Monopoly  
PC) Partial Competition
It is too early to predict the long-term effect of these entrants using alternative technologies. However, cable companies now provide a service to 14 per cent of the customers whose premises they pass. PCS operators have attracted approximately 200,000 subscribers in addition to the more than two million subscribers of the cellular networks established in the 1980s. Energis claims to undercut the long-distance rates of both BT and Mercury by about 20 per cent. The other services mentioned above have not yet come into operation.

Similar examples can be given from other OECD countries, although the effects of liberalisation of alternative infrastructures are less evident there than in the UK. In regulatory terms, the key recent development in Europe has been the November 1994 acceptance by the Council of Ministers of the European Union of a Commission proposal to liberalise the use of alternative delivery technologies from 1 January 1998. This coincides with the agreed liberalisation of telecommunications services (subject to transitional arrangements for certain member states). The key principle underlying the November 1994 agreement is that "providers of telecommunications services which are open to competition should have a free choice of the underlying infrastructure for the delivery of such services" (EC, 1994b). Use of the cable television infrastructure in such delivery is particularly emphasised in the document.

While these developments have been occurring in the European Union, legislators in the United States have developed a variety of proposals for the entry of PTOs into entertainment and of cable television operators into telecommunications services. While attempts in 1994 to pass a new Communications Act, explicitly permitting competition of this kind, were unsuccessful, a new Bill has been introduced in 1995. At the same time, the US courts are progressively breaking down the barriers to such cross entry. In other non-European Union OECD countries, the trend towards liberalising use of alternative infrastructures can also be observed.

3. **Telecommunications strategies for economies in transition are characterised by:**

(a) generally low levels of development of the telecommunications network, yielding penetration rates about one third or one half (or in some cases even lower) than the OECD average;

(b) relatively obsolete technologies, partly as a result of trade embargoes; and

(c) price structures which fail to reflect costs (in particular, the price of access and of local calls is typically too low, and that of national and international calls too high.)

The governments also inherited from the previous regimes publicly owned monopoly networks, in which the tasks of operation and regulation were combined in a single ministry.

The last four years or so have seen considerable changes in these arrangements. Entry has occurred, particularly in mobile networks. Foreign capital and technology have been mobilised to provide the necessary investments, through the granting of licences to consortia containing foreign operators, through the sale of strategic stakes, sometimes combined with management contracts, to foreign operators, and through other means. In some countries, plans have been carried out or are in place to sell part of the network to the domestic population, through voucher schemes or otherwise. Franchising has also been employed.
Concurrently, there have been developments in regulatory arrangements. In some countries, regulatory departments have been established, typically within the relevant ministry, to supervise firms in the industry. Regulation is thus increasingly separated from operation.

Some progress has also been made in the rebalancing of prices. This has involved the painful process of increasing the price of access in real terms, in circumstances where real incomes have declined. At the same time, long distance and international call charges have sometimes been cut in real terms.

While regulatory and price changes can be accomplished relatively swiftly, despite their political difficulties, the extension of coverage and general increases in the penetration rate are longer term problems. They have been addressed in various ways: by imposing investment obligations upon newly privatised or partly privatised incumbents; by allowing new licensees to construct overlay networks in competition with the incumbent; or by offering franchises to new operators prepared to develop networks in unserved areas, on the basis of a licence granting exclusivity for a specified period of years.

This brief summary makes it clear that economies in transition have ambitious plans to develop and reform their telecommunications networks. However, they do so against the difficult background of a low starting point and an inefficient set of prices. They typically have to balance a number of conflicting considerations: the desire to develop competition against the need to offer some limited exclusivity in order to attract investment for network expansion; the need to attract foreign capital and technology against reluctance to see majority ownership of the dominant carrier fall into foreign hands; and the need to raise and rebalance tariffs in order to fund further investment against the political unpopularity of such price increases.

In terms of overall strategies, these considerations suggest that one of two broad options must be adopted (with numerous sub-choices for each option). The first is to acknowledge the need to restrict competition for a period of years, while the network is developed with the assistance of foreign capital and prices are adjusted, thus permitting the opening up of competition subsequently. This adjustment will involve both an increase in the overall levels of tariffs, and a rebalancing of them. The time required for this process will depend upon initial penetration rates and tariff levels. It is desirable that it should be minimised, and in most cases it should not exceed five years. Moreover, the regulatory authority should commit itself to a particular maximum period. Failure on the part of the incumbent to meet interim targets should reduce (and certainly not extend) the period of exclusivity.

The second approach is to open up competition sooner by an immediate liberalisation of entry, thus attracting (potentially) a variety of new operators, whose desire to enter profitable markets will place much stronger pressure upon the incumbent to rebalance tariffs. This approach will also permit an earlier liberalisation of prices, provided competition is included in all (or at least most) segments of the market.

