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Privatizing Waterworks: Learning from the French Experience*

by Steve H. Hanke, Johns Hopkins University, and
Stephen J.K. Walters, Loyola University Maryland

“From 1838 to 1841, whilst examining the sanitary conditions of town populations, I found urban districts in England where there are two or three sets of water-pipes carried through streets which might be as well or better supplied under one establishment, [resulting in] bad and deficient supplies at high charges to the public ... These competitions are what I then designated as ‘competitions within the field of service.’ As opposed to that form of competition, I proposed, as an administrative principle, competition ‘for the field.’ ”

—Edwin Chadwick, Esq., *before the Statistical Society of London, 1859*¹

Edwin Chadwick’s observations on the inefficiency of English water-supply systems in the nineteenth century were remarkably prescient. He correctly identified such systems as natural monopolies. Moreover, he proposed a novel yet practical private solution to the problems inherent in natural monopolies. But Chadwick’s suggestions were not heeded. As a consequence England and Wales are now served by ten regional, publicly owned waterworks systems that face no competition.

The conservative government of Prime Minister Margaret Thatcher has proposed to alter the current system of regionalized waterworks monopolies. The Thatcher government has also announced that it intends to privatize the nation’s waterworks. The receipts from a public offering of the waterworks might exceed the \$9 billion generated by the sale of British Gas, the country’s natural-gas utility, in December 1986. The waterworks privatization would be the largest stock offering in history.

The objectives of privatizing waterworks are numerous. The most frequently cited goals include improving the economic performance and service functions of the assets;

depoliticizing economic decisions; generating public-budget revenues through public-offering receipts; reducing public outlays, taxes, and borrowing requirements; reducing the power of public-sector unions; and promoting popular capitalism through wider share ownership.

These are, of course, ambitious goals. Critics question whether they are attainable and, if so, whether they are desirable. The discussion here is limited to the first objective of privatization—improving economic performance. The theory and evidence of the performance of private versus public enterprises are presented, focusing specifically on the applicability of Chadwick’s concept of private competition “for the field” as a means of generating superior performance in the provision of water supply.

Private versus Public Enterprises

Private enterprises should be expected to be more efficient than public enterprises precisely because a private owner stands to gain enhanced wealth from improvements in efficiency, reductions in cost, and the like. To put it another way, a private owner stands to forgo wealth if improvements in effi-

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1. Edwin Chadwick, “Results of Different Principles of Legislation and Administration in Europe; of Competition for the Field as Compared with Competition within the Field, of Service,” *Journal of the Statistical Society of London*, 22 (1859): 384-85.

ciency, reductions in cost, and the like are not pursued. In essence, private owners face significant incentives to monitor the behavior of managers and employees so that they will supply what consumers demand and do so in a cost-effective way. Private owners are “residual claimants” who have a strong interest in seeing that there is indeed a residual, or profit, to claim.

Monitoring by owners can be quite costly. The necessity for owners to monitor managers, however, can be mitigated by providing the managers with compensation packages that include profit sharing or stock options. These packages are designed to make the managers’ interests coincide with those of the owners.

The combination of monitoring and incentive compensation packages tends to make managers operate private firms in an efficient manner. If managers do not maximize owners’ residual claims, however, the market for shares acts as a court of last resort. If the actions of incumbent managers are inappropriate, profits and share prices will be lower than they should be. This attracts corporate takeover specialists, because share prices that are relatively low enhance the returns from a takeover aimed at replacing current management. The threat of corporate takeovers thus helps discipline incumbent managements and generates an efficient provision of goods and services.

Public enterprises, by contrast, lack a “residual claimant” in any meaningful sense. Ownership shares in public enterprises generally cannot be bought or sold, so that takeovers are impossible. And it is rare to see the compensation of managers of public enterprises tied to their companies’ performance. “Profits” generated by enhanced efficiency in a public enterprise could be refunded to taxpayers through tax reductions, but such refunds would be spread over many taxpayers, and any individual’s benefits would be small. More important, taxpayers would be only one of the constituencies competing for these benefits. Before the “profits” were refunded, a variety of interest groups would try to see them spent in other ways. The taxpayers’ costs of obtaining these benefits—such as those incurred in acquiring information, lobbying, and monitoring elected officials—would be very high. Consequently, the incentive of any individual “taxpayer-owner” to monitor the behavior of public managers and employees is weak, and the likelihood of their shirking or acquiring various

perquisites that increase production costs is greater than in private firms.

