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11.1 Introduction

In February 1985 the Minister for Housing and Construction announced in the House of Commons that the Government intended to examine the possibility of a "measure of privatization" in the water industry. An initial discussion paper was published in April of that year, and, after studying the responses to its contents and examining the issues, the Government presented a White Paper on water privatization to Parliament in February 1986. The White Paper set out a number of reasons for the decision to proceed with privatization in the industry and laid down the basis for the legislative proposals that the Government intended to put to Parliament "as soon as possible."

The original timetable called for the introduction of a paving Bill transforming the publicly owned water authorities into public limited companies in late 1986, completion of the legislative stage by mid-1987, and the flotation of the resulting companies, either individually or in groups, from late 1987 onwards. In the event, with a General Election impending in either 1987 or the first half of 1988 and the legislative proposals proving more difficult to implement than had originally been anticipated, the Environment Secretary announced in June 1986 that privatization of the water industry was to be deferred.

The Conservative Election Manifesto of 1987, however, reaffirmed the Government's intention to proceed with water privatization, and, following that party's victory in the June 1987 General Election, the proposals were quickly revived, albeit with a number of significant modifications that we will discuss below. The paving legislation will now be introduced to Parliament in 1988, and, if all goes to plan, it can be expected that flotations of the resulting companies will commence in 1989 or 1990.

Although the general thrust of Government policy toward the industry is now clear, many issues of detail remain to be resolved, particularly with respect to methods of regulation. The water industry shares many of the network and natural monopoly characteristics of telecommunications, gas

supply, and electricity supply, and much of our earlier analysis is therefore immediately applicable to this particular case. Rather than simply repeat these earlier arguments, however, we will, in this chapter, focus rather more on the special features of water supply and on their implications for regulatory policy. Three examples will suffice to illustrate the sorts of points we have in mind. First, the opportunities for increasing competition in the services provided by the industry are generally less favorable than in most of the other cases of privatization we have considered, and, in the search for improved economic efficiency, greater weight must necessarily be placed upon the development of effective regulation. Second, since the publicly owned water authorities have themselves been entrusted with regulatory functions with respect to a number of environmental issues, privatization necessarily involves a substantive reappraisal of the conduct of important aspects of environmental policy. Finally, at the moment, charges for many of the services supplied by water authorities are *not* quantity related (e.g. most domestic water supply is unmetered).

Even where regulatory issues are broadly similar to those we have considered in previous chapters, the trade-offs confronted in the water supply industry serve to bring certain dimensions of the problems into sharper focus. Two problems in particular merit special attention. The first concerns the quality of service provided. Given the structure of the industry, it is extremely unlikely that profit-maximizing firms, subject to price controls alone, would face an incentive structure conducive to the efficient choice of quality standards. As a consequence of this market failure, effective regulation will require that the privatized industry be subject to strict quality controls as well as price controls, and, in setting price and quality constraints, regulators will be compelled to take into account the trade-off between the two variables: higher quality standards will, by raising costs, lead to higher prices. Any notion that regulation need only concern itself with price controls is therefore fundamentally misguided, and should be abandoned at the outset.

The second issue of particular interest in the water supply case is the potential use of regulatory yardsticks. Unlike in telecommunications, gas, and electricity generation, the pre-privatization industry is already regionalized and current policy proposals rely upon the continuation of this structure. Thus, regulators will have access to information from a group of independent private companies and, as in electricity distribution, this will afford opportunities for the implementation of more efficient incentive structures. It remains to be seen whether or not these opportunities will actually be realized, but the existing structure of the

industry at least invites a thorough appraisal of the approach. In the analysis that follows, therefore, we will attempt to develop some of our earlier remarks on yardstick regulation.

In the light of these various points, the material in the remainder of this chapter is divided into three sections. Section 11.2 provides an account of the recent history and structure of the industry, up to and including the abortive attempt at privatization in 1985–1986. In section 11.3, after considering the scope for increasing competition in water supply (including the introduction of franchising) and the position of the existing statutory water companies, we concentrate upon three of the major issues that will arise in connection with the regulation of a privately owned industry: price controls, quality controls, and the use of regulatory yardsticks. Finally, section 11.4 contains an assessment of current Government proposals for the privatization of the industry.

11.2 The Water Industry in Britain

The proposals concerning water privatization that were set out in the 1986 White Paper related only to the industry in England and Wales (i.e. they did not include Scotland). This restriction, and the subsequent delay in the implementation of the policy, is partly explained by the evolution of the organizational framework of the industry in the postwar period. Before examining both the functions/activities of the existing public corporations and recent policy developments, we will therefore first consider this structural history. The key year in this period was 1973, when the industry in England and Wales was reorganized into ten regional water authorities.

11.2.1 The Organization of the Industry

Prior to 1973, the water industry in England and Wales was dominated by three categories of organization: water undertakings, sewerage and sewage disposal authorities, and river authorities. Responsibility for the supply and distribution of water was placed in the hands of the organizations in the first of these categories. Until the mid-1950s there existed over a thousand separate water undertakings, but thereafter numbers were substantially reduced by a process of consolidation aimed at achieving economies from increased scales of operation. Thus, by the early 1970s the number of water undertakings had fallen to 198, of which 64 were run by individual local government authorities and 101 by joint boards comprising more than one local government authority, and 33 were statutory privately owned water companies.

The sewerage and sewage disposal authorities were responsible for the treatment and disposal of water-borne wastes, and were run either by individual local government authorities or, in a relatively few cases, by joint boards of local authorities. Over 1,300 such organizations were in existence at the beginning of the 1970s.

The river authorities, of which there were 29 in 1971, came into being in 1965, and were responsible, among other things, for water conservation, land drainage, fisheries, control of river pollution, and, in some cases, navigation. Thus, for example, the river authorities controlled abstractions of surface and underground water (whether by water undertakings or by other parties) by means of a system of licensing, and regulated discharges of wastes into river systems through the allocation of discharge consents. The authorities were entitled to construct reservoirs, but not pipeline networks or treatment works, which were the responsibility of the water undertakings.

In addition to these principal types of institution, a number of other organizations were active in the industry prior to 1973. These included the Water Resources Board (a national agency entrusted with data collection, research, and planning for the industry as a whole), the British Waterways Board (responsible for canals and some river navigation), navigation authorities, and national drainage boards.

It can be seen, therefore, that the institutional structure of the water industry in England and Wales prior to 1973 was highly fragmented, with water supply, sewerage, and regulatory functions divided amongst a large number of relatively localized organizations. In many ways the structure resembles that of the prenationalization electricity and gas industries: public ownership was predominant but Government involvement in the industry occurred via local authorities. Likewise, the 1973 reorganization of the industry can usefully be compared with the nationalization (centralization) of the energy sectors that had taken place in the 1940s: the principal aim was to achieve economies of scale and scope associated with larger more integrated operations.

The guiding principle of the Water Act 1973, which established nine regional water authorities in England and the Welsh Water Authority, was that a single body should plan and control all uses of water in each river catchment, a principle generally known as "integrated river-basin management." Each water authority was entrusted with responsibility for water supply, sewerage, sewage disposal, water resource planning, pollution control, fisheries, flood protection, water recreation, and environmental conservation in its own area. Thus, not only were the major

activities of water supply, sewerage, and sewage disposal consolidated but they were also bundled together with a wide range of environmental and regulatory functions.

While the integrated river-basin management principle suggests the establishment of a separate authority for each river basin, the actual areas allocated to the water authorities by the 1973 Act reflected a compromise between this underlying principle and potential economies of scale and scope. Thus, given the small sizes of river systems in England and Wales, in practice the area covered by each of the water authorities typically contains more than one river basin. The important point, however, is that the legislation created organizations based on river catchment areas, rather than on artificial administrative boundaries that required separate bodies to be responsible for different parts of the same river system.

In principle, it would have been possible for the new water authorities to carry out their allocated functions whilst preserving local authority ownership of the bulk of the assets of the industry. If that course had been followed the authorities would have been responsible for contracting out water supply, sewerage, and sewage disposal to local authorities. In the event, however, it was decided that local government assets should also be transferred to the water authorities, although the Water Act 1973 made provision for local authorities to act as agents with respect to the discharge of sewerage duties. Thus, the new water authorities came into possession of substantial physical assets in the form of water mains, sewers, treatment works, and the like. Since the asset transfer was internal to the public sector, no compensation for the loss of assets was paid to local authorities—an outcome that has now become controversial in view of the impending privatization of the industry and the anticipated sales proceeds that will be derived by central, rather than local, government.

Following reorganization some local authority involvement in the control of the water authorities was retained in the form of representation on the boards of the new organizations. Until 1983 the authorities were run by relatively large boards with a majority of local authority representatives. However, the position was changed by the Water Act 1983, which provided for smaller boards that were designed to facilitate the introduction of a more commercial approach to the conduct of the businesses and all of whose members are appointed by ministers. The Act therefore served further to shift control of the authorities from local to central government and, in effect, it was only in 1983 that water became a full-fledged nationalized industry.

