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Will water float?

Competition and private provision in urban water supply

The balance between competition and monopoly and the role of the public and private sectors in urban water supply has shifted over the years due to changes in markets and technology and government capabilities in regulation and governance.

Introduction

It was Harold Macmillan, the British Conservative politician, who warned about selling off the family silver in the enthusiasm for privatisation: “First of all the Georgian silver goes, and then all that nice furniture that used to be in the salon. Then the Canaletto’s go”. Four years later, Margaret Thatcher privatised the nation’s water system; not the Canaletto’s perhaps, but certainly the nice furniture from the salon.

Other governments have not followed the British Government in privatising their water undertakings, but they have enthusiastically embraced the private sector

through a variety of contracts and concessions. And they are once again exploring the role that competition can play as a regulator. How should we read these trends? Are they the outcome of ideological excess, an obsession with “economic rationalism” that will pass with time? Or are there deeper causes that suggest a more permanent shift in the structure of provision?

This chapter explores the patterns of private and public ownership and of competition and monopoly in urban water supply over the long term, particularly in the English-speaking world, in an attempt to provide an insight into recent developments.¹

Private risk, public service, 1600–1800

Private enterprise played a major role in the early development of water supplies in the larger cities of Europe and North America, partly because of the fragmented and largely voluntary nature of local government until the middle of the 19th century, and partly because of the risks involved in raising capital and managing the harvesting and distribution of water. Looking back, it is easy to assume away these risks; indeed, looking back from the late 18th century, even Adam Smith was inclined to regard the business of bringing water to a great city as largely routine (Smith 1776).

Technological risk

But it was far from so. Until the late 18th century, the technologies available for lifting water from a river and distributing it throughout the streets of a large city were primitive. Steam pumps were not used successfully in London until the 1740s and they were not widespread until the end of the century. Wooden pipes were used until the middle of the 19th century, and when cast iron was first introduced, it was expensive and significant difficulties were experienced with the joints. Water leakage from the wooden pipes was a major issue until the 1820s. And water pressure continued to be a significant challenge. Water treatment was non-existent and with urbanisation and industrialisation, consumers often complained of “bad water” (Graham-Leigh 2000, pp. 16–18).

It is unsurprising then, that when the City of London first entered into a contract for the construction and operation of a waterwheel to pump water from the Thames in the late 16th century, the technology was imported from the Netherlands. Peter Morice went on to establish the London Bridge Water Works Company and was given a 500-year lease over the first arch of the bridge. The family remained in control of this business for more than a century and the company survived until the early 19th century (Clifford 1887, Vol. II, pp. 52–53). The second of the great London water companies, the New River Company, was formed in the early 17th century to bring water from springs located to the north of London. Here the risk lay in constructing forty miles of tunnel to carry fresh water through wooden pipes to London (Graham-Leigh 2000, pp. 9–10).

Capital risk

The early water companies were large and complex undertakings for their time, with financial resources well beyond the capacity of any single individual. As a result, the water industry was one of the first to adopt the joint stock principle (with limited liability and a separation of ownership and control). Maitland's *History of London* (1739, p.170) listed 26 joint stock corporations in the city, three of which were water companies. Only overseas trade (eight) and fire insurance (five) were better represented. Given the risks associated with this form of business structure at that time, only those undertakings requiring a significant capital investment were organised in this way (Maitland 1739).

In the early 19th century, when the middle class first developed confidence in the stock market, water companies

featured prominently. Ralph Dodd, the greatest promoter of the day, was instrumental in floating three new water companies, his “big idea” resting on the supply of water to London's rapidly expanding suburbia. The joint stock company was still an uncertain vehicle for investment, and Dodd became the first individual in almost a century to be prosecuted under the Bubble Act (legislation introduced at the height of the South Sea Bubble in 1720 to deal with speculation). The prosecution failed, but the case sent shockwaves through London's business community (Graham-Leigh 2000, pp. 24–6, 33–4, 82–5; Harris 2000, pp. 236–239).

