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Thirty years after water privatization—is the English model the envy of the world?

Dieter Helm*

Abstract: The paper considers whether water privatization 30 years ago has delivered the promised superior performance to nationalization, which remains the dominant model in Europe. The paper sets out the arguments at privatization, in particular in relation to efficiency, the managerial incentives, the role of private-sector balance sheets in facilitating investment, and the impacts on the cost of capital. Alternative explanations of relative performance, notably the regulation model adopted, are highlighted, and the paper concludes by outlining an alternative model of water regulation which better marries up public responsibilities and private incentives.
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* New College, Oxford; e-mail: dieter@dhelm.co.uk
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I. Introduction

Water is a public enterprise in almost every country in the world, with local or national public ownership and control. England is an exception (Scotland and Northern Ireland remain in the state sector, and Wales now has a not-for-dividend structure). A host of claims were made at privatization as to why this new English model of private ownership would be significantly better than its public predecessor. Some were general, derived from the economic theory of competition in product, capital, and managerial markets. The private-sector managers would be disciplined by the need to hold on to their customers who would be free to switch to other providers, and they would face the threat of takeovers and capital market pressures to perform. In addition, the private owners would have a choice of managers in what was assumed to be an intensely competitive market for executives. Free from the controlling hand of the state, these new executives would make the companies much more efficient. This would contrast with the claimed inefficiency of governments, and government failures, including cost inflation, labour

bias, and politically driven investments, all constrained by the envelope of overall public expenditure.[1]

Thirty years after privatization, it should be possible to see whether the English model has honoured the promise that the advocates of privatization made back in 1990. Is it better than everyone else's model?

At first glance, this might seem a very easy question to answer: just compare the efficiency and quality of the outputs of English private water companies with those of their European public counterparts. Look at the operating and capital expenditures; look at the quality of drinking water and the discharges of sewage and see which is better. See whether the access to capital markets has increased the relative levels of investment, and whether moving away from the state model of paying for investment out of current income to a more market-based model of pay-when-delivered has improved both efficiency and fairness. Finally, see if the prices to customers are lower.

It turns out that there is almost no credible empirical research to address these questions, and the studies that the water industry companies and their lobbyists have paid for, while producing results that may suit the owners' and managers' interests, add very little to the debate.[2] This paper does not produce any new empirical work, but rather reviews the current arguments, sets out how to evaluate the claims, and considers whether they admit of ready and easy answers.

The paper is structured as follows. Section II looks at the arguments at privatization. Section III looks at the efficiency and costs, while section IV considers the financial arguments, notably on the cost of capital and the balance sheets. Section V turns to regulation, and section VI concludes on the search for a better model.

II. Arguments at privatization

[1] For the general arguments made by the Thatcher government, see Moore (1983).

[2] Two recent examples are the reports by Social Market Foundation (2018), commissioned by Severn Trent, Anglian Water, South West Water, and United Utilities (note that executive directors typically receive a significant proportion of their remuneration in the form of shares, and therefore have a direct personal interest in the nationalization debate), and Global Water Intelligence (2019), which does not disclose who paid for it. It was subsequently highlighted by Water UK. An exception is the study by Frontier discussed below.

Two major arguments for privatizing the water industry were advanced. First, it was argued that the water companies would be more efficient than their public predecessors because private ownership would provide the grounds for incentives to work, and the companies would now profit-maximize by cost-minimizing, given regulated fixed prices. Second, it was argued that privatization would allow the companies to borrow to invest, and therefore by implication that the public sector would restrain such investments. This was arguably the main political reason for pursuing what was a very unpopular privatization: to get the water industry out of public expenditure.

There was a final and little-discussed further political argument for privatization, wrapped in an economic shell. The requirements of the EU's Water Framework Directive and the Bathing Water Directive mandated more future investment, and the government wanted to avoid current customers (and current voters) paying for this. They wanted water capital expenditure (CAPEX) not only off the government's books, but also not on current customers' and taxpayers' bills. They wanted to kick the can away from the government's responsibilities, and kick it down the road, too. Privatization achieved this aim by moving from *pay-as-you-go*, to *pay-when-delivered*. The government could take the credit for investments, which current customers would not have to pay for, and it could do this all off its balance sheet through private debt, and hence avoid taxpayers having to contribute.

The advocates of both privatization and nationalization share the assumption that it is ownership that matters, and that by changing ownership the performance will be better. Clement Attlee's great nationalizing government in the 1940s claimed that state ownership would replace private greed with the pursuit of the public interest, and for good measure public planning needed statutory monopolies to prevent short-term competition. To prevent the product market limiting the scope for planning and the pursuit of wider social objectives, it should be banned. Margaret Thatcher's great privatizing government agreed that the two key issues were ownership and competition. She just took the opposite line: private ownership was the road to efficiency and meeting the public interest, regulated by competition, not monopoly.