The statutory (privately owned) water companies escaped reorganization

in 1973, and were left to operate as before. They are unregistered companies, incorporated by individual Acts of Parliament (hence the title statutory), whose shares are quoted on the Stock Exchange. They are, however, subject to strict regulatory controls, which include restrictions on the amounts of share and loan capital that can be raised, the methods by which new share capital can be raised (which must be by auction or tender), rates of dividend on share capital, rates of interest on loan capital, amounts that may be put to reserve and contingency funds, and amounts of accumulated surpluses that may be carried forward from one year to the next. As with the prewar regulation of private gas and electricity companies, this regime was designed to prevent the exploitation of market power.

The continued operation of the statutory water companies was guaranteed by section 12 of the Water Act 1973. Where a statutory water company operates within the area of a water authority the legislation obliges the latter to discharge its water supply and distribution functions through the company. There now exist 28 such companies, which collectively supply water to about 25 percent of the households in England and Wales. They are not, however, involved in activities such as sewerage and sewage disposal.

Given the history of coexistence of publicly and privately owned firms in the British water industry, in evaluating the prospects for further privatization it would clearly be useful to know how the past performances of the two types of firms have compared. Unfortunately, most probably as a consequence of the difficulties in obtaining comparable data, there is little systematic evidence on this issue. Thus, studies of the type conducted in the U.S. water industry (see section 2.5) are notable for their absence in Britain, and we are therefore compelled to treat the question as unresolved.

The structure of the water industry in Scotland is somewhat different from that in England and Wales. Twelve Regional and Island Councils (local authorities) are responsible for water alongside other local services, and an organizational structure based upon administrative boundaries has therefore been preferred to one based upon the integrated river-basin management principle. We do not want to dwell upon the reasons for this particular decision, but simply note that factors such as differences in political institutions, physical geography, and settlement patterns contributed to the outcome. The important point to note, however, is that, as a consequence, the physical assets of the water industry in Scotland are not currently owned by public bodies that are responsible to the central government. Hence, any legislation to privatize the industry in Scotland

would require the disposal of *local* government assets. Given that most local government in Scotland is not controlled by the Conservative Party, and irrespective of whether the final destination of the sales proceeds would be the Exchequer or the relevant local authorities, it is unlikely that such a move would be politically attractive. Thus far, therefore, the Government has shown no inclination to grasp this particular thistle.

11.2.2 Functions and Activities of the Water Authorities

Taken together, the water authorities in England and Wales currently employ around 50,000 people and have an annual turnover in excess of £2.6 billion. Their capital expenditure in 1986–1987 was over £900 million and the value of total net assets, calculated on a replacement cost basis, is estimated to exceed £27 billion. These assets include about 139,000 miles of water mains, 141,000 miles of sewers, 6,500 sewage treatment works, and 800 water treatment works. Thus, the industry is highly capital intensive, with assets per employee of over £0.5 million in 1987 prices.

As explained above, implementation of the principle of integrated river-basin management in 1973 has led to a situation in which the authorities are required to carry out a very wide range of functions. These can be grouped into three general categories: *operational activities* (the supply of water, and the treatment and disposal of liquid wastes), *environmental regulation* (the planning and regulation of water resources and uses, control of the quality of river and drinking water, control of waste disposal, fisheries, and navigation), and *community services* (whose beneficiaries are not identified for charging purposes, and which include land drainage and flood protection, highway drainage, wildlife conservation, amenity, and recreation).

Of these categories, operational activities account for the great bulk of both costs and revenues, and it is upon these functions that most of our analysis will be focused. Nevertheless, the question of how best to deal with the environmental regulation and community service functions in the context of private ownership of the industry has substantial implications for any evaluation of the overall benefits of privatization, and we will touch upon this issue at various points in the following discussion. It will therefore be useful to set out in more detail the principal features of each of the existing activities of the water authorities. Briefly, they are as follows.

Water conservation Water authorities have the statutory duty of water conservation, with each authority having control of the function in its own area. This involves the planning of water resources, provision to meet

demand for water, and the ownership and management of reservoirs, aquifers, and gathering grounds.

Water supply and distribution This function consists of the pumping and treatment of raw water, and the ownership and management of treatment works, service reservoirs, and the mains network. It is partially discharged through the statutory water companies.

Control of drinking water quality Drinking water standards are laid down by the European Community Drinking Water Directive, and these must, in law, be enforced by the Government. The water authorities are required to meet these prescribed standards but, where it is satisfied that there is no public health risk, the U.K. Department of the Environment is permitted to authorize delays or derogations.

Sewerage Water authorities have a statutory duty to provide public sewers to drain their areas effectively. They are also required to endeavor to make arrangements to discharge this function through local authorities acting on an agency basis, and this type of relationship with local authorities is the norm in the industry. The activity consists chiefly in owning and maintaining the sewer network, and thereby providing a means of transporting domestic water-borne wastes, surface water run-off, and liquid trade-effluent discharges either to a treatment works or, less frequently, directly to a receiving watercourse.

Sewage treatment and disposal This involves the ownership and management of treatment works, wherein water-borne wastes are rendered acceptable for discharge into watercourses, and the disposal of sludge residues from the process.

River management Among the duties of the water authorities falling under this heading are planning the use of rivers, monitoring the quality of river water, and licensing any abstractions of water from rivers.

Regulation of discharges The water authorities are entrusted with the allocation of rights ("consents") to discharge wastes into watercourses, although, in the case of discharges by the authorities themselves, consents are granted by the Secretary of State for the Environment.

Land drainage, flood protection, and sea defense The authorities have a

statutory duty to exercise general supervision over all aspects of land drainage and flood protection in their areas, and have some powers to carry out improvement and maintenance work on their own account.

Navigation Obligations imposed upon the authorities with respect to navigation include duties to keep channels open for traffic, to license boats using the rivers, and to make and police bylaws governing the use of rivers for navigational purposes.

Fisheries Water authorities have the duty to maintain, improve, and develop fisheries, and to regulate the use of these fisheries via the allocation of licenses and the passing of bylaws.

Nature conservation Water authorities have duties to have regard to the preservation and conservation of flora and fauna, to further nature conservation, and to protect sites of special scientific interest.

Amenity and recreation The authorities are required to secure the use of water and land associated with water for the purposes of recreation (principally angling and boating).

By way of drawing attention to the multifarious duties carried out by the water authorities under the integrated river-basin management system, the 1986 White Paper quoted the example of Thames Water, which is the largest and most profitable of the authorities in England and Wales. The River Thames catchment area covered by the authority supports 3,500 water abstractions: 1,200 for agriculture, 500 for water supplies (by the Thames Water Authority itself and by the eight statutory water companies that operate, either entirely or partially, within its area), and 1,800 for industrial and other uses. These abstractions are regulated and managed by Thames Water to ensure that they do not unduly lower the level of the river and thereby threaten natural life in the area or substantively interfere with recreational use of the river and its tributaries. The Authority now issues about 193,000 rod licenses per annum for fishing and there are about 19,000 boats which are registered to use the river. Finally, Thames Water must regulate discharges into the river and its tributaries so as to prevent pollution that would have detrimental effects on water supplies, wild life, and recreational activities.

As noted above, however, in financial terms it is the operational functions that dominate the activity of the water authorities. This can be

Table 11.1 Water Authorities' operating and capital expenditures in 1984-1985

Function	Operating expenditure		Capital expenditure	
	Amount (£ million)	Percentage	Amount (£ million)	Percentage
Water supply	579	46.0	261	33.0
Sewerage	161	13.0	239	30.0
Sewage treatment	366	29.0	148	18.5
Water resources	54	4.5	27	3.0
Land drainage	54	4.5	58	7.0
Environmental	40	3.0	3	0.5
Other	-	-	61	8.0
Total	1254	100.0	797	100.0

Source: Department of the Environment (1986).

seen from table 11.1, which provides a breakdown of operating and capital expenditures by the ten authorities in 1984-1985. Thus, in that year, the main activities of water supply, sewerage, and sewage treatment accounted for 88 percent and 81 percent of operational and capital expenditures respectively.

A similar picture emerges if the activities of the water authorities are broken down according to their contributions to turnover. Table 11.2 provides illustrative figures drawn from the accounts of the Severn Trent Authority for 1984-1985, which show that water supply and sewerage charges together accounted for about 83 percent of total turnover. In contrast, income from land drainage and environmental activities amounted to only about 5 percent of the Authority's income. The table also illustrates the point that much of the income of the water authorities is derived from the provision of unmetered services. Thus, charges for the great majority of domestic consumers are based not upon the quantities of services supplied, but rather on the rateable value of the relevant dwelling. That is, the amount payable by each household is some designated fraction—which varies from area to area and is changed each year by the water authorities—of the property's rateable value, which in turn is estimated on the basis of the rent that the property is anticipated to command if let on the open market. However, since the Government plans to abolish the domestic rating system, unless current legislative proposals are withdrawn this method of charging will necessarily be in need of reform in the near future, a point to which we will return in section 11.3.3.