Though the preponderance of theoretical work suggests that private firms are more efficient and productive than public ones, it is only by examining the available evidence that the validity of any theory can be judged.

Numerous studies compare the performance of public and private firms. One of the most widely cited is David G. Davies’s comparison of Australia’s two interstate airlines—one public, the other private.² Davies found that even though the private airline labored under heavy regulatory constraints it was more efficient: it carried 103 percent more freight and mail and 17 percent more passengers per employee than the public airline but earned 12 percent more revenue per employee.

Many studies show sizable cost savings in other private enterprises. Robert W. Poole, Jr., has documented significant savings in privately run air-traffic control systems, ambulance services, fire-protection services, park systems, and prisons.³ E. S. Savas has documented enhanced efficiency in private postal services, security services, and refuse collection.⁴ James T. Bennett and others have reported cost savings in privately run custodial-service firms, day-care centers, debt-collection services, schools, electric utilities, and ship-maintenance operations.⁵ Kenneth W. Clarkson and William Rushing have found that private hospital administrators are more efficient than their public counterparts.⁶ Hanke has found that public timber and grazing-land firms are less efficient than private firms.⁷

Most relevant to the central concern of this essay, W. Mark Crain and Asghar Zardkoohi have compared the performance of public and private water utilities in the United States.⁸ They found that operating costs are significantly higher in the publicly owned utilities. Using 1970 data from a sample of twenty-four private and eighty-eight public water-supply companies, Crain and Zardkoohi established that public companies’ low labor productivity and underutilization of capital equipment led to operating costs about 25 percent higher than in the private companies. Using a different data set, W. Douglas Morgan reached similar conclusions; Hanke found that customer cross-subsidization (that is, overcharging some consumers so that other consumers can be sold water at prices below cost) is more common in public water companies than in private ones.⁹

2. David G. Davies, “The Efficiency of Public versus Private Firms: The Case of Australia’s Two Airlines,” *Journal of Law & Economics* 14 (April 1971): 149-66. See also David G. Davies, “Property Rights and Economic Efficiency: The Australian Airlines Revisited,” *Journal of Law & Economics* 20 (April 1977): 223-26.

3. See Robert W. Poole, Jr., *Cutting Back City Hall* (New York: Universe Books, 1980); idem, “Air Traffic Control: The Private Sector Option,” Heritage Foundation Background No. 216, 5 Oct. 1982.

4. See E.S. Savas, *Privatizing the Public Sector: How to Shrink Government* (Chatham, N.J.: Chatham House Publishers, 1982).

5. See James T. Bennett and Manuel H. Johnson, *Better Government at Half the Price: Private Production of Public Services* (Ottawa, 111.: Caroline House Publishers, 1981); James T. Bennett and Thomas J. DiLorenzo, “Public Employee Unions and the Privatization of ‘Public’ Services,” *Journal of Labor Research* 4 (Winter 1983): 33-45.

6. See Kenneth W. Clarkson, “Some Implications of Property Rights in Hospital Management,” *Journal of Law & Economics* 15 (October 1972): 363-84; William Rushing, “Differences in Profit and Nonprofit Organizations: A Study of Effectiveness and Efficiency in General Short-Stay Hospitals,” *Administrative Sciences Quarterly* 19 (December 1974): 474-84.

7. See Steve H. Hanke, “The Privatization Debate: An Insider’s View,” *Cato Journal* 2 (Winter 1982): 653-62.

8. W. Mark Crain and Asghar Zardkoohi, “A Test of the Property-Rights Theory of the Firm: Water Utilities in the United States,” *Journal of Law & Economics* 21 (October 1978): 395-408.