Few outside the political bubbles on the Left and Right think that ownership and competition are all that matters, or indeed that these are even the most important issues facing the utilities now. Ownership is always attenuated. Private ownership does not convey complete control to shareholders, and competition is not always the complete answer, especially where there is

natural monopoly, public goods, externalities, and issues of citizens' entitlements and poverty. Indeed, sometimes it is not even a good idea: there are certain activities, such as those performed by healthcare provision, policing and the courts, and probation and prison services, where the pursuit of private self-interest can be detrimental and even dangerous.

Water has many of these market failures and distributional issues (see Cowan, 1998). Neither nationalization nor privatization—nor monopoly nor competition—solves any of these. What they do is set the context within which regulation operates, to close the gap between the public interest and that of the managers. It is about public *control* in both the privatized and nationalized models. And as we shall see, it is the failure of regulation to properly address these market failures and especially the distributional problems that has in significant measure given rise to the current state of affairs. Expecting companies to maximize profits and then castigating them for doing so gives rise to just the sort of confusion that increases the cost of capital and blunts the underlying incentives. Expecting state ownership and monopoly to automatically deliver the public interest is similarly naïve.

When it comes to control, there is a further twist. It is often better not to own something if you want to control it. Across the economy, supermarkets do not tend to own farms. Clothing retailers do not own manufacturers. Applied to the water companies, it may be better for governments not to own them if what they want is control. Why? Because if the government owns the companies, it is vulnerable to capture by their workforces and by their management. Problems of union control have been apparent in the history of the nationalized industries, and indeed a prime motive for general restructuring (see Rees, 1989).

Further to this specific utility argument, there is the general and classic argument about the control exercised by the owners over the managers, and the principal–agent problem. In the political debates about both privatization and nationalization, it was often assumed that the managers would be the servants of their owners. In making the case for privatizing the water industry, Stephen Littlechild went so far as to suggest that the takeover mechanism could enforce discipline on managers, and the closure of this gap meant that regulation could be light-touch (Littlechild, 1988).

This turned out to be at best naïve: in a monopoly context, the primary impact of the new incentives would be on managers rather than owners—and they moved quickly to increase their

own pay and benefits. Later, the owners would begin to reassert control over the boards through the takeover mechanism (as Littlechild had anticipated), but here the incentive was mainly for private equity and infrastructure funds to extract short-term value from the companies. This was done though comprehensive financial engineering—in effect, mortgaging the assets of the companies and leaving them highly geared as a result. There has been a rapid turnover of owners for many of the privatized companies, and those with the fastest turnover have tended to come bottom of the Ofwat efficiency assessments, with Southern Water and Thames Water identified as the least efficient in the 2019 price review by Ofwat.

This mattered because a prime argument for privatization was that the ownership would lead to increased efficiency, as there were profits to be made. The regulatory problem was therefore assumed to be less about promoting efficiency, but rather about limiting the profits over and above the greater efficiency. Provided that the managers did what the owners wanted, they would not use the protection of monopoly to 'pursue the quiet life' as John Hicks had claimed (Hicks, 1935). But without the ability to take the profits, this was argued to have caused inefficiency in the public sector, to the benefit of managers and workers.

III. Efficiency and cost comparisons

(i) Conceptual problems

In order to evaluate the success or otherwise of the English model, the comparators have to be comparable. But they are not: the English model is unique, not only in its private ownership, but for three further reasons: in the structure of the companies and their functions; in their geography; and in the regulatory model.

Taking company structure first, the government initially proposed to privatize the Area Water Boards as they had evolved in the public sector intact. This was Plan A. These were stand-alone public bodies which had been separated from the local authorities in 1974. Being public bodies, they had combined a number of environmental and water regulatory functions with the narrower operational and investment activities, as many European water authorities still do today. They were producers and regulators.

The recognition that private ownership was not suitable to carry out public regulatory duties and functions led to Plan B: the industry was substantially restructured, leading to a unique set of interfaces with the regulators, especially on the environmental side.

It follows that simply comparing European and English companies will tell us very little. Empirical analysis must first reconstruct hypothetical businesses, either to compare English companies with a notional re-inclusion of regulatory functions, or to disaggregate European water businesses, to identify the non-regulatory functions only.

Even if comparators could be created by unbundling the functions on the European side, there remains a second major problem, namely geography. Delivering water in central Europe is very different from doing so in England, and disposing of sewage to fast-flowing English rivers all relatively close to the sea is very different to doing so in the middle of the European continent. Indeed, it is hard even to compare Scotland and England, given their radically different geographies.

A third consideration is whether the differences in performance might be explained by regulation, rather than ownership. Ignoring for the moment the question of where these regulatory functions are located, it may well be that differences in performance are due more to the effectiveness or otherwise of regulation, and the regulatory model deployed. For example, were the English model not found to be significantly better than its counterparts, the explanation for this may lie with poor regulation rather than ownership. The alignment of the ownership incentives with the regulatory model might inhibit performance which might otherwise have been good.

