DEREGULATED PRIVATE WATER SUPPLY: A POLICY OPTION FOR DEVELOPING COUNTRIES

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The Privatization Alternative

Many citizens in developing and transition economies are excluded from enjoying safe and reliable water supply. In many cities, 30 to 60 percent of the population has no formal water hook-up at all, but rather must resort to wells, buckets, supply by tanker-trucks, and physical transport of water through human labor and beasts of burden.

A few simple facts illustrate the serious nature of this problem. In Jakarta, 75 percent of the population has no formal connection; in Maputo 65 percent. In Madras, the percentage served is around 50 percent; and even in relatively prosperous Manila, 29 percent of the citizenry has no connection. When individuals must resort to nonpiped water sources, prices are often at least 10 to 20 times higher. In Luanda, where the price for piped supply is around nine cents per cubic meter, households can pay as much as $16.00 per cubic meter for tanker supply. Table 1 portrays some connection rates and price differentials.

The fundamental problem is institutional rather than technological. Tariffs set by governments at levels below cost recovery fail to encourage inclusion. In developing countries, water utilities recover on average around 30 percent of their total costs (World Bank 1994). As a

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TABLE 1

PRICES FOR PIPED AND VENDOR SUPPLIES IN SELECTED
DEVELOPING COUNTRIES

City and Year	Percent without Connections	Price for Piped Water (US cents/m³)	Price for Vendors (US cents/m³)
Bandung (1991)	61	9.9	616
Jakarta (1991)	75	17.2	185
Manila (1992)	29	10.5	187
Karachi (1992)	17	7.5	175
Ho Chi Minh (1991)	35	7.6	151

SOURCE: Asian Development Bank (1993).

result, utilities have no incentive to deliver services to large sectors of the population, almost always low-income households. Incentives for research and development are similarly weak, given that the price-controlled monopolist cannot capture the full benefits of a new product idea.

The human costs of these institutional arrangements have been very high. According to one estimate (the World Health Organization, cited in Cooper 1997), contaminated drinking water accounts for 80 percent of disease in India, including a sizable share of the 500,000 Indian children who die each year from diarrhea. Around the world, diarrheal diseases kill more than 3 million people annually, and cause approximately 900 million episodes of illness (World Bank 1992).

We propose that unregulated privatization be considered as one means of limiting these tragedies. To date, the world has experimented with four kinds of institutional regimes: outright public provision of water (common throughout the world), government-supported natural monopoly with regulated price (the English model), government-supported natural monopoly with regulated rate of return (the American model), or a government-controlled franchise, lease, or concession agreement (the French model and its variants). We add a fifth possibility: complete privatization of water assets and unregulated natural monopoly. This scenario involves no price regulation, no rate of return regulation, no residual government ownership of assets, and no surreptitious regulation through antitrust law.

The rationale for unregulated privatization is straightforward. An unregulated private monopoly would have an incentive to bring as many potential buyers into the system as possible, so as to maximize profit. Unregulated private monopolies could thus significantly

increase the number of water connections in developing countries. If unregulated privatization could produce hook-ups for currently neglected low-income customers, the poor would end up with higher real incomes, better water service, more time for other endeavors, and a greater probability of a long life. London water supply in the early 18th and 19th centuries, which was private and relatively unregulated, had a favorable record for extending the number of connections (see Dickinson 1954: 102–3).

While standard theory emphasizes the output-restricting nature of monopoly, water utilities will use price discrimination and fixed hook-up fees (Oi 1971) to capture as much profit as possible, thereby increasing supply in the process. Unlike the governmental and regulated alternatives, a private unregulated monopoly also would have strong incentives to hold down costs and supply an optimal quality of product. Our main point is that this monopolistic alternative deserves serious consideration.

In a comparative institutional context, the more heavily regulated alternatives may end up excluding more potential buyers. Developing or transition economies, regardless of their historical background or geographic locale, tend to share common problems with their governments. These governments have relatively low levels of credibility, weak track records, and very short time horizons. The government performs especially poorly as an owner or regulator, partly through lack of experience and partly through improper incentives and corruption.[1]

In Guinea, for example, progress under a water lease has been hampered by problems in defining and implementing the regulatory function, and by continuing disputes between the government-owned water holding company and the private water operator over who is responsible for failures in service expansions and water loss reductions. While the lease contract has increased the number of connections and improved water flows, progress has fallen short of expectations (Brook Cowen 1996).

