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Improving Water Services through Competition

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Water sector reforms in recent years have concentrated on involving the private sector in the operation and management of monopoly water utilities. Much effort has gone into regulation to stop utilities from abusing their monopoly power, but relatively little into considering ways to reduce that monopoly power. This Note explains how to bring competitive pressures to bear in the water industry. It shows that while it can be difficult to implement conventional product market competition (in which two or more rival operators compete to sell water services to customers in one area), this option should not be ruled out. Better, cheaper water services can also be achieved by increasing the use of competition in purchasing inputs, relying on competitive bidding for the right to supply an area, and benchmarking rival utilities in different areas.

Scope for competing products

In principle there are four means of introducing product market competition: competing networks, private supply, retail competition, and common carriage competition (table 1). The high cost of installing competing networks makes it hard to envisage this as a serious option. But it should not be ruled out. Some utilities are so inefficient or provide such poor service that the construction of a competing network in some areas could be economic. Private supply occurs when one consumer (self-supply) or a group of consumers (cooperative supply) supply themselves rather than rely on the incumbent utility. But this is not an option where there are no suitable water sources close to customers. Retail competition occurs when an entrant takes over supply in an area while continuing to purchase bulk water from the incumbent utility. Another form of retail competition is reselling, in which an entrant exploits a price differential between bulk and retail supply but does not invest in distribution facilities. Common carriage competition can include competition between vertically integrated suppliers sharing access to a single network and competition between vertically disaggregated retailers that share access to a single network and purchase water from competing bulk suppliers.

Opportunities for competitive supply include providing improved service to areas willing to pay for it. Intermittent supply often forces businesses and hotels to install their own tanks and backup arrangements, at a higher cost than would be required to provide a secure piped system. Retail competition can help them cut costs by providing secure supply to an area. Another opportunity is providing supply to customers who are willing to pay the full cost but are currently unserved. Such customers could be in slum areas and urban peripheries, for example, where consumers often pay more than the cost of piped service to water vendors or for self-supply.

The main obstacle to such competitive service is that competition—and operations, such as private abstraction, that make competition possible—are prohibited by law in many countries. But for reasons explained below,

TABLE 1 OPTIONS FOR PRODUCT MARKET COMPETITION

Option	Description	Relevance to cities	Relevance to secondary towns	Conditions for success and government action required[a]	Examples
Competing networks	Competing suppliers each establish their own distribution system.	X[b]	X[b]	No ban on competition	
Private supply	Customers supply themselves (and their neighbors).	√√	√√	No ban on private supply	Jamaica (on-site sanitation for hotels), Bahamas (on-site desalination), India (private wells), among many others
Retail competition[c]	An entrant purchases bulk water supply from the incumbent and constructs its own distribution network to customers without service or with poor service.	√√	√	Bulk supply prices that neither disadvantage nor subsidize the entrant; sufficient bulk water to supply entrants	The United Kingdom and informally in many places, including Maputo, Mozambique
Common carriage competition	Several water utilities use a single network to supply customers, and customers can choose their water supplier.	√	X[d]	Appropriate network access; technical parameters for water quality; possibly separation of network ownership from service provision; considerable information and administrative capacity May be inappropriate for deteriorated networks, and may be accompanied by development of a wholesale water market, to allow trading between water providers	U.S. and U.K. railways, U.S. telecommunications The United Kingdom is moving toward this kind of competition in the water sector.

a. In all models of product market competition, social objectives need to be met through market-friendly mechanisms, not exclusive franchises and cross-subsidies. Environmental and health regulations need to be competitively neutral.
b. Unlikely to be economic.
c. Facilities-based with bulk supply.
d. Small towns probably cannot support competing providers.

governments should be reluctant to grant exclusive franchises or to otherwise place legal limits on competition. And sometimes it is desirable to go beyond allowing competition and actively promote it. For example, a new supplier could not set up a competing water supply network if there are no suitable water sources close to the potential customers. In such cases it may be efficient to require the incumbent to provide bulk water from its network to the new entrant. (This approach will work only where the incumbent utility has adequate water. Where that is not the case, the approach will work only if combined with other strategies to increase water supply, such as competitive procurement of build-own-operate water supply projects or of leakage reduction services.) An analogous situation arises in telecommunications, where phone companies are required to interconnect with one another.