(ii) Operating costs—performance since privatization

Given the claim at privatization that public ownership leads to chronic inefficiency and in particular higher wages and employment, we would expect the result to be very large efficiency gains being made immediately after privatization (Rees, 1989). Despite the lack of evidence that the public sector was in fact inefficient,[3] the gains in the run-up to and immediately after

[3] Millward (1986). See also Millward (2005).

privatization of the water industry were significant (see Bishop and Kay, 1988). This is reflected in a study of total factor productivity (TFP) in the sector for Water UK by the economic consultancy Frontier Economics. The table below summarizes the results.

Table 1: Water company total factor productivity (TFP)

Annual TFP growth estimates over price review periods	**TFP average growth, % (no quality adjustment)**	**TFP average growth, % (quality adjustment)**
1994–5	2.9	3.5
1996–2000	2.2	4.5
2001–5	0.7	2.0
2006–10	1.4	2.2
2011–15	–0.5	–0.2
2016–17	–0.2	0.0
1994–2008 business cycle 1	1.6	3.2
2009–17 business cycle 2 (ongoing)	–0.1	0.1
1994–2017	1.0	2.1

Source: Frontier Economics (2017).

The Frontier study shows that there was an initial significant improvement in efficiency, and that it peters out after the first two decades in the private sector.

(iii) Operating costs—making comparisons

Were these early gains better than the public sector might have achieved? There are several strategies for assessing the operative performance of the private English water companies to see if they are better than the public-sector alternatives. These are: to compare the performance of the English companies since privatization with that of the Area Boards under public ownership; to compare England's private ownership with Scotland's public ownership; and to compare England's private companies with public ownership across most of Europe.

The first, comparing pre- and post-privatizations gets around the geography problem, which is common between the public and subsequent private experience. The main difficulty here is

that water companies before and during the 1980s existed in a pre-digital age. They were organized with card index records, and much of the system knowledge was held by long-term employees. To compare a system of typewriters, card indexes, and specific employee knowledge with one dominated by computers, datasets, and remote sensors and automation is to compare two different worlds. There are also the issues relating to the different regulatory models, and the nationally driven charging. Assessing the claim that privatized companies are more efficient than their pre-1990 predecessors requires a detailed counterfactual which either rebases the privatized companies as if the communications and other data-driven revolutions had not taken place, or reconstructs the public companies as if they had experienced the rapid technical change that happened after 1990.

Turning to the second possible comparison, privately owned England versus publicly owned Scotland, the problem of geography reappears. Nevertheless a series of static comparisons and assessments have been carried out by the Scottish Regulator, WICS.[4] In its recent Interim Decision on prices, WICS found that:

> Since its creation in 2002, Scottish Water has improved its year on year operating performance. After initial reductions of around 30%, operating costs have remained broadly stable since 2006 despite significant upward pressures from new investment, rising input costs and legislative changes. At the same time, service levels have improved and overall performance has risen rapidly to match that of the better UK companies.[5]

In other words, the private English and the public Scottish companies have performed similarly.

The third comparison is privately owned England versus European water companies in the public sector. Given the surprising absence of studies, Water UK commissioned Global Water Intelligence to produce a comparison of performance (Global Water Intelligence, 2019). The report does not, however, compare efficiency, but focuses on water quality, waste treatment, customer service, non-revenue water (leakage) charges, and the reported total cost per person for selected countries (Germany, Spain, France, Italy, and Ireland). As the report notes, the

[4] Water Industry Commission for Scotland, 'Staff Paper 17: Econometric Models', https://www.watercommission.co.uk/UserFiles/Documents/Staff%20paper%2017.pdf; and 'Staff Paper 13: Cost Base Assessment', https://www.watercommission.co.uk/UserFiles/Documents/Staff%20Paper%2013.pdf

[5] Water Industry Commission for Scotland, 'Strategic Review of Charges 2021–2027. Initial Decision Paper 10: Operating Expenditure', https://www.watercommission.co.uk/UserFiles/Documents/IDP10_OPEX_FINAL.PDF

results are conditioned by geography, social values, transparency, and finance (and the full cost of water services). It indicates that England and Wales have among the highest bills. Since the data is not adjusted for any of the conditioning factors, its conclusion that '*There is a strong case for stating that the England and Wales system delivers the best value for money of all the utility sectors in this study*' is little more than an assertion. This it does not show, by reason of the factors it lists but does not adjust for.

What to conclude? That the operating performance was better in the early years; that it has since fallen back to normal levels consistent with the rest of the economy; and that the very limited evidence from Europe shows that no great difference can be claimed from the data. Scotland is not obviously better or worse. If the case for privatization rests on operating efficiency, then it is less than overwhelming—either way.

(iv) Better managers

Managers are appointed as the owners' agents to maximize profits by minimizing costs. Private ownership should have incentivized the owners to find the best management at the least cost. This is what they directly control.