9. See W. Douglas Morgan, “Investor Owned vs. Publicly Owned Water Agencies: An Evaluation of the Property Rights Theory of the Firm,” *Water Resources Bulletin* 13 (August 1977): 775-81; Steve H. Hanke, “On Water Tariff Equalization Policies,” *Water Engineering and Management* 128 (August 1981): 33-34.

Though the great weight of empirical evidence seems to support the economic theory that private enterprises should be more efficient than public enterprises, it is possible to find examples of seemingly well-run public firms. John R. Baldwin, for example, reported that the Canadian airline industry, with a nationalized firm playing a key role, operated with higher load factors and lower markups than the privately owned (but at that time heavily regulated) United States industry.¹⁰ Richard Hellman has argued that some publicly owned electric utilities may also operate at lower average unit costs than regulated private utilities, though comparisons are clouded by water-rights differences and other disparities.¹¹ All of these isolated examples, however, involve either comparisons with private firms that are heavily regulated as to rate of return—and regulation in itself implies a whole host of inefficiencies—or comparisons with private firms that have been vested with some sort of monopoly “rights.”

But this is the crux of the problem regarding waterworks. Since water utilities generally qualify as natural monopolies, it may be that some form of government regulation of even privately owned utilities is inevitable. If so, perhaps some of the advantages of private ownership will be reduced or eliminated. In the presence of a true “natural monopoly problem,” which necessitates some sort of government involvement, is privatization feasible?

The “Natural Monopoly Problem” and Franchise Bidding

An industry is usually said to be a natural monopoly if production can be conducted most efficiently by a single entity. This will generally be the case if unit costs are declining over the entire relevant range of market demand for a product—that is, in cases where there are massive economies of scale in the production of a good. Under this condition, having two firms in operation side by side would be undesirable and unlikely in the long run, since either of the rivals could expand output, experience lower unit costs, and drive the other from the market; a monopoly situation would “naturally” result. Only if a single firm captured the entire market and exploited all of the potential for lower unit costs through increases in scale would production be organized as cheaply as possible.

The water-supply industry is a straightforward illustration. A water pipe’s capacity is roughly proportional to its cross-section area, while cost is roughly proportional to the

pipe’s circumference. If the cross-section area of a pipe is doubled, the circumference is *less than* doubled; therefore, doubling the volume of water to be transmitted between any two points less than doubles the cost, and the average transmission cost is declining everywhere. Not surprisingly, field data analyzed by Hanke and Roland W. Wentworth strongly support this theory.¹² Within any single area, therefore, more than one water utility will involve wasteful duplication of facilities.

On the other hand, any firm that is the sole producer of a commodity enjoys some measure of market power, and the fear has long been that *unregulated* natural monopolies would reduce output, charge prices substantially above costs, and thereby misallocate resources. To deal with the problem, governments have generally recognized and licensed a single producer in markets identified as natural monopolies and then regulated the prices (or rates of return) received by these firms to forestall monopolistic conduct.

But rate regulation itself involves numerous problems. Since most rate regulation involves enforcing some sort of “cost-plus” pricing rule, regulated firms tend to allow their costs to drift upward—since, in most cases, they can be reasonably confident that rates will be set high enough to cover these costs and provide a “normal” return on capital. Harvey A. Averch and Leland L. Johnson have documented this tendency.¹³ Obviously, it will be difficult for even a well-intentioned regulatory authority to determine which costs are legitimate; there is also a strong possibility that the authority will be “captured,” come to serve the interests of the utility instead of the broader interests of consumers. Thus, one important study suggests that rate regulation can be completely ineffectual; in a comparison of regulated and unregulated electric power companies, George J. Stigler and Claire Friedland found no evidence that regulation resulted in lower prices or increased quantities supplied for the period 1912-37.¹⁴

Such observations have led economists and policymakers to search for alternatives to direct regulation that might better address the natural monopoly problem. One approach has been a revival of interest—begun by Harold Demsetz¹⁵—in Chadwick’s concept of competition *for* the field. Chadwick recognized that those markets most cheaply served by a monopoly need not be afflicted with monopolistic conduct so long as there is *meaningful competition for the rights to the*

10. John R. Baldwin, *The Regulatory Agency and the Public Corporation: The Canadian Air Transport Industry* (Cambridge, Mass.: Ballinger, 1975): 200-205.