Unregulated privatization has received little serious attention, and has generally been rejected or dismissed, albeit without serious analytical consideration. Few sectors have been classified as market failure more universally than the supply of water to households and residences. Throughout the world, water systems are characterized by extensive government ownership or thorough regulation and control. Water supply typically is regarded as a natural monopoly, and therefore a poor candidate for unregulated market provision. In the technical

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[1]See, for example, Zajc (1996) on the incidence of these problems in transition countries and their implications for water privatization.

literature, Guislain and Kerf (1996) restrict their discussion of infrastructure privatization to concessions and divestitures accompanied by a regulatory license. Klein (1996) takes as a starting assumption that the weakness of competitive pressures in the water sector creates a need for at least some form of regulation. Breyer (1982: 17) considers a price-discriminating natural monopolist briefly, but does not explore the unregulated alternative in depth. Loeb and Magat (1979) attempt to replicate private price discrimination through regulation; their scheme has the government award monopolists for the consumer surplus they generate. Armstrong, Cowan and Vickers (1994) essentially argue that if competition is not possible, regulation will be necessary.

In the remainder of the paper , we provide an analysis of potential sources of inefficiency in water markets, explain why government ownership and regulation have failed to provide fully satisfactory results, discuss how unregulated privatization might resolve the efficiency problems that plague regulation and government ownership, consider the ability of an unregulated monopolist to price discriminate when selling water to residential users, and focus on some residual problems with the proposed policy option of unregulated private natural monopoly. We find that the case for unregulated privatization is not conclusive, but that the proposal deserves serious consideration.

Sources of Efficiency Loss

The relevant natural monopoly problem comes from the distribution of water rather than from water itself. Water, considered apart from the problem of distribution, satisfies the traditional definition of a private good—nonrivalry in consumption. If one person consumes some water, another person cannot use the same water. While there are public health benefits to a clean water supply, the private benefits of clean water are high as well, giving individuals a strong incentive to pay for water quality. Consistent with the private-good nature of water, we observe the efficient private supply of water in a variety of circumstances. We buy bottled water at the supermarket, and private, for-profit car washes supply water to clean our cars. The private sector has had considerable success in supplying and running wells, at least where wells are a reasonably efficient means of water delivery.

The construction and maintenance of water distribution networks presents the difficult problem, and the potential cause of market imperfection. Once a system of water pipes is built, the owner of the system has a monopoly advantage in the market. If only one set of pipes exists, the owner of those pipes can exercise market power and

charge a price for water in excess of its marginal cost. As discussed above, other means of obtaining water, such as water delivered by tanker-vendors, typically involve costs from 10 to 20 times higher than buying water through a piping system. Alternatively, we might imagine a system of competing pipes, or competing pipe systems. Such systems did occur in Canada and the United States in the 19th century, and do still occasionally arise when water of different qualities is being supplied. For example, in Hong Kong seawater pipes supply flushing water (Klein 1996). In this case, however, consumers ultimately must finance both piping systems. The high prices needed to recoup the costs of multiple piping systems will imply a restriction of water output, just as the monopoly did. Furthermore, the stability of market equilibrium is problematic when multiple, competing suppliers own networks with high fixed costs (Bittlingmayer 1982). Competition will tend to force prices back down to marginal cost, but at marginal cost no supplier can break even and recover the fixed costs spent on constructing the piping system.

Some treatments emphasize market means of overcoming the natural monopoly problem. Under one proposal, water is distributed through a club-owned network, with different suppliers competing against each other to win contracts with consumers. Either the suppliers or the consumers themselves own or control the club. We see merit in this idea, but for the purposes of exposition we assume that the natural monopoly problem cannot be overcome so easily. The potential ability to make the market competitive, however, would only favor our basic proposal.[2]

Assuming that competition is not possible, the fundamental problem involves the construction of a distribution network with fixed costs that are high relative to marginal costs of supply. The problem behind the private provision of water thus resembles analogous problems with the sale of cable television services, electricity, and natural gas.

Institutional regimes for water provision face three kinds of efficiency problems: inefficient levels of output, inefficient levels of cost, and inefficient levels of product quality. A non-price-discriminating monopolist, in the absence of regulation, will set price above marginal

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[2]We also see some problems with the club proposal. Even if many suppliers compete by selling water services through a single pipeline, the fixed costs of the pipeline still must be covered somehow. Competitive pricing allows no means of financing the pipeline and allowing each company to break even. Presumably some kind of Ramsey pricing is necessary, where inelastic demanders face the highest mark-ups, but this introduces some of the welfare losses of market power. Along other lines, Demsetz (1968) analyzed ex ante competition "for the market." In this proposal utilities offer competitive bids to communities for water supply; see below for a discussion of franchising.

cost and restrict output, compared to a first-best social optimum. That is, consumers would be willing to pay more for additional units of output than it would cost society to produce them. The monopolist does not expand output, however, because the extra units of output could be sold only by lowering the price for all units and thus reducing profits.

