

Institution: University of Liverpool
Unit of Assessment: 19 – Business and Management Studies
Title of case study: Investment Management and Regulation in the Water Industry
<p>1. Summary of the impact</p> <p>The impact is a change in the behaviour of water companies in investment planning processes to meet with 5-yearly Periodic Reviews with the industry regulator (Ofwat), and on the requirements by Ofwat for water companies to adopt a cost-benefit approach that takes account of water customer preferences. It is based on findings from a research programme concerned with economic approaches to utility regulation theories and practice. Policies, processes and practices of water companies and Ofwat, at a national level, have been affected, with respect to the 2009 and 2014 Periodic Reviews. The impacts are primarily economic, commercial and organizational, and environmental. The beneficiaries are water companies, their regulators, and customers.</p>
<p>2. Underpinning research</p> <p>The programme of research which led to impact was undertaken at the University of Liverpool by Melinda Acutt in collaboration with colleagues from Lancaster and Newcastle universities from 1998 to 2003. Acutt was a Lecturer (1998-2000), and then Honorary Fellow (2000-2003) at the University of Liverpool. Initial research papers on economic approaches to utility regulation provided insights on antitrust policy, contestability theory, intervention analysis and threat-based regulation. As a result of joint research with Elliott (Lancaster University), discussion papers published from 1998-2001 (Section 3, 1/2/3) led to journal publications on threat-based competition policy and credible regulatory effects, demonstrating an intellectual approach to utility regulation (Section 3, 4/5). A symposium followed on regulation and competition in utility industries, organised by Acutt and held at the University of Liverpool, with papers published in <i>Fiscal Studies</i>. Knowledge and insights from the papers and symposium, especially regarding the manner in which a threat of investigation and punishment by regulatory authorities (threat-based policies) can affect companies' decisions, provided the intellectual basis for this development of an approach to water company investment planning that allowed a company to engage directly with its customers, and understand their preferences.</p> <p>A further study, published in <i>Water Resources Research</i> (Section 3, 6), applied economic optimisation techniques, utilising valuations of services elicited from customers, to identify water company investment plans which maximised net customer benefit. Monetary valuations of benefits for fourteen service attributes were estimated, jointly with academics from the University of Newcastle, and an economic optimisation engine was built to determine an optimal investment programme across the full range of a water company's activities. It represented a completely novel approach at the time to investment planning in the water industry.</p> <p>Professor William Baumol considered the early work about 'Threat-based Competition Policy', subsequently published in <i>European Journal of Law and Economics</i> (Section 3, 5), "a fine piece" and that what it proposed was "clearly different from current regulatory policies" (letter available). During her honorary fellowship (2000-2003), Acutt worked as Economic Policy Manager at Yorkshire Water. Water companies were preparing for the 2004 Periodic Review of water company prices. The research, carried out in 2001-03 in preparation for the 2004 Periodic Review, was awarded the Operations Research Society's President's Medal for best application of OR in 2003, and was finally published in <i>Water Resources Research</i> in February 2005.</p> <p>Aware of Acutt's expertise in economic aspects of utility regulation, Yorkshire Water commissioned research by Acutt (while an honorary fellow at Liverpool) and collaborators to counter the perceived 'intellectual neglect' in the tools and processes previously adopted in investment planning in the industry. The key research insights, which ultimately changed the behaviour of water companies (Section 4), were that cost-benefit analyses would be more appropriate than</p>

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cost-effectiveness calculations that had previously dominated the Periodic Review reports. To undertake cost-benefit analysis, practical systems would be needed to assess customer preferences and benefits. A novel application of 'willingness-to-pay' was introduced and evaluated for this purpose.

Acutt played a key role in this research project through designing the overall framework, engaging with Yorkshire Water operational researchers, and interpreting the econometric model outputs to have a meaningful input to water company's investment planning in a regulatory context.