11. Richard Hellman, *Government Competition in the Electric Utility Industry* (New York: Praeger, 1972), argued that the TVA had favorable competitive effects on adjoining utilities. By contrast, Sam Peltzman, “Pricing in Public and Private Enterprises: Electric Utilities in the United States,” *Journal of Law & Economics* 14 (April 1971): 109-47, argued that an average government utility-rate advantage merely reflects lower tax burdens.

12. Steve H. Hanke and Roland W. Wentworth, “Études statistiques de prix de revient pour les canalisations d’eau usée,” *Techniques et Sciences Municipales-L’Eau* 75 (Octobre 1980): 517-18.

13. Harvey A. Averch and Leland L. Johnson, “Behavior of the Firm Under Regulatory Constraint,” *American Economic Review* 52 (December 1962): 1052-69. For a survey of other studies of this tendency, see Elizabeth Bailey, *Economic Theory of Regulatory Constraint* (Lexington, Mass.: Lexington Books, 1973).

14. George J. Stigler and Claire Friedland, “What Can Regulators Regulate? The Case of Electricity,” *Journal of Law & Economics* 5 (October 1962): 1-16.

15. Harold Demsetz, “Why Regulate Utilities?” *Journal of Law & Economics* 11 (April 1968): 55-65.

monopoly franchise. In theory, if there is vigorous bidding for the franchise monopoly, the best of both worlds—avoidance of wasteful duplication of facilities and competitive prices—will be possible.

The crucial point is that the bidding for the monopoly franchise should not be in terms of a sum to be paid for the franchise but in terms of *the prices that the franchisee would charge and the services the franchisee would provide the public on award of the right to be the exclusive seller*. If the franchise were merely awarded to the bidder willing to pay the highest price for this exclusive right, competition would drive bids up to an amount equal to the present value of expected future monopoly profits in the market. This would filter these profits through the franchisee to whatever authority granted the franchise in the first place, but the net result would still be underproduction and overpricing of the product. By contrast, Chadwick proposed that an auction be held in which the franchise is awarded to whichever bidder promises the best combination of price and quality to consumers. Competition would then drive bid prices down to competitive levels for each possible level of service quality. So long as this bidding process is open and competitive, and so long as inputs to the production process are available in open and competitive markets as well, there is no need to fear monopolistic results even though a single firm has been granted rights as an exclusive seller.

Chadwickian theory is not necessarily reality, however, and scholars like Richard Schmalensee have expressed strong reservations about such franchise bidding.¹⁶ One set of problems relates to the bidding process itself. Selecting a winner—that is, determining an optimal price structure and a mix of products—may be exceedingly complex, requiring the kind of expertise in the franchise-granting authority that one normally associates with a regulatory commission. In addition, there is no guarantee that bidding will be truly competitive; significant numbers of new firms may be reluctant to bid on a franchise that has expired when the previous franchisee is also in the bidding, since the previous supplier is almost certain to be better informed about actual cost and demand conditions than are the rivals.

Another set of problems relates to the likely behavior of the winning bidder during the term of the franchise contract. First, if the contract is for a reasonably long term, there must be some formula to allow for rate changes as costs, demands, and technologies change over time—or renegotiation must be allowed. If a formula approach is impractical and the latter approach is taken, the need for some sort of agency similar to a regulatory commission again becomes apparent. Such an agency will also be needed to police the franchise contract, since the agreement will not be self-enforcing.

Another problem is that as the contract deadline approaches, the franchisee may stint on maintenance and underinvest in new assets, leaving any resulting problems for the next franchisee. Indeed, since part of the return on any specialized assets (including knowledge about the firm or industry) might accrue to a subsequent franchisee, a finite contract term could imply a suboptimal incentive to invest in or maintain these assets.