Regulators have found it difficult to address this problem of monopoly without inducing other distortions. One approach grants private ownership but places a cap on price (the British model for water provision). Placing a cap on price, however, gives the private supplier an incentive to skimp on service and product quality. As with all price controls, the supplier will raise the real price to its desired level by lowering the quality of the product. Not only will quality decline in the short run, but long-run investments in system maintenance will be suboptimal. As discussed above, this problem is particularly drastic in developing and transition economies.

An alternative method of regulation, common in the United States, uses rate of return caps to limit the profits of the private monopolist. In practice, rate of return regulation usually involves price caps as well, whether implicitly or explicitly, and in that regard also leads to skimping on service and product quality. Furthermore, rate of return regulation brings a new set of distortions in the form of higher costs. As rate of return regulation is practiced, firms typically are guaranteed a minimum as well as a maximum rate of return. Without the minimum guarantee firms would not participate in the arrangement, given that they have sacrificed upside potential for profit. Firms therefore can use cost increases as a justification for price increases; not surprisingly, the incentive to keep down costs is low. The end result is high costs and a lower level of water consumption than is optimal.

Leasing and concession agreements, in their various forms, provide yet another attempt to overcome the basic problem with natural monopoly. These institutional arrangements, however, do not avoid the fundamental problems associated with regulation. Leasing and concession agreements typically regulate prices and rates of return to various degrees, either implicitly or explicitly. In this regard they involve the welfare losses associated with price and rate of return regulation. Leasing and concessions may provide for a looser or more informal kind of regulation, given the ongoing relationships between the water company and the relevant government, but in the final analysis either the supplier is free to adjust its prices or it is not. If prices can be set freely, we return to de facto unregulated natural monopoly (of course this may be an advantage of concessions, as will be discussed below). If prices and rates of return are not free to adjust,

we return to the distortions of regulation and the weak incentives to expand the number of system hook-ups. Particular problems arise where concession contracts mandate expansions into low-income areas, while also mandating ''life-line'' (below-cost) tariffs for low-income consumers.

Leasing and concession agreements involve further distortions through the government's role as residual asset owner. As the leasing or concession agreement nears an end, the private concessionaire has an incentive to cease maintenance or even strip the water assets. Leasing works poorly when the company faces a short time horizon. The government can alleviate these problems by promising a forth-coming renewal of the lease, or by offering comprehensive provisions for compensation upon contract termination, but if these promises are credible, leasing and concessions do not differ greatly from asset privatization with regulation. If the promise is not credible, we return to poor incentives for maintenance[3].

A fourth proposal involves outright government ownership of water assets and full governmental control. The record of governmental provision in this sector, however, is extremely poor. In developing countries, where government ownership has been the norm, tariffs are routinely set well below cost recovery levels, routinely less than half of supplied water is actually paid for, and large segments of the population go without formal services (World Bank 1994). For political reasons, governments have weak incentives to reduce costs, price water at marginal cost, maintain water systems, introduce innovations, and cut staffing to efficient levels. Not surprisingly, countries around the world are moving away from the government ownership option, and embracing various forms of private sector participation (Rivera 1996). Table 2 shows examples of private sector contracts that are now in place.

Sketch of an Unregulated Natural Monopoly for Water

Consider a scenario where a government allows complete private sector ownership of all water system assets, including the impounding of bulk water, water treatment, and distribution. The private sector would own all water system assets (which may or may not be vertically integrated) just as the private sector owns the assets in the automobile industry or the computer industry. Furthermore, suppose that the

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[3]Zajc (1996) provides a comprehensive survey of the efficiency problems with concessions and leases.

TABLE 2

EXAMPLES OF PRIVATE SECTOR ARRANGEMENTS IN WATER AND
SANITATION

Contractual Type	Water	Sanitation	Water and Sanitation
Management Contract	Colombia Gaza Malaysia Turkey	United States	Puerto Rico Trinidad and Tobago
Lease	Guinea Italy Senegal Spain		Czech Republic France Poland
Build- Operate- Transfer	Australia China Malaysia Thailand	Chile Mexico New Zealand	
Concession	Cote d'Ivoire Macao Spain	Malaysia	Argentina France Philippines
Divestiture	England and Wales		England and Wales

SOURCE: World Bank (1997).

owner of the water assets could set prices and quantities without regulatory interference. Water suppliers and customers would rely solely on contract to set the terms and conditions of water delivery, and the courts would agree to uphold any contracts which are written. The absence of regulation, as defined in this paper, also implies a credible laissez-faire antitrust policy with regard to pricing and output decisions. If water companies set their prices with an eye to avoiding charges of "anticompetitive behavior," or "price gouging," we would return to an implicit form of price regulation. The laissez-faire antitrust policy also would allow complete freedom of merger and cooperative relations across differing firms.