Following privatization, the cost of managers increased dramatically, and it is set at much higher levels than for comparators in the public sector. The argument is that there are very few highly talented individuals capable of running water companies well, and that executive pay levels at the much higher levels are justified because these individuals will deliver much greater efficiency, and hence higher profits and dividends, which could not have been achieved by paying less.

Set aside for a moment that many of the newly highly paid managers were those who had previously run the nationalized industries, is a £2.4m per year private-sector water chief executive better than a £1m private or public one? It is an argument with almost no obvious validity. Indeed, not only is there no evidence to support these assertions, but there are some very high-profile cases of expensive chief executives delivering questionable performance across the privatized utilities. BT, Railtrack (Network Rail's predecessor), Thames Water, Royal Mail, SSE, British Gas, National Power, and Centrica stand out. In the case of Thames

Water, Ofwat has made the remarkable assertion that it is 25 per cent inefficient,[6] despite three takeovers since privatization.

An alternative explanation is that the boards of the privatized utilities have enriched themselves, because they can. The principal–agent controls on which Littlechild placed so much faith have turned out to be very weak.

(v) Resilience and CAPEX

Water companies are capital intensive and assets are typically very long term. What matters is the state of the infrastructure, and its physical resilience in the face of the demands placed upon it.[7] Crudely, CAPEX (capital expenditure) is much more important than OPEX (operating expenditure). None of the studies referred to above addresses the question of whether the short-term, profit-maximizing incentives described above have been detrimental to the long-term system resilience.

There are no convincing studies which show that privatized firms are more resilient. Indeed, we have some obvious examples to the contrary, notably in rail. The Environment Agency has drawn attention to the challenges of climate change and meeting water demand; and in the current price review, companies in the south-east have focused on future water supplies, from new resources to desalination. The regulators, however, have largely focused on price reductions.

The comparison of capital efficiency since privatization with what went before is much more difficult. The capital projects post-1990 are not the same as those before. Indeed, the privatized industry has largely lived off the assets it inherited. The basic infrastructure was created in the public sector, up to and including big projects such as the London ring mains. The London sewers and the major supply pipelines from the Lake District and from mid-Wales were all built in the public sector, and there have been no new significant dams or reservoirs since 1990. One exception, the Thames Tideway, is yet to be completed. Storm overflows elsewhere are

[6] https://www.ofwat.gov.uk/wp-content/uploads/2019/07/PR19-Draft-Determinations-Thames-Water-Securing-cost-efficiency-actions-and-interventions.pdf

[7] In the 2019 price review, Ofwat regarded resilience as largely financial rather than physical, reflecting concern over the companies' gearing.

still less than required to control pollution. Most CAPEX has been about incremental additions to the existing networks. There is no evidence that the Victorian sewers were inefficiently constructed, or that the reservoirs and dams were excessively costly to construct in the public sector.

IV. Cost of capital, access to capital and balance sheets

(i) Cost of capital

Even if the privatized companies have greater OPEX and CAPEX efficiency, might these be offset by a higher cost of capital? The state can borrow at interest rates below those of the private sector. Its cost of debt is lower. But this is not the same thing as claiming that its cost of capital is lower. In the public sector, equity risk does not go away—rather it is transferred to taxpayers and customers. Whether the cost of equity and the cost of project risk are greater in the private than the public sector depends in turn on the overall portfolio the public sector has relative to the private water company, and whether there are systemic government failures over and above the private ones which raise the project risk.

The answer is that there are likely to be both market and government failures, and whether these risks raise the cost of capital for projects depends on how and by whom the project is carried out. If a public-sector water company puts the projects out to tender for the private sector to bid, then the relative project risks to the owner depend on how well the contract auctions work. There is no obvious reason for assuming that a private water company is better at eliciting cost-competitive bids than the public sector, and since the public sector has a lower bankruptcy risk, the cost of equity in the private-sector bids is likely to be lower when contracting with government.

(ii) Access to capital markets and balance sheets

A separate, though related, argument is that privatization gives water companies access to capital markets which they would not otherwise enjoy, and that this means that they will be able to invest more than would have been the case under public ownership. It is therefore to be

expected that, under private ownership, water companies will have invested more than had they remained in the state sector.

Back at privatization in 1990, the water companies did face a large investment challenge. The EU Directives fell particularly hard on English and Welsh water companies, in part because of the way European regulation works. In the UK case (including Scotland and Northern Ireland), the guiding principle of environmental regulation since the late nineteenth century had been that each case should be considered on its own merits, and that Best Available Technologies Not Entailing Excess Costs (BATNEEC) would be the guiding hand (see Sorrell, 2002). This meant that different water and sewerage qualities, and different beach conditions, would apply in different locations. Add the fact that UK rivers tend to be short and fast-flowing, and that the coastal waters are subject to significant currents and tides, it became apparent that there would be a big clash with EU regulation, which followed a more Napoleonic regulatory model, defining clean water, river quality, and beach pollution on a generic rather than location-by-location basis. The result was manifested in sharply increased investment requirements after 1990 to meet the EU rules.