In spite of the challenges, Dodd and his peers were successful in introducing the joint stock corporation to middle England, and with the coming of the railways, large scale capital raising became less difficult. Of the 136 proprietors of the Dodd's West Middlesex Water Company who were paid a dividend in 1810, 90 can be identified. And of these, 70 were merchants and tradesmen (Graham-Leigh 2000, p. 82).

Market risk

The wearing of cottons had become popular in the late 17th century as the East India Company started importing them from the subcontinent. Cottons were easier to wash and thus were washed more often, and cleanliness became more fashionable. The ready availability of clean water created its own demand, and water closets were available from the late 18th century, although not widespread until much later.

Companies invested in the hope that supply would generate new demand, but also with the expectation that users would switch from existing suppliers. The older water companies of London had not enjoyed statutory monopolies, but the scale of the untapped market was such that they did not need to engage in aggressive competition. That changed in the first decade of the 19th century as new companies entered the market and started competing for the same customers. A similar pattern was evident in the leading cities of North America.

The limits of laissez-faire, 1800–50

The first half of the 19th century was the high point of laissez-faire, when direct competition between utilities was regarded as a virtue. Newspaper advertisements boasted the superiority of a particular company's water in terms of both pressure and purity, and companies conducted public experiments demonstrating the height of the jet that their pipes could produce.

Competing companies ran water pipes down the same streets and employed salesmen to go from door to door touting for customers. In one part of Marylebone in London, four separate companies competed for the same customers. Water wars broke out, with collectors spreading rumours about the financial viability of their competitors, brawling in the streets and deliberately damaging pipes. On the other hand, customers could drive down prices and avoid paying arrears by threatening to switch supplier.

Of course with large fixed investments, this was not a sustainable market. Water companies were faced with rising capital costs as they introduced iron pipes and searched for new sources of fresh water further afield. They were also obliged to employ more collectors and turncocks at the same time as they were faced with falling revenues. Dividends collapsed, and for some years, none were paid at all.

Companies sought to overcome the destructive effects of competition by merging their operations, or by negotiating agreements over territorial monopolies. But these arrangements were not always stable. In North America, anti-trust laws were invoked to block such agreements. State and local governments encouraged new entrants and threatened to establish their own water authorities. In some cases, the emergence of a new technology such as iron pipes gave private companies the confidence to believe that they could undercut existing suppliers who were financially committed to outdated systems (Graham-Leigh 2000, pp. 37–51; Troesken 1996).

But the economics of natural monopoly meant that the trend towards exclusivity continued largely unabated. In an attempt to restore economic viability, prices usually rose following amalgamation, and with no external benchmarks, concerns grew that consumers were being gouged. In London, an Anti-Water Monopoly Association was formed in the 1820s to boycott price increases. Faced with the intransigence of the companies, the association began to campaign against joint stock ownership.

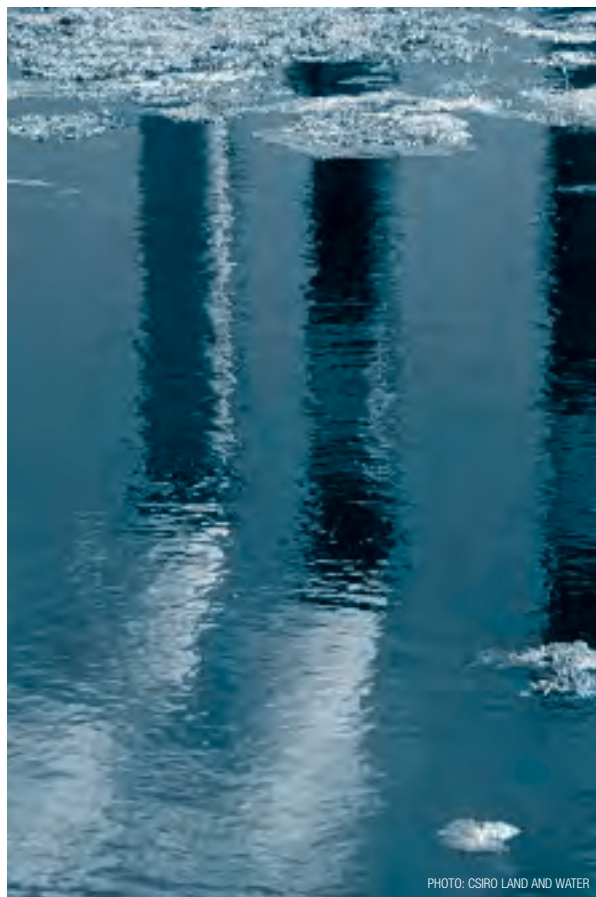
A separate campaign also began to build over water quality and its availability for sanitation purposes. By the 1840s, the leadership of this movement had passed to the utilitarian reformer, Edwin Chadwick. While recognising that competition had contributed to an improvement in London's water quality, Chadwick argued that if it remained unregulated, private enterprise would always respond to the demands of the middle classes and undervalue the importance of public health. He increasingly argued for public ownership and centralised control (Flinn 1965, pp. 149–150; Finer 1970, pp. 390–396, 403–412, 466–467).