These problems are serious but not intractable. Three aspects—selecting a winning bidder, specifying or renegotiating contracts, and policing the contract—require the existence of some sort of “buyers’ agency” to represent consumers. Critics of franchise bidding have asserted that such an agency would, after all, be reduced to performing the same tasks that traditional regulatory commissions now perform—and with the same difficulties and potential for inefficiency or abuse.

But that need not be the case. The degree of complexity and swiftness of technological change in the relevant industry are crucial variables. Selecting a winning bidder may be difficult if technology has created a myriad of potential service options. But if it is possible to specify a limited number of service standards—as, for example, with water supply—awarding the franchise may not be troublesome at all. And where the pace of technological change is not too rapid—as, again, with water supply—it may be quite easy to agree on a formula for rate increases, and the possibility of midcontract renegotiation may never arise. Enforcing the contract will also be facilitated in industries with a relatively limited number of service standards to be specified. The enforcement role of the buyers’ agency is fundamentally different from that of the traditional regulatory commission. The buyers’ agency in franchise bidding is merely enforcing a contract; there is no need for this agency to try to authenticate (as public utility commissions must) the franchisee’s costs—a much more complex and difficult task.

The critics’ doubts about the competitiveness of the bidding process are based largely on a misperception of existing suppliers’ presumed advantageous position vis-a-vis new bidders. It is true that a current franchisee will know more about the market than a prospective one, but this in no way implies that bidding for franchise renewal must be less than fully competitive. Knowledge is an asset like any other; it must be created at a cost. That the current franchisee has already acquired the asset and paid the associated cost is irrelevant. Bids of current franchisees will incorporate a return to the knowledge asset that has been created, while bids of prospective franchisees will incorporate the capital cost of acquiring the asset. This will be equal to the interest rate times each bidder’s cost of creating the asset; any bidder (includ-

16. Richard Schmalensee, *The Control of Natural Monopolies* (Lexington, Mass.: Lexington Books, 1979), 68-73.

ing prospective franchisees) with a comparative advantage in creating this asset cheaply will be well situated to submit a winning bid.

The issue of a franchise holder's incentive to engage in suboptimal levels of maintenance and investment expenditure may also relate to the technological complexity of the industry. If the fixed assets of the operation may be feasibly inspected and evaluated by the authority, then the problem may be addressed by having the franchisee post a bond (to be forfeited and used to replenish any assets found deficient) as part of the contract. This would be similar to the process every tenant must follow in renting an apartment: a security deposit is posted as part of the lease agreement and forfeited if the apartment is depreciated more than normal. Obviously, the more complex the production process, the more difficult such an approach would be.

The nature of the water-supply industry, however, appears well suited to the franchise-bidding approach. The technology of water supply is well known and relatively static, and specifications about service standards ought to be readily formulable. Critics' qualms about the practicality of franchise bidding recede in such a context. The best evidence of this is that privately owned water-supply franchises have been commonplace in several areas; the track record of these systems will now be outlined.

Private Water Utilities in Practice

Practice likely preceded theory in this area. In his original article, Chadwick noted that the principle of awarding franchises to the bidder promising to charge the lowest price to consumers had already been undertaken in France in a variety of activities, including water supply.

The first franchise contract for water distribution in France was in 1782, when the Perrier brothers were given exclusive distribution rights in Paris for a period of fifteen years. The charge was about one cent per liter. The Perrier firm was later nationalized, however, and by 1854 the price of water in Paris had quintupled. While some other population centers (such as Avignon, Calais, Le Havre, and Cannes) were serviced by private water franchises as early as the 1850s, many municipalities opted to build and manage their own systems. Since 1950, however, many of these municipalities, including Paris, have turned to private companies to manage their systems. Today, about 55 percent of the drinking water in France is supplied by private companies.