11.2.3 Recent Policy Developments

The story of recent Government policy towards the water industry in

Table 11.2 Analysis of turnover for the Severn Trent Water Authority, 1984-1985

Charge	Amount (£ million)	Percentage
Unmeasured water supply	86	23.7
Measured water supply	48	13.2
Unmeasured sewerage	156	43.0
Measured sewerage	13	3.6
Trade effluent	15	4.1
Water abstraction	14	3.9
Other water resources, water supply, and sewerage	11	3.0
Land drainage	12	3.3
Environmental service charge	6.6	1.8
Other environmental	1.4	0.4
Total	363	100.0

Source: Littlechild (1986), based on Severn Trent Water Authority Accounts, 1984-1985.

England and Wales is a familiar one. The ten authorities are subject to the system of control set out in the 1978 White Paper on nationalized industries, and have therefore been controlled by means of a mixture of financial targets, external financing limits, performance targets (the most important of which have taken the form of target reductions in real operating costs), and investment criteria. In addition, a number of the authorities have been subject to efficiency audits by the Monopolies and Mergers Commission (MMC). In Scotland, central government's influence on the industry is less direct, operating through more general financial controls on local authorities that include cash limits on capital expenditure and, in certain cases, rate-capping (i.e. placing limits on levels of local taxation).

As with most of the other nationalized industries, policy since 1979 has rested on the view that, in the past, the internal efficiency performance of the authorities had left much to be desired, and the general approach has been to attempt to make the enterprises operate along more commercial lines (the reorganization of the boards of the authorities by the Water Act 1983 is one illustration of the general drift of public policy). In particular, and again in line with developments in other parts of the public sector, priority has been given to reducing the financial contribution of the water industry to the public sector borrowing requirement.

The changed emphasis of public policy since the late 1970s has had substantial effects on the performance of the water authorities. The upward

trend in real operating costs in the 1970s has been reversed, and, as can be seen from table 11.3, despite continued demand growth for water there was a reduction in manpower of approximately 18 percent between 1979 and 1985, an outcome that again stands in contrast with the earlier trend.

Equally striking has been the turnaround in the proportion of capital expenditure financed from internal sources. In 1974 virtually the whole of the industry's capital program was financed by borrowing. By 1980–1981 this proportion had been reduced to around 60 percent, and by 1986–1987 to around 10 percent. This has been achieved both by improvements in operational efficiency, and by holding back planned investment programs: in 1986–1987, for example, the authorities sought permission for capital expenditures that were 13 percent above those eventually allowed. However, price increases forced by the imposition of tighter external financing limits and higher financial targets have also made a significant contribution to higher cash flows and hence to the greater availability of internal funds. Thus, over recent years, increases in water charges have tended to run well ahead of the general inflation rate.

Despite the gradual tightening of financial constraints on the water authorities, the latter appear to have been relatively generously treated in comparison with many other nationalized industries. In 1986–1987 the financial target, expressed as the ratio of operating profits to net assets on a current cost accounting (CCA) basis, was set at a level of only 1.6 percent, which represents an increase from the 1.4 percent return in 1985–1986, and from 1.0 percent in 1984–1985. Financial results for the authorities in 1985–1986, calculated on a historic cost accounting (HCA) basis, are shown in table 11.4. While operating profit was about 21 percent higher than in the previous year, it can be seen that, assuming the replacement cost of net assets is of the order of £27 billion, the resulting rate of return on capital (i.e. the ratio of historic cost profit to the replacement cost of assets) was, by most standards, extremely low, standing at about 3.7 percent. On a fully consistent CCA basis, and largely because of the much higher CCA depreciation charge, the rate of return was lower still (less than 2 percent). Thus, unless further very substantial improvements in internal efficiency can be made and/or there are significant further price increases, it is

Table 11.3 Water Authority manpower as at 31 March each year

Year	1976 ^a	1979	1982	1985
Number of employees	60,649	63,221	60,586	51,785

Source: Department of the Environment (1986).

a. Figures prior to 1979 were calculated on a slightly different basis.

Table 11.4 Financial results for the Water Authorities, 1985–1986

Authority	Turnover (£ million)	Operating profits (£ million)	Net profits (£ million)	Capital expenditure (£ million)	Loans outstanding (£ million)
Anglian	297.0	138.7	39.4	122.0	838.0
Northumbrian	111.0	58.1	7.7	39.0	421.0
North West	362.0	146.7	36.5	167.0	905.0
Severn Trent	391.0	149.0	51.7	125.0	805.0
Southern	177.0	77.7	38.5	70.0	286.0
South West	88.0	39.4	23.2	41.0	136.0
Thames	501.0	184.3	149.9	194.0	269.0
Welsh	187.0	46.0	12.2	55.0	432.0
Wessex	106.0	64.1	18.8	54.0	232.0
Yorkshire	248.0	99.3	35.6	100.0	509.0
Total	2468.0	1003.3	413.5	967.0	4833.0

Source: Water Authority Annual Reports and Accounts.

unlikely that the returns on new investment in the industry will appear attractive to profit-seeking private investors.

The 1986 White Paper on the privatization of the industry did not provide any detailed information about how the Government intended to tackle these fundamental financial issues. Indeed, for the most part, the document was concerned only with setting out the Government's plans in the most general of terms, leaving detailed decisions to be made at a later stage. The outline program was as follows:

- (i) restructure the ten water authorities in England and Wales as "water supply public limited companies" (WSPLCs);
- (ii) establish a system of regulating the WSPLCs;
- (iii) modernize water and sewerage law;
- (iv) permit domestic water metering trials on a compulsory basis;
- (v) improve the legislative framework for the control of drinking water and river water quality.

The ten water authorities were then to be transferred to the private sector in their existing forms. Thus it was planned that the various regulatory functions relating to environmental matters would be retained by the WSPLCs. However, the exercise of these functions by private bodies was to be underpinned by a clearer strategic framework of national policy for the water environment and by a system of finance whereby the costs of providing environmental services could be recovered by a mixture of direct charges (e.g. for consents to discharge wastes into rivers) and general charges (e.g. for public goods).

The White Paper was also unspecific about the future of the privately owned statutory water companies. While their continued existence was not immediately threatened, paragraph 43 stated that:

"The Government sees advantage in ending the constitutional link between the water companies and the authorities once they become WSPLCs, and in bringing the companies under the same form of financial regulation as will apply to the WSPLCs. At the same time the companies would be able to convert to PLC status, and take advantage of the greater scope for enterprise that this would offer. The Government will be discussing these proposals further with the companies."

With respect to regulation more generally, the 1986 proposals envisaged a framework of control that would broadly be in line with the regimes established for the telecommunications and gas industries. Thus, the main water services were to be regulated by a Director General of Water Services (DGWS) through long-term licenses granted to the WSPLCs. The White Paper expressed a preference for price controls over limitations on profits or dividends (the approach that had earlier been adopted for the statutory water companies), explicitly recognized the need for regulation of water quality standards, and reaffirmed the principle that cross-subsidization among services should be avoided. It also indicated an awareness of the opportunities for the adoption of yardstick regulation of the industry. Thus, in paragraph 56 it was stated that:

"The regulatory system will enable comparison of performance to be made between WSPLCs, and this will both act as an impetus to improvement and—by providing a yardstick for investors to make judgements—facilitate competition between WSPLCs on the capital market."

However, it was not precisely spelt out how these various principles were to be implemented.

The ambitious legislative program outlined in the 1986 White Paper quickly ran into timetable difficulties. Problems that emerged included the following.

- (i) Existing water industry legislation is spread over many different acts and statutes, and the consolidation required by the privatization proposals was therefore a complex and lengthy technical task.
- (ii) It proved difficult to clarify the respective roles of the water authorities and the Government with respect to the discharge of (environmental) regulatory functions, and there was considerable opposition from a variety of interest groups to the notion that privately owned companies should act as environmental regulators.
- (iii) On the original timetable, the Government would have been faced with

the prospect of attempting to guide complex and controversial legislation through Parliament at a time when the next General Election was likely to be imminent.

(iv) The legal right of the Government to sell assets which it had acquired, without compensation, from local authorities in 1973 was questioned, and the local government trade union NALGO brought a court case against Thames Water for spending money on furthering the case for privatization before Parliamentary authority had been given.