To meet this investment requirement, the companies were privatized without debt so that they would have the capacity to borrow to invest. Better still, the companies were given a 'green dowry' of around £1 billion. it was assumed that the privatized companies would use these ungeared balance sheets for these investment purposes.

How, then, have the companies used this private-sector freedom to raise capital? The answer is that a primary use of many of the balance sheets has been to mortgage the assets—to engage in widespread financial engineering. It is hard to imagine that anyone at privatization envisaged this, and it is very likely that, had this been anticipated, privatization would not have passed through Parliament. Worse, the use of the green dowry (public money) for these financial engineering purposes would have been regarded as completely unacceptable.

But in many utility cases this is what happened. It started with the electricity distribution company, Northern Electric, and then spread to water and across the privatized utilities. Northern Electric received a bid of £11 per share in 1994 for shares that had been sold in 1990 for £2.40. In its defence, Northern Electric effectively went to the banks and asked how much they would be willing to lend it against the value of its assets. The answer was roughly

equivalent to £5 per share. It borrowed this sum and handed out the cash to its shareholders (it was subsequently sold for £7 per share) (see Helm, 2004).

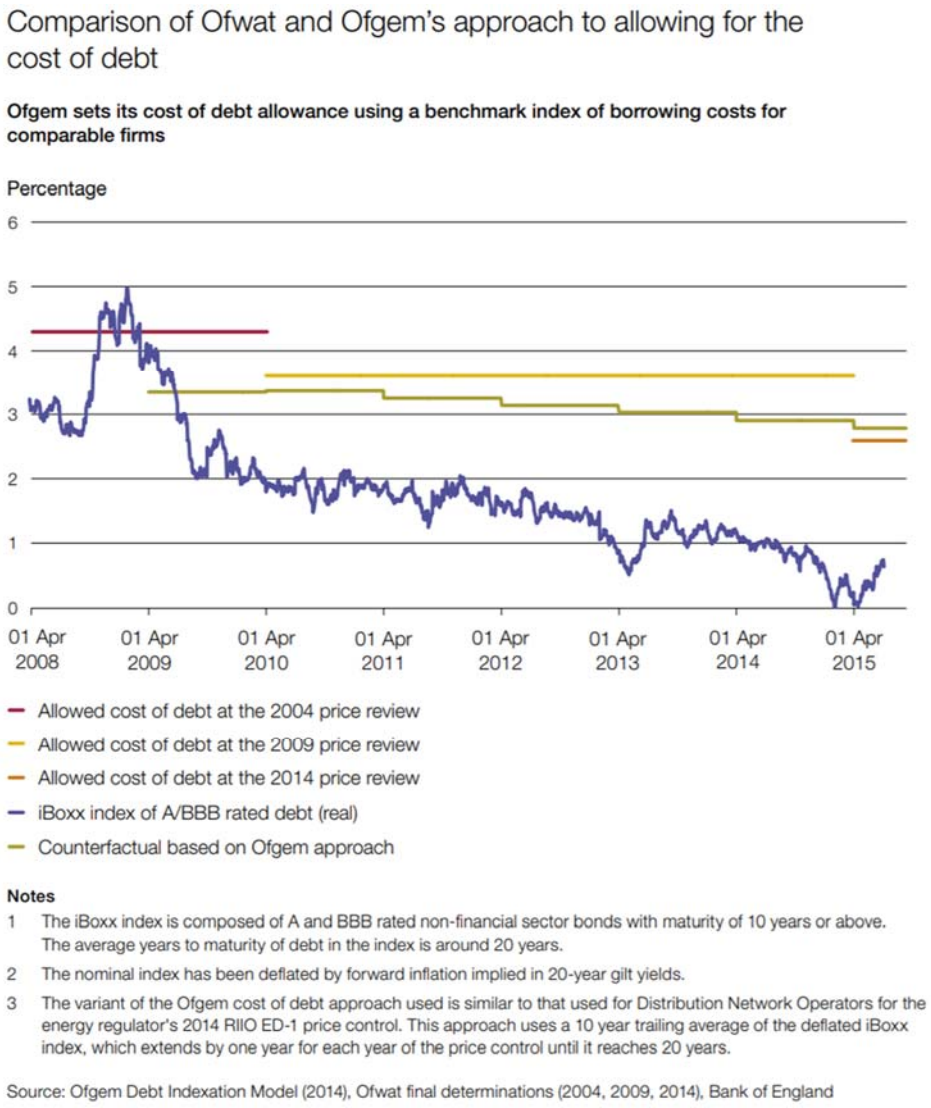
Once it became apparent that the regulators would do nothing to stop this financial engineering, it spread rapidly across the other utilities—either by takeover, or by incumbents acting to prevent a takeover, as in the Northern Electric case. Suddenly, the water companies' balance sheets had nothing much to do with investment: they were part of a great and very financially rewarding capital market game.