Regulated and municipal monopolies, 1850–1945

During the second half of the 19th century, it became increasingly clear that the future of the water sector lay in monopoly supply. Two different models emerged – one based on municipal franchising and the other on municipal ownership. The second became dominant compared with other urban utilities such as electricity and gas, where regulated private monopolies were more common.

Municipal franchising

Not until the middle of the century did public officials and political economists discover natural monopoly and the public health benefits from universal access to clean water. The common law had not been entirely ineffective. In North America, the courts were willing to punish water companies that negligently spread diseases such as typhus; they were even prepared to impose access rules on private



utilities. But the common law was not enough, and governments increasingly turned to prescriptive regulation and performance contracting (Troesken 1999, p. 934; Haar & Fessler 1980).

These contractual and regulatory conditions were originally laid down in very general terms so that water, for example, had to be supplied at “reasonable” prices. As public authorities learned from experience, these conditions came to be expressed in more concrete language with detailed rate structures and service specifications. And as time passed, state and municipal authorities reserved for themselves greater discretion, retaining the freedom to review prices and quality standards throughout the life of the franchise. Thus there was a trend away from specifying all the contractual conditions up front and towards the development of “administered contracts”, where prices and service standards were adjusted continuously. With long-term contracts involving major capital investments, price control came to be based on cost-plus arrangements such as rate-of-return regulation (Priest 1993, pp. 309–313; Goldberg 1976).

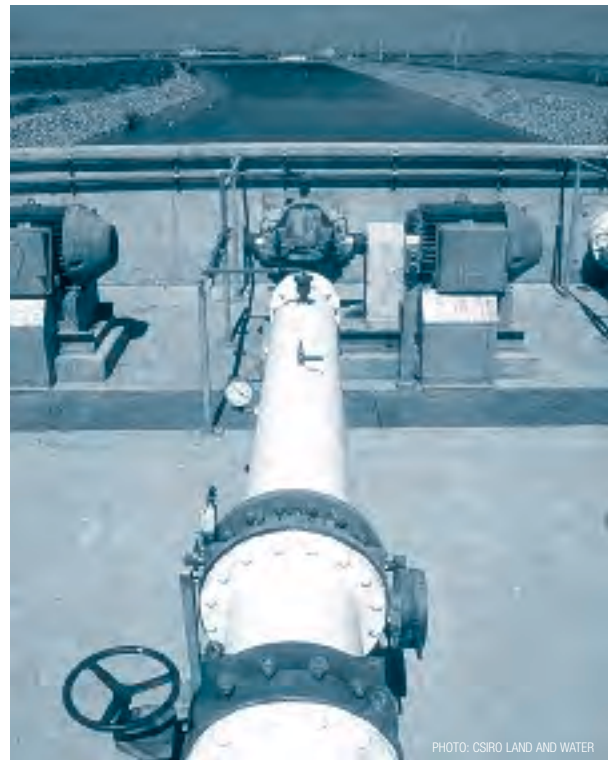
The fact that so many municipal, provincial and national governments abandoned the regulated private monopoly in water supply suggests that there were deficiencies in this model. And because they did so more often than with electricity and gas, it appears that water was somehow different. The available evidence confirms that water quality was not the problem. Private companies in North America were much more likely than public utilities to invest in filtration systems, and typhoid outbreaks were no less common after municipalisation than before (Troesken 1999).