Our use of the term "unregulated" refers to the absence of a set of government regulations found in today's regimes—specifically, restrictions on asset ownership, pricing, service delivery, etc., and exclusivity arrangements. Under laissez faire, the provision of services is regulated by market forces and economic incentives. In this sense

our analysis compares one kind of regulation to another, rather than comparing regulation to an unregulated state of affairs. Furthermore, all regimes possess an implicit form of government regulation through ex post liability law. In the scenario we consider, private water suppliers would remain liable to lawsuits for breach of contract, fraud, or provision of water of dangerous quality. Nonetheless we continue to use the word "unregulated" for purposes of expositional simplicity and for lack of a more accurate descriptive term.

The forces for natural monopoly within a single geographic area would be strong in an unregulated environment. Experience suggests economies of scale in the operation of distribution networks for populations of at least 50,000 to 100,000 people. Economies of scale in system management as a whole are more extensive (evidence from Britain indicates that managerial economies of scale are exhausted at populations of 500,000 to 1 million). The natural monopoly may be limited at certain margins, such as when industrial users develop their own wells. At the residential level, some households may find it more profitable to dig wells, or to collect and store rainwater for at least some uses. For the typical residential user, however, we envisage a situation where water can be obtained at lowest cost from a single dominant supplier within that geographic region.

We expect suppliers to offer standard packages to their consumers. If an individual is building a house, the water supplier will offer to outfit the house with pipes for some fixed sum, perhaps based on the value of the house and the neighborhood. Where real estate developers are responsible for installing household connections, they routinely use this approach. If a house is already in place and already possesses a hook-up (perhaps as a legacy from a previous, regulated regime), the water supplier will offer so many units of water at a given price, so many more units at another price, and so on. Households will either accept or reject these offers, depending on the promised bundle of price and service.

The water company has strong incentives to set initial offers that will be accepted. The company will try to capture as much surplus from each household as possible, but the company also wishes to ensure that each household signs up to purchase water. Given the initial assumption of natural monopoly, the company can serve subsequent households at relatively low marginal cost. Note that in the polar case where the company has perfect knowledge of household demands, and can precommit to a series of price offers, a "first-best" result will obtain. The water company will extract all of the consumer surplus associated with water purchases. We do not present the first-best as an attainable real world outcome; the relevant comparison is

between imperfect markets and imperfect government regulations. Nonetheless, presentation of the first-best illustrates some basic incentives behind unregulated monopoly and also serves as a foil, by contrast allowing us to see ways in which unregulated monopoly falls short of an ideal outcome.

The relevant consumer surplus can be extracted in either of two ways. The company may charge a fixed fee for a hook-up, and then sell remaining water units at marginal cost over some specified period of time. Both the fixed fee and the subsequent per unit prices would be determined by initial contract; Oi (1971) has analyzed the efficiency of this arrangement. Alternatively, if the hook-up is already in place, or if it is too costly to bargain over the hook-up fee, companies will simply supply the hook-up and then sell water at some price above its marginal cost of production.

This situation, if it can obtain, solves all three of the efficiency problems discussed above. First, the supplier will produce a socially optimal amount of output. For any unit whose value exceeds its marginal cost, the supplier will produce it and offer it on the market. With perfect price discrimination, a supplier never increases profit by withholding output from the market. Second, the supplier has first-best incentives to engage in cost reduction. Any reduction in costs translates into a one-to-one increase in profits. Suppliers therefore will reduce their costs to the point where the social benefits of cost reduction equal the social costs. High costs cannot be socialized but rather eat directly into profits. Third, a perfect price-discriminating monopolist has first-best incentives with regard to product quality. The supplier captures all of the consumer surplus in the form of profits. That same supplier will therefore offer the product qualities that maximize consumer surplus, net of the cost of production.[4]

The ability of a natural monopolist to perfectly price discriminate may be problematic, under a variety of assumptions. For that reason the first-best results may not strictly hold. Nonetheless an unregulated, privatized natural monopoly obtains first-best results under the basic assumption that the water company succeeds in maximizing its profit. Even in a second-best setting, the monopolist may produce a greater quantity and quality of water outputs than do today's highly regulated alternatives. In most developing and transition economies the key problem is to get users some minimal amount of clean water, not to satisfy all optimality conditions.