(v) Given the low levels of profitability of most of the water authorities, major questions concerning both the writing-off of debts to improve financial viability and the methods of flotation to be adopted needed to be resolved before the asset transfers could proceed.

The cumulative effect of these problems was that, less than six months after the publication of the White Paper, the decision was taken to defer the proposed privatization of the water industry. As noted earlier, the legislative program was revived after the June 1987 General Election, and the paving Bills will come before Parliament in 1987–1988. The Government has announced one major change in its approach to the issue, however. In contrast with the 1986 plans, it is now intended that the water authorities will be stripped of most of their functions relating to regulation of the environment, and it is proposed that these will instead be allocated to a new body, provisionally entitled the National Rivers Authority. Again, precise details of the Government's plans have not yet been finalized, but it is clear that the general effect of the policy would be to restrict the functions of the WSPLCs to the main operational activities of water supply and distribution, sewerage, and sewage disposal.

Not surprisingly, most of the managements of the water authorities have reacted with some hostility to this proposal, since it entails a significant diminution in their roles. Thus, whereas the chairman of Thames Water was initially a keen advocate of privatization, he has now become an opponent of the Government's policy. More important, the separation of regulatory functions from water supply and sewerage responsibilities implies the abandonment of the integrated river-basin management principle, and a reversion to an industry structure that more closely resembles the pre-1973 situation (although it is planned that there will be only one river authority, rather than the 29 that existed before reorganization). Thus, while the separation of regulatory and operational functions is eminently sensible in the context of an industry that is privately owned—which is presumably why the Government modified its original

proposals—the decision serves to demonstrate a lack of compatibility between private ownership and integrated river-basin management. It follows that, to the extent that the latter has substantive merits—as has consistently been argued by Governments in documents up to and including the 1986 White Paper—privatization will necessarily have substantive detriments. The decision also reopens questions concerning the most appropriate structure for a privatized water industry: given that the functional scope of the existing public enterprises was determined by the integrated river-basin management principle, if the latter is to be abandoned it is natural to ask whether there is any justification for retaining these existing areas and organizations and, more generally, whether further restructuring would be beneficial.

11.3 Regulatory Issues in the Water Industry

To accompany the 1986 White Paper on privatization, in January 1986 the Government also published a report by Professor Littlechild that had been commissioned by the Department of the Environment. The Littlechild Report examined a variety of issues relating to the regulation of privatized water authorities on the assumption, specified in the terms of reference for the study, that the authorities would be privatized in substantially their present form, and that responsibility for economic regulation would be placed with an independent regulator whose position would be similar to that of the Director General of Oftel. Given both the availability of this document and the extensive discussions of similar regulatory issues in earlier chapters, in this section we will not attempt to cover as wide a range of questions as Littlechild, but will rather focus upon those areas where water privatization raises either particularly difficult or particularly interesting problems. In one sense, however, our discussion is broader than Littlechild's, since we need not restrict ourselves by the assumption that the water authorities will be privatized in their present form (indeed, the 1987 Government announcements indicate that, in at least one important respect, they will not be).

11.3.1 The Scope for Competition

It appears to be accepted by both the Government and industry analysts that the the scope for increasing competition in the supply of water and sewerage services to final customers is extremely limited, and we can see no reason to dissent from this general consensus. Natural monopoly conditions derive from the established local networks of pipes and sewers.

In effect, there are two separate monopolies—water supply and distribution, and sewerage—and it is an open question whether factors such as the interrelated demands for the two services make the combined activities a natural monopoly. Both functions are now carried out by the water authorities, but before 1973 there was clear separation between water undertakings and sewerage and sewage disposal authorities. Moreover, statutory water companies are not involved in the latter activities. What little evidence on relative performance that there is appears to be consistent with the view that, to the extent that there are economies from the integration of the two principal activities of the industry, the resulting benefits are not of decisive importance. Thus, vertical separation appears to be a viable structural option.

Irrespective of the degree of integration, however, the natural monopoly problem remains, and competition in the provision of the basic "transportation" services (of both water and water-borne wastes) only appears feasible in boundary areas along the borders between neighboring enterprises. Clearly, the greater the number of individual competing firms, the greater is the scope for this type of boundary competition. However, settlement patterns are such that it is difficult to imagine that such spatial competition could be turned into a potent force other than by creating an industry structure so fragmented that substantive scale economies would be lost. Thus, unlike in telecommunications (where Mercury competes with British Telecom) and energy (where the various fuels are partially substitutable for one another), the prospects for introducing even modest amounts of product market competition in the provision of the transportation services of the water industry are bleak.

In theory, as in other network industries, it is possible to envision the separation of pipeline operations from, for example, the water supply (sales) business. Different water supply companies would then be able to compete for customers using the common pipeline network. However, because of the increased costs of coordination, the option is likely to be unattractive as far as domestic consumers are concerned (cf. the discussion of restructuring in the gas industry in section 9.2.4). While competition for the custom of large industrial and commercial users would be more feasible to arrange, it also has to be recognized that any resulting benefits from increased competition in supply are likely to be considerably less than in other utility industries. Unlike gas and electricity, the costs of "producing" water suitable for domestic consumption are relatively low in relation to the value added at the transportation stage.

Of rather greater significance, however, are the opportunities for

promoting competition in the downstream operation of sewage treatment. Currently, the water authorities collectively own around 6,500 sewage treatment works which, prior to re-organization in 1973, were operated by a large number of different local authorities. Scale economies are not sufficiently great to justify high levels of either national or regional concentration in this activity, and it would be possible to have a relatively large number of firms, whether publicly or privately owned, competing for contracts from publicly or privately owned water authorities/companies.

More generally, competition in the industry could be increased by the more widespread adoption of franchising. Water authorities already discharge some of their functions via both the statutory water authorities (water supply and distribution) and local authorities (sewerage). Apart from sewage treatment, it would also be possible to contract out economic activities such as the maintenance and construction of the pipeline networks themselves. Thus, although natural monopoly conditions hold in the basic transportation services of the industry, and although there are strong arguments for maintaining the organizational link between pipeline operations and the provision of service to final consumers (at least for smaller customers), this does not necessarily imply that forward and backward integration from these activities is desirable. On the contrary, as a matter of general principle public policy should seek to isolate the natural monopoly elements and to prevent the firms entrusted with these activities from extending their monopoly powers into other areas. By limiting the degree of vertical integration, extensive use of franchising and contracting out would therefore serve to expand the domain of economic activity in which effective competition can be introduced.

Finally, there is also scope for increasing competition in activities other than the basic services of the industry. These operations comprise a wide range of commercial services, stretching from the production and sale of bottled mineral water to overseas consulting. They are, however, only fringe activities of the authorities and, while opportunities for expansion do exist, they are likely to remain of relatively minor importance for the foreseeable future.

11.3.2 The Statutory Water Companies

Within both the existing framework of regulation and control of the water industry and the structures likely to be proposed by the Government for a privatized industry, the position of the statutory water companies appears to be somewhat anomalous. Full implementation of the integrated river-basin management principle in 1973 would have required the transfer

of these companies to the public sector, followed by the amalgamation of each company with the water authority responsible for its area. No doubt political pressures on the then Conservative Government spoke against this option and contributed to the survival of the companies. Whatever the reasons for it, however, their continued existence has been a source of complication for later proposals to privatize the industry.

If anything, the anomalous position of the companies will be accentuated by privatization of the water authorities. Under the approach set out in the 1986 White Paper, one central problem would have been the determination of the charges that the companies would have had to pay to the authorities for water abstractions. With the water authorities in private hands, there would have been a danger of monopoly pricing for the companies' basic input which could have left the latter at a substantial disadvantage. Strict regulation of such charges would therefore have been necessary. The problem is likely to be eased considerably by the revised Government proposals for the industry that were put forward in 1987. Thus, if a National Rivers Authority is to be responsible for the licensing of water abstractions (a function undertaken by the river authorities before 1973), the successors to the statutory companies will be on a par with the privatized water authorities in the market for water abstractions.

However, a second, more important, difficulty remains. Given the Government's preference for price rather than dividend controls, the existence of the statutory water companies (and their future, assumed survival as PLCs) implies that any future DGWS will be faced with the prospect of regulating not ten but 38 different sets of tariff structures for final customers, with wide variations in cost conditions amongst the various companies. While we are generally favorable to the idea that increased numbers of firms can assist regulators by providing them with greater information, the control of such a large number of tariffs (and standards of service) by one office may cause serious administrative problems that could potentially detract from the quality of decisions, particularly if the new regulatory body is of a similar size to Oftel and Ofgas.