It would also be possible to have several water utilities that compete for customers using a single set of pipes. The network owner would be required to allow other water suppliers to use the network for a cost-reflective, nondiscriminatory fee. This approach, known as common carriage, has been successfully used to introduce competition in gas and electricity in many countries (box 1).

The experience of England and Wales, where small, dynamic, innovative companies are setting up to compete in the water industry, provides an interesting example of how competition in water can develop (box 2).

Promoting competition—regulating for bulk access and common carriage

To promote competition, governments may have to develop an efficient bulk supply or network access regime. The most important part of such a regime is the price of bulk supply or network access. To ensure efficient competition, this price should reflect costs. But estimating the cost of providing access or bulk supply can be difficult for water utilities in developing countries, which often have limited information on their network. Many do not know exactly how much leakage is occurring, or even where their pipes are.

Other network industries faced similar (though generally less severe) problems in introducing competition. From their experiences have come many workable solutions, including:

- Requiring the parties to agree on a price and reserving the right of a regulator to intervene or arbitrate if they cannot.
- Setting a price that approximates marginal cost initially, and then refining it over time.
- Requiring an incumbent to charge an entrant the same cost that it charges itself. This may require accounting separation of the incumbent's business into bulk supply, distribution, and retail.

Differences in water quality are a serious issue for common carriage arrangements. Water from different sources may vary in chemical composition, bacteria levels, turbidity, color, and other parameters. But once it flows into the network, water from all sources is mixed, which can result in such problems as:

- Contamination. If one company puts water contaminated with fecal coliform into the system, customers of all the companies will get sick.
- Disruption in industrial users' processes. Food processors, breweries, and other water users calibrate their processes to the water's usual chemical composition. If this composition changes, product quality will be affected.
- Changes to the network. The inner walls of pipes reach a chemical equilibrium with the water flowing through them. Changing the composition of the water could cause faster corrosion, increased buildup of residue inside the pipe, or the release of previously accumulated residue into the water.

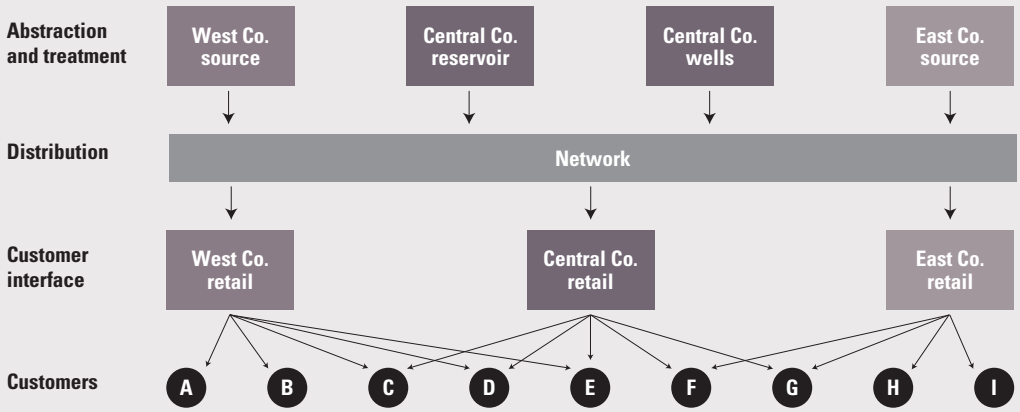
Water operators tend to argue that these problems are unique to water and that they rule out common carriage competition. Neither assertion is true. All network industries must ensure consistent minimum quality standards and technical compatibility in use of the