Note that the potential efficiency of price discrimination also indicates why leasing and concession agreements, and divestitures with

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[4]Phlips (1983) provides an overview and survey of the economics of price discrimination.

a license, may sometimes result in first-best or near first-best outcomes. If the company holding the concession has sufficiently cozy relations with the host government, that company may be given latitude to replicate the efficient price-discriminating natural monopoly outcome. Quantity and quality decisions will again be optimal, if the "unregulated" outcome can be obtained under the guise of regulation. In practice, however, governments frequently impose uniform tariff rules, or otherwise restrict price discrimination by regulated private water companies.

The Feasibility of Price Discrimination for Water

Price discrimination is most feasible when four primary conditions hold. First, the seller must hold some degree of market power. Second, the product cannot be vulnerable to low-cost resale from low-price buyers to high-price buyers. Third, the seller must be able to make good estimates of buyer demands. Fourth, the supplier must be able to commit to initial price offers. Each of these assumptions characterizes the water market to some degree.

We take the presence of market power as given, and as following from the natural monopoly assumption. If somehow no market power were present, price discrimination would be impossible, but a regime of unregulated private water supply would in any case prove effective.

The absence of cheap resale from low-cost to high-cost buyers also follows from the natural monopoly assumption. By construction of the example, it is much cheaper to sell the water through a system of pipes than through bottles, wells, and buckets. Even if some resale were possible, however, market demands would shift without changing the fundamental nature of the problem. Assume, for instance, that in the absence of resale low-valuation buyers would be charged $20 and high-valuation buyers would be charged $100. Now consider resale, which is profitable at any price above $80 to the high-valuation buyers. The high-valuation buyers will refuse to pay more than $80, and the price-discriminating monopolist must lower prices accordingly, presumably to just below $80. Even at this lower price an optimal quantity of output is still produced, and the monopolist still has full incentives to economize on costs at the margin. Optimal quality cannot be guaranteed, since the monopolist cannot necessarily reap the full benefits of a quality improvement (higher prices for quality improvements may be undercut, implying that the innovator cannot reap all of the new consumer surplus that is produced), but some incentives for quality improvement remain nonetheless.

The third and perhaps most problematic condition for effective price discrimination is whether the seller can predict the market demands of the buyers. The water supplier will estimate two differing features of water demand: how much a given buyer values having any water connection at all, and how much a given buyer values subsequent units of water. We envisage a market where the water supplier sets price by examining the previous use patterns of the water buyer, the value of the water buyer's property, and the wealth of the neighborhood. In wealthier areas the supplier may consider the number of bathrooms in the house, whether the water buyer has a lawn, and other pieces of ancillary information, such as the water buyer's age, job, or credit record.[5] Insofar as water demand is closely correlated with observable characteristics of the property and the buyer, effective price discrimination will be relatively easy. The water supplier will run information on the buyer and the property through its "pricing office," which will respond with a suggested price offer, both for initial service and for successive units of water use. In Los Angeles, for example, the water department has the capacity to customize base tariffs across consumers, according to such factors as lot size, temperature zone, and size of household (Mann 1996).

Price discrimination will inevitably be imperfect in practice. Prices sometimes will be set too high, thereby excluding buyers from either participation in the piping network or from the purchase of additional units, even when the social benefits of added output would exceed the social costs. While some inefficient exclusion will occur, water supply may well be higher than under most current regimes in developing economies.

Even when suppliers make pricing mistakes, they need not exclude buyers altogether. To the extent that monopoly power is considerable, price will exceed marginal cost by a large amount, and the profits of water sales will be large. Each excluded buyer represents a chunk of foregone profit. Consider the position of a water company which believes that a given buyer values regular water use at, say, $1,000, and where the company can produce those same water services at a cost of $300. If the company knows that the buyer's valuation is in the neighborhood of $1,000, but the company is not sure about the exact valuation, the company will more likely price the services too low rather than too high. If the company charges $1,001, it loses $700 of potential profit. The expected return to guessing low will tend to exceed the expected return to guessing high. The microeconomic

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[5]Since U. S. public utilities routinely run credit checks, this need not involve a significant loss of privacy.

intuition here is simple: individuals or institutions which face a good chance of capturing a significant prize will behave cautiously when they are within range of winning the prize. For similar reasons, monopolistic firms in other contexts will choose high levels of product safety, reliable service, and easy access to their product, all in the desire to protect their monopoly profits (Klein and Leffler 1981).

The excluded buyers will tend to be those whose valuations do not much exceed the marginal cost of producing water services. If the marginal cost of production is $300, and the buyer values service at $320, the firm has less marginal profit to lose by trying to squeeze out all of the buyer surplus. Some of these buyers may end up excluded, since the firm will sometimes guess incorrectly and offer a take-it-or-leave-it price above $320. Even when exclusion results, however, the welfare costs of this exclusion tend to be relatively low. In the example, the buyer valued the product only slightly more than its marginal cost of production. When expected profit, and expected social surplus, are low, fewer resources will be spent trying to capture that profit and some potential gains from trade may be foregone.