11.3.3 Price Controls and Investment Problems

Assuming that some variant of the RPI - X approach is to be adopted for the regulation of privatized water authorities, the Government is faced with a range of questions similar to those considered in previous chapters. For example, at what levels should both X and the initial prices be set, and, given that the authorities supply several different services, which of these

should be covered by the price controls? There is also the issue of whether the regulatory constraint should be applied in aggregate to all the services so covered, or whether there should be a separate constraint for each service supplied. If the former approach is adopted, it gives rise to the further question of how the appropriate weightings applied to each service in the calculation of the aggregate price index should be determined.

In the case of water supply, these various issues are complicated by the fact that a large proportion of the revenue of the authorities derives from unmetered services. The current pricing system for unmetered supplies can be regarded as a special case of a two-part tariff comprising a fixed "connection" charge and a variable unit charge, in which the fixed component is set at a level linked to property (rental) values and the per unit component is set at zero. For most domestic consumers, therefore, the only dimension of choice that is affected by charges is whether or not to receive water and sewerage services: once connected to the system, additional services are charge free. Since water and sewerage services are basic necessities, this means that, to a first approximation, domestic demand is independent of the charges that are levied, and that the water authorities therefore effectively face a completely inelastic demand for much of their output.

It is possible to argue that the market power that would accrue to privatized water authorities under a system in which they can, in effect, levy taxes on domestic consumers is one of the reasons why the introduction of metering for domestic water supplies might be beneficial. Thus metering can be seen as a way of increasing the price sensitivity of demand, and hence of reducing market power. However, because of the lack of substitutes for the basic services of the industry, it is unlikely that the elasticity of demand for water would be very high at the unit price levels likely to pertain in the event that metering was introduced, and the water authorities would therefore still continue to enjoy very considerable market power.

The more fundamental potential advantage of domestic water metering is the contribution it might make to improvements in allocative efficiency. There is an obvious tendency towards overconsumption of goods and services that are provided free of charge at the margin, although the avoidance of metering costs has to be set against this detriment of the existing system when determining the overall balance of advantage between the two alternative methods of charging. Again, much depends upon the price sensitivity of demand: the greater the reduction in consumption induced by a given increase in per unit charges the greater will be the cost savings to the supplying firms.

An additional factor that is currently stimulating increased interest in the possibility of domestic metering is the Government's plan to abolish the domestic rating system and replace it with a system of local taxation based upon a community charge levied at a fixed rate per head of the population (i.e. a poll tax). In principle, the community charge approach can be used for unmetered water supplies simply by levying a per capita fixed charge on consumers, so that a given household's water bill would be equal to the number of adult members of that household multiplied by the per capita community charge for the relevant locality. However, since one of the aims of the proposed change in local taxation is to link taxes more closely to the quantity of local services consumed by households, this underlying principle points in the direction, where feasible, of increased use of unit charges.

In the light of these points, it is not surprising to find that the paving legislation for water privatization provides for the introduction of compulsory water-metering trials—that is, households in the sample areas would be compelled to accept metering—aimed at assessing the costs and benefits of introducing unit charges to domestic consumers. Earlier, in 1984, the Department of the Environment had commissioned a steering group, chaired by Mr R. Watts, Chairman of Thames Water, to "report to the Government on the possible extension of water metering generally to households." The subsequent report (Watts Report, 1985) concluded that, on best available evidence, the net benefit of introducing metering for the average domestic consumer was likely to be close to zero but that, because of underlying uncertainties about the price sensitivity of demand and the cost savings that could be achieved from reduced volumes, further research based on metering trials was warranted.

The net benefit calculations in the Watts Report were based upon an assumption that, in the event that metering was introduced, unit charges would reflect the marginal cost of supplies. Since it is unlikely that this would turn out to be the case in practice, the conclusions about the benefits of metering are probably overoptimistic. There is a much more fundamental weakness in the Report, however, in that, while its purported aim was to examine "whether the social gain from charging domestic water consumers according to usage exceeds the social costs of replacing the existing rate-related charging system with a relatively expensive charging system based on individual metering," at no point in the document is the concept of consumers' surplus mentioned. Thus the social gains from metering are equated with the cost savings to the water authorities that would flow from the reductions in quantity demanded induced by a

positive unit price, while the social costs are equated with the costs of metering. Properly calculated, however, social costs should include the consumers' surplus losses associated with the decline in consumption. The magnitude of these losses is difficult to estimate, depending as they do on both the slope and the curvature of the demand curve over the relevant price interval, but, unless demand is completely inelastic (in which case there is no allocative efficiency case for metering anyway), they will certainly be positive. Thus, if the other calculations in the steering group's report are taken at face value, once consumers' surplus losses are taken into account the correct conclusion is that the net social benefits of metering the average domestic consumer are *negative*.

The Watts Report serves to highlight an important difference between the decision criteria of publicly and privately owned enterprises that is germane to the water privatization debate. Profit-seeking privately owned WSPLCs will ignore consumers' surplus losses when evaluating investments in metering equipment, since such losses will be irrelevant to the incremental profit calculations. It is hard to be certain as to how the metering issue would be settled by a privately owned industry; much depends upon the anticipated effects of the decision on the regulated price level (which determine the revenue consequences of the decision). Nevertheless, and particularly if regulators allow post-metering prices that protect the firms' pre-metering revenues, there is a real prospect that a privatized water industry will shift to a metering system for domestic consumers in circumstances where the net social benefits of such a policy will be negative (the methodology of the Watts Report is indicative of the likely bias in this direction). If this happens, the consequential net loss in economic welfare should be treated as one of the costs of the privatization policy.

It remains to be seen whether or not extensive metering of domestic water supplies will in fact be introduced at some point in the future. Whatever the outcome, the relatively long timescale that is involved indicates that, if the Government's privatization of the industry proceeds as planned, in the short to medium term price controls for the industry will need to allow for the fact that much of the output of the WSPLCs will be unmetered. In general, this will tend to exacerbate the regulatory problems associated with ensuring that the tariff structures of privately owned multiproduct monopolies are allocatively efficient. Suppose, for example, that an authority provides two similar services, one metered and one unmetered, with charges per unit volume equal to p_1 and p_2 respectively. Suppose further that the total costs of supply are $C(q_1 + q_2)$, where q_1 and q_2 are the

respective volumes, and that the WSPLC is regulated by an aggregate average revenue constraint of the type adopted for British Gas, implying that

$$p_1q_1 + p_2q_2 \leq \bar{p}(q_1 + q_2)$$

where \bar{p} is the maximum allowable average charge per unit volume.

Since service 1 is unmetered and, by assumption, revenues are derived from a fixed charge, q_1 will be constant (i.e. independent of p_1). If the average revenue constraint is binding, it yields a simple expression for p_1 that can immediately be substituted into the firm's profit function. Hence, profit is simply equal to

$$\bar{p}(q_1 + q_2) - C(q_1 + q_2),$$

which can be maximized with respect to q_2 . As a result, and assuming that the maximum allowable price is consistent with non-negative economic profits, the firm will have an incentive to keep expanding its metered supply if there are scale economies in production: marginal revenue is constant (equal to \bar{p}) and greater than marginal costs. Price in the metered market will, of course, fall with increasing volume sold, but any lost revenues will be more than covered by the rise in charges in the unmetered market that are permitted by the average revenue constraint. As a consequence, unmetered consumers will cross-subsidize metered supplies.

We conclude, therefore, that water industry regulators will need to play close attention to the *structure* of charges for the different services of privatized water authorities. Whether this is done via an aggregate price constraint based on a rather more sophisticated weighting system than the average revenue constraint just described, or by the introduction of a series of constraints for individual services, is a matter that is essentially of secondary importance. In both cases, regulators will require extensive information about the relevant demand and cost structures. As in the telecommunications and gas industries, the notion that regulators can make do with relatively simple cost and demand information and need not concern themselves with the fine detail of the tariff structures of the monopoly firms is, to say the least, misguided.

Apart from questions relating to the price structures of multiproduct monopolies, privatization of the water authorities will also raise difficult issues connected with the setting of appropriate *average* price levels. The Littlechild Report and the 1986 White Paper devote attention to the issue of whether or not price controls should be relatively uniform across the ten different authorities or should be tailored to the individual circumstances

of each authority. We will consider this question in section 11.3.5 below, but here we focus on the rather different issues surrounding the low levels of profitability in the water industry. In particular, we ask whether privatization of the water authorities will provide appropriate incentives for new investment in the industry.

We have discussed theoretical issues connected with investment incentives for regulated monopolies in section 4.2, and the water industry serves as a good illustration of some of the difficulties that can arise. The basic services of the industry are highly capital intensive and its assets are extremely durable. Given the physical state of some of these assets, demand growth, and consumer demands for increased water quality and service standards, to operate efficiently the industry will require a continuing and substantial program of new investment which, after privatization, will only be forthcoming if investors expect to receive market rates of return on their capital expenditures.