On the other hand, pricing was a major source of contention, with local politicians striving to drive prices down to levels that proved to be economically unsustainable. They did so partly because of public health concerns, but largely as a way of currying political favour with potential voters. Pricing regulation was not necessarily fatal to franchising and some governments were able to establish stable markets by appointing independent regulatory commissions. Commissioners made pricing determinations based on an impartial assessment of the evidence, and the application of widely understood regulatory principles, which gave companies confidence to invest. But this approach was adopted much less often in water supply than for other urban utilities (Troesken 1997; Masten 2004, pp. 16–22).

By the early 20th century, the advantages and disadvantages of private provision were generally understood. Private ownership gave increased scope for innovation, greater managerial autonomy and stronger incentives for efficiency. Where there was little need for technological innovation or where the service in question was relatively simple to manage, the case for private involvement was, therefore, not strong. On the other hand, where the service was tightly integrated so that managing across an organisational interface was more challenging, and/or where large scale capital investment necessitated long-term contracting, the disadvantages associated with franchising might well outweigh the benefits (Knoop 1912, pp. 378–387; Wilcox 1931, p. 6).

Economic historians have argued that throughout the late 19th and 20th centuries, urban water supply displayed many of those characteristics that made public ownership more cost effective. For much of this period, there were no radical changes in technology, and once the infrastructure had been installed, the distribution of water was a relatively simple concern. Unlike electricity and gas supply, water supply involved very little “manufacturing”, and where filtration was required, municipalities tended to rely more often on the private sector for delivery (Masten 2004, p. 30). State and local authorities also found it easier than they had in the past to raise finance, and in the case of mega-facilities such as dams and reservoirs, national and provincial governments enjoyed a huge advantage over private corporations both in their capacity to raise the capital sums involved and in their ability to insure against the high levels of risk.

The evidence suggests, however, that municipal authorities tended to deliver services themselves where population density was greater and thus where distribution networks were more tightly coupled (Masten 2004, pp. 25–31; Troesken 2003, pp. 389–392). And finally there were the problems associated with long-term contracting, which made it difficult to simultaneously protect the producer’s right to serve and the customer’s right to be served (Goldberg 1976). The challenge of long-term contracting was well understood at the time. A leading British text published in 1912 concluded that “the difficulty of drafting a lease entirely satisfactory to both parties is probably one of the principal causes which have favoured the development of municipal trading (Knoop 1912, pp. 36–37, 382–383).



Municipal ownership

Municipalities in Britain started acquiring waterworks from the 1850s, with London’s water companies finally being taken over by the state in 1904. At the end of the second world war, about one in five water systems were still operated by private companies; by the 1980s, there were only 28 private water companies left in the country, although this included several major cities such as Newcastle and York (Bakker 2003, pp. 49, 52–54; Sheldrake 1989, p. 22).

The story was much the same in the United States. At the beginning of the 19th century, 94 per cent of municipal waterworks were in private hands; by the end of the century, this had declined to less than 50 per cent, and by the 1920s, it was down to about 30 per cent (Baker 1899, p. 14–15; Thompson 1930, p. 286; Maltbie 1898, p. 726). This ratio continued to fall for several more decades, although a study published in 2005 claimed that 40 per cent of drinking water systems in the United States were regulated by private utilities (Segal 2005, p. 123).

State and municipal undertakings played a more prominent role in Canada and in continental Europe, although Germany retained a system of mixed ownership, and following the second world war, many French local governments franchised their water supply facilities. (Maltbie 1898, pp. 728–729) Today about three-quarters of municipal water supplies in France are managed by private companies under ten to 12-year “affermage” contracts, or under long-term concessions that also involve constructing and financing the facility .