Under the former policy regime, the scope for alternative fixed link technologies is limited. An exception can perhaps be made for cable television networks, which could be allowed to supply telecommunications services to residential areas, thus expanding coverage in conditions when PTO may be concentrating upon meeting business demands. Provided CATV operators are unable to enter the long-distance market, the PTO will be able to maintain a substantial flow of cross-subsidies to its access and local calls business.

In this regime, mobile services can to some degree be detached from fixed services, provided that the former do not jeopardise the revenues of the latter. In situations where prices are being kept artificially low and there is a substantial excess demand at those prices, the PTO will not lose revenues in the short run as a result of the introduction of mobile telephony. Each customer lost to such services will merely
reduce the length of the queue waiting for PTO service, and the PTO will also gain from increased long-distance revenue. For the purpose of developing competition subsequently, it may thus be desirable to license another operator than the PTO to provide mobile service, or, if several mobile operators are licensed, to ensure that some are new operators and that the PTO cannot favour the mobile operator with which it is affiliated.

The alternative regime of earlier liberalisation of competition has been recommended by the OECD in its work on the Central and Eastern European economies and NIS countries and in a recent World Bank paper on telecommunications in Asia (Smith and Staple, 1994). It would involve permitting immediate use of all possible infrastructures, including permission for CATV networks to serve business and residential customers, and to interconnect with alternative long distance operators. It would also permit the use of fixed or mobile radio access as a substitute for wire-based access.

It is impossible to say which of these broad approaches is preferable. Not only will the answer depend upon the circumstances of each particular case, but many of the data required to evaluate the alternatives are not available. In qualitative terms, however, we would expect the second strategy, which involves immediate use of alternative infrastructures to be preferable:

(a) the higher the level of per capita income;
(b) the greater the initial level of penetration;
(c) the greater the variance of population density (which would make the use of a variety of technologies more desirable);
(d) the more cost-reflective the initial tariff structure;
(e) the lower the relative costs of the alternative infrastructures;
(f) the more stable and predictable the regulatory regime.

4. Regulation and competition policies to sustain the chosen strategies

It is useful to distinguish between policy-making and regulation in telecommunications. The former involves determining the general framework of the industry, required to achieve broad objectives set at a political level relating to such matters as ownership, industry structure, spectrum allocation and social objectives. The regulator then implements the chosen policies in detail. A precise demarcation between the two functions is difficult, and allocation of responsibilities between a government department or independent agency as regulator will vary from country to country. But once the major strategic decisions of the kind described in the previous section have been taken, more detailed regulatory interventions are required, within some specified legislative framework.

The legislative framework for the control of telecommunications (and other utilities) can take broadly four forms. If the PTO is a central government department, it will be governed by legislation covering similar government activities such as health and defence. Typically the legislature will vote it funds in addition to the revenues it collects and assign it other targets and performance standards.

A second variant, consistent with both public and private ownership, is to establish the operator as a corporation regulated under appropriate legislation by a government department. The relevant
legislation may grant a public corporation immunity from the provisions of competition acts. A third variant is for legislation to establish an independent industry-specific regulatory agency, the members of which are typically appointed by the Government, endowed with specified powers and duties. These may be of a general nature, with day to day regulation being determined by the more flexible provisions of a licence. The regulated firm may also be exempt from certain provisions of competition law. Fourthly, the operator may be subject only to ordinary competition law, and free from industry-specific regulatory control.

The first variant describes the position of the telecommunications ministries of the former Communist regimes. The second variant is illustrated both by many economies in transition and by the regulatory regime currently in place in France and Germany. The third regime applies in many OECD countries, and also in certain economies in transition such as Hungary and the Czech Republic. (In practice, because regulatory powers are shared between the Government and the independent regulatory agency the distinction between the second and the third regimes is not absolute.) The principal or only exponent of the fourth approach is New Zealand. In that country, competition issues in the telecommunications industry are resolved under the Commerce Act, the country's general purpose competition legislation - and enforced through the courts.

Only variants two to four above can apply in a regime of private ownership. Accordingly, any economy wishing to permit private telecommunications firms must choose from those options. It is impossible to be categorical about the choice, as it must depend upon the Government's objectives, political traditions and the starting point of the industry. However, if the aims of telecommunications policy include the development of the network or networks through substantial injections of funds and a competitive market structure (utilising all available technologies), either at once or with a lag, then it is possible to make a tentative evaluation of the choices available.