The American "solution" to this investment problem has been to establish implicit bargains between society and regulated firms, whereby the latter are promised a reasonable rate of return on capital employed. In an attempt to avoid some of the undesirable incentives associated with this type of cost plus contract, U.K. policy has nominally taken a slightly different approach based around the RPI - X formula. However, in capital-intensive industries where there is little competition, the U.K. approach to regulation itself has serious drawbacks and, in the context of water privatization, two problems are particularly serious.

The first is associated with the lack of any long-term guarantees as to the decisions that will be taken when the pricing formulas come to be reviewed. The durability of capital assets implies that rates of return on new investment will, for the most part, be a function of these review decisions rather than of the price levels and indexation provisions established at the time of flotation. In the absence of clear guidance as to the long-term conduct of regulatory policy, and in the absence of precedents from earlier periods, private investors will rightly be concerned that they will not be allowed to recover the costs, including an appropriate return on capital, of their investment expenditures. Hence, because of lack of credibility with respect to future public policies, there is a real danger of underinvestment in a privatized industry. Moreover, incentives for underinvestment are strengthened by the potential payoffs from strategic behavior by the regulated WSPLCs. Thus, in order to influence later regulatory decisions, firms may deliberately underinvest since, by confronting regulators with supply shortages and relatively poor service standards, they will be in a

stronger position to argue that higher prices are required to finance the desired improvements. In contrast, if high expenditures to improve standards are incurred at the outset, regulators will later treat these items as *sunk* costs and firms would have to rely more heavily on arguments of fairness in supporting their case for higher prices, which arguments may not always be persuasive to public bodies facing consumer pressures for lower prices. To offset these biases, therefore, we can see no alternative to the explicit introduction of rate-of-return criteria in regulatory decisions but, until this is done, the uncertainties associated with regulatory policy are likely to have negative effects on investment in the industry.

The second difficulty that is particularly acute in the case of water privatization is the low level of profitability of the industry. Table 11.5 shows the profit position in 1984-1985, and it can be seen that, in CCA terms, the water authorities were, after subtracting interest charges, making significant losses. The extent of the problem can be gauged by considering the case of Thames Water, the most profitable of the authorities. In 1984-1985, Thames made a 1 percent current cost rate of return on net assets and, in the accounts, current cost depreciation for that year amounted to £126 million, or about 2.8 percent of the replacement cost of net assets (approximately equal to £4.5 billion). Thus, if the real cost of capital had been raised from the implicit value of 3.8 percent to, say, 10 percent, the authority would have had to increase operating profits by about £280 million, from £55 million to £335 million. Even assuming a zero price elasticity of demand, on a turnover of £455 million this would have implied an average increase in charges of over 60 percent. Alternatively, operating costs (equal to £268 million) would have to have been reduced to approximately zero!

Although water authority charges have, in real terms, been steadily increasing in the pre-privatization period, it is unlikely that the

Table 11.5 Profits of the Water Authorities in 1984-1985

	Historical cost (£ million)	Current cost (£ million)
Net available income for financing capital	1,023	1,023
Less depreciation	202	719
Operating profit before interest	821	304
Less interest	565	565
Overall profit	256	--261

Source: Vass (1986).

Government will be politically attracted by price hikes of the magnitudes suggested by the above calculations (despite the increased sales proceeds that they would generate). Much more likely, therefore, is the prospect that the authorities will be privatized with initial price levels that will imply rates of return on assets that are low by the standards of private industry. This outcome need not be unduly damaging: past investment expenditures are sunk costs and what matters to private investors is the allowed rate of return on new incremental investment. It does, however, pose some difficult problems for regulators when the price control formulas come to be reviewed. In effect, what is required is that, for purposes of calculating future rate bases (an exercise that we believe to be inevitable in the longer term), the values of existing assets are written down to levels commensurate with the initial prices, but that post-privatization investment expenditures and depreciation provisions should then be calculated according to standard accounting conventions. However, once again it is difficult to see how the extensive and detailed forms of regulation practiced by U.S. authorities can be avoided.

11.3.4 Quality of Service

As both the 1986 White Paper and the Littlechild Report explicitly acknowledge, any regulatory body for the privatized water industry will need to exercise control over the quality of water and of more general service standards of the new WSPLCs. The underlying problem is that a profit-seeking regulated monopolist will not typically be confronted with incentives that lead to quality choices that efficiently meet consumers' demands.

The point is illustrated in figure 11.1. Point E_1 shows an initial equilibrium where the regulated firm is producing a volume of output q_1 that is sold at a (controlled) price \bar{p} . The initial demand curve D_1D_1' is drawn on the assumption of a given quality-of-service level, denoted s_1 . Consider now the effect of an increase in service quality to s_2 , which is assumed to shift the demand curve outwards to D_2D_2' , leading to a new equilibrium at E_2 . The effect of the change is to increase (gross) consumers' welfare by the sum of the shaded areas A and B and, if a cost-benefit analysis were being conducted, this sum would be compared with the incremental costs, including the costs of producing the extra output, associated with increased quality. Thus, for example, if incremental costs are C , the increase in quality would be beneficial if $A + B > C$. The gain in revenue to the regulated firm, however, is equal to area B , and the quality improvement will only be made if $B > C$. It follows that, at any given price,

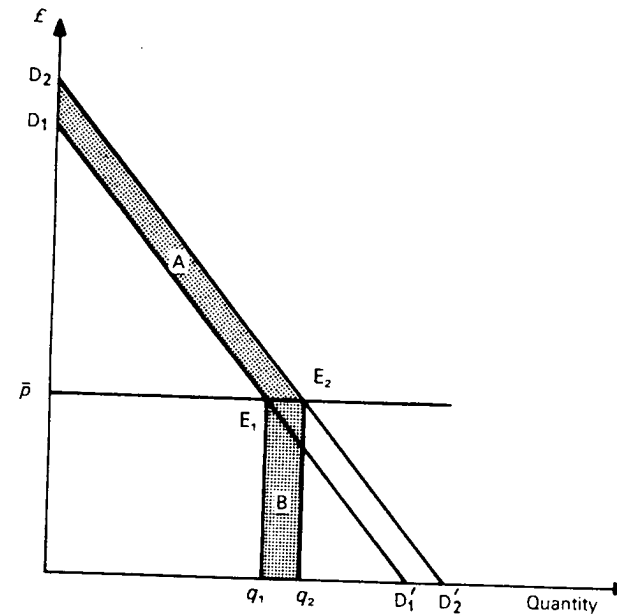


Figure 11.1 The effect of regulation on service quality

the regulated monopolist has incentives to choose suboptimally low levels of service quality. It can also be noted that the magnitude of the bias will tend to be greater the less price elastic is the demand curve, since steeper demand curves will tend to be associated with higher values for area A (in the limit of complete inelasticity area A becomes infinite).

Put more intuitively, the regulated monopoly has incentives to chisel on quality since, by so doing, it can reduce its costs. In a more competitive market this might lead to sharp reductions in volume sold as customers switch to other products, but the revenue penalties from volume reductions will tend to be much less where substitutability in demand is limited. The latter condition is satisfied in the water industry case, and quality reductions can therefore be expected to have relatively small effects on quantity demanded at the relevant price. Hence, the quality problem is potentially a serious one.

The European Community Drinking Water Directive lays down minimum bacteriological, chemical, and acceptability standards, covering about 60 parameters, with which the water authorities are required to comply and which will continue to be imposed on a privatized industry (although profit-seeking firms will have greater incentives to press for derogations and delays in meeting these standards). Nevertheless, overall

service quality depends upon a host of factors not specified in the Directive, and the water authorities currently collect and publish information on an additional set of indicators relating to the following aspects of service.

Water supply availability: new connections, response times.

Water supply quantity: reliability, pressure, supply failure.

Sewerage availability: new connections.

Sewerage service quality: flooding, sewer collapses, storm overflows.

Environmental protection: river water quality, estuarial quality, sea outfalls, sludge disposal, effluent consents.

Land drainage and flood protection: standards, conditions of main rivers, tidal defenses, flood warning.

Customer contact: emergencies, correspondence, administration, billing.

In the event that the 1987 proposals to remove environmental functions from the WSPLCs go through, the burden of regulating several of these quality-of-service indicators would be passed to other public bodies. Similarly, if the British Telecom precedent is followed, withdrawal of the existing legal privilege of the water authorities, exempting them from proceedings in tort, will ease some of the regulatory problems: affected parties will be able to sue the WSPLCs for nuisances such as foul flooding. Nevertheless, the DGWS will still be confronted with the task of ensuring that profit-seeking monopolists devote sufficient resources to the maintenance and improvement of a number of important dimensions of service quality. This will impose a considerable information burden, since, in setting service standards, the DGWS will have to both determine the cost-quality trade-offs that are involved and form judgments as to consumer preferences over prices and quality. Finally, once service standard decisions have been made, there remains the problem of enforcement of the resulting targets.