Australia bypassed much of the controversy about regulated private water utilities. By the time our cities were large enough to warrant major investment in water infrastructure, the technology was mature, and faith in

competition as a way of regulating natural monopolies had passed. Private companies were involved for a short time in Melbourne and Perth, but in Sydney, local government seems to have dominated throughout (Dunstan 1984, pp. 26, 126–129; Lloyd 1988).

The state hydraulic paradigm, 1900–75

The original municipal waterworks were little different from their private sector counterparts, but by 1945, provincial and national governments had become more deeply involved, and water supply had taken on an industrial profile. For much of the 20th century, water supply was dominated by the engineering profession, resulting in a form of state capitalism where government was expected to build the basic infrastructure thought to be necessary to support and subsidise industrialisation. The “state hydraulic paradigm”, as this model has been called, was characterised by:

...planning for growth and supply-led solutions, with an emphasis on hydraulic development as a means of satisfying water demands; a focus on social equity and universal provision; command-and-control regulation; a discursive representation of nature as a “resource”; state ownership and/or strict regulation of water resources development and water supply provision; based on a desire to provide sufficient quantities of water, where and when needed, such that economic growth could proceed unconstrained. (Bakker 2003, p. 20)

The most obvious manifestation of this model was in the massive increase in dam-building that followed the second world war. Worldwide, the number of large dams increased from about 5000 to 45,000 over those five decades. During this period, “dam-building and the harnessing of large-scale water resources was of critical importance to national elites...” (Bakker 2003, pp. 19, 45). There is no more powerful example of this than the Snowy Mountains Hydro-Electric Scheme, which was commenced in 1949 and completed a quarter of a century later. With 16 dams and seven power stations, it was the largest engineering project ever undertaken in this country, and for the post-war generation, it was a matter of immense national pride.

But there were significant downsides to this model. Engineering solutions were expensive, and from the mid-1970s (a time of increasing fiscal constraint) they were seen as diverting scarce resources from projects with higher political returns. In the 1980s, for the first time in living memory, water demand declined in some jurisdictions, leaving politicians with the prospect of dams and reservoirs that were “white elephants”.

Financial management was also weak, capital and recurrent spending were treated separately, and rates were often set only to cover the latter. One of the consequences of this was that when governments came under financial stress, they cut back investment on infrastructure maintenance, and water quality thus declined.

From the late 1970s, political activists began to protest at the industrial model of water supply which undervalued

in-stream uses. In particular, they objected to the impact that dam construction was having on the natural environment – the controversy over the Franklin Dam signalled the beginning of the end for the state hydraulic paradigm in this country, but similar debates were taking place at about the same time in Britain and in North America.

Commercialisation and market environmentalism: from 1975 to today

What arose in its place was not the return of *laissez-faire* as some have suggested, but a complex mix of privatisation and regulation, commercialisation and environmentalism that bears a much closer resemblance to the era of regulated utilities.

Water as a commodity

Water has increasingly come to be regarded as a commodity, subject to the laws of supply and demand in much the same way as other natural resources. Economists rather than engineers have come to dominate policy design, and in the urban environment, there has been a move to demand management through pricing and metering. This new paradigm was first evident in Australia in 1982 in the demand-management policies adopted by the then Hunter District Water Board, and at roughly the same time in the Victorian Government’s development of sophisticated water pricing models.

Commercialisation

Structural changes were also being made to the water utilities, and professional managers were being recruited with a brief to improve productive efficiency. The most striking example of this was in the United Kingdom, where the ten regional water companies were floated in 1989. While this was driven largely by European legislation on water quality and the need for a massive injection of infrastructure spending, commercialisation had in fact commenced much earlier, with employment levels being significantly reduced from the late 1970s.

While the United Kingdom was unique in privatising its entire system, many other countries have followed a similar path in commercialising and corporatising their water and sewage undertakings. In Australia, the Metropolitan Water, Sewerage and Drainage Board in Sydney appointed Peter Crawford as Managing Director in 1983 with an explicit commercialisation agenda, a process that continued through to the corporatisation of Hunter Water and Sydney Water in the 1990s. Victoria had been following a similar path with the formation of Melbourne Water in 1991, and the separation of the wholesale operation from four new retail businesses several years later.