Firstly, reliance upon general competition law alone runs the risk of protracted legal proceedings with an uncertain outcome. Even in a country such as New Zealand with a well established competition law, the strains placed upon it by competition issues arising in network utilities have been severe. The resolution of the issues is lengthy, costly (both directly through litigation costs and indirectly through costs of delay) and uncertain. Much of this is due to the novelty of the issues, and the resulting lack of clear principles. This problem has partly been resolved in New Zealand, but in economies in transition, where competition legislation has only recently been passed, sole reliance on competition law to regulate the telecommunications sector might be hazardous.

This does not mean that telecommunications firms should be immune to the provisions of the general competition law. Indeed, such provisions can not only be applied in general ex post, but may also be written into operators' licences. For example, it has been suggested that a provision equivalent to Article 86 of the Treaty of Rome should be written into the licences granted to UK telecommunications operators by the Department of Trade and Industry and governing their provision of regulated services; as a result, the Article would be enforced both by the regulatory agency - OFTEL - and by the courts. (This proposal is discussed in OFTEL, 1994.) In addition, other UK competition agencies such as the Office of Fair Trading and the Monopolies and Mergers Commission police unregulated sectors.

The choice between regulation by a relevant Government department or by an independent regulatory agency is a more difficult one. It is likely that one of the aims of regulation will be to develop a stable and predictable framework for operators and their investors. In many countries, it is likely that this is best achieved by detaching regulation to some degree from the political process through the creation of an independent agency. However, in other circumstances such independence is not credible and provides little comfort to investors. Maintaining regulation within the Ministry may be more realistic in such cases.
On the assumption, then, that there is both a regulator (independent or Government Ministry) and a competition authority, what tasks is the regulator likely to be given?

The list will include the following issues:

1. **Licensing of operators**

   The regulator is likely to have to provide a licence for all operators, setting out their rights and obligations. Such licences should be specific (to avoid regulatory uncertainty) and in the public domain. Where they are allocated on a competitive basis, the process should be as transparent as possible. (For a discussion of licensing issues in the mobile sector, see the recent EC Green Paper on Mobile Telecommunications (EC, 1994a)).

2. **Line of business restrictions**

   The regulator may choose to limit the participation of the dominant telecommunications firm in certain activities - for example - cable television, in order to promote entry (see 10 below). Alternatively, if such entry is permitted, it is likely that regulatory safeguards will have to be put in place to prohibit cross-subsidy (see 11 below).

3. **Control of retail prices**

   Both during the period of exclusivity and while the PTO remains the overwhelmingly dominant operator, some form of price control will be necessary. This can be achieved either through a price cap or rate of return regulatory system. As competition develops, the need for controls on price levels will naturally decline. At the same time however the regulators may wish to switch their attention to the structure rather than level of prices. This is because increased competition will generate pressure for the dominant PTO to rebalance its rates, bringing them more into line with costs of service. There may be valid political and distributional reasons for the regulator to resist that trend.

   There are two reasons why regulators rather than competition authorities should normally be charged with administering price controls. In the first place, regulators will probably find it easier to accumulate and master the industry specific information required. Secondly, if a competition agency is given the power to directly control prices, it may neglect its more usual mandate of indirectly fostering efficient pricing through preserving and enhancing competition.

4. **Control over roll-out of the network**

   Typically the regulatory agency will choose in an articulated way (a) the market structure, (b) the level of the price control and (c) the speed of roll-out. Thus price rises permitted may be made conditional upon the attainment of coverage targets.

5. **Control of interconnection charges**

   This issue assumes particular importance in the competitive variant for fixed services, or, in view of the increasing potential for substitution between fixed and mobile services, when a monopoly PTO
interconnects with one or more mobile networks. If there are several mobile networks, one of which the monopoly PTO owns, the need to regulate interconnection will be more intense, because the PTO will have the opportunity to raise the costs of rival mobile services through high interconnection charges. Regulation here will have to cover (a) the requirement to interconnect, (b) the form of interconnection, (c) the quality of interconnection and (d) the price of interconnection. It has recently been suggested (WIK, 1994), that many of these issues can be left to negotiation between the parties, with the regulator having the power to arbitrate if agreement is not reached. The regulator may, however, have to specify ex ante the appropriate approach for pricing interconnection, possibly in the form of upper and lower bands. It must ensure that the dominant PTO does not appropriate for itself the benefits potentially available to consumers from the greater efficiency and innovative potential of new entrants.

6. **Universal service obligations**

Issues of coverage and of targeted subsidies have been noted above. The regulator may, however, wish to impose uniformity of tariffs to be charged to subscribers with differing costs. In conditions of competition, the regulator may also wish to require operators to contribute to a universal services fund or in some other way, where obligations are imposed asymmetrically upon one operator. This approach has recently been elaborated in Part II of the European Commission's Green Paper on infrastructure liberalisation (EC, 1995).