The issue of service standards in the water industry is also intimately connected with the investment questions discussed in section 11.3.3, since many quality improvements are dependent upon additional capital expenditure on the pipeline infrastructure. Incentives to reduce service standards will therefore be reinforced by any biases toward underinvestment that result from the regulatory regime. However, it is possible that the quality regulation problem could be made less severe by the use of rate-of-return criteria when setting allowable prices. Thus, if rate-of-return regulation tends to encourage higher capital expenditures and if such expenditures are associated with improvements in service quality, it can be

seen that the rate-of-return criterion tends to offset the incentives to reduce quality when the allowable price is fixed. The trade-offs involved have been explored by Spence (1975), and, while it is unlikely that the resulting outcomes will be socially optimal, the results serve to reinforce our earlier arguments that, as well as probably being inevitable, the development of explicit links between allowable prices and rates of return on capital would have a number of desirable consequences.

11.3.5 Yardstick Regulation

The opportunities for the use of yardstick regulation in the water industry follow from the fact that, when setting prices or target quality standards for any given firm, the performance statistics of other firms in the industry are likely to contain informative signals concerning the underlying economic trade-offs faced by the given firm's managers. The informativeness of the signals springs in turn from a variety of common features in the input and output markets of the several regional monopolists. As explained in chapter 4, it is a general principle of agency theory that incentive structures will be more efficient if rewards are made contingent upon such signals (where they exist). Hence, if feasible, the development of regulatory yardsticks would be highly desirable.

In paragraph 70 of the 1986 White Paper the choice of regulatory approach facing the Government was summarized as follows:

"In applying price controls and target standards, there is a choice between:

- (i) tailoring standards and price controls individually to each WSPLC, taking account of its geography and investment needs; and
- (ii) setting uniform standards and price controls throughout the industry.

The first allows for greater flexibility, but would involve the Director General in complex and repeated negotiation with each WSPLC, making it difficult to judge the success or failure of an individual company, and leading to the risk that the Director General would usurp some of the management's functions. It would also be difficult to demonstrate even-handedness between the regulated companies. The second method has the advantage of simplicity once it is in operation. The variations in their situation would be reflected in their capital structures and the prices they would command on the market. By encouraging direct comparisons between authorities by investors, it would also promote efficiency by means of competition. The normal disciplines of the capital market would become a direct spur to poor performers as would sanctions available to the Director General himself. If the price formula were set to reflect changes in the average performance of the industry as a whole, it would provide two further advantages: it would pass on to the customer the benefit of the average cost reduction, and would give WSPLCs an incentive to be more effective than the average, and so more profitable."

In terms of the choice posed, option (i) might be labeled the traditional cost-of-service approach, under which controls imposed upon a firm are based entirely, or almost entirely, on information specific to the firm and its own local markets while, to the extent that standards and prices are based on averaged national information, option (ii) can be considered to be a variant of yardstick regulation. Unfortunately, however, this passage from the White Paper contains a number of confusions, and a commentary upon it will serve to bring out the issues more clearly. In particular, we would draw attention to the following points.

(i) The choice facing the Government is less stark than the one cited. In setting price controls and standards for a given firm, available information can be partitioned into two sets: that deriving from the firm in question and its markets (labeled F) and that deriving from the set of other firms and their markets (labeled S). The general issue is how this available information is to be used in arriving at regulatory decisions. Yardstick regulation refers to any solution that conditions decisions on information in set S, irrespective of whether or not the decisions are also influenced by information in set F. In general, it will be optimal to rely on both sources of information, and there exist a large number of ways in which this can be done. Thus, setting uniform standards and price controls throughout the country is far from being the only alternative to traditional cost-of-service regulation. For example, in the basic version of Shleifer's model (see section 4.6.2), the allowable price for one firm is set equal to the averaged unit costs of all other firms. In that case the resulting prices will not, in general, be uniform unless the cost conditions of the various firms are identical.

(ii) Whatever form of regulation is ultimately implemented, the information requirements of regulators will be broadly similar; in all cases detailed information about the activities and performance of each and every firm in the industry will be required. Problems of judging success and failure, of complex and repeated negotiation with each WSPLC, and of demonstrating evenhandedness are therefore characteristics of all options. For example, if uniformity of prices and standards prevailed, a company with high costs arising from the geographic characteristics of its region might properly complain that it had not been treated in an evenhanded manner.

(iii) The relationship between the prices and costs of a particular company is not a matter that affects only its standing on the Stock Exchange and that can simply be dealt with by an appropriate choice of initial capital

structure. Consider again the high cost WSPLC described in (ii). If allowable prices are very low in relation to its costs, the marginal return on investment is also likely to be low, leading to deficient capital investment and, given the practical impossibility of precisely controlling all dimensions of quality, lower service standards. On the other side of the coin, excessively high price-cost margins imply the exercise of market power that will impair allocative efficiency (at least with respect to metered supplies).

(iv) Rational investors will make direct comparisons between authorities irrespective of whether or not the latter face uniform price controls and quality standards. Given the public nature of regulated price and quality constraints, and provided that the general procedures for setting them in the future are known, there is little reason to believe that particular methods of calculation will significantly affect the efficiency of the capital market. Of rather more concern is the problem that, to date, U.K. policy has created uncertainty as to the conduct of future regulatory policy.

(v) The most important advantage of yardstick regulation, which is not dependent upon uniform constraints, is that it can improve the regulatory trade-off between allocative and internal efficiency. That is, as claimed in the final sentence of the quotation from the White Paper, prices can be adjusted to reflect cost movements whilst preserving incentives for cost reduction.

To illustrate the flexibility of yardstick regulation, consider the situation of a regulatory body faced with the question of how to reset the pricing formula at the end of the first indexation period (i.e. at the first review date). Suppose further, for simplicity, that $X = 0$, so that the issue at hand is simply the determination of the real price levels of the WSPLCs. Finally, assume that regulators are considering either one or other of two extreme options:

(a) setting prices for each WSPLC so that, with given real costs, each will be expected to earn the same rate of return R on capital assets;

(b) with respect to firm i , calculating the uniform increase or decrease in the prices of all *other* firms that would yield a rate of return of R on their collective assets and then applying this percentage increase or decrease to the allowable price for firm i .

Thus, option (a) is traditional rate-of-return regulation, while option (b) is the "rate-of-return equivalent" of the Shleifer model. Let the resulting prices be $p_i(a)$ and $p_i(b)$. Then the two options can be regarded as special

cases of the more general rule that the allowable price should be set equal to

$$p_i = \mu p_i(a) + (1 - \mu)p_i(b),$$

where $0 \leq \mu \leq 1$. It can be seen that, by varying μ , it is possible to change the relative weights accorded to information specific to firm i and its markets and to information derived from other firms in the industry.

Under this scheme the most efficient weighting pattern would be determined by balancing off the effects of changes in μ on incentives for internal and allocative efficiency in the product market. When $\mu = 1$ (cost-of-service regulation) prices are kept closely in line with costs, but the incentives for cost reduction are weak and there will be a tendency towards overcapitalization. On the other hand, when $\mu = 0$, because the firm is unable to influence the regulatory decision via manipulation of its own cost structure, the incentives for cost reductions are strong. However, the fact that movements in a regulated firm's prices are completely unrelated to its own costs opens up the prospect of substantial losses in allocative efficiency, particularly in the longer term as the effects of review decisions cumulate.

Broadly speaking, as μ is decreased, the marginal (negative) impact on allocative efficiency will be greater in magnitude the less well correlated are those cost variations of the different firms in the industry that arise from exogenous changes in their economic environments. This occurs because the more the allowable price for a firm is made to depend on cost variations that are uncorrelated with its own the greater will be the expected value of the absolute magnitude of its price-cost deviation. It follows that the greater the similarity among the operations and market conditions of the firms the lower will tend to be the value of μ that maximizes overall economic efficiency. Note, however, that while complete similarity indicates that μ be set equal to zero, the fact that firms are not identical does not imply that yardstick regulation should be abandoned in favor of individualistic price setting (i.e. that μ should be set equal to unity). Even if each of the individual WSPLCs has significant idiosyncratic characteristics, regulatory effectiveness can still be improved by the proper use of comparative performance data.

Against these points in favor of yardstick regulation, it might be argued that its introduction would introduce unnecessary complexity into the policy process, and that it would be difficult to understand. We have little time for this position. Effective regulation is necessarily a complex business, and to pretend otherwise is likely to have damaging long-term consequences for the industries concerned. Undue simplification of the

initial framework of regulation for privatized monopolies will, as we have argued throughout this book, very frequently lead to the emergence of much more serious difficulties in the longer term. Moreover, managements and investors alike have continuously to find solutions to difficult incentive and information problems, and it is hard to believe that they would for long be perplexed by the type of averaging formula described above.