Regulatory commissions

Privatisation in the United Kingdom was accompanied by the appointment of an economic regulator, Ofwat (Office of Water Services), and the development of a new generation of price control based on industry benchmarking.



Prior to this, Britain had not developed a strong tradition of independent economic regulation, and the debate that followed its adoption was to influence policymakers elsewhere around the world.

While Australia did not privatise or franchise its urban water supplies, commercialisation provided an incentive for a number of states to appoint independent regulatory commissions – the Independent Pricing and Regulatory Tribunal in New South Wales, the Essential Services Commission in Victoria, and the Economic Regulation Authority in Western Australia. Together with the establishment of a strong national competition policy and the development of competitive neutrality and national access regimes, Australia has provided private utilities with a stable and predictable market environment.

Conservation

These managerial reforms were accompanied by a new sensitivity to environmental issues. Bakker (2003, p. 13) has described this new paradigm as “market environmentalism: an emphasis on efficiency, economic equity, planning for scarcity, demand-led solutions, regulatory decision-making based on market-simulating and surrogate valuation techniques, an emphasis on incorporating environmental goals and valuations into water policy, and private management and/or ownership of infrastructure”.

The commercialisation of water supply in Australia necessitated the establishment of independent environmental regulators (commercialisation and corporatisation in New South Wales led directly to the formation of the Environment Protection Authority). But environmentalists also agreed with economists about the reform of water pricing, and to a more limited extent, on the introduction of property rights in water, including allocations for environmental and in-stream uses.

Competition

There has also been a renewed interest in the use of competition in regulating water prices. In the United Kingdom this was originally confined to benchmark competition, although it was always contemplated that there would be some measure of direct competition, either through the separation of retailers from common carriage wholesalers or through “inset appointments”, a system licensing providers to supply water within an area covered by a monopoly network provider. The common carrier model has not been pursued, and in spite of progressive liberalisation of the law, very few “inset appointments” have been negotiated. Large industrial users in the cities have benefited and domestic users have picked up the bill.

National competition policy in Australia has opened the way for some competition in water supply, with (unsurprisingly) significant resistance from the state owned utilities. The most serious challenges have come from water recycling. The most notable was a proposal by Services Sydney, first put forward in 1999, to mine Sydney Water’s wastewater system and deliver tertiary-treated water back into the city’s reservoirs. Services Sydney has won a series of largely pyrrhic victories with the competition regulators (NCC 2004). A similar struggle has been taking place in the west, where the Water Corporation of Western Australia has been resisting a proposal put forward by United Utilities Australia to supply the Kalgoorlie–Boulder region with desalinated water from Esperance (ERA 2005).

In the early 1990s, Sydney Water issued contracts (with massive cost savings) for three water treatment plants at Macarthur, Prospect and the Illawarra. Two years later, the South Australian Government entered into a contract for the management of its water services, and at about the same time, the Water Authority of Western Australia con-

tracted out the operations and maintenance of its water and sewerage networks in the Perth metropolitan area. The water distribution companies in Melbourne have also worked closely with the private sector through short-term contracts. At the time this report was written, Sydney Water was conducting a competition for the operation of a new recycling plant to serve industrial and irrigation users in Camellia in Sydney's west. Interestingly, this had attracted a highly innovative proposal by AGL – one of Australia's private gas utilities – to distribute water through disused gas mains.

Analysis

What has changed? Why are we seeing the return of competition and contracting to urban water supply throughout the industrialised world? Why has a model that was seen as having failed in the late 19th and early 20th centuries made a return? The explanation seems to be that the risks faced by those engaged in developing and managing these systems have changed.

Technological risk

We seem to be witnessing another period of innovation in water supply technologies, particularly in wastewater treatment and in desalination. For the immediate future, the advantage will lie with the private sector in managing these risks.