In defence of this stripping-out of balance sheets, it was claimed that gearing up represented 'financial efficiency'.[8] The argument was simple: debt was cheaper than equity, and hence by gearing up the balance sheet the average cost of capital would be reduced. Little was said in answer to the obvious question: to whose benefit? The shareholders'? The managers'? The customers'? Future customers'? Nor was an answer provided to the less obvious question of what happened when the balance sheets were exhausted to investment.

The great financial engineering game was made worse by the regulators. By setting a weighted *average* cost of capital, they positively encouraged the switch from equity to debt. The right answer should have been to set a split cost of capital, thereby capturing any benefits for customers.[9] They rejected this, and then they made a further mistake by failing, until very recently, to index the cost of debt. As a result, in every regulatory period since 1990, the interest rate has turned out to be less than assumed by the Ofwat at the reviews, to the great benefit of shareholders—and not customers. Figure 1 compares the outcome for interest rates against the *ex ante* assumptions made by CAPEX, benchmarked against the Ofgem approach which was to move to indexation earlier than Ofwat.

[8] There was much reference to corporate finance theory, notably the Modigliani–Miller theorem, to claim that capital structure did not matter, and hence could be left to the privatized companies to manage as they saw fit.
[9] Helm (2008). See also Queensland Competition Authority, https://www.qca.org.au/Other-Sectors/Research/Form-of-Regulation/Split-Cost-of-Capital-02, and, for the approaches of the regulators, https://www.ukrn.org.uk/wp-content/uploads/2018/11/2018-UKRN-Annual-WACC-Summary-Update-v2.pdf

Figure 1: Comparison of Ofwat and Ofgem's approach to allowing for the cost of debt



Source: National Audit Office, 2015, Figure 12.

If this is what the companies did with their balance sheets, how does this compare with what would have happened in the public sector? The answer is that this sort of financial engineering would not have taken place. Publicly owned companies could and do borrow, but for specific investment purposes. This is a big difference.[10]

[10] This argument should not be pushed too far: Transport for London is borrowing to cover its operating deficit, given that the Mayor of London has prevented prices rising to match increases in operating costs.

There is still the argument that the public-sector companies would have been starved of capital for investment, and there is much evidence to support this. This has been a gain from privatization, but it does beg the question as to whether a better-run public sector could have tackled this. In the period from 1945 to 1975, there is little evidence of public-sector under-investment.[11] On the contrary, the argument is that the public sector over-invested—at least in electricity sector (see Monopolies and Mergers Commission, 1981). Up until the mid-1970s, roads, waterworks, and power stations got built. The great switch from town to natural gas was managed by British Gas in the public sector, and these sorts of examples were replicated across Europe. Even in the railways, as demand declined, the argument was that they were over-provided (hence the Beeching Review—National Railways Board (1963)). Europe managed with its public-sector model. A better-managed public sector would have a balance sheet, with assets and liabilities. To take a current example, Statnett, the Norwegian state-owned enterprise that operates the electricity grid in Norway, is an example of publicly owned equity and wholly private debt.[12] It is not balance-sheet-constrained by the Norwegian Treasury and public-sector capital controls. It does not pay very high private-sector salaries, and it has invested in large-scale network enhancements. Across Europe there are various mixed models, and no one model has emerged as obviously superior to the others.

(i) Debt and pay-when-delivered

In the nationalized industries, current investment was largely paid for by current customers. It was a chain: each generation inherited the assets built by its predecessors and, in turn, it built assets for the next. In the process, the time inconsistency problem was overcome. There was no risk that future taxpayers and customers would not pay when the assets came on to the systems, because they would already have been paid for. Privatized companies would borrow to invest, and future beneficiaries would pay. The risk that they might not, either because they were not able to, or because politicians and regulators might not pass through the costs, increased the private cost of capital, a deadweight welfare loss.

[11] See Millward (2005).
[12] For information on Statnett see https://www.statnett.no/globalassets/om-statnett/investor-relations/annual-reports/statnett-annual--report-2018.pdf

There are three separate arguments at play here. The first is the intergenerational equity one. Going from *pay-as-you-go* to *pay-when-delivered* is a profound shift in the intergenerational burden. Instead of each generation bequeathing the next a set of assets, environmental or otherwise, at least as good as it inherits, *pay-when-delivered* meant that future generations would get the assets *and* the debts *and* the higher bills. It was a decisive break in the intergenerational contract, and was replicated across the other utilities and eventually even into education with the coming of tuition fees and student loans. At a time when the benefits of depleting the North Sea oil and gas windfall were also being enjoyed by the current generation, without providing for a sovereign wealth fund for the benefit of future generations, this intergenerational shift at privatization is one of its most enduring effects.