If such resulting instances of exclusion prove unacceptable, perhaps for reasons of fairness or equity, a government may decide to intervene in the market and require service to low-income buyers at prices they can afford. In this case our proposal would cease to be purely unregulated, and would involve the costs of price controls, at least for some buyers or some neighborhoods. This outcome, however, represents a worst case scenario for our proposal, which still appears to provide superior overall performance, compared to a regime with full regulation across all contracts and all buyers.

Many cases of harmful exclusion will come in the form of overpriced marginal units, rather than overpriced fees for basic hook-ups. Companies often will choose price discrimination in the form of a schedule, where the prices for water services vary with the quantity consumed. Assume that a buyer values the first unit of water services at $100, the second unit of services at $60, and the third unit at $30. The company will try to offer a price schedule that matches these demands exactly, but if the company calculates demand incorrectly, it may offer, for instance, a schedule of $100–$60–$40, thus excluding the buyer from the third unit of water services. The buyer will take shorter showers than would be socially optimal, but some amount of safe water will still be supplied.

Fragmentary data and lack of experience with unregulated privatization prevent us from offering an empirical assessment of the relative magnitudes of these exclusion costs across institutional regimes. Nonetheless we see no prima facie case for dismissing the unregulated

alternative. The unregulated monopoly has a continual incentive to reduce exclusion problems, whereas the regulated monopoly does not, and may even have an incentive to increase costs and therefore prices, such as under rate of return regulation.

The foregoing discussion has assumed that water companies make single, take-it-or-leave-it offers, which customers must either reject or accept. The analysis becomes more complex if the company must engage in bargaining with its customers.

Bargaining with customers may have either positive or negative effects on welfare, compared to the take-it-or-leave-it alternative. When bargaining is present, some of the initially excluded customers may receive price reductions until they are no longer excluded. Low-valuation buyers face a lesser danger of complete exclusion. On the negative side, consumers may hold out for excessively low prices, if they cannot observe the marginal cost of the firm. If the marginal cost is $30 and an individual values the service at $40, the individual may nonetheless hold out for a price of $20, in the mistaken belief that marginal cost is $19. Since customers probably cannot observe the marginal cost of the firm with great ease, the potential for such losses exists. Furthermore, some quantity of real resources will be consumed in the bargaining process. Customers may delay buying hook-ups or may try to masquerade as low-valuation buyers, for instance, or the company may invest in signaling its resoluteness as a bargainer. All of these real resource investments are made for the purpose of receiving transfers, and thus violate first-best efficiency.

We expect that bargaining costs will be a significant issue only for very large users, such as large businesses or perhaps condominial developments that buy their water services collectively. We envisage the water company as being able to commit to a price offer to individual users, rather than having to bargain on a house-to-house basis. Most unregulated large-scale suppliers of household services offer their wares on precisely such terms. If a city has only a single newspaper, for instance, that newspaper may be sold at a price above marginal cost. Yet the newspaper company does not bargain with each household, but rather can precommit to a given schedule of prices, and then sell papers to interested subscribers. We expect a similar practice to develop with water. Bargaining over prices is most likely when the purchase is occasional, rather than repeated, and when the item has significant value, such as an automobile, a home, or an expensive painting. Even in these cases, such as with automobiles, bargaining is often largely a ritual of convergence on a publicly available "book price."

Those institutions that can bargain with the water company, such as large businesses or developments, will consume some resources in

the form of bargaining costs. Longer-term rent-seeking costs may arise as well. Individuals will be more likely to live in large condominial developments, for instance, if such decisions hold the promise of reducing their water bill. Residential decisions will be made inefficiently, as the search for transfers from the water company will lead to too many cooperative developments and too few stand-alone houses. In these regards an unregulated privatized monopoly will again fall short of a first-best optimum.

Further Issues

We see three other potential problems with unregulated privatized monopolies in the water sector: equity and distributional objectives, rent-seeking costs, and the imperfect ability of governments to pre-commit to a laissez-faire regime. We consider each problem in turn, and how privatization might be structured to overcome the relevant objections.

Equity

Commentators often find the distributional implications of perfect price discrimination to be disagreeable. If the water company succeeds in price discriminating, it will capture all of the produced social surplus for itself, and leave consumers with very little benefit. We do not regard this as a decisive objection to unregulated privatization for two reasons. First, it is possible to structure privatization in such a way as to prevent wealth transfers away from consumers. Second, water policy may be an inefficient means of realizing distributional objectives.