Market risk

The introduction of new technologies, combined with access regimes that give new entrants the opportunity to challenge territorial monopolies, has opened up the prospect of companies taking on market risk. In Australia, the proposal by United Utilities Australia to transport desalinated water to Kalgoorlie, and the suggestion by AGL that it could employ disused gas mains to supply water in Sydney's west, are striking examples of market-shaping technologies. Publicly owned water utilities are poorly positioned to manage such risks.

Capital risk

The era of dam building is over, and once again, the private sector is being used to finance, construct and operate major public infrastructure. While governments can still borrow at a lower rate than the private sector, we have learned that public sector finance is not risk free. When project finance is adjusted for risk, government is not necessarily able to finance its projects more cheaply.

Operational risk

Contrary to what we had assumed, the management of urban water supply is not a routine business. It turns out that "scientific management" and economies of scale are not enough and that competition and contracting offer significant advantages in creating value for money incentives. When it comes to long-term assets such as urban water supply, whole of life management matters.

Governance risk

Over a hundred and fifty years, we have also learned something about competition for public services and long-term contracting. Ironically, many of the lessons are to be found in the writings of Edwin Chadwick – using competition for the service rather than competition in the service (allowing competition for the right to deliver a natural monopoly), contracting for results rather than resources, and benchmarking across multiple contracts – but they were overlooked at the time (Chadwick 1859, pp. 385, 408, 409). It is now rare for governments to award long-term contracts without competition. Not only does this result in better value for money, it has also led to deeper markets where companies are engaged in repeat business (Priest 1993, pp. 307, 316). This means that experience and reputation play an important role in modern public utility contracting.

Some qualifications

This analysis suggests that the future of urban water management lies in franchising and contracting rather than outright privatisation or state ownership. As always, there are a number of uncertainties associated with projecting trend lines into the future.

Australia and the United Kingdom have conducted a few limited experiments with direct competition, based on access rules and common carrier regulation. To date, this has delivered very little public benefit. But if the economic and environmental gains from technological innovation in water treatment were great enough, governments might well regard the costs of direct competition as justified. In this regard, the Australian access regime appears to possess some advantages over the British system of inset appointments.

The decision of federal and state governments to abandon plans to privatise Snowy Hydro in the face of public opposition suggests that the state hydraulic paradigm is not entirely dead. It is unlikely that we will see a full scale return to engineering-led water management, but this recent example provides us with a warning about drawing simple trend lines.

Public health is another source of public concern, not because the problems are more intractable than in the past, but rather because of an electorate that is more risk averse, and a media that is forever hungry for headlines. Politicians will continue to struggle with the management of high profile controversies such as the *Cryptosporidium* scare in Sydney in 1998 and the E. coli deaths in Walkerton, Canada in 2000. There is no evidence to suggest that contracting is incapable of managing these risks; Walkerton's failures occurred under public management and it is unclear whether Sydney actually had a problem with water quality (Sheil 2000; Sturgess 2000). Nevertheless, the politics of risk management in a politically charged environment may create obstacles to competition and contracting in some cases (Wildavsky 1995).

Finally, even with 700 public private partnerships (PPPs) underway in the United Kingdom, we still do not know what a mature PPP market looks like. It is possible that it may manifest some of the limitations encountered by municipal franchising in the late 19th and early 20th centuries. But as long as the market is growing, there are powerful incentives on both sides to collaborate. And once it stabilises, it is possible that the gaming behaviour predicted by academic economists may become more evident.

Conclusion

Over several hundred years, the balance between public and private delivery, and between competitive and monopolistic supply has shifted several times, and while we are still trying to interpret these trends, the available evidence suggests that they were driven by something more than ideology. Rather, this balance shifted backwards and forwards as markets and technologies matured, as attitudes changed in broader society, and as understanding of and competence in regulation and governance expanded.

While it is difficult to project recent trends into the long-term future, it seems likely that the private sector will be increasingly engaged in delivering urban water supplies. This means that competition for the market will become a familiar feature of the water sector, with the possible expansion of competition in the market if developments in treatment technologies continue.

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