BOX 1 COMMON CARRIAGE COMPETITION IN THE WATER SECTOR

Box figure 1 shows a city served by three water companies, the West, Central, and East Companies. Each company owns one or more water sources. All the companies pipe their water into the same network, paying a network access fee to its owner. The companies then compete with one another to sell water to customers. Each customer signs a contract, specifying the price of water, with one or more companies. Each company's retail arm is then responsible for reading its customers' meters, billing them, and collecting payment. While this kind of competition has not yet been tried in water, experience shows that it works in gas, electricity, and telecommunications.

To take the competition one step further, ownership of the sources could be separated from the retail functions. That would create a wholesale market between the water resource owners and the water retailers, a market structure that has worked well in other utility industries.

BOX FIGURE 1 A CITY WITH COMMON CARRIAGE COMPETITION



network. In electricity, where failure to observe standards could bring down the entire system, voltage and frequency limits are tightly prescribed and monitored for all generators. In water workable common carriage competition will require specifying parameters for all water put into the network. Such parameters would include maximum levels for harmful substances, permissible ranges for substances that affect industrial processes or the network, and permissible ranges for such characteristics as color and turbidity.

Costs versus benefits of competition

Social and environmental concerns are often the reason for limiting competition. These concerns are valid. For example, uncontrolled groundwater abstraction can lower the water table, causing subsidence (as in Bangkok and Mexico City) or saline intrusion. Similarly, uncontrolled on-site sanitation can pollute groundwater. Package sewerage plants are often poorly operated, create smells, and discharge inadequately treated effluent into rivers or the

sea. Cross-subsidization is often a deliberate social policy, used to provide services at below cost to households or to promote a uniform tariff throughout a town or country.

It is generally better to achieve environmental and social objectives through competitively neutral mechanisms, however. For example, an independent water resource or environmental agency should control all water abstraction and discharge, regardless of whether done by an incumbent water utility, a new entrant, or someone supplying themselves. Social objectives can be met through direct subsidies to low-income households or through the general tax-benefit system.

But common carriage or bulk supply arrangements demand skilled policymaking and well-developed regulatory capacity. Complex contracts and metering and payment systems are needed to control relationships between companies that compete while sharing a single network. Would the efficiency gains from competition in water outweigh the costs of these? The case for common carriage competition in water is less compelling than that in other network industries, for several reasons:

- The costs of introducing product market competition in water are likely to be as high as those in other industries—and they may even be higher as a result of the lack of information in the sector.
- Water is generally less valuable than the products or services provided by other network industries. For example, the combined turnover of the regional electricity companies in England and Wales last year was more than twice the turnover of the water companies serving the same area. So a given percentage gain in efficiency is worth less in water than in other industries.
- In water a greater share of costs is in the network (which will remain uncompetitive) than in the potentially competitive areas. This is the reverse of the situation in electricity, for example, where more than 50 percent of the costs are in the competitive generation and retail segments.

BOX 2 INSET APPOINTMENTS IN ENGLAND AND WALES

During privatization of the water and sewerage sector in 1989 the U.K. government allowed limited competitive entry. "Inset appointments" —licenses issued by the regulator, the Office of Water Services (Ofwat), to new entrants to supply a defined area—were permitted for sites that were not already connected and that were more than 30 meters from the local water utility's distribution main or sewer.

In 1992 the scope for competition was increased. The 30-meter rule was removed. And large customers at qualifying sites (sites not connected to a supplier's distribution main or sewer) taking 250 million liters or more a year were given the right to choose a new (inset) supplier.

At the same time inset entrants were allowed to apply for bulk supply from the local water utility. The terms of this bulk supply would be decided by Ofwat if negotiations between the parties failed. Residential customers were also allowed to connect to a neighboring water utility, at their own expense.