If the distributional implications of price discrimination were objectionable, the income transfer could be reversed by giving water customers an equity stake in the water company itself. The government could privatize water company assets using a Czech-style voucher plan, and send the vouchers to potential water customers. High company profits would then imply high values for the shares, thus reversing the initial transfer of income or social surplus. As long as the company continued to maximize profit, an efficient quantity and quality of water would be produced, without objectionable distributional consequences.[6]

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[6]The firm may deviate from profit maximization if enough of its shareholders are customers as well. The customers, if they have enough voting power, may eschew direct profit maximization and instruct the company to mimic the price and quantities of a perfectly competitive firm. Even in this (unlikely) case, however, the water monopolist will produce a first-best outcome.

The water market could even be used to redistribute income toward the poor, if the government distributed especially high numbers of shares to the poor (we are not necessarily recommending this policy, however). Even if a foreign company were supplying water, the government could require that company to set up a local subsidiary, and the government could then purchase shares in that subsidiary for its poor. Alternatively, the government could demand that the company distribute such shares for free, as part of the payment for being allowed to market water in the country. The government also could charge the foreign company an entry fee, up to the size of the expected profits (adjusting for risk), and rebate these funds to disadvantaged groups. Even in the absence of rebates or voucher-style privatization, the distributional consequences of unregulated privatization are unlikely to be strongly negative, and may even be positive.

To the extent that clean, potable water brings external benefits, the community will gain under price discrimination, even if the monopolist water company extracts the full consumer surplus for each individual. Each individual would fail to reap surplus from his or her water purchase decision, but the community as a whole would receive the external benefits of the additional supply. The widespread provision of clean water would help break the well-known cycle of disease, poverty, and poor sanitation that plagues so many parts of the world. From the community's point of view, the potential status of clean water as a good with positive externalities strengthens the case for unregulated natural monopoly. If water is a public good, from the community's point of view it becomes less important how much consumer surplus is retained by buyers, and more important to increase the absolute number of hook-ups as rapidly as possible.

Developed countries also are unlikely to experience significant distributional problems with unregulated natural monopoly. Households currently purchasing water from tankers are likely to face lower per unit prices once they receive a piped connection, even with price discrimination. A government also could offset any undesired distributional consequences of its water policy by changing tax rates or by using the numerous other policy instruments that influence the distribution of wealth.

Using water policy to implement distributional objectives has had an undistinguished track record. Governments often have required water companies to set price below marginal cost to achieve distributional objectives. Fortunately, such practices are now almost universally discredited, even though they continue in practice. Using pricing to achieve distributional objectives has caused many water utilities to be insolvent, and has brought unfavorable long-run distributional

consequences as well, again as discussed above. For the same reasons that we reject the distributional argument for pricing below marginal cost, we do not accept the distributional critique of unregulated privatized monopoly.

Rent Seeking

A regime of unregulated privatized monopoly may involve significant rent-seeking costs if firms can compete for that monopoly position. In traditional rent-seeking models, the resources expended on capturing a monopoly position are exactly equal to the monopoly profits at stake. If the water company would earn an expected $500 million in profits (in present value), companies would be willing to invest up to $500 million dollars to earn that position (Tullock 1967). The more successfully a monopolist could price discriminate, the greater the corresponding rent-seeking costs. Unregulated privatized monopoly could cease to serve as a first-best optimum. We see rent-seeking costs as a potential problem for unregulated privatized monopoly. Nonetheless the transition to privatization could be structured to keep rent-seeking costs to a minimum. The theory of rent seeking implies only that the would-be monopolist will pay a sum equal to the available rents; this sum make take the form of a transfer rather than the consumption of real resources. Assume, for instance, that the government is selling or auctioning off existing water assets to private companies. The winning company will be willing to bid a sum up to the expected profit, adjusted for risk. So if expected profits are $500 million, companies will bid some sum just short of this amount (again adjusting for risk), and transfer the funds to the government. Rent seeking takes the form of a pure cash transfer and consumes no real resources. In fact, the transferred funds could be used to satisfy distributional objectives, such as cash rebates to low-income water customers, as discussed above.