The second is the economic efficiency argument. In standard investment analysis, the case for a specific project is that it has a positive net present value. Private investors will take up the opportunity of the project if the gains exceed the costs, discounted back to the present. The costs should be borne by those to whom the benefits accrue. Yet this assumes that the current customers have in fact paid the current costs. It could be argued that the reason the Water Framework Directive and Bathing Water Directive were so burdensome and required so much CAPEX was because previous generations had bequeathed lots of pollution to the current generation. This included polluted rivers, polluted groundwater, and polluted beaches (not all the fault of the water companies directly). *Pay-when-delivered* should arise *after* current customers have paid for the pollution costs they have and are causing, not *before*. The intergenerational equity argument is that we should not bequeath to the next generation the costs of clearing up the mess we have made.[13]

The third is a political argument—that without the move to *pay-when-delivered*, the investment would not have happened because current customers would have rebelled. Current customers, according to this argument, would not face up to their responsibilities for the pollution they have caused, preferring their own utility over that of future customers.

This is an example of a classic problem in the theory of democracy—the inability to incorporate the interests of future generations. It is manifest in part in the discount rate, and the fact that

[13] The counterargument is that future generations will have the benefits of economic growth to offset the pollution. On why this argument is incorrect, see Helm (2015).

the private companies face a higher cost of capital means that the focus would be more on shorter-term rather than longer-term projects. Nothing in this argument suggests that private is better than public, or vice versa. It is a political issue, and it is for regulators (and ultimately the courts) to impose the costs of the Directives, regardless of who owns the companies.

Of the three arguments—efficiency, access to capital markets, and the intergenerational issue—it is the last one which is the most neglected, but perhaps the most important. In the long-term scheme of things, the level of operational efficiency is not the main issue, and access to capital markets can be overcome by sensible public accounting. What really matters is whether the current generation has managed the water assets in such a way as to bequeath to the next generation a set of assets at least as good as it inherited, and fit for the purposes of that next generation.

V. Private monopolies and the RPI – X regulation model

The water industry displays classic natural monopoly characteristics. The companies are organized primarily on a catchment basis, and the water treatment and sewerage works, and the pipes collecting and then distributing water and disposing of sewage represent fixed and sunk costs. Competition for the core services provided by water companies is, and will remain, at best a fringe activity, and could even be perverse. Indeed, this is what repeated studies by Ofwat of the merits of even purely retail competition found.[14]

In the face of such deeply entrenched monopoly, private ownership opens up the prospect of providing too little capacity, poor services, and excess pricing. In the public sector, public controls determined the prices and the investments—in other words, public regulation, intermediated by the appointment of publicly motivated directors to the boards of the water authorities,[15] and with the shareholder—the government—setting the objectives of the companies, and also appointing the managers and determining their salaries.

[14] OFWAT conducted a review of residential retail competition. For the key finding see https://www.ofwat.gov.uk/regulated-companies/future-markets/extending-retail-competition-to-households/rrr/

[15] The appointment of the 'right' people capable of exercising their judgement as to the public interest is a deep one in British administration, with roots in the foundations of the modern civil service in the late-nineteenth century, through to the Moral Sciences and PPE degrees at Cambridge and Oxford, respectively. See Le Grand (2003) and Helm (2006) on the concept of 'good chaps regulation'.

Water requires comprehensive regulation, whether public or private. And there is an added and particular difficulty: water companies provide an essential service, with considerable health dimensions, and abstraction and sewage treatment have major environmental consequences. Of all the utility privatizations, water raised the biggest quality and environmental challenges. There is comprehensive market failure.

The post-privatization English system provides a new and very different regulatory model, and it is the combination of private ownership and the new regulatory regime which determines performance, and is hence the basis for the argument about the superiority or otherwise of the English model.

The starting point for regulation was drinking water quality and environmental standards. They required, respectively, the Drinking Water Inspectorate and the creation of the National Rivers Authority (NRA). These institutions were supposed to determine the outputs that the privatized companies would deliver, and Ofwat, the new economic regulator, was charged with setting and enforcing contracts with the companies to ensure that these outputs were delivered at minimum cost by setting prices using the so-called RPI – X model. In practice, Ofwat refused to accept this derivative and instrumental role, arguing that affordability meant it should also have a say in the standards themselves, and, if not, over the time periods and interpretations of them.

The idea behind RPI – X was remarkably simple, and remarkably naïve.[16] The regulator would mimic competitive markets, by setting *ex ante* contract prices for a fixed regulatory period. It was a fixed-price, fixed-period approach (notwithstanding that in competitive markets prices are obviously not fixed in this way). In this model's crudest form, the regulator sets the forward prices on the basis of the current prices, adding in inflation (RPI) and then subtracting an efficiency number (X), representing how much the regulator *ex ante* expected the companies to outperform *ex post*.[17] The companies then profit-maximize by cost-minimizing, revealing

[16] The original RPI – X model was set out by Littlechild (1983) and a formal presentation was given in Beesley and Littlechild (1989).
[17] Confusingly, in water the number was referred to as 'K' rather than 'X', possibly because it was going to be positive. The water companies were sold at about 10 per cent of their current cost value, and hence as the assets were replaced, prices were bound to rise.

the true and efficient costs of the business, and in the next contract period these revealed costs form the new baseline, against which the X is reset.