7. **Quality of service and consumer protection**

Monopoly or dominant operators have few incentives to offer high quality service, and the regulator may have to set standards and impose penalties for failure to achieve them. Regulators may also be required to deal with disputes over such matters as billing.

8. **Numbering**

Traditionally, the monopoly PTO has allocated telephone numbers to subscribers. With competition, this arrangement can confer competitive advantage on the incumbent. The regulatory agency will have to assume this task, and may wish to require number portability - allowing subscribers to change operator at a given location without changing their number.

9. **Equal access**

If entrants in long distance and international markets face an integrated incumbent dominating the access and local market, the regulator may wish to impose equal access - allowing all subscribers to choose their long distance operator on equal terms.

10. **Entry promotion**

Either as a deliberate policy, or as a means of counterbalancing incumbent's advantages deriving from control of numbering or absence of equal access, the regulator may offer temporary or conditional entry assistance, notably in the form of abating interconnection charges. As entry occurs or the advantages of incumbency are removed, the justification for such assistance will be weakened.
11. Availability of accounting data

In order to carry out the tasks noted above, the regulator will need access to cost data. It may, therefore, be necessary to impose reporting obligations and cost allocation procedures. These may involve some form of accounting separation between different parts of the dominant operator's business. Such accounting requirements will also help the competition authorities fulfil their particular tasks.

The competition authority should be charged with enforcing either the general economy-wide or any telecommunications specific prohibitions of anti-competitive practices, such as predatory pricing and tying. Note that the balance of effort between this and the eleven regulatory functions listed above will vary considerably as competition develops. The regulation of a monopoly operator is comparatively straightforward, as is the "regulation" (through generally applicable competition rules) of a market which is effectively competitive. However, the transition from the former state to the latter is likely to require frequent interventions. In particular, the regulator will have to neutralise competitive disadvantages under which entrants suffer, and control the incumbent's price and quality of service. Interconnection arrangements will be a key issue at this stage. As competition develops, the market increasingly regulates price and quality for some services, and the focus may switch to devising methods of funding universal service obligation consistent with competition and control of predation and cross-subsidy. Ultimately, the need for industry-specific regulation will disappear, but until this stage is reached, it is likely that regulatory authority will be shared between the industry-specific regulator and the competition authority.

In some administrations, such as the UK, the task of the competition authority has been reduced to joint enforcement with the industry-specific regulator of competition rules in markets such as customer premises equipment, or value added services which are not subject to specific regulation. In others, such as Germany and the United States, the enforcer of competition law has broader powers of intervention. However, it is desirable that the competition authority have a statutory right to obtain information and to advise on regulatory decisions significantly affecting the degree of competition in the sector, especially where other sectors (such as broadcasting) are also affected by the decisions.

Examples of such "overlapping regulation" are many. In the United States, the divestiture of the "Bell System" was initiated by the anti-trust authority and enforced through the Federal Courts. In the European Union, the Commission's Competition Directorate (DGIV) has issued guidelines on competition policy affecting telecommunications and has been jointly responsible (with DGXIII) for the recent Green Paper on the liberalisation of telecommunications infrastructures in the Union (EC, 1995). Such joint responsibility clearly creates a risk of confusing and even contradictory regulation. The work of the two agencies will therefore have to be closely co-ordinated.

5. Conclusions

(1) Alternative infrastructures offer the possibility of providing telecommunications services with a different structure of costs from a conventional telecommunications network. Where the services are provided in conjunction with others, economies of scope make the incremental costs of telecommunications services lower than the total costs of a dedicated telecommunications network. Fixed radio access and possibly mobile radio are also likely to have cost advantages over a fixed telecommunications network in particular circumstances.

(2) In those OECD countries where alternative infrastructures are permitted, increasing use is made of them. Within the European Union, their use will be liberalised from 1998.
(3) Policy towards alternative infrastructures in economies in transition must be guided by the general approach towards the sector, in particular by whether liberalisation is to be introduced immediately or deferred, in order to expand the network. In the former case it is desirable to permit use of alternative infrastructures as part of the general competitive process.

(4) When full competition is deferred, there is still scope for using alternative infrastructures in the interim. The provision of telecommunication services by CATV operators can mitigate scarcity of lines. Radio can be used to take coverage into unserved areas, either by the PTO or by a franchisee.

(5) Whichever strategy is pursued (immediate or deferred competition), it is desirable to set in place stable and predictable regulatory arrangements. These will often require the creation of a regulatory body, either independent or within a Ministry. That regulatory body will share certain functions with the competition authority.

(6) Tasks likely to be discharged by the regulator include: licensing of operators, price control, regulation of network expansion, regulation of interconnection and enforcement of universal service obligations. Subject to legal arrangements, the competition authority should be charged with the prohibition of anti-competitive practices.
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