Rent seeking for monopoly positions will consume real resources only when cash transfers are not available. We can imagine water companies which court the local politicians, engage in expensive advertising campaigns, and send costly signals of their trustworthiness. In all these cases the search for a monopoly position will lead to real resource consumption, and in fact we do observe all of these phenomena in the contracting process. Nonetheless, both the government and the water company will attempt to replace costly signals and investments with pure cash transfers, simply because the latter are both cheaper and of greater value to the recipient. Rent-seeking costs also can be limited by noncompetitive procurement practices. If one company stands in a favored position to win a given contract, that

company need not invest large sums of real resources to capture the subsequent rents. When rent-seeking costs are potentially high, governments may obtain superior results by limiting entry into the profitable activity. The winning company will still be able to serve the entire market, and other companies will be dissuaded from investing resources to capture that position. In sum, we see rent-seeking costs as a potential problem for unregulated privatization, but not necessarily a decisive problem. A comparative analysis also must consider the rent-seeking costs involved with various forms of government ownership and regulation. These costs may be quite high, given the profits at stake.

Government Precommitment

The imperfect ability of governments to precommit provides perhaps the most serious problem for the unregulated privatization of water. By construction of our policy proposal, water companies and customers are free to set whatever prices and quantities they can agree to. The analysis so far has simply assumed that governments would honor and enforce these contracts with credibility. In reality, governments often do a poor job of enforcing contracts. Many governments are too incompetent to enforce contracts efficiently, or political pressures intervene and the government deliberately voids or rewrites certain contracts. Even in developed countries governmental interference into the contracting process is common. In the context of an unregulated water market, we can imagine the government rewriting a contract where buyers promise to pay high prices in return for an expansion of capacity or additional hook-ups. Once the hook-ups have been made, political pressures might induce the government to regulate or cap prices. Knowing this in advance, the water company might be reluctant to conclude certain kinds of contracts with potential water buyers. In particular, they will be reluctant to conclude contracts that require them to sink significant amounts of capital. (The water sector typically is the most capital intensive of the infrastructure sectors.) The absence of government credibility will limit the gains from trade.

To a considerable degree, imperfect government credibility simply mimics or recreates the costs of regulation. The costs of forthcoming regulation resemble the costs of having regulation now. In this regard the initially unregulated alternative should not produce inferior performance, compared to regulation. In some cases, however, the initial absence of regulation may create more risks for companies than if regulation were already in place. If a water company knows that future regulation is forthcoming in any case, the company may prefer to know the nature and extent of regulation upfront. Transactions costs

may be lower if regulation is present from the onset. Although we regard this problem as a serious one, we do not see regulatory risk as a decisive argument against unregulated privatization. First, an initially unregulated system will not necessarily imply more regulatory risk than a system with initial regulation. Even when initial regulation is present, the water company and its customers always face the risk of additional regulation. A non-credible government cannot make policy risk disappear or even diminish by instituting regulations today. In fact the appearance of regulation may be a signal that more regulation is forthcoming in the future. Typically we expect greater credibility from governments which are willing to experiment with market solutions, even if those governments cannot precommit in absolute terms. Today's world exhibits a significant positive correlation between a government's willingness to allow the private sector to operate and the credibility of that government. Starting with a laissez-faire experiment may increase rather than decrease a government's credibility, as it has in Singapore, New Zealand, Chile, and other countries in a variety of (non-water) contexts. Experimenting with unregulated privatization thus might lower regulatory risk, rather than increase it.

The regulatory risk argument also proves too much. We could, for similar reasons, argue that the government should regulate every economic sector immediately, to reduce the uncertainty about subsequent regulation. Yet successful economies do not typically approach regulation in this fashion. Rather, a responsible government first attempts to discover what a good policy might be and then implements that policy. It should not shy away from good policies for fear that the policy might later be abandoned.

Furthermore, a policy "proposal" is precisely that—a proposal about what would work, not a prediction about what will be adopted. Governments might be unwilling to embrace credible commitments to favorable policies, but policy analysts nonetheless should continue to hold such commitments as an ideal or aspiration (Philbrook 1953). Credibility is, in part, a function of what a government, its citizens, and its advisors believe. By attempting to persuade and to change beliefs about what will work, policy analysts themselves manufacture credibility for policies. To argue that a policy will not have credibility is to assume what is at stake in the policy debate itself.

Conclusion

The need for water policy reform is pressing, given the stakes in terms of economic development and human health. The lack or very high cost of access by the poor to safe sources of water has devastating

social and economic consequences. We have considered unregulated, privatized monopoly as a potential policy improvement. Under some conditions, this policy can approximate a first-best solution across the quantity and quality of output. While we do not expect this first-best result to hold, laissez-faire in water may nonetheless result in a significant increase in the number of water hook-ups. Given the number of individuals who have no access to clean, safe water, this factor should weigh heavily in our evaluation of the policy. The unregulated natural monopoly will bring problems of partial exclusion, bargaining costs, rent-seeking costs, and imperfect government credibility, but in comparative terms we do not see a knock-down argument against unregulated private provision in this context. Unregulated privatization should join the roster of plausible policy alternatives for the water sector.

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