A 1995 review led to proposals to further increase competition. These included relaxing the definition of a qualifying site for inset appointments, removing the water utilities' monopoly on making connections to the water main, and allowing utilities to supply large customers in a competitor's interconnected system by paying a fee for using the system (common carriage).

Only three cases of inset competition have occurred so far, but many applications for inset appointments have been made to Ofwat. In response to the threat of competition, twenty-two of the United Kingdom's twenty-eight water companies have lowered tariffs for large users, making cuts ranging from 1 percent to about 25 percent.

Still, the net gains from competition have been huge in many industries. If even a fraction of these gains could be realized in water, the costs could be worthwhile. As a general rule complex forms of competition involving common carriage arrangements are worth contemplating where:

- Administrative and regulatory capacity is high.
- Water is high cost.
- The incumbent's network is in reasonable shape.

While rare, these conditions do exist in some places in Central and Eastern Europe and Latin America. And they are likely to arise in more and more places as a result of other reforms, such as introducing private sector participation. So it is a good idea to build in the potential for competition rather than locking in monopolies for thirty or so years, as often happens when concessions are granted today.

In most places it will be desirable to allow self-supply as well as competitive entry by suppliers that can meet a market need by providing both a source of water and a distribution system. This can be a simple and effective way to put pressure on incumbents to keep costs down and limit cross-subsidies. The main exceptions will be where, as a result of a severe lack of administrative capacity, pressing social needs can be met only through cross-subsidy, or effective control of abstraction of water or discharge of wastewater can be achieved only through an outright ban on small abstractors and dischargers.

It might also be argued that granting an exclusive concession is essential to attract the private sector. Exclusivity could reduce risk to private investors and provide a secure base to finance expansion of the system to new areas. Where these goals are important, it might be best to draw on experience in telecommunications, where it is now common to grant newly privatized incumbents exclusive rights for only a limited period, typically four to seven years.

Competition to supply inputs

There is a growing trend toward expanding the scope for competitive procurement to include larger and more important services. There are three main reasons why putting operating and maintenance functions out to tender can lower costs. First, independent providers of functions such as cleaning may reap economies of scale beyond the reach of individual water companies. Second, small specialist companies have lower overhead and adopt new technologies faster than large utilities. Third, public water companies often have high costs as a result of overstaffing and restrictive labor practices.

But competitive contracting can go beyond operations and maintenance. For example, services to reduce water losses can be contracted out to competing teams. If contracts with the teams are well defined, they can provide strong performance incentives. Toulon, France, for example, has awarded a five-year contract in which the contractor's only payment is a 50 percent share of the value of the water saved.

Expansion of supply capacity can also be contracted for competitively. Build-own-operate (BOO), build-operate-transfer (BOT), and build-own-operate-transfer (BOOT) projects for water supply and sewerage have been used in many countries.

Such approaches could be used more extensively as a way of increasing competition. Utilities wishing to increase water supply or sewage treatment capacity could be required to publish their needs and call for bids. That would allow bidders complete freedom to design any scheme that would achieve the objective. For example, a water utility might intend to expand water supply by building a pipeline to bring water from far outside the town. Calling for bids for bulk water supply (rather than for bids limited to the project the utility has in mind) opens the way to innovative solutions. One bidder might offer to provide the water by fixing leaks in part of the network. Another might offer to rehabilitate a pumping station to increase its capacity.

Network extensions can also be competitively procured by adapting BOOT ideas. For example, the contractor could be made responsible for designing and building the network and then maintaining it for a set number of years after construction, with penalties payable if leakage rises above the target.