3. References to the research

1. Acutt, M. and Elliott, C. (1998), "Hit and Run Regulation – Regulatory Contestability", Lancaster University Management School Discussion Paper, EC9/98. (precursor of journal paper).
2. Acutt, M. and Elliott, C. (2000), "A Model of Threat-based Regulation", Liverpool Research Papers in Economics, Finance and Accounting, January, No. 001. (precursor of journal paper).
3. Acutt, M. and Elliott, C. (2001), "Threat-based Regulation and Endogenously Determined Punishments", Lancaster University Management School Discussion Paper, EC8/01. (precursor of journal paper).
4. Acutt, M., Elliott, C. and Robinson, T. (2001), "Credible Regulatory Effects", *Energy Policy*, 29, pp. 911-916. (subjected to rigorous peer review procedures). [cited by 11 (Google Scholar)] ABS 2*
5. Acutt, M. and Elliott, C. (2001), "Threat-based Competition Policy", *European Journal of Law and Economics*, 11(3), pp. 309-317. (subjected to rigorous peer review procedures). [cited by 16 (Google Scholar)]
6. Willis, K.G., Scarpa, R. And Acutt, M.Z (2005), "Assessing Water Company Preferences and Willingness-to-pay for Service Improvements: A Stated Choice Analysis", *Water Resources Research*, W02019, February, pp. 1-11. (subjected to rigorous peer review procedures). [cited by 24 (Google Scholar)]

4. Details of the impact

The impact of the research traverses economic, commercial and organizational impact, environmental impact, and impact on practitioners and professional services. Economic, commercial and organizational impacts resulted from;

- the development of improved processes for investment planning based on the research outcomes, which enabled options to be evaluated on the basis of their cost-benefit, incorporating customers' preferences, rather than simply their relative cost; and
- a changed approach to management of resources resulting in improved service delivery.

Application of these processes in water and sewerage has led to impacts of improved management of environmental resources and improved implementation of environmental policy. This is confirmed by an Ofwat report in 2006 (Section 5, 5), in which the links between a cost-benefit approach and sustainability are outlined. The improved processes have led to impacts on practitioners and professional services (Section 5, 1/2/3). The water companies are employing consultants to advise on the investment planning approach, devised originally by Acutt and colleagues for Yorkshire Water, for submissions for the 2014 Periodic Review.

The impacts on management, implementation and processes are a result of research by Acutt and colleagues on contestability theory and regulation behaviour, particularly regarding threat-based regulation policies, which influenced Yorkshire Water to commission a study employing a cost-benefit approach to investment planning with a focus on generating information on customer preferences and willingness-to-pay, in respect of their water and sewerage services. The trigger for the commissioned research was an upcoming Periodic Review 2004 of water companies' business investment plans. By going to customers directly, and collecting and modelling willingness-to-pay

data, Yorkshire Water anticipated that this would lead to reductions of the threats of intervention by the regulator (Ofwat). While the research directly influenced Yorkshire Water's behaviour and relationship with Ofwat in the 2004 Periodic Review, its influence was more important in connection with the 2009 Periodic Review. It resulted in a change in the behaviour of many water companies, including Anglian Water and Severn Trent Water, with respect to their business and investment planning for the 2009 Periodic Review on customer preferences (Section 5, 1/3). Water companies actively conducted robust, contemporary willingness-to-pay analysis, and will continue to do so at the 2014 Periodic Review (Section 5, 4).

Equally importantly, Ofwat, as a champion of customers, has recognised findings of water companies on customer preferences and willingness-to-pay (based in Acutt's research) that have become common practice, and has shown a willingness to give more independence to water company managements in setting their own service quality targets and incentives as a result (Section 5, 4). This has had an effect on regulatory processes across the whole industry. For the first time, water companies were able to demonstrate their analyses of customer preferences which resulted in more meaningful interactions with the regulator. The impact continues. Now, the approach developed by Acutt and colleagues *is required* by Ofwat. Evidence for this is outlined in Ofwat consultation papers issued in respect of the 2009 and 2014 Periodic Reviews (Section 5, 4/5).

Through Acutt's employment by Yorkshire Water from 2000-2005, and then by Ofwat from 2005-2007, key stakeholders were made aware of the academic research and the impact on the regulation and management of the UK water industry. Acutt convened meetings to obtain stakeholder input and views, undertook conference presentations and seminars and wrote articles in both the trade and academic press. These activities, ensuring stakeholder engagement, contributed significantly to the successful impact of the research.