Privatization of the water supply in France has generally taken one of two franchise forms, though at least two variants of these bear mentioning as well. The first form is the *concession*. In this system, a private company is entrusted with the construction (or, possibly, overhaul or modernization) of the facility as well as its operation. Such a system is especially advantageous when the municipality lacks funds for a major capital expenditure. The concessionaire advances capital for

construction and operation, assumes full responsibility (and risk) for monitoring, management, and maintenance of facilities, and collects payment directly from users. The contract is usually signed for a long-term period—generally thirty years—to enable amortization of the original capital outlay. The contract sets the price of the water with a formula that includes a fixed and variable component. For example, a user may pay a set monthly fee for access to a supply pipe of a certain diameter along with a variable charge based on the number of cubic meters consumed.

In the second system, *affermage*, the expenses for the installation of major civil works are borne by the local community; the private firm then manages the completed facilities and provides working capital. Such systems are popular when municipal financing can be provided at preferential interest rates. The contract contains detailed specifications for maintaining or upgrading facilities. All electromechanical, hydraulic, and metering equipment is the operator's responsibility, while civil works, water collection, and facility expansion are the responsibility of the municipality; pipe renewal may be the responsibility of either party. As in the *concession* system, a formula fixes the price of water; often this formula contains a surcharge that the operator remits to the municipality for debt service.

Gerance, a variant of the *affermage*, involves roughly the same relationship between municipality and operator but more limited responsibilities for the private firm. The firm's pay is based on a tariff list agreed upon by the local authority. Yet another variant, *regie interressee*, involves management of a public authority by a private firm that shares in the revenues or profits. In theory, the municipality retains overall management; the firm is an agent of the municipality and is paid a percentage of revenues (to which may be added productivity bonuses or a share of net profits). This system leaves greater authority with the municipality but retains access to the technical services of a company with specialized knowledge and abilities. Franchise contracts usually include clauses specifying the quality of services, the minimum quantity to be supplied to each individual consumer, the mains pressure, and procedures for renewal of the contract, in addition to the clauses relating to maintenance responsibilities and a pricing formula.

The French experience demonstrates clearly that, at least in regard to waterworks, the franchise-bidding approach is a practical system. The technology of water supply and transmission is such that bidders may be selected, contracts drawn up and enforced, and maintenance and expansion conducted efficiently and at acceptable cost. While no comparative studies are available for the costs of private and public water-supply systems in France, the trend toward greater privatization (in a country not generally predisposed to the private sector) suggests that enhanced cost-effectiveness is a signal virtue of the private systems. Additional evidence

of the superiority of the private French system of franchising is provided by the observation that “water professionals” are increasingly traveling to Paris to learn the most recent developments in waterworks management and technology.

The French experience, moreover, is not unique. In Spain, private water companies account for nearly as large a share of drinking-water requirements as in France. Since 1914, French concessions have branched out and have set up systems in Italy, Brazil, Peru, Morocco, Indonesia, Kuwait, and several African nations (although some of these were expropriated during the 1960s). In Santiago, Chile, two “private concessions” operate in separate areas of the city, and in Guatemala City, Guatemala, a private concession shares the market with a partially public enterprise.

Conclusion

Both theory and evidence strongly support the notion that private supply is more efficient than governmental supply. Waterworks, however, are true natural monopolies; consequently, many argue against privatizing them. As they see it, privatization would simply transform a public monopoly into a private monopoly.

But that need not be the case. The benefits of large-scale, single-firm operations can be secured at competitive prices. This can be accomplished by employing Chadwick’s system of franchise bidding in which the rights to a franchise are awarded to the firm that offers the best terms to the public.

Implementing such a system presents difficulties, of course. That such a system of private, competitive franchises is widely employed for waterworks in France, however, demonstrates that these difficulties can be overcome. Therefore, the question of natural monopoly should not enter into the debate over privatizing waterworks. The privatization of waterworks and the proper use of competitive franchising can and should generate substantial benefits for water consumers and reduced resource waste by society as a whole.

STEVE HANKE is a Professor of Applied Economics and Co-Director of the Institute for Applied Economics, Global Health and the Study of Business Enterprise at Johns Hopkins University.

STEPHEN J. K. WALTERS is an economics professor at Loyola University Maryland and a Fellow at the Institute for Applied Economics, Global Health and the Study of Business Enterprise at Johns Hopkins University.

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