11.4 Assessment of the Government's Privatization Proposals

Thus far, the Government has set forth its proposals for privatization of the water industry only in relatively general terms. Nevertheless, the central strands of policy are clear: the ten water authorities, most probably stripped of many of their environmental functions, will be turned into ten water supply public limited companies that will then be offered for sale on the stock market, privately owned statutory water companies are likely to be given the option of converting to public limited companies, the industry will be regulated by a new Director General of Water Services through licenses granted to the WSPLCs, and regulation to protect consumers from abuse of market power will take the form of price controls rather than profit or dividend controls. Given this general approach, and its similarity to many of the features of privatization in the telecommunications and gas industries, in this final section we will focus on three questions.

Do the proposals take full advantage of opportunities for increasing competition in the industry?

Is it likely that an effective regulatory regime will be established?

Taking into account the likely framework of competition and regulation, will ownership transfer improve economic efficiency?

Competition Except at the unacceptably high cost of a spatially fragmented industrial structure, there is little prospect of substantially increasing competition in the core transportation services of water distribution and sewerage. However, the non-environmental activities of the water authorities extend beyond the areas of natural monopoly and, with respect to these other operations, the proposed flotations are likely to be less conducive to the development of competition than are alternative policies based on the organizational isolation of natural monopoly activities. In particular, it is possible to create organizational structures that would be more favorable to the development of competition in, for example, sewage treatment and the construction and maintenance of the

pipeline networks. Such a policy could be based upon the retention of water authorities in the public sector, but with their roles constrained by compulsory franchising requirements in designated activities (such as sewage treatment and pipeline maintenance). Firms competing for these contracts could be either privately or publicly owned (e.g. local authorities).

In section 4.6.1 we examined some of the limitations of franchising as a solution to the natural monopoly problem. Most of these difficulties stem from the existence of sizeable sunk costs and, because of this, we would favor proposals that leave the ownership of the pipeline networks with the water authorities or their successors. That said, the scope for increased use of franchising in the water industry is still substantial.

As Littlechild points out, however, the WSPLCs will themselves be free to contract out parts of their businesses, or to franchise parts of their operations. Hence, outside contractors will be able to compete with each authority's in-house service units, and, to the extent that the authorities are cost minimizers, the performance outcome might be expected to be similar to that likely to emerge from compulsory franchising.

Our own view is less sanguine than Littlechild's. The WSPLCs will not be operating in a competitive product market, where pressures to serve consumers' interests more effectively than rivals feed back into pressures to reduce costs. The payoffs from cost reductions achieved by contracting out activities previously undertaken in-house will therefore depend heavily upon the effectiveness of the regulatory regime. Since, as we have seen, incentives for internal efficiency that are established by regulatory frameworks are likely to have significant imperfections, there are grounds for concern about the extent to which competition will, in fact, develop. Further, large organizations are prone to develop biases in favor of in-house activities (see Williamson, 1975). Given that there are no reasons to believe that the WSPLCs will be immune to these biases, we conclude that the Government's proposals are unlikely to produce the same effects as compulsory franchising and, in particular, that they are less favorable to the promotion of effective competition in the markets for supplies of inputs to the natural monopoly services.

Regulation On the assumption that the water authorities are to be privatized without restructuring of their principal operational activities, there are two aspects of the Government's proposals for the regulatory structure that are to be welcomed. The first is the 1987 decision, reversing earlier plans, to create a new environmental regulatory body to which many

of the subsidiary functions of the water authorities will be transferred. The original proposal to retain the integrated river-basin management principle by allowing privately owned firms to act as environmental regulators would have created severe longer-term problems. While it is not impossible to envision the subcontracting of some regulatory functions to profit-seeking firms, the scope and variety of the environmental activities of the water authorities would, within the timescales usually associated with legislative preparations for privatization, have almost certainly led to a regulatory quagmire. For example, one effect would probably have been substantial duplication of effort, together with undue delay in finalizing decisions, as disgruntled third parties appealed to the Government against the judgments of the WSPLCs.

The second favorable development has been the apparent willingness of the Government, expressed in the 1986 White Paper, to contemplate the introduction of more explicit regulatory yardsticks into the control framework. Unfortunately, the White Paper also contains what appear to be a number of confusions about the underlying issues that are involved, and it remains to be seen whether or not the ideas will be taken any further. Since exogenous movements in demand and cost conditions for the water authorities are correlated, albeit imperfectly, yardstick regulation offers scope for improving the regulatory trade-off between internal efficiency and allocative efficiency, and it is therefore to be hoped that the tentative suggestions in the White Paper will indeed be developed and implemented.

The Government's intentions regarding other aspects of the regulatory framework for a privatized water industry have not yet been revealed. The multiproduct nature of the water authorities, the importance of unmetered supplies, the question of domestic metering itself, and the issues surrounding the control of water quality and levels of service will all raise serious problems for regulatory policy. The telecommunications and gas precedents do not give many grounds for hope that these issues will be satisfactorily handled in the initial licenses, and perhaps the best that can be anticipated is that the policy regime will give sufficient scope for the DGWS to correct some of the deficiencies later (as has been done by the Director General of Telecommunications).

Perhaps the most fundamental problem to be solved is how to ensure an adequate supply of finance from private investors for investment purposes. Existing rates of return in the industry are low and, unless the yield on new investment is increased, there is a danger that service quality will be damaged in the longer term. One method of offsetting any bias to underinvestment would be to create an industry structure that afforded

protection to managements from capital market pressures (e.g. by rendering takeovers more difficult) in the hope of encouraging discretionary capital expenditures. Needless to say, we find this option unattractive, since it would also reduce the incentives for internal efficiency and, on earlier arguments, weaken competition in input markets. Instead, we would favor attempts to establish a long-term bargain between society and the WSPLCs which, to the extent that it is feasible, seeks to provide clearer assurances to investors that regulatory policy recognizes the importance of capital cost recovery. We can see no way of doing this without explicit recognition of the importance of rate-of-return criteria in the determination of allowable prices. While this may lead to some diminution in incentives for internal efficiency, it would be better to deal with this effect through the use of regulatory yardsticks rather than by abandoning the rate-of-return approach; maintenance of capital programs is simply too important for the future performance of the industry to risk serious supply failures in this area.

Ownership It will be apparent from the above discussions that we believe that the existing proposals for privatization of the water industry will have several substantive detrimental effects on economic efficiency. Among the negative factors are the following:

- (i) loss of economies of scope from the abandonment of the integrated river-basin management system, which abandonment is desirable if privatization is to be based on flotations of the existing water authorities but undesirable if alternative policies, such as compulsory franchising of some of industry's activities, are allowed on to the policy agenda;
- (ii) the likely effects of using private, rather than social, decision criteria when assessing whether or not to meter domestic water supplies;
- (iii) the establishment of an industrial structure less conducive to the promotion of competition than alternatives characterized by greater use of franchising;
- (iv) the incentives of privately owned firms to lower service standards and the difficulties faced by regulators in preventing this effect;
- (v) depending upon the precise form of the pricing rules that are adopted, the possible creation of incentives for cross-subsidization;
- (vi) the danger that, in the absence of a clear long-term policy framework that protects the sunk investments of private shareholders and which commands general assent, capital expenditure in the industry will be suboptimally low.

This is a formidable list of problems, and it would be necessary to believe that the Government's proposals would lead to substantial gains in internal efficiency, over and above those available under alternative policy regimes, to conclude firmly that privatization of the water industry in the way that is planned is likely to have a net beneficial effect on economic welfare. In our view, the evidence does not support such a conclusion. Despite the deficiencies of the current framework of control for the nationalized industry, significant reductions in operating costs and significant improvements in productivity have already been achieved over the last few years, and this necessarily reduces the scope for further gains from the introduction of profit incentives. More importantly, stronger incentives for reductions in both operating and investment costs can be introduced through compulsory franchising. Since this can be achieved whilst retaining the public sector status of the water authorities, it is also consistent with the maintenance of the integrated river-basin management system, the retention of cost-benefit criteria for metering decisions, and the promotion of effective competition in input markets. In addition, it avoids the creation of incentives for lower service standards and lower investment that are likely to arise from an increased emphasis on profit criteria in decision making.

It is likely, of course, that a franchising solution would lead to a substantial increase in the level of involvement of privately owned firms in the water industry. Such firms would be free to compete with, say, local authorities for contracts and, given the evidence outlined in section 2.5, we believe that they would meet with a large measure of success. Thus, our conclusions should not be read as arguments against all forms of privatization in water supply and related activities. Rather, they point toward an industry containing a mix of public and private firms, with the former (the water authorities) responsible for regulatory functions, major investment decisions (e.g. with respect to pipelines, metering, etc.), and service standards, and the latter more prevalent in activities such as pipeline construction, pipeline maintenance, and sewage treatment.