Whether efficiency gains are realized depends on the monopolist's cost-consciousness. A private concession holder subject to an incentive-

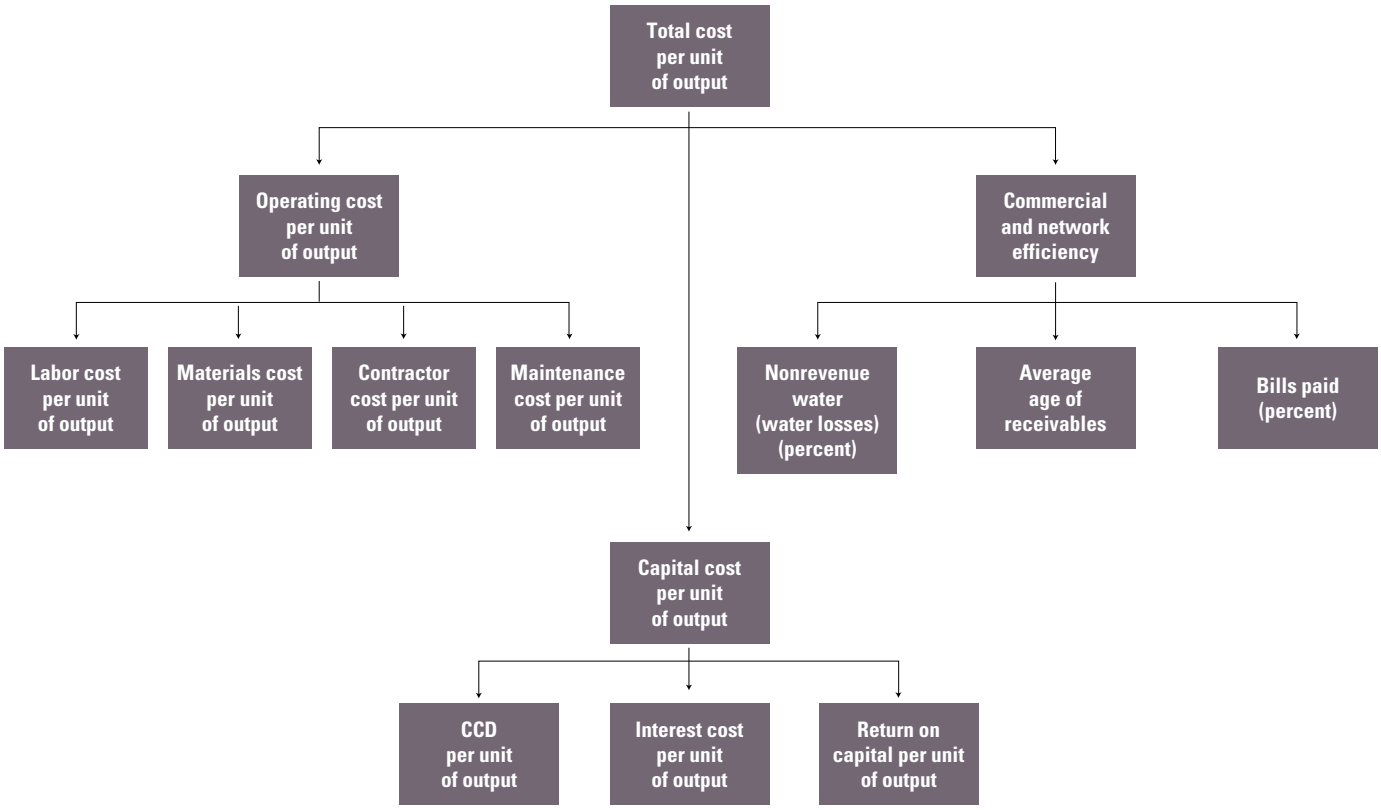
compatible regulatory regime (such as a price cap) could be expected to contract out operating and maintenance functions if this lowered costs. Publicly owned utilities or those subject to cost-plus regulation could be required to procure many inputs competitively. Such rules would be beneficial as long as the utility has, or can develop, the ability to manage, coordinate, and enforce contracts.