This model's great advantage is indeed its simplicity. It does not require the regulator to get the 'right answer'. It is the repeated nature of the regulatory contracting that matters and, provided the companies believe that the regulator will let them keep the profits in any particular period, they reveal the information about costs. The regulator does not, therefore, have to predict the future costs of the businesses, or intervene in the capital structures, or even calculate a rate of return and the underlying asset values.

The trouble with the pure RPI – X model of regulation is that it is politically infeasible. This is its naïvety, for if the profits turn out to be large, there will be a revolt, and intervention will follow. This is a 'stylized fact' about democracy. Regulation is not and never will be a purely technical economic problem. Unsurprisingly, despite one attempt to follow its austere path in electricity distribution, a pure RPI – X approach has never been taken.[18] Instead, regulators have become increasingly entrenched in modelling the companies, including defining and adjusting their regulatory asset bases, the cost of capital for debt and equity, the gearing of the companies, and the CAPEX and OPEX. On top of this they have built a pyramid of additional measures, including innovation incentives, metrics of customer services, and even the suitability of directors and the organization of their boards. In a piecemeal fashion, each price review has added new complexities and mechanisms (roughly two per price review), with the result that the line between the management of the companies and the regulator has become very blurred. In the current price review, consultation documents on methodology were extensive and the scrutiny of the business plans has become a complex interaction.

It might be thought that this has been a process through which regulators have become increasingly proficient, fine-tuning the constraints and incentives to better match the public interest. Unfortunately, complexity increases the scope for capture (see Helm, 2006). More complexity increases the asymmetry between the companies and the regulator: for every new tweak and rule, there are more games to play. This asymmetry of information, which the original Littlechild model addressed with its simplicity, has not gone away. It remains a defining feature of the water industry. The regulators themselves get captured by lobbying and

[18] On the first periodic review of the regional electricity companies, see Helm (2004).

broader political interests. Regulators are appointed by government, which also controls their budgets. The latest price review is a case in point: implicitly at least, the regulator starts with a rough idea of what sort of answer (price cuts in the latest review) the politicians expect.

Did regulation undermine the efficiency incentives? Is the reason why there is no clear difference between the English companies and the rest the failure of regulators? At one level the answer is 'yes': the regulators could have been smarter, for example using a split cost of capital, regulating the balance sheets to prevent financial engineering and insisting that the balance sheet was exclusively to finance investment not paid for by current customers, and indexing the cost of debt. The result would have been a much better outcome for customers, lower returns for investors, and much greater political acceptability. But whether it would have demonstrated a decisively better private experience remains unanswered. Taking a tougher line would have changed the distribution of returns, but privatization was supposed to change the level through greater operating efficiency. There is no clear evidence either way.

VI. Conclusion: towards a better model

The performance of the water industry since privatization has not, then, been unambiguously better than that which the public sector might have delivered. A nationalized industry would not necessarily have been much more inefficient; it would not have facilitated such widespread financial engineering; and the executive salary game would not have been permitted. It might have accessed private capital markets for debt.

What this mixed picture indicates is a rather radical conclusion: it might not matter very much who owns the water companies, and renationalization might not make much difference. It is what is done with the companies afterwards that counts. The issues turn out to be more about objectives, control, and regulation than about access to capital markets and operating efficiency.

Looking ahead over the next 30 years, the current model is unlikely to prove fit for purpose. The questions to which it is supposed to be the answer are changing. The new challenges are to better manage and invest in catchments; to integrate land management and flood defences with water and sewerage; and to do all this in ways that enhance the environment and given a

larger population and further economic growth. The current Ofwat-regulated model, focusing only on the water and sewerage activities and not their wider contexts, is not conducive to addressing these issues. Economic efficiency is ultimately about delivering the objectives, and in the water industry they are not merely private.

This is partly recognized by Ofwat and its attempts to get company boards to act in the wider interests of customers,[19] and it is what a great deal of the corporate governance agenda pursued by the regulator is all about. In effect, Ofwat is rejecting the pure privatized model.

Elsewhere I have set out how take a wider perspective, especially in respect of natural capital, on a catchment basis with a catchment plan, and with a catchment system operator (CSO) at the core.[20] The CSO's job is to ensure that the functions that are necessary to deliver on the objectives are met. It requires a catchment plan, including water services, river biodiversity, pollution control for farming and other catchment activities, and flood defences. For the most part, these can be auctioned.

The advantage of the CSO model is that it starts with objectives, and it is set at the appropriate system level. With such a model, ownership really does not matter very much: all organizations can bid to undertake the tasks that the CSO demands. This would also have the advantage of being a live experiment: we would see whether the privatized companies sweep the board by being more efficient and better able to deliver what the system requires—or not.

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[19] For a discussion of corporate purpose, see Mayer (2018).
[20] See Helm (2019). For an application to energy, see Helm (2017).

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