The asset management and regulation teams in the water companies use the tools and processes developed by the research to produce a 'dashboard' showing the implications of different investment scenarios, thus contributing to more informed decision-making. The scenarios, often prepared with the aid of consultants, are shared with regulators, customers and their representatives. The transparency has resulted in stakeholders such as customer representatives and regulators having greater reassurance about the water company's plans: an approach which has been further built on by Ofwat for the 2014 Periodic Review by requiring companies to engage more formally with their customers and stakeholders through adopting the willingness-to-pay surveys that are integral to the research of Acutt and colleagues (Section 5, 4). The focus on service delivery of outcomes most valued by consumers is now a key element of the methodology proposed by Ofwat for water companies' business plans for the 2019 Periodic Review (Section 5, 7).

To summarise, the scale of the impact of the research has gained momentum in the period 2008-13 to develop a significance and reach that has gone beyond a single water company (Yorkshire Water) to cover the economic, commercial and organizational practices across the whole UK water industry, with resulting environmental impacts and implications for the work of practitioners and professional service providers in the industry.

5. Sources to corroborate the impact

1. Corroborating statement from the Director of Regulation of Anglian Water Services that confirms that the research carried out by Acutt developed a comprehensive approach to obtaining information on customers' willingness to pay for water and sewerage services. It also confirms that the approach to Periodic Reviews of Yorkshire Water became the benchmark for other water companies.
2. Corroborating statement from the Finance and Regulatory Director of South West Water that demonstrates how the economic rigour, emanating from research undertaken by Acutt, has supported water companies' capital investment programmes, and verifies that the approach,

initiated at Yorkshire Water, has been endorsed by the industry.

3. Corroborating statement from the Strategy and Regulation Director of Severn Trent Water that confirms that the introduction of the comprehensive cost-benefit analysis, including willingness to pay, based on Acutt's research and involvement with Yorkshire Water, became an industry practice in support of investment and business planning. His statement also confirms the subsequent adoption by Ofwat of a mandate that required water companies to apply robust cost-benefit analyses in plans put forward at Periodic Reviews.
4. [Ofwat \(2013\) Setting price controls for 2015-2020 – Framework and Approach: A consultation](#). These guidelines follow directly from the research undertaken and reported by Acutt and colleagues.
The report contains a summary of consultations that lead to best practice for the Periodic Review of water company's investment plans in 2014. On p33, Ofwat's guidance is that "We expect companies to have carried out willingness to pay surveys and collected other forms of evidence to back up their proposals, where appropriate." Later, on p34, the advice is that "In determining their committed performance levels, companies should consider the related costs and benefits, building on the cost-benefit analysis carried out at the 2009 price review. And they should also consider recent developments in this area, such as UKWIR's 'Carrying out Willingness to Pay Surveys' and 'Review of Cost-Benefit Analysis and Benefit Valuation'." Also the report states that "committed performance levels should be cost-beneficial – the expected marginal benefits of improved outcomes should be more than the marginal costs of delivery. Companies may commit up to a level of performance that represents the economic level of service (that is, where marginal benefits equal marginal costs), within an acceptable and affordable overall plan."
5. [Ofwat \(2006\) A sustainable water industry – To PR09 and beyond](#) contains a summary of consultations that lead to best practice for the Periodic Review of water company's investment plans in 2009. In paragraph 25 (pp 7-8), the report by the regulator emphasises the importance of seeking value benefits, in the way that was advocated in the Liverpool research, to aid decision-making, and confirms that the emphasis on cost-benefit analysis promotes good governance and the responsible use of sound science.
6. [Ofwat \(2008\) Further Ofwat guidance on the use of cost benefit analysis for PR09](#), PR09/08
Following directly from research undertaken by Acutt and colleagues, the Ofwat guidelines for how to use cost-benefit analysis for the 2009 Periodic Review contain the following statement "The use of CBA to inform the construction of each company's business plan is *vital* for ensuring transparency of investment proposals to consumers. A company can use a CBA developed plan to explain its investment decisions to its consumers, regulators and other stakeholders and demonstrate that its business plan maximises the benefits relative to the costs. Full justification and understanding will increase the likelihood that consumers will be willing to pay in the future for further improvements." (our emphasis)
7. [Ofwat \(2013\) Setting price controls for 2015-20](#) – final methodology and expectations for companies' business plans, drawn up in parallel with [#4](#) above, emphasises service delivery, customer preferences, and transparency of services in the summary table contained in pp 170-173.