Competition for the market

When the right to serve customers in an area is put out to competitive tender, the winner might be the company promising the lowest tariffs or the one requiring the lowest subsidy. Competition forces the bidders to reveal the minimum cost of providing water and sanitation, allowing efficiency gains to be realized and passed on to consumers. Many major water sector reforms in recent years have used competition for the market as an efficient way of introducing private sector participation, and the approach has delivered benefits to consumers.[1] For example, in Guinea competition resulted in a tariff 30 percent lower than a benchmark price estimated by consultants, and in Manila the winning consortium for one of the concession areas offered a tariff reduction of 74 percent.

Drafting such contracts and holding a tender are expensive. For small towns the cost of preparing a tender is disproportionate to their size. Small towns are further disadvantaged because private operators may be unwilling to incur the substantial cost of making a bid when the contract is small. These problems can be overcome. Several small towns can join together and award a contract to supply all of them.

FIGURE 1 SIMPLE UNIT PERFORMANCE MEASURES



Competition for the market can be combined with other forms of competition:

- While it is common practice to award bidders an exclusive franchise, allowing product market competition could increase competition.
- Requiring the concessionaire to contract out many services can keep up the pressure for efficiency during long-term contracts.
- Comparative competition between the concessionaire and other utilities can boost performance (see below).

Comparative competition

Regulators and consumers can compare utilities to judge their performance. Several types of such comparative competition are possible, including:

- A "pure" version, in which the price a firm may charge is set by the costs of other firms in the industry. This means that firms can increase profits by reducing costs. If all firms lower their costs, a virtuous circle results in which all firms' costs and tariffs are driven downward.
- Regulatory benchmarking of companies against one another, to estimate efficiency and set price caps accordingly. Figure 1 shows a hierarchy of cost indicators that can be used in this approach. These indicators can be supplemented by sophisticated statistical techniques that take into account differences in companies' operating environments.
- Publication of comparisons of companies' performance in the media. This can be a simple but powerful tool.

Sophisticated benchmarking using statistical techniques to compare companies' efficiency has worked in England and Wales to some extent. In Brazil a national agency concerned with water sector reforms, the PMSS, has assembled consistent data on a full set of operating cost variables for almost 100 municipal areas. Comparative competition can also focus on quality. New Zealand grades potable water supplies from A to E. This system has stimulated debate on the cost-quality tradeoff in areas with low grades and put pressure on utilities to improve. Consumer groups in India have had success with a similar "report card" concept comparing utilities' performance in many aspects of service.

Comparative competition is a powerful tool for improving performance, and it can be introduced at relatively low cost in a wide variety of settings. To ensure that it is effective, governments introducing such competition should:

- Divide municipalities or regions into several zones, each served by a separate utility, where this can be done without sacrificing economies of scale. Manila and Mexico City have both adopted this approach.
- Set up systems to share information on utilities in different areas (as in Brazil, Colombia, the United Kingdom, and elsewhere).
- Link comparative performance to incentives. This can be done by linking pay or profitability to relative performance or making renewal or expansion of contracts contingent on good performance.

It is also worth developing international performance comparisons, as the Asian Development Bank, the World Bank, and other institutions have started to do. Since the United Kingdom has advanced furthest in comparative competition, the techniques and data definitions it has developed could provide a good basis for an international system.

This Note is based on "Improving Water Services through Competition" (Water Resources Occasional Paper 6, U.K. Department for International Development, London, 1998) and a longer paper, "Competition in Water" (available from London Economics, 66 Chiltern Street, London, W1M 1PR).

[1] For details on concession contracts see Pierre Guislain and Michel Kerf, "Concessions—The Way to Privatize Infrastructure Sector Monopolies" (Viewpoint 59, October 1995), Claude Crampes and Antonio Estache, "Regulating Water Concessions" (Viewpoint 91, September 1996), Penelope J. Brook Cowen, "The Private Sector in Water and Sanitation—How to Get Started" (Viewpoint 126, September 1997), and Helen Nankani, "Testing the Waters—A Phased Approach to a Water Concession in Trinidad and Tobago" (Viewpoint 103, January 1997).

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